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**9 Education, Training and
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1 EXECUTIVE SUMMARY

1.1 National circumstances

Slovenia is a parliamentary democracy. Since 1 May 2004, it has been a Member State of the European Union. There are 212 municipalities in Slovenia, which are basic local government units.

The Ministry of the Environment, Climate and Energy (MECE) is responsible for preparing and implementing environmental and climate policy and legislation. MECE coordinates the preparation of measures on climate policy implementation together with other relevant departments, primarily Energy, Transport and Agriculture. The preparation of emission inventories and their reporting is the responsibility of the Slovenian Environment Agency (SEA), a body of MECE.

In 2021, Slovenia's population was 2,108,977, 59,000 more than in 2011. The increase in population is mainly due to immigration. The population density is moderate.

Geographically, Slovenia is located in Central Europe and borders Austria in the North, Hungary in the East, Croatia in the South and Italy in the West. The surface area of the territory is 20,273 km². Its landscape and biosphere are very diverse. The majority of its surface is covered by forests (58%).

Climate change is most obviously manifested by warming of the atmosphere. The average annual temperature rose by 1.7 °C between 1986 and 2011. 2021 was also warmer than the 1981-2010 average, which made it one of the 17 warmest years since 1961. Temperature variations vary from one region to another. They also vary with season. The largest deviation was observed in summer. Annual precipitation varies to a great extent; from 800 mm in the far north-east to more than 3000 mm in the north-western Alpine part of the country. Changes in precipitation are less pronounced than changes in temperature. 2021 was one of the 12 driest years since 1961.

Slovenia's GDP in 2021 amounted to €52,208 million, exceeding the one from 2019. Slovenia's economic development (measured by GDP per capita at PPP) was at 90% of the EU average, with no reduction in the gap between 2008 and 2021. In the structure of added value, industry has the highest share which has also grown the most over the last ten years, followed by trade. In 2020, imports amounted to €32.9 billion of goods, and exports to €32 billion. The labour force participation rate (among people between 20 and 64 years) in Slovenia was 75.6% in 2020, above the EU average (72.6% in 2020). The at-risk-of-poverty rate for employed people was 5% in 2020, which is also better than the EU average (9.2% in 2019).

In 2021, gross inland consumption was 12% higher than in 2005. The highest value was reached in 2008. Liquid fuels account for the largest share, followed by nuclear energy, renewable energy sources, solid fuels and natural gas. Coal is the only domestic source of fossil fuels. Renewable sources (mainly wood and hydroelectric energy) account for 20%. Since 1992, final energy consumption has also increased, driven by the growth in the use of electricity, natural gas and liquid fuels. Energy consumption is growing fastest in the transport sector, where transit traffic has a significant impact, and in other use sector. Transport accounts for around

40% of final energy consumption. Slovenia's electricity production is coming from an approximately equal split of the three sources: nuclear power, renewable energy sources (mainly hydropower) and solid fossil fuels.

The volume of road freight and car traffic in Slovenia has been on the increase since the beginning of the financial crisis in 2009. The increase in car traffic was the result of the growing number of vehicles (motorisation rate in 2020 was 554 cars per 1000 inhabitants) and an increase in the average number of kilometres travelled. After a significant drop in passenger kilometres in public passenger transport, there has been a slight growth in recent years, halted by the pandemic measures in 2020 and 2021. Cars account for 86% of passenger transport. Freight transport is characterised by Slovenia's geographical position at the crossroad of two corridors, export oriented economy and the Port of Koper. These three factors contributed to the high growth of goods transport, an important part of which can be attributed to foreign carriers. The share of rail transport of goods in total land transport has been declining in recent years, as it has not been able to keep up with the growth in road transport of goods.

In 2021, 9.4 million tons of waste were generated in Slovenia, which is 111% more than in 2012. More than 80% of waste was generated by manufacturing and service industries, with the remainder generated by households. Waste management has undergone major changes in the past, leading to a drastic reduction in the amount of waste landfilled. In 2021, just under 5% of waste was still landfilled. Waste recycling rates are increasing.

According to the data from 2015 register-based census, Slovenian housing stock in 2021 comprised 864,300 housing units. The average size of a housing unit in 2021 was 83 m². Four out of five housing units were occupied, of which every 12th was rented. The majority of housing units (60%) are in one- and two-dwelling buildings.

The number of agricultural holdings in Slovenia is decreasing. In 2020, it stood at 68,311. On the other hand, the average area of arable land cultivated by Slovenian farms is increasing. In 2021, gross value added in agriculture was the lowest in this observation period, accounting for 0.8% of gross domestic product. The most important farming activity was crop production, which comprised 55% of the value of agricultural production. In 2020, 11% of utilised agricultural area was used for organic farming. According to economic accounts for forestry, gross value added amounted to 0.7% of GDP in 2021.

Slovenia is one of the most industrialised countries in Europe. This sector of the economy accounts for 24% of Slovenia's GDP. Manufacturing accounted for 23.6% of value added in 2019 (up from 25.1% in 1995). Energy-intensive industries, paper, metal and non-metallic mineral products production accounted for 8% of value added in manufacturing. One in five jobs in Slovenia is in manufacturing.

1.2 Greenhouse Gas Inventory Information

Total greenhouse gas emissions in 2020, with no sinks taken into account, amounted to 15,851 kt CO₂ eq, representing a 22.5% emission reduction compared to 1986. In the period 1986-1991, a reduction of emissions was recorded due to the economic situation at that time and because the Republic of Slovenia was gaining its independence. In the period 1992-1997, emissions increased sharply, resulting from increasing economic expansion and revival of industrial production. In the second half of that period, the increased emissions were also the result of

“fuel tourism” (25% of the total sale of motor fuels in the Republic of Slovenia), because the prices of motor fuels in the Republic of Slovenia were significantly lower than in the neighbouring countries.

In the period 1998-1999, emissions decreased due to the measures taken by neighbouring countries to control “fuel tourism” and due to the increased supply of electrical energy from the Krško Nuclear Power Plant. In the period 2000-2002, emissions increased again due to the extension of the mandatory export of electrical energy from the Krško Nuclear Power Plant to the Republic of Croatia. After joining the EU in 2004 and the accession of Romania and Bulgaria to the EU in 2007, emissions from road transport increased drastically and offset emissions reductions made by other sectors resulting from policies and measures in the manufacturing industry, agriculture and waste sector.

In 2009, emissions from fuel consumption and industrial processes started to decrease due to the global financial crisis. In 2010 and 2011, emissions remained at the same level as in 2009, before decreasing again in 2012. In 2020, emissions decreased noticeably due to the Covid-19 restrictions that had the greatest impact on transport emissions

1.3 Policies and measures

The umbrella document in the area of climate policy is the Resolution on the Slovenian climate long-term strategy (ReDPS50), adopted by the National Assembly in March 2021. The overarching national target is to achieve climate neutrality by 2050.

In 2020, the umbrella implementation document, the Integrated National Energy and Climate Plan (NECP), was adopted in accordance with the Regulation on the Governance of the Energy Union (2018/1999/EU), which assumes the role of the implementation document in the field of climate change mitigation from OP GHG-2020. Both umbrella documents are built on sectoral strategic documents. An updated NECP is currently being prepared, which will have to include measures to meet the more ambitious targets from the Fit for 55 and REPower EU packages.

The EU ETS is the most important cross-sectoral instrument which encourages companies that are included in this system to reduce GHG emissions by reducing the amount of emission allowances in the market and thus affecting the price of allowances. In Slovenia, 38% of GHG emissions are covered by the EU ETS. The environmental tax on CO₂ emissions, as well as taxes and other charges on energy that reduce emissions, also make an important contribution to reducing emissions in Slovenia through an energy price supplement. Instruments deriving from European legislation (use of best available techniques, minimum requirements and labelling of energy-using products, obligation for energy suppliers to achieve savings) limit the use of technologies that cause higher emissions or consume more energy, and promote the implementation of EEU and RES measures. A necessary condition for successful implementation of measures is a high level of awareness and information among users and decision-makers, as well as the competence of operators and managers, which is also complemented by integrating these topics into the educational process. Green public procurement promotes the market for products that reduce greenhouse gas emissions, and sets the public sector as an example for other sectors. Green economic growth is a long-term measure that encourages the economy to transit to a climate-neutral society by stimulating

research and the development of new products. Only one additional measure is foreseen in this package, namely changes to environmental taxes and charges that will reduce CO₂ air pollution through an increase in taxation for energy use to encourage a faster reduction of GHG emissions and through gradual phasing down and phasing out of incentives for fossil fuels.

In terms of transformations or energy industries, the technological modernisation of the thermal power sector will have an important impact, reducing the use of coal for electricity production, as well as promoting the production of electricity from RES and in CHP with higher efficiency. Additionally, RES and CHP are also promoted in district heating. In order to reduce emissions more quickly, additional measures are planned to reduce GHG emissions from thermal power plants, which will have the effect of accelerating the phase-out of coal for electricity and heat generation. The introduction of RES and CHP will also be accelerated, an important complementary measure for the faster introduction of RES are incentives for the development of local energy communities and RES communities, and additional measures will also be taken in the area of introducing RES and CHP in district heating.

Instruments in the energy use sectors intensively promote the implementation of EEU measures and RES use (in industry, also waste heat in combination with district heating), mainly through financial incentives in the form of subsidies and loans with favourable interest rates (Eco Fund, European funds, funds from ministries, Climate Change Fund). For buildings, an important instrument is the energy efficiency code, and great emphasis is placed on creating a stimulating environment for renovation of buildings, multi-apartment buildings in particular. Special emphasis is given to socially disadvantaged households. Energy performance contracting is also a very important instrument, especially in the public sector. Additional measures are also planned in this sector to further boost the implementation of EEU and RES measures. In industry, this means promoting the transition to a circular economy, encouraging the production of new products that contribute to lower GHG emissions, the use of synthetic gas and hydrogen, and in buildings, creating sustainability criteria for buildings, limiting the use of fossil fuels for heating, establishing an energy and emissions register, further strengthening support for EEU in households for vulnerable population groups, creating a supportive environment to alleviate energy poverty, and further developing financial incentives for investments in EEU and RES.

Transport is a sector where in the past the trend of emissions was reversed compared to other sectors, and is therefore given special emphasis in the NECP. The instruments are divided into four sets - the promotion of public passenger transport (PPT) which can be linked to the promotion of non-motorised modes of transport for sustainable mobility. This includes substantial funding for infrastructure improvements (in particular, to improve the railway infrastructure), and in the case of PPT, an integrated electronic ticket for public transport and connecting different modes of PPT, including passenger vehicles via P+R. The measure of sustainable freight transport is divided into two sections – promoting railway freight transport (through investments in the railway infrastructure) and improving the efficiency of road freight transport. The third set of measures concerns the increase in transport efficiency and promoting the use of fuels with low CO₂ emissions, which will contribute most to reducing emissions in transport. The final set covers transport planning and traffic management. The existing measures are not sufficient to achieve the necessary emission reductions, therefore

additional measures are needed in all the above-mentioned areas, namely: ensuring integrated transport planning at all levels, additional funding for sustainable transport mobility measures, pilot projects for sustainable transport policy, mobility plans for public administration, modification of the reimbursement model for commuting costs, further improvements to PPT, additional measures to encourage energy-efficient driving and higher vehicle occupancy rate, further increases in the share of RES in transport, and additional funding for alternative fuels infrastructure in transport.

In industrial processes, the implementation of European legislation on F-gases is important and will significantly contribute to reducing emissions through substituting substances.

Agriculture today accounts for around 10%, but is proving to be a sector where emission reductions will be difficult to achieve, so its importance will increase. The measures focus on increasing the efficiency of animal husbandry through consultancy and financial incentives, promoting breeding methods with low emissions (grazing and producing biogas from livestock manure) and rational fertilising of crops with nitrogen. It is also planned to implement new measures that have not been implemented so far, as well as to upgrade existing measures, which will be achieved through adopting new programming documents and securing funding.

Regarding waste, a reduction in the quantity of landfilled biodegradable waste has already been achieved, landfill gas recovery has been implemented, and measures are now focusing on reducing the amount of waste generated in the light of the reduction in resources needs, while urban waste water management must also be arranged to contribute to the reduction of emissions from urban waste water management.

Slovenia is rich in forests, so sustainable management of forests and CO₂ sinks is an important climate change mitigation measure. In order to secure sinks in the long term, sustainable forest management will need to be upgraded, as well as other activities to reduce emissions and increase sinks.

1.4 Projections and the Total Effect of Measures

The projections are almost identical to those from the previous biennial report (BR4). They were prepared in 2019 as part of the LIFE ClimatePath2050 project. The base year was 2017. New projections are in the preparation stage. The report includes projections with measures, projections with additional measures and projections without measures.

According to the projection with measures, emissions will decrease to 17,011 kt CO₂ eq by 2025, to 16,931 kt CO₂ eq by 2030, and to 16,074 kt CO₂ eq by 2040. According to the projection with additional measures, emissions will reduce to 15,841 kt CO₂ eq in 2025. In 2030, emissions will amount to 13,148 kt CO₂ eq, while in 2040 they will amount to 6,972 kt CO₂ eq. In 2020, measures to prevent the spread of the SARS-CoV-2 virus had a major impact on emissions, resulting in a significant reduction of just over 7% compared to 2019. This should be taken into account when comparing projections with 2020 emissions. Compared to 2020 using the projection with measures, emissions are projected to be 7% and again 7% and 1% higher in 2025, 2030 and 2040, respectively, and 0%, 17% and 56% lower using the projection with additional measures. The projection without measures shows significantly higher emissions

and an upward trend. In 2025, emissions are estimated at 21,502 kt CO₂eq, in 2030 at 22,198 kt CO₂eq, and in 2040 at 23,755 kt CO₂eq

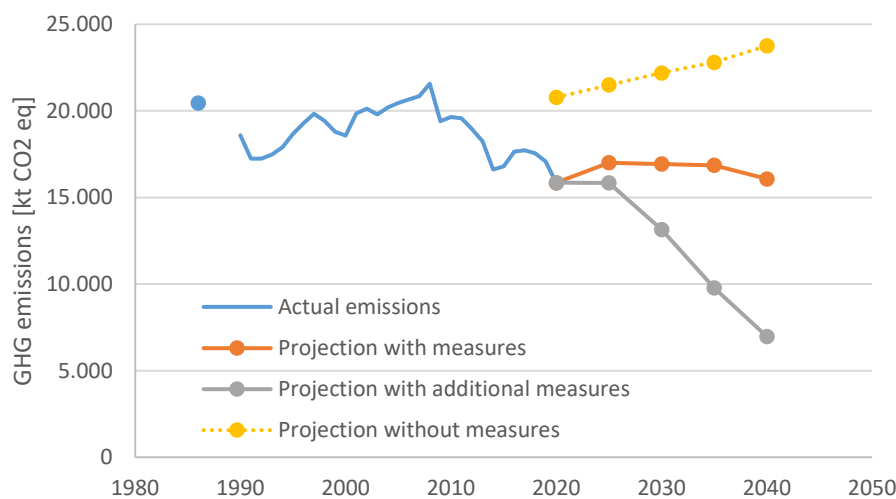


Figure 1: Current emissions trend, up to and including 2020, and emissions trend according to projections with measures, with additional measures and without measures from 2025 to 2040 (source: SEA, JSI-EEC, AIS)

CO₂ emissions represent a major part of greenhouse gas emissions in Slovenia. According to the projection with measures, their share in total GHG emissions will increase from 81% in 2020 to 84% in 2030 and 2040. In the projection with additional measures, this share is slowly decreasing. In 2030, it will get down to 80%, then decrease significantly after 2030, and in 2040, it will be down to 68%. According to the projections with measures and with additional measures, methane emissions are reducing. Its share, which accounted for 12% in 2020, is according to the projection with measures, decreasing very slowly, but according to the projection with additional measures, it will increase sharply after 2030. N₂O emissions are the only emissions with no pronounced reduction. In 2020, they accounted for 5%. According to the projection, F-gas emissions will be significantly reduced by 2040.

According to the projection with measures, emissions from energy industries and fugitive emissions will increase by 1% by 2030 compared to 2020, and reduce by 4% by 2040. Emissions from industry will decrease by 2030 and will then increase to exceed the 2020 emissions in 2040. Emissions from transport will increase by 2030 and then decrease, but will still be 31% higher in 2040 compared to 2020, when emissions were very low due to the pandemic and almost reached the 2005 levels. Emissions from other sectors and waste will be significantly reduced, and will be lower by 58% and 54% respectively in 2040 compared to 2020. In industrial processes, in 2040, emissions will be down by 15%. Emissions in agriculture will increase and will be 6% higher in 2040 compared to 2020.

According to the projections with additional measures, emissions from energy industries and fugitive emissions will be reduced by 34% by 2030 and by 71% by 2040 compared to 2020. Significant decreases are also projected in other sources; in industry by 26% by 2030 and by 46% by 2040, in other sectors by 51% and 77%, in industrial processes by 9% and 46%, and in waste by 37% and 54%, respectively. In transport, emissions will increase by 2025 and then decrease, particularly significantly after 2030. Compared to 2020, they will be 8% higher in 2030 and 59% lower in 2040. In agriculture, the smallest reduction will be achieved, namely by 1% by 2030 and by 9% by 2040.

In accordance with instructions, fuels for international navigation and aviation are not included in the projections presented above.

According to the projection with measures, sinks will be high (around -4,000 kt CO₂ eq) until 2030 due to reduced felling, but will reduce rapidly after 2030 to only -1,131 kt CO₂ eq in 2040. In the projection with additional measures, which assumes higher felling over the whole period, sinks will be around -2,000 kt CO₂ eq in the period 2025-2040.

According to the projection with measures, non-ETS emissions will amount to 10,779 kt CO₂ eq in 2025, while according to the projection with additional measures they will be 9,998 kt CO₂ eq. According to the projection with measures, emissions will amount to 10,629 kt CO₂ eq in 2030, 10% less than in 2005. According to the projection with additional measures, emissions will be lower by 28%. It follows that Slovenia will achieve the target for 2030 under EU legislation, which is 15% reduction in emissions for Slovenia, will be achieved according to the projection with additional measures. By far the largest source of non-ETS emissions is transport, accounting for more than half of emissions.

1.5 Climate Change Impacts, Vulnerability and Adaptation

In December 2016, the Government of the Republic of Slovenia adopted the Strategic Framework for Climate Change Adaptation, the first comprehensive strategic document in the field of climate change adaptation, which is still valid today. The first report on implementation in 2016-2020 was also prepared.

The Slovenian Environment Agency is running a project on climate change impact assessment in the 21st century. In 2018, SEA already prepared some climate change assessments for the future and climate change impact assessments for some extreme events, such as heat waves, droughts, extreme precipitation phenomena, frost, high water conditions. The climate change scenarios show that the air temperature in Slovenia will continue to rise. Compared with the period 1981-2010, it will increase on average by 1°C throughout the country in the period up to 2040, and for an additional degree C until 2070. For precipitation, the climate scenarios show greater uncertainty, but signals are becoming more pronounced as we look further into the future. The projection of changes in the 100-year flow rate shows for the next period 2021-2050 a slight increase in the western part of the country and a decrease in the eastern part of the country.

The main highlights of the first report on the implementation of the Strategic Framework for Climate Change Adaptation are: the objective of resilience and adaptation to climate change should be integrated into the environmental impact assessment of all programmes, plans, spatial and other acts and amendments; further guidance on climate change impact assessment in administrative procedures, recommendations and other tools to strengthen the environmental impact assessment instrument needs to be prepared; Atlas of climate projections (SEA) has been published; for the first time, climate change adaptation measures are also included in the Climate Change Funding Programme.

A vulnerability assessment for municipalities is under preparation. Estimates of the effects of climate change on individual sectors are behind schedule. Sectoral effects for forest fires and health effects are under preparation.

The National Environmental Action Programme with programmes of measures until 2030 sets out the following measures regarding the climate change adaptation objective: offering climate services by providing and disseminating information on climatic conditions and expected changes in climate, tailored to the needs of users (sectors, public, researchers) in a user-friendly format that allows easy follow-up; vulnerability assessment by municipality; municipal adaptation strategies; vulnerability assessment by sector; adaptation action plans and guidelines for climate change impact assessment in administrative procedures.

Slovenia has yet to establish a comprehensive action programme for climate change adaptation, but has addressed the need for action in the areas of water resources management (The River Basin Management Plan for the Danube and Adriatic River Basins for the period 2015-2020, the Flood Risk Management Plan 2017-2021), agriculture (one of the main areas of focus in the new agricultural policy for 2021-2027), drought risk management (mandate of the Drought Management Centre for Southeastern Europe, expert groundwork for the national action plan for drought management and soil degradation).

SEA carries out a number of activities related to communication and awareness-raising for a wide range of target groups, and also issues warnings of adverse climate and hydrological events.

Activities are also carried out at local level. As part of the LIFE ViVaCCAdapt project, a climate change adaptation strategy for the municipalities in the Vipava Valley has been prepared. Two pilot actions were also launched related to a decision support system on irrigation and to model planting of green windbreaks.

Currently, Slovenia has not yet established a special portal with information on adaptation to climate change, information on national activities is provided at the European ClimateADAPT portal.

1.6 Financial Resources and Transfer of Technology

In accordance with Article 9 of the Paris Agreement, the relevant decisions of the UN Convention on Climate Change, commitments and decisions at the EU level, in particular the decisions of the Economic and Financial Affairs Council (ECOFIN) and the Environment Council (ENVI), on climate finance to assist developing countries in implementing long-term climate policy measures, Slovenia is also striving towards increasing the volume of climate finance.

The EU Member States, including Slovenia, follow the commitment of the Paris Agreement to mobilise USD 100 billion per year by 2020 for assistance and implementation of measures for reducing greenhouse gas emissions and adapting to climate change in developing countries. The assistance includes financial resources, a transfer of so called “climate-friendly technologies” as well as strengthening administrative capability of developing countries in this area.

Slovenia is working to mobilise climate finance from various sources. In 2021, it allocated almost EUR 5 million to climate finance or aid in developing countries, which is a 119% increase compared to 2020, thus returning to pre-Covid-19 levels.

In the draft Development Assistance Programme for developing countries, which also includes climate finance, Slovenia plans to increase the share of bilateral help for climate measures. The current share of climate finance in 2016 represents around 15% of the total ODA, and by 2030, it is expected to be increased to at least 30%, which is twice the increase in the share of climate finance, both in absolute term and in the share of all ODA resources. In the field of climate finance, Slovenia will after 2020 also follow joint decisions and guidelines, both at the EU and UNFCCC level agreements.

1.7 Research, Development and Innovation, and Systematic Observation

Key research institutions include the University of Ljubljana, the University of Maribor and the University of Primorska, as well as public research organisations and institutions. In Slovenia, research falls under the Ministry of Higher Education, Science and Innovation. In order to bring together the needs of the State, the research community and the wider public in terms of priority topics, Slovenia has created the instrument of targeted research projects (TRP), which are a form of implementing the Slovenian Development Strategy and the Research Strategy. The 2022 Research Strategy states that scientific research and innovation policies must contribute to sustainable development. In the period 2018-2020, research and development expenditure increased, amounting to 2.15% of GDP in 2020, still below the EU average (2.32%). In 2020, the share of environment and energy R&D expenditure was 10%.

Selected climate and environment research which was carried out or is in the process of being carried out:

- The assessment of climate change in Slovenia by the end of the 21st century
- The LIFE ClimatePath2050 project, which aimed to monitor progress and plan climate action to reduce GHG emissions
- The comprehensive strategic project for decarbonising Slovenia through the transition to a circular economy
- Impact of climate change on the dynamics of beech and spruce woody biomass accumulation
- Climate change and sustainable development of Slovenian tourism
- WETADAPT – Adaptive and plastic potential of ectotherm physiology to respond to climate change
- Transboundary ecological connectivity of Alps and Dinaric Mountains
- Circular Industry – Introducing circular economy into industrial processes
- Integrating Community Power in Energy Islands
- Horizon 2020: Smart, green and integrated transport
- Horizon 2020

The Slovenian Environment Agency (SEA) is a national environmental institution that monitors the state of the environment and performs other professional tasks in the field of environment and nature. SEA provides high-quality meteorological, hydrological,

oceanographic and air quality data. SEA plans, develops, maintains and manages the national infrastructure for environmental measurements. Currently, there are 451 automatic stations in our network with about 7800 instruments measuring 258 different parameters. SEA also operates 332 manual observation stations. In 1850, the first meteorological observatory in Ljubljana started operating.

Slovenia has an atmospheric climate observing system, an ocean climate observing system with the Koper mareographic station and two oceanographic buoys, and a terrestrial climate observing system with phenological observations, hydrological observations of surface waters and groundwater, and observations of two glaciers. Observations are also performed as part of the LTER network. Slovenia is also a member of EUMETSAT, an international organisation for exploitation of meteorological satellites, and an associate member of the European Space Agency (ESA). SEA uses two radars to monitor precipitation systems.

1.8 Education, Training and Public Awareness

The key players in the implementation of Article 6 of the UNFCCC and the Kyoto Protocol in terms of raising public awareness regarding the climate change issue, its causes and consequences, and activities to combat climate change include, at government level, the Ministry of the Environment, Climate and Energy, the Ministry of Infrastructure, the Ministry of Economy, Tourism and Sport, the Ministry of Finance, and the Government Communication Office. The above-mentioned ministries are also active in the areas of education and training on climate change, whereas the lead government bodies are the ministries responsible for education (Ministry of Education and the Ministry of Higher Education, Science and Innovation) and the ministry responsible for employment policy and lifelong learning (Ministry of Labour, Family, Social Affairs and Equal Opportunities).

As early as 2008, the Organisation and Financing of Education Act listed among the fundamental objectives of education and training also the education for sustainable development. The findings of the 2018 PISA survey highlighted gaps in 15-year-olds' knowledge of climate issues, which is closely linked to environmental issues and sustainable development. To improve the situation, the Climate Goals and Content in Education (2022–2023) project is underway. The key activities of the project are the development and implementation of an integrated programme of public awareness-raising and education on climate change in the context of education for sustainable development. In addition, activities are underway to integrate sustainable mobility into the education system, and the Behaviour and Education Culture Strategy for Sustainable Mobility of Children and Adolescents in the Education System until 2024 has been developed. Among the programmes in the field of education for sustainable development, the Eco-school programme, which has been operating since 1995, is Slovenia's most established one. The Integrated National Energy and Climate Plan (NECP) identifies education as an important element of climate policy. In line with that and the Slovenian Development Strategy (SDS), the Recovery and Resilience Plan (RRP) allocates a share of research, innovation and education resources to the green transition. The importance of education for nature conservation is also recognised in the National Environmental Action Programme, and MECE thus supports a number of education activities with funding from the Climate Change Funding Programme. The Resolution on National

programme of higher education 2030 makes a clear commitment to engage higher education in addressing key societal challenges, including climate change.

Training is recognised as an important prerequisite for the mitigation of climate change, as it requires many changes that will not be possible without qualified personnel. This is evident from the NECP, the National Environment Protection Programme with programmes of measures until 2030 and the Act on Energy Efficiency. In Slovenia, the following activities are underway in this area:

- EUREM – European Energy Manager training is aimed in particular at those responsible for energy management in public and private sector companies, building managers, plant and production managers and process engineers.
- Targeted training for the transition to a low-carbon society is part of the LIFE IP Care4Climate project.
- The LIFE Care4Climate project includes several training activities: preparation of a training plan for the transition to a low-carbon society and the establishment of a national qualification platform; preparation, implementation and monitoring of targeted training courses in the field of energy efficiency, renewable energy and green energy technologies and the validation of acquired skills and knowledge; integration of local communities into the transition to a low-carbon society. Training activities are also carried out in agriculture, forestry and other specific areas.

The NECP provided for the preparation and implementation of a comprehensive national promotion and awareness-raising campaign on the importance and the way to transition to a climate neutral society, which has not yet been organised. Nevertheless, there has been a significant increase in awareness-raising activities, as well as in the number of actors actively working to raise awareness in the areas of energy use, mobility, waste, agriculture and other areas that have an impact on emissions or are impacted by climate change. NGOs also have a special role to play in raising awareness, as they provide information and raise awareness among citizens, as well as make a significant contribution to improved decision-making by decision-makers. The importance of NGOs is also recognised in the National Environmental Action Programme.

2 NATIONAL CIRCUMSTANCES

2.1 State Organisation

Slovenia is a parliamentary democracy. The president of the country is elected in direct elections for a maximum of two five-year terms. The National Assembly of the Republic of Slovenia, the main legislative body, is composed of 90 deputies who are elected for a period of four years. The government is formed by the Prime Minister: the current government consists of 17 ministers, including three ministers without a portfolio. Since 1 May 2004, Slovenia has been a Member State of the European Union.

According to the Government Act, the Ministry of the Environment, Climate and Energy (MECE) is responsible for policy and measures in the area of climate change. MECE coordinates the preparation of measures on climate policy implementation together with other relevant departments, primarily Energy, Transport and Agriculture. Moreover, MECE prepares reports relating to climate issues, both at EU and UN level, and obtains input data and documents from relevant departments. The preparation of emission inventories and their reporting is the responsibility of Slovenian Environment Agency (SEA), a body of MECE. SEA is also responsible for the Emissions Trading Registry and environmental indicators including climate change indicators.

In Slovenia, there are 212 municipalities, basic local government units, of which 12 have the status of urban municipality. Municipalities have their own administrations and budgets. Municipal competencies in the field of reduction of GHG emissions are related to spatial development planning, local and public traffic regulations (preparing road transport strategies), preparing local energy concepts (local energy plans) and waste collection and disposal.

2.2 Population Profile

The population of Slovenia has been increasing very slowly in the last years. In the period 2011-2021, the population grew by 59,000. On 1 January 2021, the population of Slovenia was 2,108,977. The number of Slovenian citizens increased by 800 in 2020, while the number of foreign nationals increased by 12,300. On 1 January 2021, foreigners accounted for 8% of the population. The population density was 104 inhabitants/km². In 2021 (1 July 2021), Ljubljana, the capital city, had 293,822 inhabitants and a density of 1,068 inhabitants/km². According to EUROPOP2019 population projections, Slovenia's population is projected to increase until around 2024, after which it is expected to slowly start declining. On 1 January 2100, Slovenia is expected to have 1,888,000 inhabitants, a decrease of just over 10% compared to the beginning of 2021. The birth rate is projected to increase in the future, reaching 1.72 in 2100. Life expectancy is projected to keep increasing, with men expected to live to 89 years and women to 93 years. This will affect the further increase in the proportion of elderly population, with residents aged 65 and over expected to represent just over 31% of Slovenia's population in 2100 (19.8% of the population in 2019). In 2100, children are expected to account for 13.5% of the population. In 2021, natural increase was negative (-2). Net migration was slightly positive (1.2). Slovenian population has been ageing in the past; in 1991 the average age of the

population was 34.4 years, and in 2021 it will be 42.7 years. Life expectancy in 2020 was 77.8 for men and 83.4 for women, which is 5.7 years and 3.8 years more than in 2001, respectively.

2.3 Geographic Profile

Slovenia is located in Central Europe with geographic coordinates of approximately 46° north latitude and 15° east longitude. The surface area of the territory is 20,273 km². It borders Italy, Austria, Hungary and Croatia, with which it shares the longest state border.

Despite its small size, Slovenia is a very diverse country with three distinct types of landscape. To the north are the mountain ranges of the Julian Alps, the Karawanks and the Kamnik-Savinja Alps which gradually slope down to the Adriatic Sea towards the south. The hilly central part with its numerous valleys and basins, including the Ljubljana basin where the capital of Slovenia is located, is separated from the Adriatic Sea by the northernmost slopes of the Dinaric Alps. In the northeast, the country flattens out onto the Pannonian Plain. The length of the coast is 46.6 km. The variability of the terrain is illustrated by the average inclination of 25%. The average altitude is 550 m.

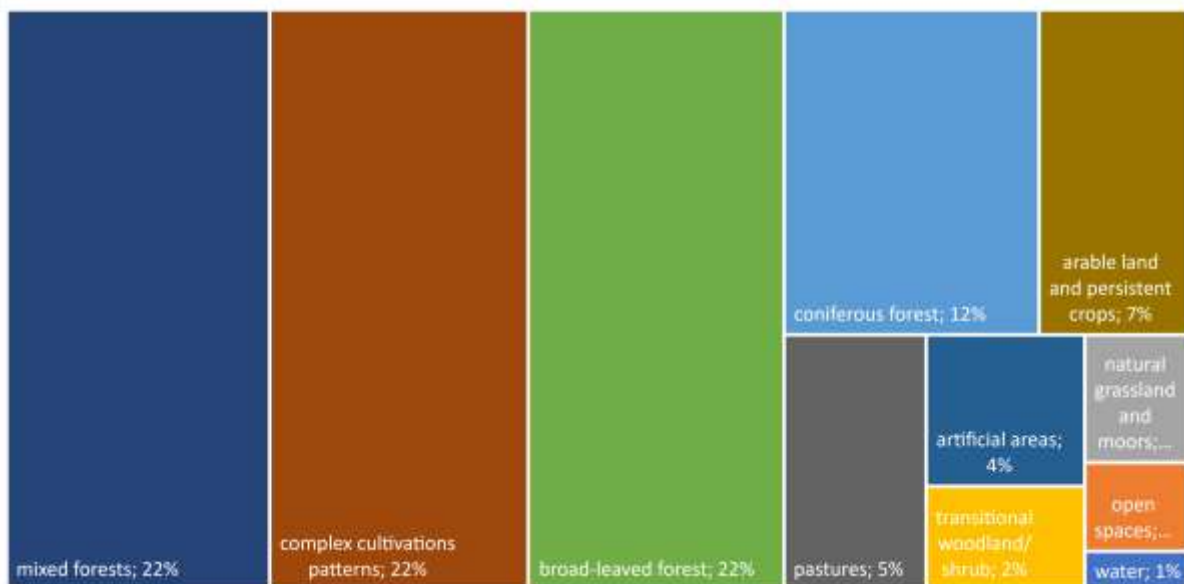


Figure 1: Shares of individual land cover categories (%) (source: <http://kazalci.arso.gov.si/sl/content/pokrovnost-raba-tal-0>)

Landscape and climate diversity, pedodiversity, large forest areas and the preservation of traditional management practices in parts of the cultural landscape are the reasons for the high biodiversity, which is threatened by possible climate change.

Slovenia is home to around 22,000 animal and 3,500 plant species, more than 2,000 of which are on the Red List of Threatened Species, while more than 800 animal and more than 300 plant species are protected. There are 355 Natura 2000 sites in Slovenia, covering just over 37% of the country's territory. 70% of Natura 2000 sites are covered by forests, while just over 20% are farmland. Natura 2000 is a European network of Special Protection Areas declared in the Member States of the European Union with the main objective of preserving biodiversity for future generations. Special Protection Areas are intended for the preservation of animal and

plant species and habitats which are rare or endangered on the European level due to human activities.

Currently (2021), Slovenia has 1 national park, 3 regional parks, 46 landscape parks, 1 strict nature reserve, 56 nature reserves and 1161 natural monuments. Just over 13% of Slovenia's territory is protected. Since 1992, the share of protected areas has increased by 5.5 percentage points.

2.4 Climate in Slovenia

As in other parts of the world, changes in climate, as well as in water balance have been observed in Slovenia as well. The main characteristics of these changes are presented below.

The Slovenian Environment Agency (SEA) plays a key role in monitoring and assessing climate conditions. SEA is the source of all data presented in this chapter. Apart from environmental monitoring, SEA is also responsible for preparing forecasts and issuing warnings in case of adverse weather events, which is an important component of the short-term adaptation measures. A complete overview of activities and results of environmental monitoring can be found on the SEA website¹. A monthly overview of meteorological, agrometeorological, hydrological and seismological conditions is published by SEA in the newsletter *Our environment*².

2.4.1 Temperature

Climate change is most obviously manifested by warming of the atmosphere. Surface air temperature rise in Slovenia was uneven in recent decades in terms of both spatial and temporal variability. That's why it is necessary to include in analyses, beside annual trends, also seasonal changes which can show substantially stronger effects. The differences between the regions are also significant. A linear trend in the period 1961-2011, obtained by means of homogenised time series, a result of the project "Climate Variability in Slovenia", shows a rise of approximately 0.34 °C per decade, which means that the average temperature in this period has risen by 1.7 °C.

¹ <http://www.arso.gov.si/>

² <http://www.arso.gov.si/o%20agenciji/knji%C5%BEnica/mese%C4%8Dni%20bilten/>

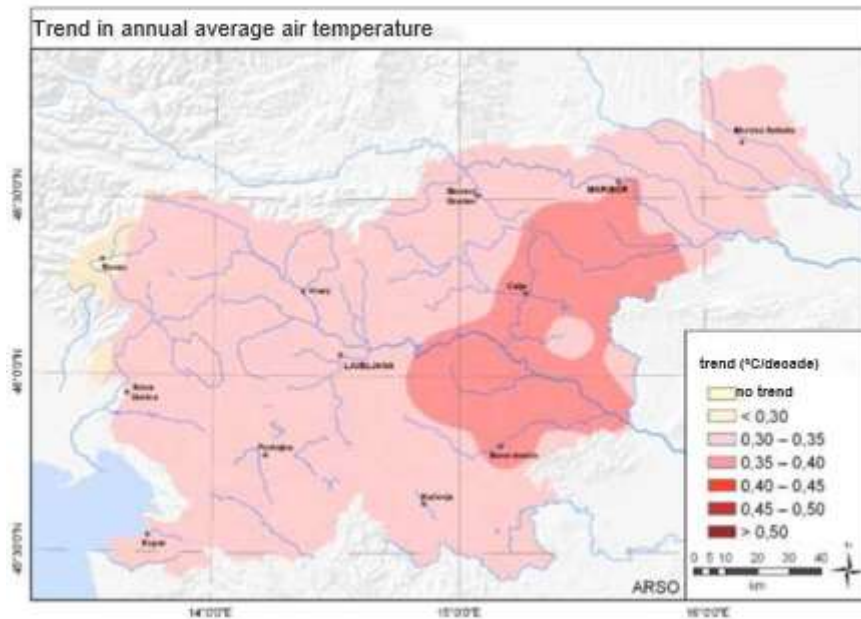


Figure 2: Mean annual minimum (left) and maximum (right) temperature trend in the period 1961–2011, calculated on homogenised dataset. (Source: <http://meteo.arso.gov.si/met/sl/climate/pss-project/>)

At a national level the year 2021 was (according to not yet fully verified data) warmer than average. The deviation of the average air temperature from the 1981-2010 average was 0.7 °C at national level, making the year 2021 one of the 17 warmest since 1961. In addition to 2014, 2019 was the warmest year in this period (temperature deviation of around 1.7 °C). The largest deviation in 2021 was in the regions of Kras, Dolenjska, Kozjansko and Haloze. Compared to the 1981-2010 average, nine months were warmer than average, while three had below-average temperatures. The months with the largest temperature deviations were January and June. Year 2021 was the 11th consecutive year with a positive temperature deviation (compared to 1981-2010). The annual warming trend over this period is around 0.42 °C/decade. The air has already warmed up by around 2.3 °C.

Deviation of average temperature (PRELIMINARY) Year 2021

Reference period 1981-2010

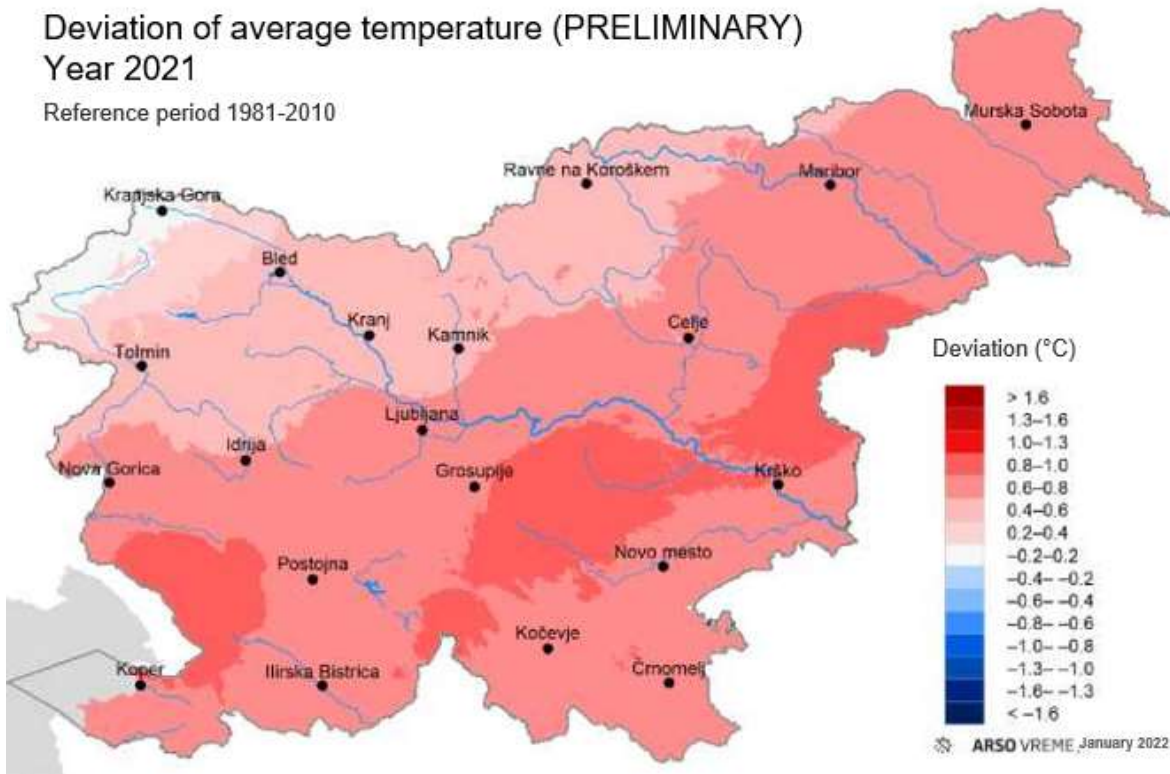


Figure 3: Average temperature deviation in 2021 from the average of the 30-year reference period 1981-2010 (source: https://meteo.arso.gov.si/met/sl/climate/current/climate_year/)

Average air temperature (reference 1981-2010) 1961-2021

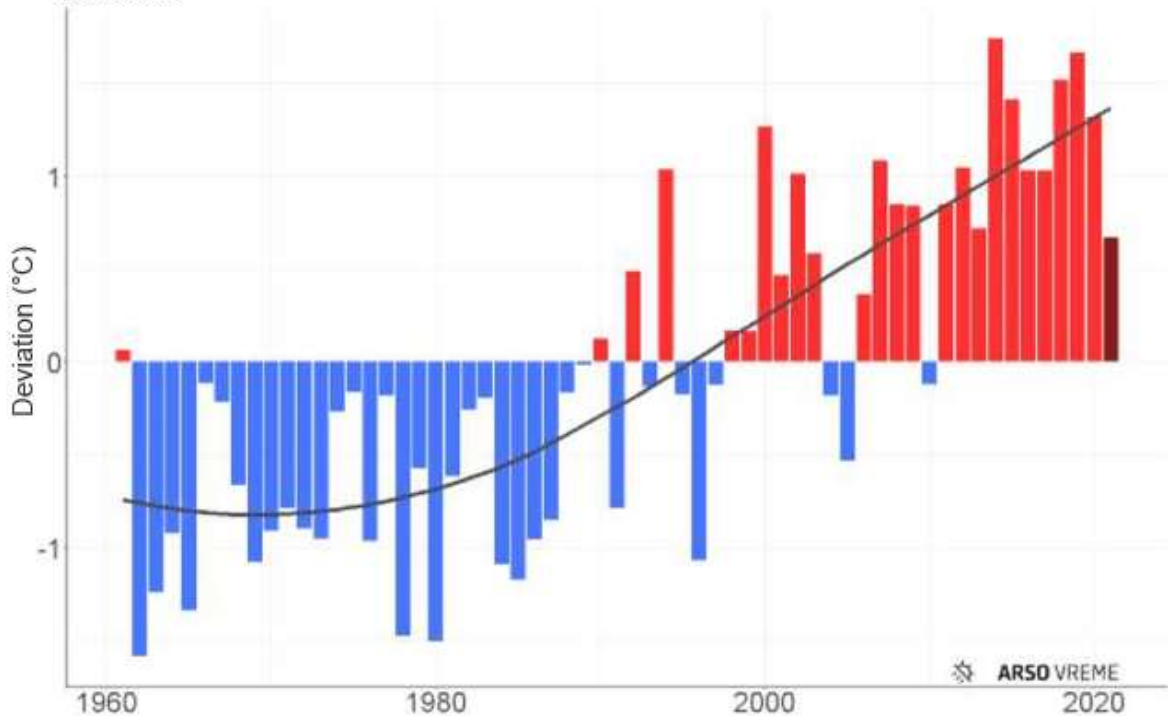


Figure 4: Average temperature deviation in 2021 from the average of the 30-year reference period 1981-2010 (source: https://meteo.arso.gov.si/met/sl/climate/current/climate_year/)

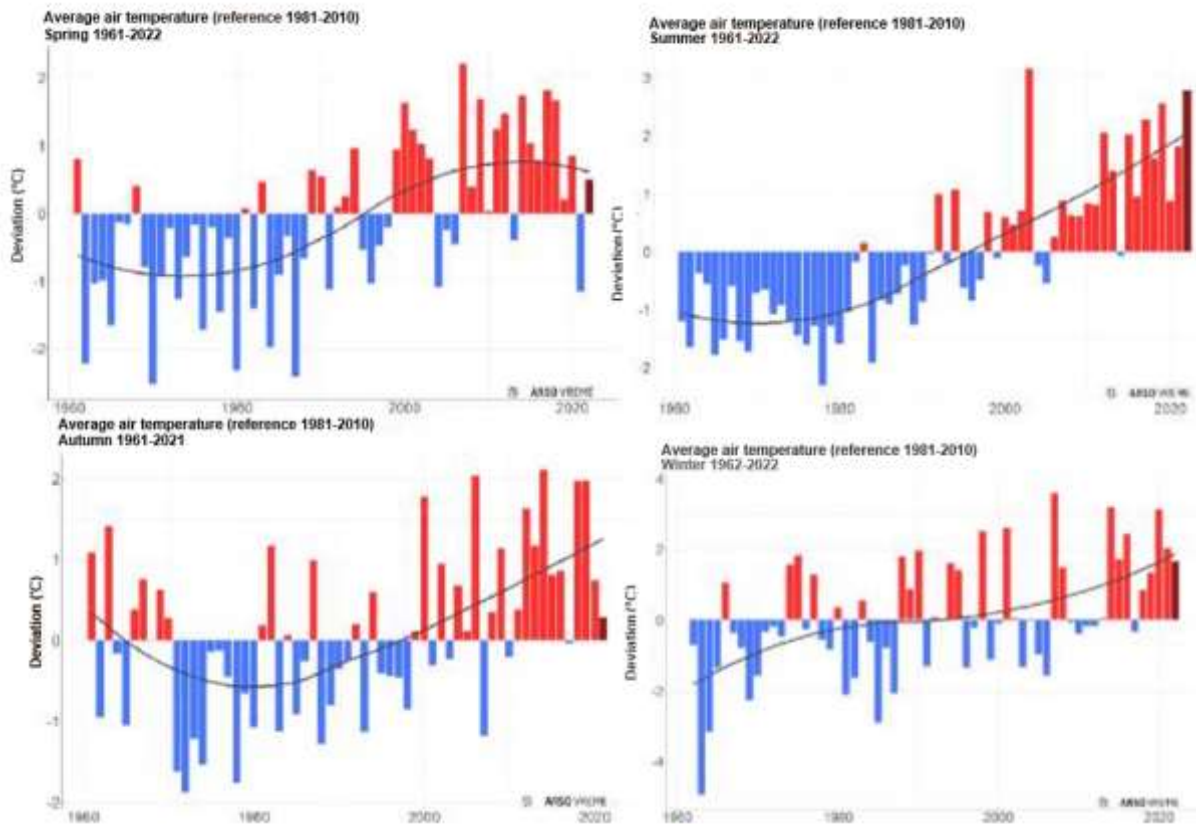


Figure 5: Seasonal deviation of the average air temperature for each year from the average of the 30-year reference period 1981-2010 (source: SEA)

2.4.2 Precipitation

In Slovenia, the differences in rainfall between the regions are substantial. Average annual rainfall in some places of the Julian Alps is 3,500 mm, decreasing towards the east and reaching only 800 mm (average) in the easternmost part of the region of Prekmurje. Yearly average precipitation for Slovenia as a whole decreased in the period 1961-2011 by approximately 160 mm (or 2-4%). The decrease was larger in western and southern Slovenia than elsewhere. About half of the decrease can be attributed to spring months, while the decrease in other seasons was substantially smaller. In contrast with temperature trends, precipitation trends are more variable, particularly in terms of spatial variability. In the same season, even opposite precipitation trends in different regions are possible.

In 2021, precipitation at national level was below the 1981-2010 average. Year 2021 is one of the 12 driest years since 1961. This year the driest areas were in the region of Kras, parts of Notranjska, Kočevsko, parts of Dolenjska, Koroška, Štajerska, Gorenjska and Prekmurje. The wettest months of the year 2021 were January and May, with May being the wettest on record. June was one of the driest months on record, with 24% of average rainfall, followed by March (37%), September (57%) and October (66%). April, August and December also had below-average rainfall.

From 1961 onwards annual rainfall had been decreasing until around the year 2000, after which it started to increase.

Precipitation data for Slovenia are available as part of other environmental indicators at: http://kazalci.arso.gov.si/?data=indicator&ind_id=555.

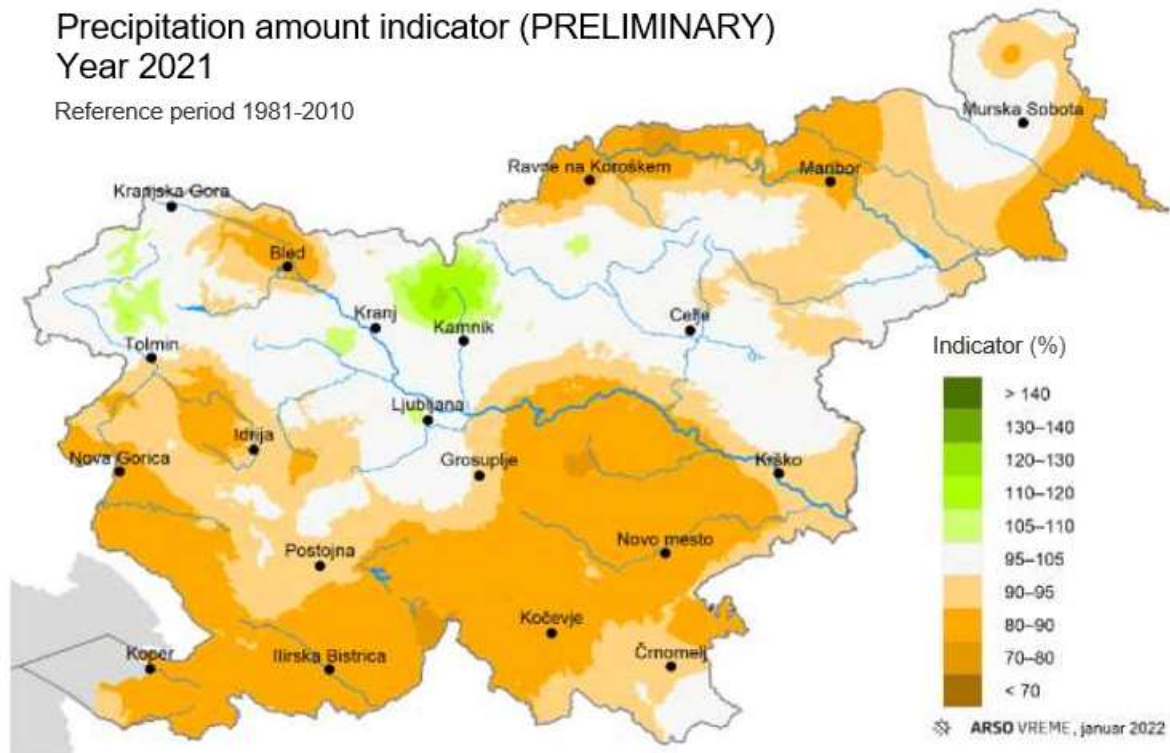


Figure 6: 2021 precipitation indicator relative to the average of the 30-year reference period 1981-2010 (source: SEA; https://meteo.arso.gov.si/met/sl/climate/current/climate_year/)

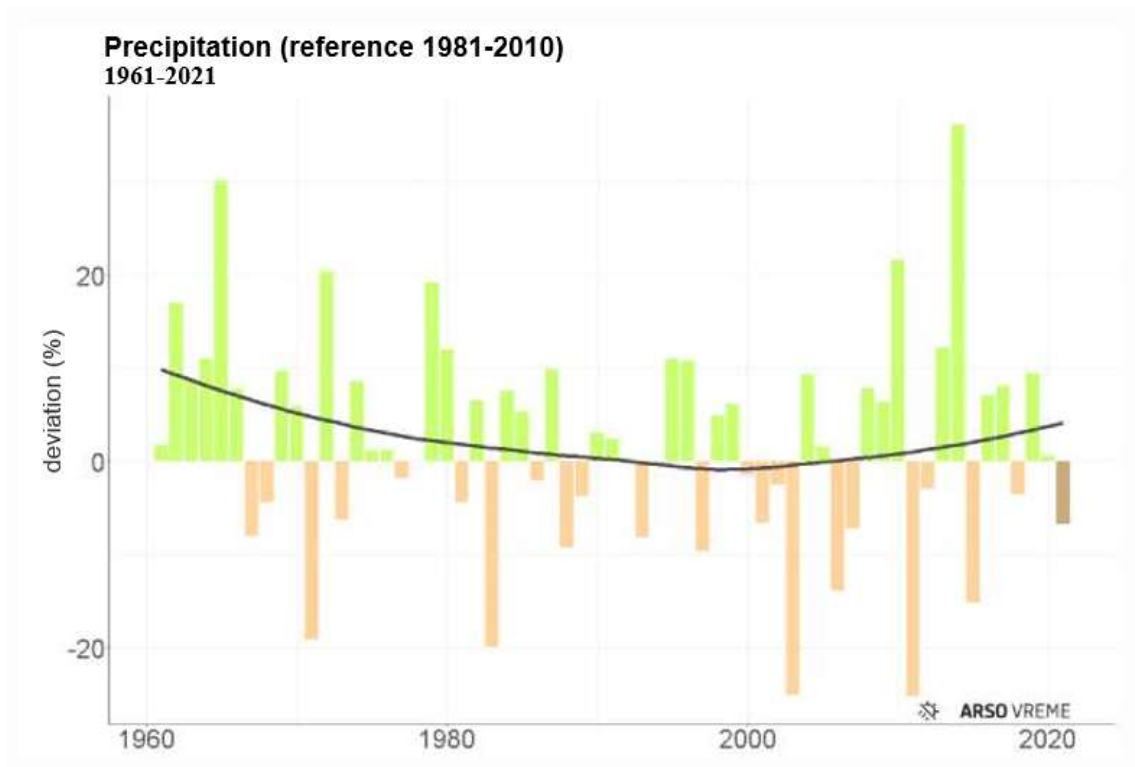


Figure 7: Relative deviation of national rainfall in 1961-2021 compared to the 1981-2010 reference period average. Green indicates above-average annual rainfall, while brown indicates below-average annual rainfall.
(Source: SEA; https://meteo.arso.gov.si/met/sl/climate/current/climate_year/)

2.5 Economic Development

Slovenian economy recovered relatively quickly in 2021, after the Covid-19 pandemic. Due to the pandemic, GDP declined in 2020 but rebounded in 2021 (to EUR 52,208 million), bringing the economy above its pre-crisis level from 2019. The average Slovenian GDP growth rate between 1993 and 2003 was 4.3% and 4.9% between 2004 and 2008. The economic crisis caused a considerable slowdown in GDP growth in 2008 and a dramatic decline in 2009 (-7.8%). In 2014, after five years, Slovenia began to catch up more developed countries – GDP experienced six consecutive annual increases in 2019. Slovenia's economic development (measured by GDP per capita at PPP) in 2021 was at 90% of the EU average, slightly lower than at the start of the crisis (91% in 2008). The gradual closing of the development gap in comparison to the EU average over the last decade is due to modest productivity growth, mainly as a result of low investments after the economic and financial crisis. Slovenia has been somewhat slow in decoupling economic growth from resource consumption and GHG emissions. Emissions productivity has been back on the rise since the economic and financial crisis, most notably in 2020 and 2021. Between 2014 and 2019, Slovenia's GDP per unit of GHG emissions was around one tenth less than in the EU, but fell to 8% in 2020, according to preliminary data.

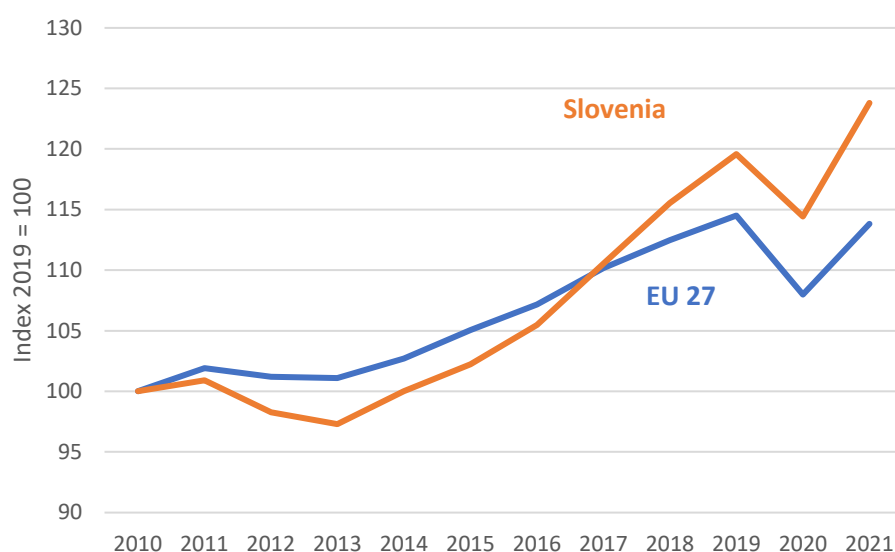


Figure 8: Slovenia's GDP growth since 2010 compared to the EU 27 (source: EUROSTAT)

The largest share of value added is accounted for by industry, predominantly by manufacturing, which accounts for 23%. Trade is the second largest sector, accounting for 12%. Compared to 2012, the share of manufacturing increased the most, followed by human health and social work activities and trade. On the other hand, the largest declines were recorded in the supply of electricity, gas and steam, real estate services, and arts, entertainment and recreation.

In 2020, Slovenia exported EUR 32.9 billion worth of goods, whereas imports amounted to EUR 32 billion. Both figures were down compared to 2019, with export dropping by 2% and

import by 6%. Export dropped because of a reduction in trade with EU Member States (Slovenia exported 66.9% of its goods to the MS), whereas trade with non-EU countries increased. Export to Germany, Switzerland and Italy increased the most, while export to France decreased slightly compared to 2019. Because export of medical and pharmaceutical products increased the most, it is the largest contributor to the total value of export. In addition to these, road vehicles are also important exports. Imports decreased due to a reduction in trade with EU Member States (67.5% of all imported goods comes from the EU), while trade with non-EU countries increased. Imports from Switzerland and China increased the most, whereas imports from neighbouring countries (Austria, Italy and Croatia) decreased compared to 2019. The most important imports are medical and pharmaceutical products, followed by road vehicles.

The labour force participation rate (among people between 20 and 64 years) in Slovenia was 75.6% in 2020, above the EU average (72.6% in 2020). The at-risk-of-poverty rate for employed people was 5% in 2020, which is also better than the EU average (9.2% in 2019). The labour market situation started to improve after the Covid-19 epidemic, especially in the second half of 2020 and in 2021, when companies started to face difficulties finding workers. At the end of 2021, the number of persons employed was at an all-time high (916,756), while the number of unemployed was close to its lowest level since 2008. Manufacturing accounted for the largest share of persons employed, followed by trade, maintenance and repair of motor vehicles, and education.

2.6 Energy

Energy use is the most important source of GHG emissions in Slovenia. Taking into account fugitive emissions, in 2020 energy use contributed to 79% to total emissions. The largest sources of emissions are transport and production of electricity and heat.

2.6.1 Gross Inland Consumption

Gross inland consumption was mostly on the increase after 1992 and reached its maximum in 2008. Compared to 1992 it was higher by 50%. Due to the crisis, energy efficiency measures and mild winters, energy consumption mainly decreased afterward and was 15% lower in 2015. It increased in 2016 and 2017, declined slightly in 2018, dropped some more in 2019, with a significant decrease in the pandemic year of 2020. In 2021, gross inland consumption was 12% lower than in 2005. In 2021, petroleum products (32%) prevailed in the structure of gross inland consumption, followed by nuclear energy (23%). Renewable energy sources (RES and waste) saw an increase and accounted for 20%, the share of solid fuels was 14%, whereas natural gas reached the share of 12%. The net import of electricity represented -0,4% of the total energy consumption (more electricity was exported than imported). With regard to fossil fuels, Slovenia produces only solid fuels.

The structure of gross inland consumption changed significantly in the period 1992-2021. The share of liquid fuels (crude oil and petroleum products) was high in the period 1992-2000, with the exception of 1992, and decreased after 2000, with the exception of 2008. Nuclear energy retained the share of approximately 20% in the period 1992-2010, while in the period 2011-2021 its share increased up to 25% due to operations optimisation in 2014. This share fluctuates due to the 18-month fuel cycle. The share of gaseous fuels remained at around 12% in the period

1992-2010 and after 2010 it decreased to 10%. However, it has regained a share of 12% in 2021, slightly increasing its value compared to 2020. After 2000, solid fuels have been used mainly in electricity and heat generation and in industry (paper and pulp production, cement production). Their share is gradually decreasing. On the other hand, the share of RES has been increasing, especially since 2000, reaching a record (851 ktoe) in 2021. The jump in the consumption of RES in 2000 is due to a break in the time series for households, as the use of RES has been monitored annually since 2000, whereas before that the figure was constant.

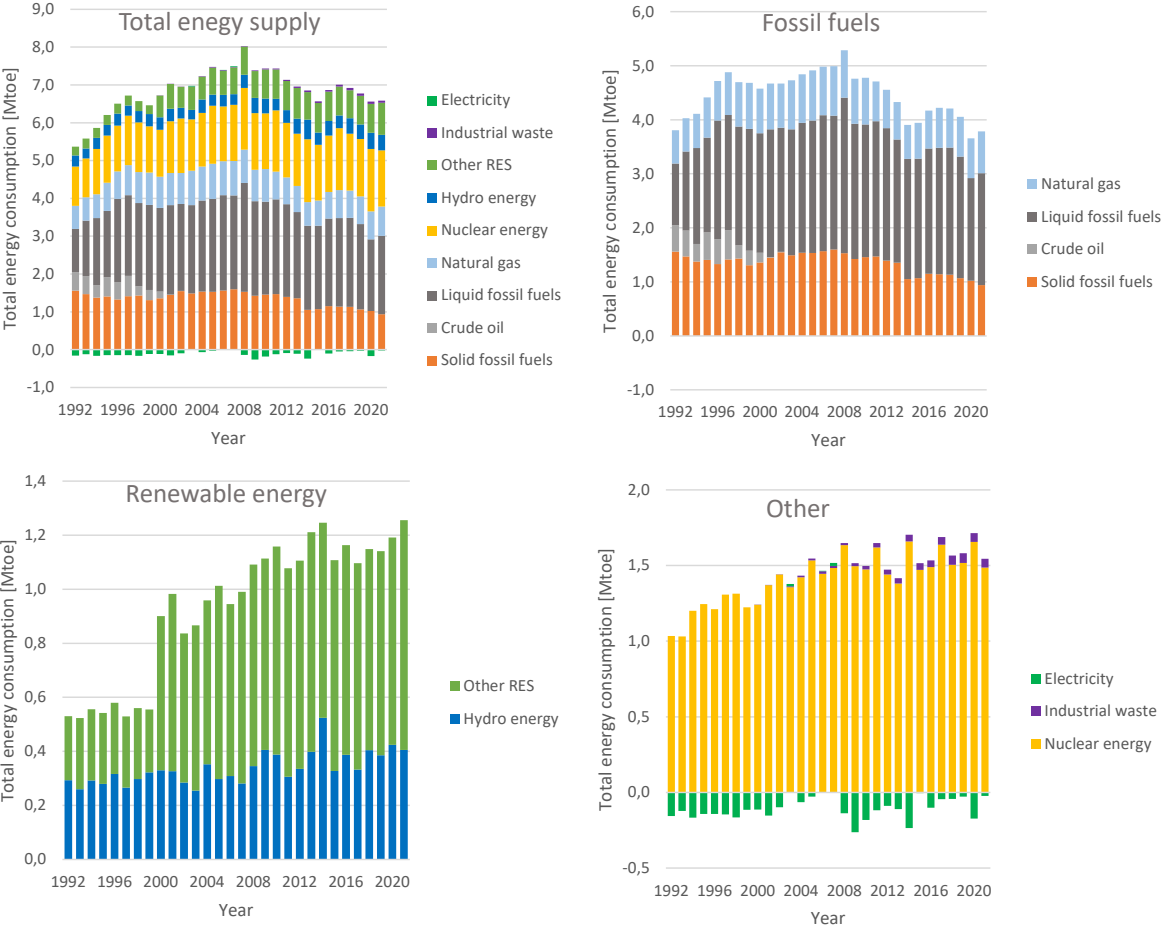


Figure 9: Gross inland consumption per energy source 1992-2021 (source: SORS)

2.6.2 Final Energy Consumption

In the period 1992-2021, final energy consumption increased by 45.7%; the majority of the increase occurred before 1997.

In the period 1992-2021, the largest increase in final energy consumption was recorded in the transport sector and the other use sector. In 2021, 105% (925 ktoe) more energy was consumed in transport than in 1992 and just under 13% (200 ktoe) less than in 2008, when it consumed a record amount. The major part of the growth in transport occurred after 2000. In 1997, the peak in energy consumption of the 1990s was reached as a consequence of fuel tourism. After the measures had been taken in neighbouring countries, such consumption was in decline until 2000. Energy consumption in transport increased sharply in 2007 (by 12.8%) and 2008 (by 17.1%). In 2009, consumption decreased by 13.4% due to economic crisis and the change in the

ratio of fuel prices in comparison to neighbouring countries. In 2011 and 2012, consumption again increased and decreased between 2013-2015. Along with the growth of transport, energy consumption in transport sector increased in 2016. In comparison to the previous year, it increased by 5.8%. In 2018 energy use in transport surpassed 2000 ktoe reaching second highest consumption in the observed period. The transport sector has been strongly affected by the Covid-19 pandemic in 2020, with final energy consumption falling by just over 18% compared to 2019. Due to the small size of Slovenia, fuel sold to vehicles in transit transport has a considerable effect on its energy balance. In 2021, 38% of final energy consumption was used in transport.

In the other use sector (the service sector and agriculture), energy consumption was higher by 123% in 2021 compared to 1992. The largest increase was recorded in 1996, when consumption increased by 150% due to methodological changes. Consumption in this sector has changed considerably several times since 2000. In 2021, its share in total final energy consumption amounted to 11%.

Energy consumption in manufacturing industries and construction grew gradually until 2002 followed by years of faster increase until 2007. Years of decrease, with the exception of 2010, followed as a result of improved efficient energy use and particularly as a result of the economic crisis. The economic recovery has had an impact on the rebound in energy consumption after the crisis. Since 2016, energy consumption has been rising again in 2017-2019 and then fell slightly in 2020 (due to the pandemic), before rising again in 2021. Compared to 1992, consumption was by 12% higher in 2021. In 2021, manufacturing industries and construction represented a 27% share in total final energy consumption.

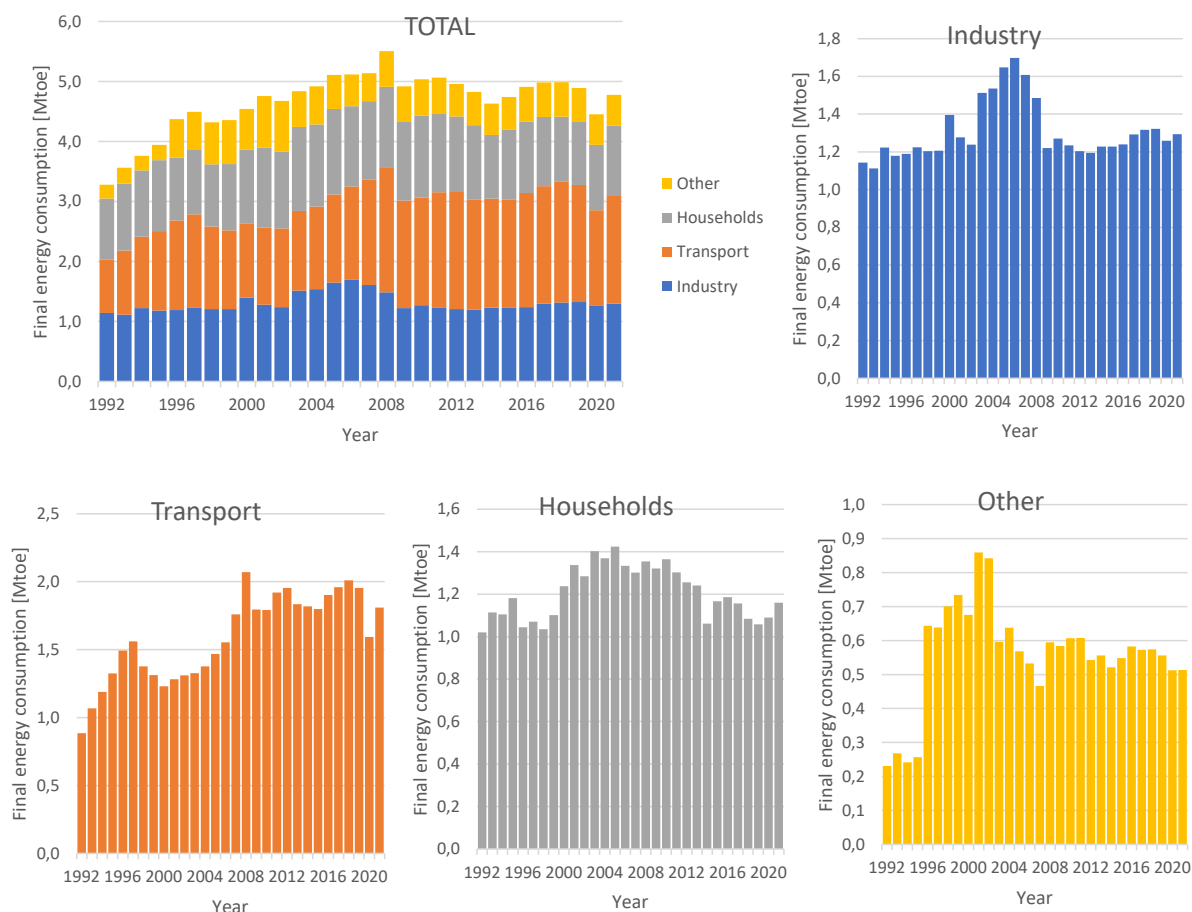


Figure 10: Final energy consumption by sector for 1992-2021 (source: SORS)

Final energy consumption in households has decreased between 2004 and 2007 after a period of growth since 1998. Trend in energy consumption in households is greatly influenced by climate characteristics. If we exclude this factor, it can be noticed that energy consumption has been in decline after 2009 as a result of implementing measures for the rational use of energy. In the observed period, energy consumption reached its highest level in 2005, namely 1424 ktoe. Compared to 1992, consumption was by 13.7% higher in 2021. In 2021, households represented 24% of final energy consumption, the same as in 2016 and 4 percentage point less than in 2005.

Table 1: Structure of final energy consumption per energy source in 1992, 2000, 2010, 2016, 2021 (source: SORS)

	1992	2000	2010	2016	2021
Solid Fuels	6%	2%	1%	1%	0.4% ³
Petroleum products	43%	51%	49%	47%	43%
Natural Gas	15%	13%	12%	12%	13%
Renewable sources	8%	10%	14%	14%	16%

³ Percentages do not add up due to rounding of values, the total is more than 100%

Electricity	23%	20%	21%	23%	24%
Heat	6%	4%	4%	4%	4%

2.6.3 Electricity Production

In 2021, total electricity production amounted to 16,400 GWh. The largest share of electricity was produced from nuclear energy (35%), followed by production from RES (33%) and solid fuels (27%). The intergovernmental treaty states that half of the electricity from the nuclear power plant belongs to the Republic of Croatia. Production from natural gas and liquid fuels is low. Compared to 2005, total energy production is up by just under 8.5%, and compared to 2020, generation is down by just under 5%, mainly due to the reduction of production of nuclear energy (the plant underwent an overhaul in April-May 2021).

In the shares of electricity production by fuel, there are oscillations as a result of variations in climate (due to river water levels – production by hydropower plants, river temperatures – cooling of nuclear plants) and maintenance of nuclear power plants. In 2015 we can see the impact of the construction of the sixth unit at Slovenia’s largest thermal power plant. However, generation from solid fuels is declining because older units have been shut down. The trend in electricity generation from renewable resources over the period 2002-2021 is positive. Three annual fluctuations can be seen in nuclear electricity generation as a result of the 18-month fuel cycle.

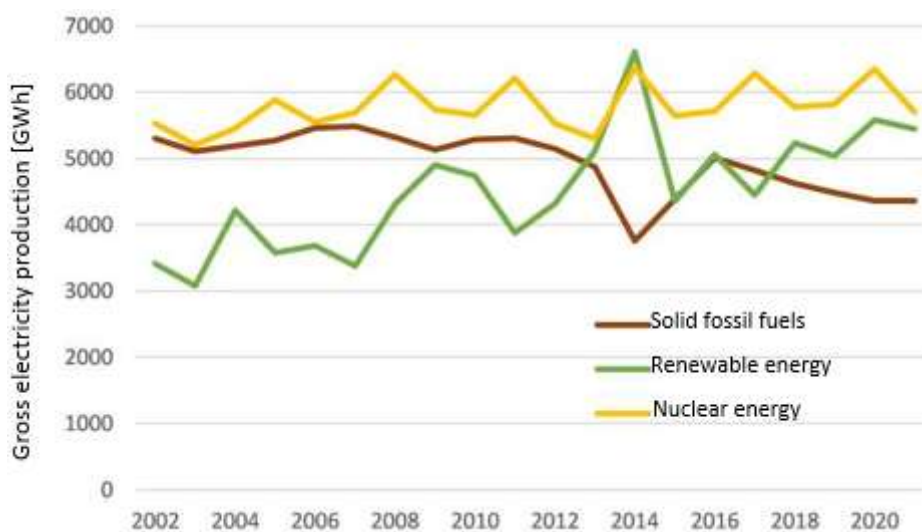


Figure 11: Electricity generation of the main fuel generator (source: SORS)

2.7 Transport

Private car road passenger transport has been increasing since 1991. According to Eurostat, passenger kilometres increased from 12,606 million km to 27,900 million km in 2019 (by 221%). Although in 2013 kilometres slightly fell, they started to rise again in 2014. There was also a drop in kilometres in 2020 due to the pandemic. At the end of 2021, there will be almost 1.2 million registered passenger vehicles in Slovenia, which is 2% more than in 2020 (the motorisation level in 2020 was 554 registered vehicles/1000 inhabitants, in 1991 it was 297 vehicles/1000 inhabitants and in 2010 it was 518 vehicles/1000 inhabitants). The average age of vehicles in 2021 was 10.6 years, compared to 6.9 years in 2001. In 2021, 51% of all registered

vehicles were diesel-powered and 47% petrol-powered. There were around 13,500 hybrid vehicles (1.1% of all registered vehicles) and just over 7,000 electric vehicles (battery and plug-in hybrids) (0.6% of all registered vehicles). The number of electric vehicles has increased, but at a slower rate than the EU average. The number of second-hand vehicles registered for the first time also significantly increased in 2021 (by 26% compared to 2020), which can be attributed to the problems with supplying new passenger vehicles. According to Eurostat, 86.4% of passenger kilometres in Slovenia in 2021 were travelled by car, 11.8% by bus and only 1.8% by train.⁴

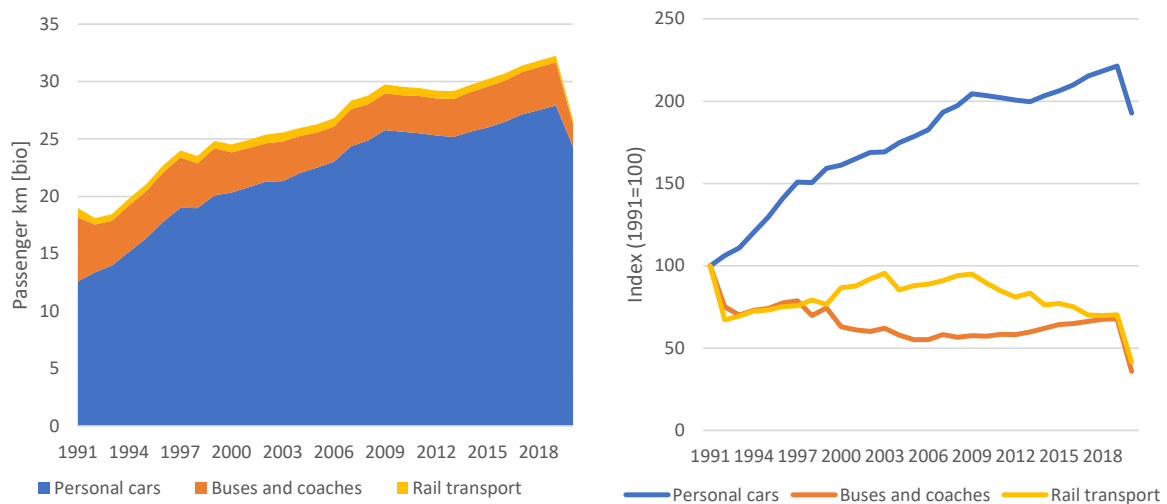


Figure 12: Passenger kilometres for passenger car transport, public road and rail passenger transport (source: European Commission).

Due to the loss of market after Slovenia’s declaration of independence, low prices of motor fuels, low costs of parking and poorly developed or even cancelled public transport lines, passenger transport by busses greatly decreased in the period 1990-2005. After 2005 the trend reversed. In the next three years, transportation of passengers by bus began to gradually increase due to the introduction of integrated public transport and combined subsidised travel card, and reached 3.8 billion pkm in 2016. As a consequence of the Covid-19 pandemic, public passenger transport services by bus as well as longer bus journeys decreased significantly in 2020. It increased slightly in 2021, but did not reach the 2019 level.

Rail transport, with the volume of 1,429 million pkm in 1990, was also strongly impacted by the disintegration of Yugoslavia and subsequent economic recession and decreased by almost two thirds. It never achieved these levels again, but there was a slight increase in the previous decade, reaching 840 million pkm in 2009. After 2009, passenger traffic volumes decreased again, due to the modernisation of lines and more accurate passenger records. In 2019 the railroad transport amounted to 698 million pkm. In 2020, the year of the pandemic, the number of pkm dropped sharply to 397 mio pkm due to a suspension of public passenger transport. In 2021 public passenger transport increased, but only to 542 mio pkm.

⁴ <http://kazalci.arso.gov.si/sl/content/obseg-sestava-potniskega-prevoza-prometa-3>

Air transport also suffered a large loss at the time of Slovenia's independence, which meant a decline in air traffic and a subsequent rapid growth, especially in the middle of the last decade. Slovenia's only airline, Adria Airways, ceased operations in 2019, which had a significant impact on the number of passengers carried. However, the number of passengers carried in 2019 was 47% higher than in 2012. Because of the Covid-19 pandemic air traffic has dropped sharply to 423,000 passengers in 2020.

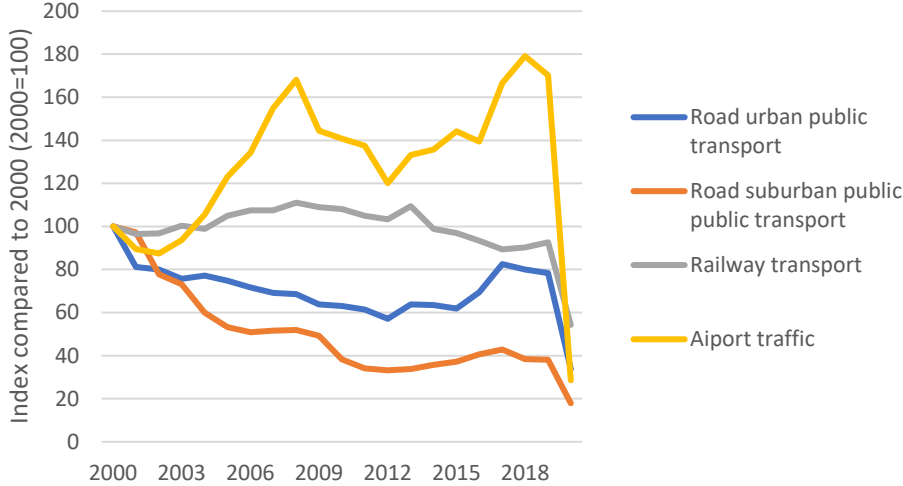


Figure 13: Number of passengers transported by urban, road suburban, rail and air passenger transport (source: SORS)

As a consequence of the geographical position of Slovenia and its export oriented economy, the high growth of goods traffic was further stimulated by the high international exchange of goods. This is also a consequence of the favourable position of Slovenia at the crossroads of European corridors V and X, where the traffic significantly increased after the last two EU enlargements. In addition, with joining the EU, many administrative obstacles for driving in the EU Member States (particularly acquisition of the limited number of permits) have been removed for Slovenian carriers. In Slovenia, a relatively small central European county, there is, as one could expect, a larger share of international and a smaller share of internal goods transport. The Port of Koper is also a major generator of freight transport in the country. Rapid growth of road and rail goods transport was additionally underpinned in the last decade, up to the crisis year 2009, by high economic growth, particularly in Eastern Europe. The increase in road goods transport of Slovenian carriers was almost three times higher than economic growth in the period 2001-2008. The global crisis caused only a slight setback in road and rail goods transport. In 2016, the volumes of road and rail goods traffic exceeded the volumes before the crises by 15% and 24%, respectively (GDP still being a bit lower than in 2008). The volume of road goods transport rose further in 2019, then fell slightly in 2020 (due to the pandemic-related measures), but reached a record level in 2021. Rail transport of goods also declined slightly in 2020, but rebounded in 2021.

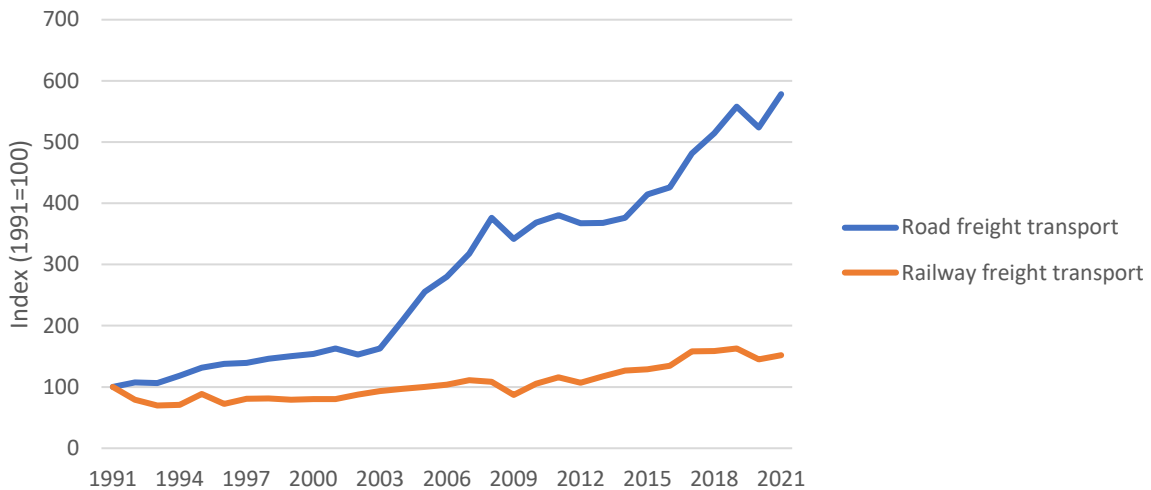


Figure 14: Data on road and rail transport of goods (source: SORS)

The share of rail transport of goods in total land transport has been declining in recent years, as it has not been able to keep up with the growth in road transport of goods. The highest share in 2017 was just over 31%, falling to 28.2% in 2020 (it declined more than road transport of goods during the pandemic), and slightly lower again in 2021 at 27.2%.

Greenhouse gas emissions from transport have been increasing simultaneously with the increase of energy consumption in this sector and have contributed a significant share to the overall GHG emissions in Slovenia. GHG emissions from transport almost tripled between 1986 and 2019. In 2020, emissions from transport accounted for 47% of total emissions from sectors not covered by the EU ETS. Emissions increased by 4% between 2005 and 2020. Due to the pandemic-related measures, emissions in 2020 were significantly lower than the previous year (by 18.7%). Road transport emissions account for 99.5% of the sector's emissions, with passenger transport contributing around two thirds of total emissions and freight transport accounting for one third.

2.8 Waste

The total amount of waste generated, which had been decreasing after the crisis in 2009, has been increasing again since 2012. In 2019, 8.4 million tonnes of different types of waste were generated, which is about 88% more than in 2012 when the lowest amount of waste was recorded due to a changed methodology and the decline in recorded construction waste. Up to the 2013 report, the municipal waste data only covers the share of municipal waste collected as part of public services. In 2021, Slovenia generated 9.4 million tonnes of waste, the main increase coming from construction waste (6 million tonnes in total). The amount of construction waste has been increasing steadily since 2012. Municipal waste accounted for 12%, with the remainder coming from activities including construction waste. In 2020, the amount of waste slightly decreased compared to the previous year. Compared to 2005, the amount of waste increased in 2020 and 2021, to 8,082,572 tonnes in 2021. The landfill rate also decreased in 2021, to just 4.5% (down from almost 25% in 2010). The recycling rate (excluding mineral waste) has increased compared to 2020, to 85.7% (compared to 63% in 2010). Since 2017 the recycling rate has been above 80%. The recycling rate of municipal waste is also

increasing, reaching almost 60% in 2021. However, the amount of waste in municipal landfills has risen slightly, to 75 kg/capita (down from 75 kg/capita in 2020).

2.9 Housing Stock and Urban Structure

According to SORS, the housing stock at the beginning of 2021 comprised just over 864,300 housing units, of which more than 80% were occupied. This is an increase in housing units from 2015. Over 36,000 housing units have been built in the period 2011-2021, the majority of which are owned by private individuals (87%). The average size of a housing unit in 2021 was 83 m². Most of the housing units have three or more bedrooms, 62% have three or more bedrooms, 25% have two bedrooms and 13% have one bedroom. Of all the occupied housing units, 60% were located in one- or two-dwelling houses, in which 66% of the population lived. Owner-occupied housing is characteristic of Slovenia, accounting for over 92% in 2021. Owner-occupiers or their family members lived in almost 79% of occupied housing units (80.8% in 2018).

Around 20% of housing units have no central heating and 5% have no bathroom. The largest number of housing units without central heating was located in the Obalno-kraška and Goriška statistical regions, which are warmer regions.

Table 2: Housing units according to period of construction and occupancy, Slovenia, 1 January 2021 (source: www.stat.si)

	Before 1946	1946–1970	1971–1990	1991–2010	2011 and later	Total	
	%	%	%	%	%	%	Number
Total	20	23	36	17	4	100	864,323
Populated	17	24	38	17	4	100	698,747
Unpopulated	30	20	28	16	6	100	165,576

2.10 Agriculture and Forestry

2.10.1 Agriculture

Slovenia had 68,331 agricultural holdings in 2020. Since 2000, when there were over 86,000 (74,646 in 2010), the number has been declining. On the other hand, the average acreage of arable land cultivated by a Slovenian farm has increased to 7.0 hectares in 2020 (compared to 5.6 hectares in 2000). In 2020, only 1% of farms cultivated more than 50 hectares. The number of such farms has almost quadrupled since 2000. In 2020, just over 23% of Slovenia's land area was used for agriculture. Pasture dominated with 57%, arable land accounted for 37% and permanent crops for 6%.

Gross value added in agriculture amounted to EUR 424 million in 2021, representing 0.8% of GDP, down from previous years (in 2020 and 2019, agriculture contributed 1.2% of GDP to gross value added). In 2021, agriculture recorded its lowest share of GDP over the observation period. The value of agricultural production was EUR 1,319 million (4% less than the previous year). The decline was mainly due to lower agricultural production of crops. The value of crop

production in 2021 was EUR 722 million, representing 55% of total agricultural production in 2021. Livestock production was worth EUR 564 million (43% of total agricultural production), up from EUR 564 million in 2020. Cattle farming is the most important production system in Slovenian agriculture.

In 2021, the number of people employed in agriculture remained stable at 73,607 (compared to around 80,000 in 2016), the vast majority of whom were self-employed.

2.10.2 Organic Farming

The share of agricultural area included in organic control is on the increase. In 2016, 5% of farms with 9% of all utilised agricultural holdings were included in the organic farming control system. In 2020, over 52,000 of agricultural plots of land in use (11% of all land in use) were included in organic farming. Organic farming is dominated by permanent grassland. Organic farming can mostly be found in areas with extensive grassland (karst areas in the regions of Primorska, Notranjska, Kočevsko, higher parts of Koroška), and least in the plains, where conditions are suitable for intensive farming. Wheat, spelt and grain maize are the dominant crops grown organically, while vegetable and strawberry production, the breeding of cattle and game, and beekeeping is also increasing. Mostly produced are dairy and meat products, fruit juices, vinegar, eggs, apples and oils.

2.10.3 Forestry

According to economic accounts for forestry, gross value added amounted to 0.7% of GDP in 2021, which is slightly higher than in 2020. The value of the forestry production was EUR 621 million, 32% more than in 2020. The growth happened due to the higher value of forestry products and services. The value of forestry products reached EUR 569 million in 2021, 32% more than in 2020. Standing timber (55%) and sawlogs (31%) accounted for the largest share, both slightly higher than the previous year, while fuelwood accounted for 9%. In 2021, 35% of wood products were exported, which means that 65% of the harvested wood raw material remained in Slovenia (4% more than in 2020). 89% of all wood used in households was used for space heating, 9% for sanitary water heating and 1% for cooking.

Forestry production employs 6,352 people, of which the majority are self-employed.

2.11 Industry

Slovenia is one of the most industrialised countries in Europe. This sector of the economy accounts for 24% of Slovenia's GDP. Manufacturing accounted for 23.6% of value added in 2019 (up from 25.1% in 1995). Energy-intensive industries, paper, metal and non-metallic mineral products production accounted for 8% of value added in manufacturing. In 2020, just under 22,000 businesses were active in Slovenia, 92% in manufacturing with 214,694 employees. One in five jobs in Slovenia is in manufacturing, compared to one in seven in the EU 27, which is another indicator of the high level of industrialisation in Slovenia. The share of investment in manufacturing is also high, at 23.1% in 2021, a good 3% lower than in 2017 but higher than in 2020.

SOURCE:

Statistical Office of the Republic of Slovenia: data via the SI-STAT portal

(<https://pxweb.stat.si/SiStat/sl>)

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3 GREENHOUSE GAS INVENTORY INFORMATION

3.1 Summary Tables

A short summary table is in the Annex B. The complete set of CRF tables can be found at <https://unfccc.int/documents/461867>

3.2 Description and Interpretation of Emission Trends by Gas

CO₂ emissions in 2020 represented 81.2% of overall emissions of greenhouse gases. CO₂ emissions excluding LULUCF followed the consumption of energy and with regard to their fraction exerted a major impact on total emissions. Compared to 1986, they decreased by 23.3% in 2020. CH₄ emissions represented 11.9% of total emissions in 2020 and were by 27.2% lower than in 1986. N₂O emissions represented 4.9% of total emissions and were by 6.8% lower than N₂O emissions in 1986. F-gases represented 2.0% of total emissions and some gases (HFCs and SF₆) have shown significant increase since 1995 (base year for F-gases), while PFC decreased drastically in 2008 and has continued to decrease in 2009. Since then, a slow increase of emissions was observed until 2016, and since then emissions are decreasing.

3.3 Description and Interpretation of Emission Trends by Source

According to the UNFCCC Reporting Guidelines, emissions estimates are grouped into five IPCC categories: Energy, Industrial Processes and Product Use, Agriculture, Land Use, Land-Use Change and Forestry, and Waste.

By far the most important sector is Energy, which in 2020 accounted for 79.1% of total GHG emissions. In this sector emissions have decreased by 23.9%, compared to the 1986. In the period between 1987-2020, GHG emissions from the Energy industries sector, which is the largest sub-sector in the base year, decreased by 34%. In the period 1999–2007, steep growth (+27%) has been recorded due to the increased consumption of electrical energy.

Undoubtedly the greatest increase in GHG emissions was observed in the transport sector, by as much as 200% until 2008, due to the increase in road transportation, while emissions from other kinds of traffic slightly declined. In 2009, GHG emissions from transport decreased by 16.3% compared to 2008. Since then, emissions fluctuate from year to year, but have never reached the 2008 peak. Due to the Covid-19 “lock down” 2020 emissions in the transport sector decreased by 18.7% compared to the previous year.

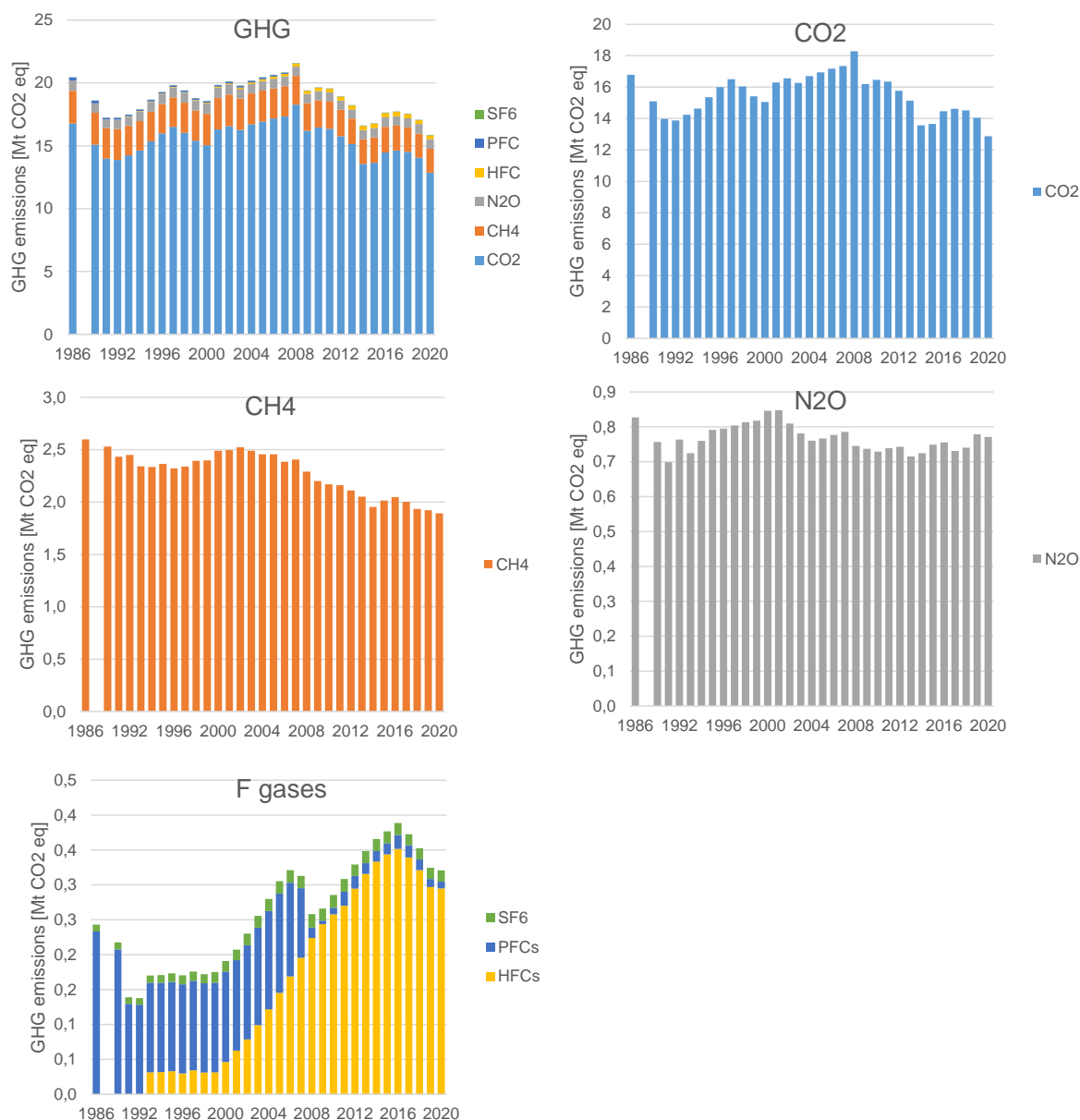


Figure 15: GHG Emissions in Slovenia by gas (source: EARS)

There was an appreciable reduction of GHGs from Manufacturing industry between 1986 and 2001 (-50.3%). After 2001, a stabilisation of emissions was observed until 2008. Due to the global financial crisis, emissions from Manufacturing industry and construction decreased in 2009 by 15.6%. In the following years, emissions decreased further, and in the 2015, due to the economic crises, emissions from Manufacturing Industries and Construction were 31.3% lower than emissions in 2008. Due to the economic recovery in the last years emissions started to increase again – however due to the Covid-19 measures emissions in 2020 were by 2.4% lower than in the previous year.

Emissions from the Other sectors fluctuate a lot from year to year due to changes in air temperature in winter time but also due to changes in the use of wood biomass in the households, since Slovenian households can quickly change fuel oil with wood biomass. Overall trend of emissions in this sector is strongly downward, since implementation of

measures, especially in the households, has been quite successful. Emissions in 2020 have been 48.1% lower compared to 1986.

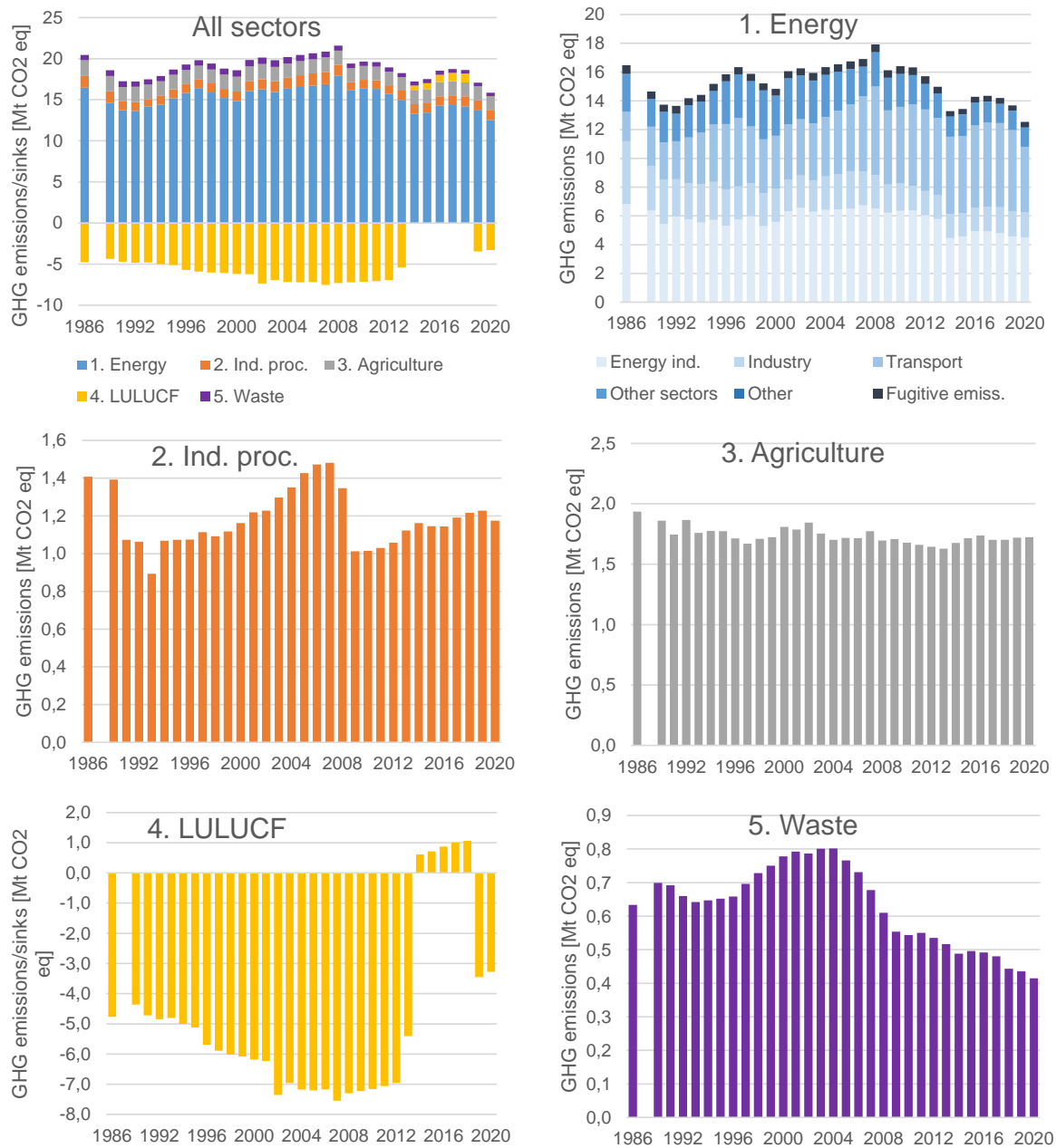


Figure 16: GHG Emissions in Slovenia by sector (source: EARS)

Fugitive emissions from fuel represented only 2.4% of emissions in the sector and have decreased by 35.8% compared to the emissions in 1986.

Since 1986, GHG emissions from Industrial Processes at first fell sharply to reach their lowest value in 1993, but then started to rise again and were in 2007 6.0% above 1986 level. Due to the global financial crises and lower industrial production, emissions in 2009 were 28.2% below the 1986 emissions but in the period 2009 – 2019 slowly increased by 21.3% while in 2020 emissions decreased by 4.3% due to the Covid-19 measures. The most important GHG of this sector was carbon dioxide, with 67.1% of emissions from this category, followed by HFCs with 25.1%, N₂O with 5.6%, SF₆ with 1.4%, and PFCs with 0.8%. In this sector, no CH₄

emissions have occurred since 2011. The main source of emissions is Mineral industry, of which the production of cement and lime alone contributed 45.5% of the emissions in this sector.

In Agriculture, as the second most important sector, emissions in 2020 amounted to 1,724 Gg CO₂ eq, which represents 10.9% of all emissions. Agriculture represents the main source of methane and N₂O emissions, namely 61.9% of all methane emissions and 67.5% of all N₂O emissions. In the agricultural sector, CH₄ emissions accounted for 68.0% of emissions and N₂O emissions accounted for 30.2% of emissions, while CO₂ emissions accounted for 1.8% only.

GHG emissions from agriculture show small oscillations for individual years, but the general trend is on the decrease. In 2020, emissions were 11.0% below the emissions in the base year. Emissions have decreased in all key categories but the most influence on the overall decrease is decrease in the CH₄ emissions from manure management due to the decrease in the number of swine and improved manure management on farms. In enteric fermentation, emissions decreased due to the intensification of dairy cow breeding, while in agricultural soils emissions decreased due to the better control of nitrogen input to soil.

The most important sub-sector represented emissions from enteric fermentation, which contributed 54.6% of all emissions from agriculture, followed by emissions from agricultural soils, with 25.6%; the rest is contributed by emissions of methane and N₂O from animal manure (18.0%) while CO₂ emissions due to the liming and application of urea and other C-containing fertilizers represented only 1.8% of emissions in this sector.

The total net removals of CO₂ from the LULUCF sector were -3,280 Gg CO₂ eq and were lower than in the base year. The maximum value of net removals was in 2007. Since then, the net removals in the LULUCF sector have been decreasing, which was initially related to change in national forest policy (adoption of the National Forest Programme). However, since 2014 Slovenian forests have been significantly affected by natural disturbances. Sanitary cut in damaged forests has increased for around 50% in the period 2014-2018, when the whole sector become a source of GHG emissions. In the last years the situation in the forests has improved but the net GHG sinks in 2020 were still by 39.3% lower than in the year 2013.

Methane emissions from the Waste sector are the second largest source of methane and represented 18.4% of all methane emissions in Slovenia in 2020. The fraction of methane emissions in this sector amounted to 84.1%, while the remaining part represented N₂O (11.2%) and CO₂ emissions (4.7%). Solid waste handling contributes 49.7% to the total emissions from this sector, wastewater handling 40.9, %, incineration of waste 4.7%, and composting 4.7%. Emissions in 2020 were by 34.5% lower than in 1986. Emissions from solid waste disposal started to decline in 2005 and since then emissions have decreased by 58.9% due to the strong decrease of deposited biodegradable part of municipal waste and an increase in gas recovery. In 2013 the emissions were the first time lower compared to the base year and were lower by 29.6% in 2020. Emissions from waste waters were by 49.9% lower than in the base year what is mostly due to recovery of gas in wastewater treatment plants and the decrease in industrial production.

3.4 National Inventory System

3.4.1 National Entity

In Slovenia, the institution responsible for GHG inventories is the Slovenian Environment Agency (SEA). The contact information of the entity is:

Republic of Slovenia

Ministry of the Environment and Spatial Planning⁵

Slovenian Environment Agency

Phone: +386 (0)1 478 40 00, Fax: +386 (0)1 478 40 52

E-Mail: gp.arso@gov.si

Address: Agencija RS za okolje, Vojkova 1b, SI-1000 Ljubljana

Internet: www.arso.gov.si

Contact person:

Tajda Mekinda Majaron

Phone: +386 (0)1 478 44 27, Fax: +386 (0)1 478 40 52

E-Mail: tajda.mekinda-majaron@gov.si

3.4.2 Description of Institutional Arrangements for Inventory Preparation

In Slovenia, the institution responsible for GHG inventories is the Slovenian Environment Agency (SEA). In accordance with its tasks and obligations to international institutions, the SEA is charged with making inventories of GHG emissions, as well as emissions that are defined in the Convention on Long Range Transboundary Air Pollution within the specified time limit. In making the inventories, the Environmental Agency cooperates with numerous other institutions and administrative bodies which relay the necessary activity data and other necessary data for the inventories.

A Memorandum of Understanding has been concluded with the Statistical Office of the Republic of Slovenia (SORS) to submit quality and verified data to the Environmental Agency in due time, because the time limits for inventories and the NIR have shortened with the entry of Slovenia into the EU, since inventories and part of the NIR for the year before last must be made by 15th of January, and with corrections and final submission of the NIR by 15th of March.

⁵ This is the situation at the time of submission of the latest inventory. In the beginning of 2023 ministries have been reorganized, so that Slovenian Environment Agency will fall under Ministry of Environment, Climate and Energy.

In view of this, an agreement has been reached with the participating institutions to shorten the time limits for submitting data. All sources of data for GHG inventory are presented in the Table 1 while the Figure 3 shows the data flows.

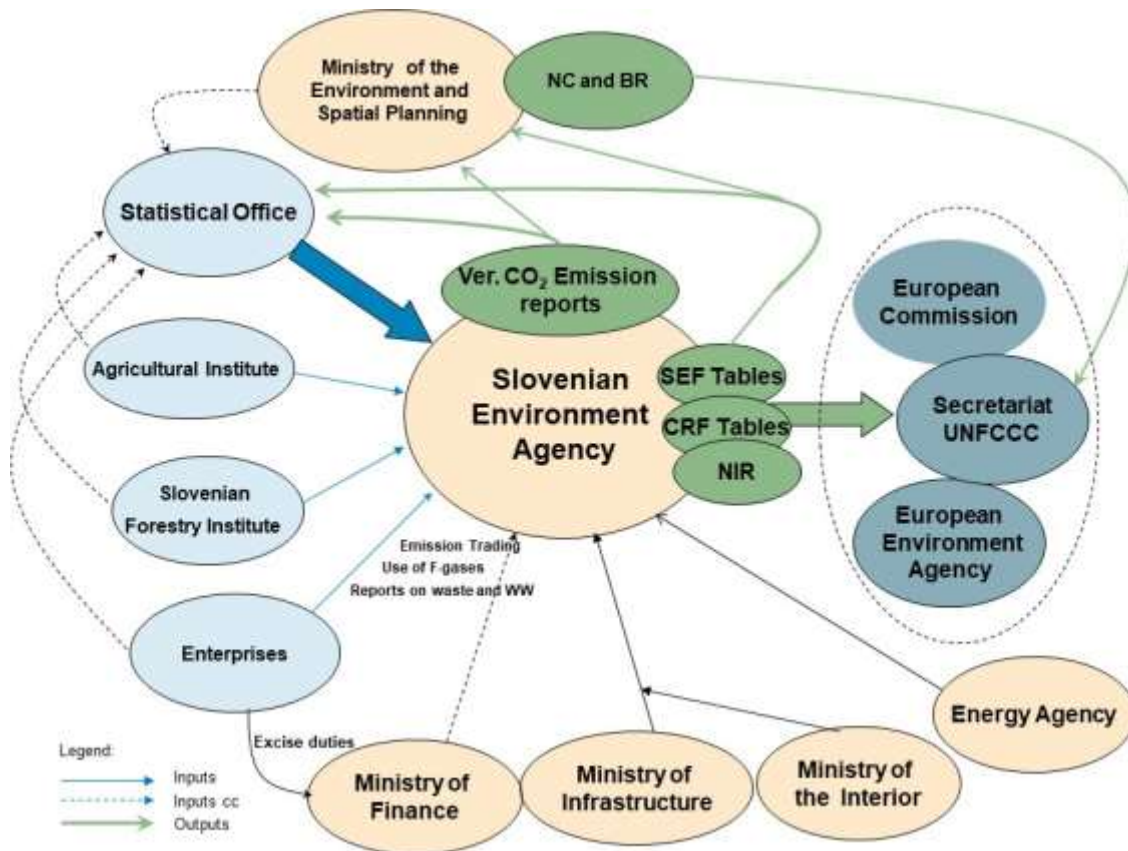


Figure 17: Data flows in the Slovenian Inventory System

The year 2003 saw the end of the process of harmonisation of data collection among the Directorate of Energy, Ministry of Infrastructure⁶, and the Statistical Office of the Republic of Slovenia. An end was put to previous parallel collecting of data. The competence of collecting data has, by law, passed to the SORS, which checks the data and eliminates potential reporting errors, and submits consolidated data to the Directorate of Energy, which has been publishing data until 2005 in its Energy Yearbook of the Republic of Slovenia. In terms of content, the data were identical to those submitted in the Joint Questionnaires to the IEA.

Table 3: Data Sources

IPCC category	IPCC sub-category	Sources of data
1.A – Energy: Fuel Combustion	1 Energy Industry	<ul style="list-style-type: none"> • Statistical Office of the Republic of Slovenia: Joint Questionnaires, Energy Balances, annual energy statistics • Slovenian Environment Agency: EU ETS data

⁶ In the reorganized government from 2023 onward, Directorate of Energy will be a part of the Ministry of the Environment, Climate and Energy.

IPCC category	IPCC sub-category	Sources of data
	2 Manufacturing Industries and Construction	<ul style="list-style-type: none"> • Statistical Office of the Republic of Slovenia: Joint Questionnaires, Energy Balances, annual energy statistics • Slovenian Environment Agency: EU ETS data
	3 Transport	<ul style="list-style-type: none"> • Statistical Office of the Republic of Slovenia: Joint Questionnaires, Energy balances • Ministry of Infrastructure - Directorate for National Roads (DRSC) • Eurocontrol • Plinovodi d.o.o.
	4 Other Sectors	<ul style="list-style-type: none"> • Statistical Office of the Republic of Slovenia:
	5 Other	<ul style="list-style-type: none"> • Slovenian Army: • Police
1.B Energy: Fugitive Emissions		<ul style="list-style-type: none"> • Statistical Office of the Republic of Slovenia: • Slovenian Environment Agency: EU ETS data • Energy Agency
CRF 2 – Industrial Processes and Product Use	CRF 2A – Mineral Products	<ul style="list-style-type: none"> • Statistical Office of the Republic of Slovenia: • Slovenian Environment Agency
	CRF 2B – Chemical Industry	<ul style="list-style-type: none"> • Statistical Office of the Republic of Slovenia:
	CRF 2C – Metal Production	<ul style="list-style-type: none"> • Statistical Office of the Republic of Slovenia: • Slovenian Environment Agency
	CRF 2D – Non-energy Products	<ul style="list-style-type: none"> • Statistical Office of the Republic of Slovenia: • Slovenian Environment Agency
	CRF 2F – ODS Substitutes	<ul style="list-style-type: none"> • Slovenian Environment Agency • Ministry of Finance • Ministry of the Environment and Spatial Planning⁷ • Statistical Office of the Republic of Slovenia • Health Insurance Institute of Slovenia
	CRF 2G – Other product	<ul style="list-style-type: none"> • Statistical Office of the Republic of Slovenia • Slovenian Environment Agency
CRF 3 – Agriculture		<ul style="list-style-type: none"> • Statistical Office of the Republic of Slovenia • Agricultural Institute of Slovenia
CRF 4 – Land Use, Land Use Change, and Forestry		<ul style="list-style-type: none"> • Slovenian Forestry Institute • Agricultural Institute of Slovenia
CRF 5 – Waste	A. Solid waste disposal	<ul style="list-style-type: none"> • Slovenian Environment Agency • Statistical Office of the Republic of Slovenia

⁷ In the reorganized government this field will be covered by the Ministry of the Environment, Climate and Energy

IPCC category	IPCC sub-category	Sources of data
	B. Biological treatment of solid waste	<ul style="list-style-type: none"> • Slovenian Environment Agency • Statistical Office of the Republic of Slovenia
	C. Incineration and open burning of waste	<ul style="list-style-type: none"> • Slovenian Environment Agency
	D. Waste water treatment and discharge	<ul style="list-style-type: none"> • Slovenian Environment Agency • Statistical Office of the Republic of Slovenia

At the beginning of 2007, the agreement between Statistical Office of the Republic of Slovenia and the Environmental Agency came into force. Accordingly, all statistical data necessary for preparing GHG inventories are available each year by October 30 at the latest. In exchange, EU ETS data and emission estimates are reported to the Statistical Office within a defined time frame. However, energy statistical data are usually not final due this date and some changes could occur as long as by the mid-January.

In 2014 the new agreement has been signed which includes more data sets and updated time lines. However, SORS tightened the access and publication of confidential information has been tightened with this agreement.

Experts from the Slovenian Forestry Institute and the Agricultural Institute of Slovenia work on GHG inventories according to the standing rules of institutes (ordinance). Financing is assured by governmental institutions according to the yearly work plan. All data from external institutions are submitted to the Slovenian Environmental Agency, where they are archived.

The detailed process from gathering data to emissions calculation and reporting is described in the Manual of Procedures, which was first prepared in 2005 and further updated in 2009. In 2014 a completely new Manual has been prepared, which follows the structure and methodology of the 2006 IPCC GL and includes also the new sources of GHG

No changes have been made to the national inventory arrangements since the last NC submission.

3.4.3 Brief Description of the Process of Inventory Preparation

A process of inventory preparation is designed according to the PDCA-cycle (Plan – Do – Check – Act). This is a generally accepted model for pursuing a systematic quality work according to international standards, in order to ensure the maintenance and development of the quality system. This structure is in accordance with structures described in decision 19/CMP.1 and in the 2006 IPCC Guidelines. The system consists of inventory planning, inventory preparation, inventory quality checking and follow-up improvements which are integrated into the annual cycle and preparation as illustrated in the Figure 18.

Owing to the ever-increasing obligations of Slovenia with regard to reporting, the SEA has decided to implement a unified system of data collection for the purposes of making inventories, as well as secure reliable financing in accordance with the annual program of its work.

For submitting reports to different institutions, various report formats have been devised, since the same data are used to report to the UNFCCC, EEA, EC, and CLRTAP. All external reports of the SEA are prepared in accordance with ISO 9001 via the Agency's reporting service, which keeps inventories of reports. Parallel to this, emissions data are submitted to the SORS, which makes them available in its publications and submits them to EUROSTAT and the IEA.

Inventories of GHG emissions were prepared on the basis of the IPCC methodology as presented in the 2006 IPCC Guidelines for all gases and sectors. Due to the importance of the source and accessibility of activity data, different approaches (tiers) from the IPCC methodology were used (Table 4,

Table 5).

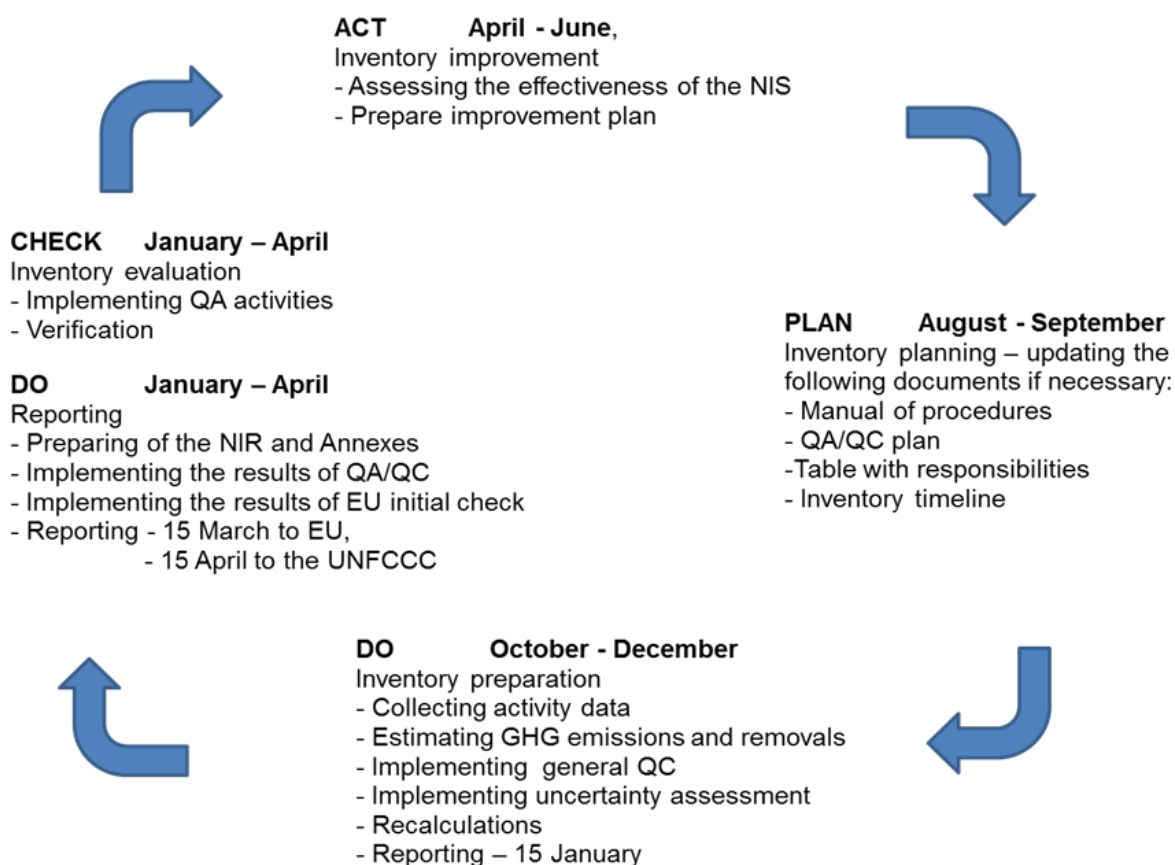


Figure 18: The inventory cycle.

In the Energy sector, mainly national/plant specific CO₂ emission factors were used for assessment of emissions from solid fuels, petroleum coke and natural gas (Tier 2/3), while default IPCC emission factors were mainly used for other types of fuels. The quantities of fuels and consumed fuel energy values were taken from the SORS. Additional data on the energy use of some types of waste (waste tyres, oils and solvents) were acquired from the verified EU ETS reports. Data on fuel consumption in agriculture and forestry refer to mobile sources only, while the rest of the fuel consumption of these sub-sectors is included in the Institutional and commercial sector. GHG emissions in road transport were determined with the COPERT 5 model using default EFs from the model.

Emission factors for fugitive emissions of CO₂ and CH₄ in mining and post mining activities were determined on the basis of measurements of methane concentrations in ventilation

shafts in mines and estimated quantities of released methane and, not very common, also a considerable amount of CO₂. The CH₄ emission factor that was determined in this manner was lower than the default IPCC emission factor. CO₂ emissions in post-mining activities were not assessed, as no estimation method is available. Following 2006 IPCC GL CH₄ emissions from abandoned and closed mines have been also included in the inventory using Tier 2 method and default parameters. Under other CO₂ emissions due to the flue gas desulphurisation are included.

Fugitive emissions from Oil and natural gas have been calculated using default EFs from 2006 IPCC Guidance. The old method for calculating CH₄ emissions from the distribution of natural gas, which were estimated according to the length of individual types of transmission or distribution pipelines with regard to the pipe type, material and pressure, applying specific losses per unit of length has been used only for the QA purpose.

Until 1997 emissions from Industrial processes and Product Use were mostly determined on the basis of statistical data on production and consumption of raw materials and by applying country-specific emission factors. After 1997, the SORS partly changed the method of collecting and presenting these data and therefore most of the data were obtained directly from individual companies. These data have also been used for preparing our National Allocation Plan for EU ETS. Since 2005, data from verified reports have mostly been used while in some cases (aluminium until 2013 and ferroalloy production) the plant data had to be obtained. In determining actual emissions caused by the use of HFCs, data were obtained from companies that have such devices and companies that maintain these devices. For SF₆ emissions, the release of this gas from gas-insulated switchgear for electricity was assessed

In Agriculture, methane emissions from enteric fermentation and manure management in bovine animals were determined using Tier 2 approach and the Tier 1 approach was used for other animals that represent a smaller fraction in methane emissions. Input data for N₂O emissions from manure handling and from direct and indirect emissions from fertilisation with animal fertilisers were obtained in the process of estimating methane emissions. For N₂O emissions, CS parameters but default IPCC emission factors were used. A default EF and Tier 1 approach has been used for calculation of CO₂ emissions from liming and application of urea and other C containing fertilizers.

Emissions and removals from the LULUCF sector have been estimated for the six broad land-use categories: Forest land, Cropland, Grassland, Wetlands, Settlements and Other land. The estimation is based on methodologies of the 2006 Guidelines for National Greenhouse Gas Inventories, supplemented by country-specific methods. Estimates of GHG emissions and removals in this sector are calculated from carbon stock changes in the five carbon pools (above-ground biomass, below-ground biomass, dead wood, litter, and soil organic carbon), direct N₂O emissions from N fertilization, N₂O emissions from drainage of soils, N₂O emissions from disturbance associated with land-use conversion to cropland, and non-CO₂ emissions from biomass burning. Country-specific emission factors and carbon stock values for forests and partially for cropland and grassland are derived from surveys and measurements. For other land use categories, the IPCC default values or expert judgements are used.

Methane emissions from solid waste handling were determined by the first order decay model from the 2019 Refinement to the 2006 IPCC GL, which takes into account the difference in the

time dynamics of methane release from different types of waste. Emissions of CH₄ and N₂O from wastewater and composting, as well as GHG from waste incineration were calculated using the default method.

Table 4: Summary report for methods and emission factors used for CO₂, CH₄ and N₂O⁸

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO ₂		CH ₄		N ₂ O	
	Method applied	EF	Method applied	EF	Method applied	EF
1. Energy	M,T1, T2,T3	CS, D, M, PS	M, T1, T2, T3	CS, D, M, PS	M, T1	D, M
A. Fuel combustion	M,T1, T2,T3	CS, D, M, PS	M, T1, T2	CS, D, M	M, T1	D, M
1. Energy industries	T1, T2	CS, D, PS	T1	D	T1	D
2. Manufacturing ind. and const.	T1, T2, T3	CS, D, PS	T1	D	T1	D
3. Transport	M, T1, T2	CS, D, M	M, T1	D, M	M, T1	D, M
4. Other sectors	T1, T2	CS, D	T1, T2	CS, D	T1	D
5. Other	T1	D	T1	D	T1	D
B. Fugitive emissions from fuels	T1, T3	D, PS	T1, T2, T3	CS, D, PS	T1	D
1. Solid fuels	T1, T3	D, PS	T2, T3	CS, D, PS	NA	NA
2. Oil and natural gas	T1	D	T1	D	T1	D
2. Industrial Processes	D, M, T1, T2, T3	CS, D, M, PS	NA	NA	D	D
A. Mineral Products	T2, T3	CS, D	NA	NA	NA	NA
B. Chemical Industry	T2, T3	CS	NA	NA	NA	NA
C. Metal Production	T1, T2	CS, D, PS	NA	NA	NA	NA
D. Non-Energy Product	M, T1	D, M				
F. Substitutes for ODS						
G. Other product man. and use	NA	NA	NA	NA	D	D
3. Agriculture	T1	D	T1, T2	CS, D	T1, T2	CS, D
A. Enteric Fermentation			T1, T2	CS, D		
B. Manure Management			T1, T2	CS, D	T1, T2	CS, D
D. Agricultural Soils			NA	NA	T1, T2	CS, D
G. Liming	T1	D	NA	NA	NA	NA
H. Urea application	T1	D	NA	NA	NA	NA
I. Other C-containing fertilizers	T1	D	NA	NA	NA	NA
4. LULUCF	CS,D,T1,T2, T3	CS, D	D, T1	D	D, T1, T2	D
A. Forest Land	CS,D,T1,T2,T3	CS, D	D,T1	D	D, T1	D
B. Cropland	CS, D, T1,T2	CS, D	NA	NA	D, T1	D
C. Grassland	D,T1,T2	CS, D	NA	NA	D, T1	D
D. Wetlands	D,T1,T2	CS, D	NA	NA	NA	NA
E. Settlements	D, T2	CS, D	NA	NA	D, T1, T2	D
F. Other Land	D, T2	CS, D	NA	NA	D, T2	D
G. HWP	D, T1	D	NA	NA	NA	NA
5. Waste	T1	D	T1, T2	CS, D	T1	D

⁸ Explanation of abbreviations used in the table: M – model; T1, T2, T3 –Tier 1, 2, 3; CS – Country specific; D – default; PS – plant specific; NA – not applicable

A. Solid Waste Disposal	NA	NA	T2	CS, D		
B. Biological Treatment			T1	D	T1	D
C. Incineration	T1	D	T1	D	T1	D
D. Waste-water Treatment	NA	NA	T1	CS, D	T1	D

Table 5: Summary report for methods and emission factors used for F-gases

	HFCs		PFCs		SF6	
	Method applied	EF	Method applied	EF	Method applied	EF
2. Industrial Processes	T1, T2	CS, D	T3	D, PS	T2	CS
C. Metal Production	NA	NA	T3	D, PS	NA	NA
F. Substitutes for ODS	T1,T2	CS, D	NA	NA	NA	NA
G. Other product man. and use	NA	NA	NA	NA	T2	CS

3.4.4 Brief Description of Key Source Categories

The analysis of key source categories was performed on the basis of sectoral distribution and use of the approach 1. This approach was used both for the base year and for the year 2020. A level assessment was undertaken for 1986 and 2020, and a trend assessment was performed for 2020. The analyse has been performed at a level of IPCC categories as suggested in Table 4.1 in Volume 1 of 2006 IPCC Guidelines. The results are presented in the Table 6.

The analyses have been performed with and without LULUCF sector. On the basis of the KCA including LULUCF, 29 categories were selected as keys in 2020 according to the level assessment, and additional 10 were chosen as key categories according to the trend assessment only. As many as 22 categories are key sources according to level and trend KC analysis.

The most of the 39 key categories are from Energy sector (18): 13 categories are CO₂ emissions from fuel combustion, two are CH₄ emissions from biomass and solid fuel combustion in the residential sector, one is N₂O emissions from diesel oil in Road Transportation, and remaining two are CH₄ fugitive emissions from Coal mining and handling and CO₂ emissions from SO₂ Scrubbing. The second most important sector is LULUCF with 9 key categories, four KCs are in the industrial processes and five in the Agriculture sector, where 2 are related to methane emissions and 3 to N₂O emissions, and three KC are in the Waste sector. On the basis of the Tier 1 analysis excluding LULUCF two non-KC become KC according to the level and one become KC according to the trend.

In 2010 a Tier 2 key categories analyse has been done for level assessment only and as much as 27 categories have been determined as keys. Mainly due to the large uncertainty, the most KC were in Agriculture sector (9), following by LULUCF (5), Road transport (4), Waste (3), Fuel combustion in Residential sector (2), Fugitive emissions from solid fuels (2), Consumption of HFCs (1) and Electricity and heat production (1).

The Energy and Industrial processes sectors have already largely improved with inclusion of big emitters in EU ETS. The use of default EFs for liquid fuels, mostly fuel oil, represents the

main deficiency. Due to the unavailability of resources needed to develop CS EF, the verification of default EFs have been made for the 2014, 2019 and 2022 submission.

The Agriculture sector has improved a lot in the past. Unfortunately, methodologies for calculation of emissions from agricultural soils are not planned for further improvement. It has been assessed that resources (financial and personal) for determination of CS N₂O EFs in this category are unreasonably high for the expected results.

We are improving HFC emissions from Refrigeration and AC with regular updates of the data on stock. In this submission the improved data related to fire protection has been introduced.

In addition in 2018, the qualitative approach has been also used to determine key source categories but no additional categories have been found to be keys. For determination the following criteria has been included: mitigation techniques and technologies, high expected emission growth, high uncertainty and unexpected low or high emissions.

Table 6: IPCC Key Source Categories for 2020, Approach 1

IPCC Category	Gas	with LULUCF	w/o LULUCF additional
1.A.1 Energy Industries, Gaseous Fuels	CO ₂	L, T	
1.A.1 Energy Industries, Liquid Fuels	CO ₂	T	
1.A.1 Energy Industries, Solid Fuels	CO ₂	L, T	
1.A.2 Manufacturing Industries and Const., Gaseous Fuels	CO ₂	L, T	
1.A.2 Manufacturing Industries and Const., Liquid Fuels	CO ₂	L, T	
1.A.2 Manufacturing Industries and Const., Other Fuels	CO ₂	L, T	
1.A.2 Manufacturing Industries and Const., Solid Fuels	CO ₂	L, T	
1.A.3.b Road Transportation, Diesel Oil	CO ₂	L, T	
1.A.3.b Road Transportation, Diesel Oil	N ₂ O	T	
1.A.3.b Road Transportation, Gasoline	CO ₂	L, T	
1.A.3.c Railways, Liquid Fuels	CO ₂	T	
1.A.4 Other Sectors, Biomass	CH ₄	L	
1.A.4 Other Sectors, Gaseous Fuels	CO ₂	L, T	
1.A.4 Other Sectors, Liquid Fuels	CO ₂	L, T	
1.A.4 Other Sectors, Solid Fuels	CO ₂	T	
1.A.4 Other Sectors, Solid Fuels	CH ₄	T	
1.B.1.a Fugitive Emissions, Coal Mining and Handling	CH ₄	L, T	
1.B.1.c Fugitive Emissions, Other	CO ₂	T	L
2.A.1 Industrial processes, Cement Production	CO ₂	L, T	
2.A.2 Industrial processes, Lime Production	CO ₂	T	
2.B.6 Industrial processes, Titanium dioxide production	CO ₂		T
2.C.3 Industrial processes, Aluminium Production	CO ₂		L
2.C.3 Industrial processes, Aluminium Production	PFC	T	
2.F.1 Industrial processes, Refrigeration and Air Conditioning	HFC	L, T	
2.G.3 Industrial processes, N ₂ O from product use	N ₂ O		L

IPCC Category	Gas	with LULUCF	w/o LULUCF additional
3.A Agriculture, Enteric Fermentation	CH ₄	L, T	
3.B Agriculture, Manure Management	CH ₄	L	
3.B Agriculture, Manure Management	N ₂ O	L	
3.D.1 Agriculture, Direct N ₂ O Emissions from Managed Soils	N ₂ O	L, T	
3.D.2 Agriculture, Indirect Emissions from Managed Soils	N ₂ O	L	
4.A.1 LULUCF, Forest Land remaining Forest Land	CO ₂	L, T	
4.A.2 LULUCF, Land converted to Forest Land	CO ₂	L, T	
4.B.1 LULUCF, Cropland remaining Cropland	CO ₂	L	
4.B.2 LULUCF, Land converted to Cropland	CO ₂	L, T	
4.C.2 LULUCF, Grassland remaining Grassland	CO ₂	L, T	
4.C.2 LULUCF, Land converted to Grassland	CO ₂	T	
4.E LULUCF, Land converted to Settlements	CO ₂	L, T	
4.E LULUCF, Settlements remaining Settlements	CO ₂	L, T	
4.G LULUCF, Harvested wood products	CO ₂	L, T	
5.A.1 Waste, Managed waste disposal sites	CH ₄	L	
5.D.1 Waste, Domestic and Commercial Waste Water	CH ₄	L	
5.D.2 Waste, Industrial Wastewater	CH ₄	T	

Key source categories have received special considerations in terms of improvements and QA/QC. In the Table 7 and Table 8 methodologies used to calculate emissions from the key categories are presented.

Table 7: Methodologies used for key categories according to the level in 2020

IPCC Category	Gas	Methodology	EF and other parameters
1.A.1 Energy Industries, Gaseous Fuels	CO ₂	Tier 2	CS
1.A.1 Energy Industries, Solid Fuels	CO ₂	Tier 3	PS
1.A.2 Manufacturing Industries and Construction, Gaseous Fuels	CO ₂	Tier 2	CS
1.A.2 Manufacturing Industries and Construction, Liquid Fuels	CO ₂	Tier 1	D
1.A.2 Manufacturing Industries and Construction, Solid Fuels	CO ₂	Tier 3	PS
1.A.2 Manufacturing Industries and Construction, Other Fuels	CO ₂	Tier 1, Tier 3	D, PS
1.A.3.b Road Transportation, Diesel Oil	CO ₂	Model	Model
1.A.3.b Road Transportation, Gasoline	CO ₂	Model	Model
1.A.4 Other Sectors, Gaseous Fuels	CO ₂	Tier 2	CS
1.A.4 Other Sectors, Liquid Fuels	CO ₂	Tier 1	D
1.A.4 Other Sectors, Biomass	CH ₄	Tier 2	CS
1.B.1.a Fugitive Emissions, Coal Mining and Handling	CH ₄	Tier 3	PS
1.B.1.c Fugitive Emissions, Other	CO ₂	Tier 1	D
2.A.1 Industrial processes, Cement Production	CO ₂	Tier 3	PS
2.C.3 Industrial processes, Aluminium Production	CO ₂	Tier 3	PS
2.F.1 Industrial processes, Refrigeration and AC Equipment	HFC	Tier 2	CS, D

IPCC Category	Gas	Methodology	EF and other parameters
2.G.3 Industrial processes, N2O from product use	N ₂ O	D	D
3.A Agriculture, Enteric Fermentation	CH ₄	Tier 1, Tier 2	CS, D
3.B Agriculture, Manure Management	CH ₄	Tier 1, Tier 2	CS, D
3.B Agriculture, Manure Management	N ₂ O	Tier 1, Tier 2	CS, D
3.D.1 Agriculture, Direct Soil Emissions	N ₂ O	Tier 1	D
3.D.1 Agriculture, Indirect Soil Emissions	N ₂ O	Tier 1	D
4.A.1 LULUCF, Forest Land remaining Forest Land	CO ₂	CS, D, Tier 1-3	CS, D
4.A.2 LULUCF, Land converted to Forest Land	CO ₂	D, Tier 1-3	CS, D
4.B.1 LULUCF, Cropland remaining Cropland	CO ₂	D, Tier 1 - 2	CS, D
4.B.2 LULUCF, Land converted to Cropland	CO ₂	D, Tier 1 - 2	CS, D
4.C.1. LULUCF, Grassland remaining Grassland	CO ₂	D, Tier 1-3	CS, D
4.E.1 LULUCF, Settlements remaining Settlements	CO ₂	D, Tier 2	CS, D
4.E.2 LULUCF, Land converted to Settlements	CO ₂	D, Tier 2	CS, D
4.G LULUCF, Harvested wood products	CO ₂	D	D
5.A.1 Waste, Managed waste disposal sites	CH ₄	Tier 2	CS, D
5.D.1 Waste, Domestic and commercial Waste Waters	CH ₄	Tier 1	CS, D

According to both analyses (Tier 1 and Tier 2), the most important key categories are from LULUCF sector. For 2012 submission the LULUCF sector was highly improved using the newest data from 2012 forest inventory and with additional support from experts from JRC and from EU support project. For the 2017 submission emissions and sinks in LULUCF have been further improved with the introduction of new land transition matrix and inclusion of results from the latest national forest inventory 2017. In 2021 the LULUCF sector has undergone a comprehensive voluntary EU review.

Table 8: Methodologies used for key categories according to the trend only in 2020

IPCC Category	Gas	Methodology	EF and other parameters
1.A.1 Energy Industries, Liquid Fuels	CO ₂	Tier 1	D
1.A.3.b Road Transportation, Diesel Oil	N ₂ O	Model	Model
1.A.3.c Railways, Liquid Fuels	CO ₂	Tier 1	D
1.A.4 Other Sectors, Solid Fuels	CO ₂	Tier 1	D
1.A.4 Other Sectors, Solid Fuels	CH ₄	Tier 1	D
2.A.1 Industrial processes, Lime Production	CO ₂	Tier 3	PS
2.B.6 Industrial processes, Titanium dioxide production	CO ₂	Tier 1	D
2.C.3 Industrial processes, Aluminium Production	PFC	Tier 3	PS
4.C.2 LULUCF, Land converted to Grassland	CO ₂	D, Tier 1 - 2	CS, D
5.D.1 Waste, Industrial Wastewaters	CH ₄	Tier 1	CS.D

3.4.5 Main Reasons for Recalculating GHG Estimates

From the previous submission of the National communication the numerous recalculations of GHG emissions have been made. Almost all recalculations were due to recommendations from the various reviews which were held in the period 2017 - 2021. The most important were from the UNFCCC reviews in 2017, 2018, and 2020, but some recommendations were also from the European ESD in NECD reviews, that are held every year.

In the Energy sector the most important recalculations have been due to the harmonization of data on fuel used in the inventory with national statistics data. These recalculations affected almost all source categories from the stationary fuel consumption as well as emissions from Road transport. This sector has also other improvements, the most important is upgrading the Copert model from Copert 4 to the latest version of Copert 5 in 2021 submission while the CO₂ emissions from the fossil part of biodiesel have been calculated already for the 2020 submission. Another important improvement was made in 2021 when GHG emissions from Domestic navigation and Fishing have been calculated for the first time and emissions have been reallocated from the road transport sector. In this year submission, the most important improvement was the acquisition of data on the composition of natural gas and update of the country specific CO₂ EF.

In the IPPU sector the category with the most recalculations is 2.F Product uses as substitutes for ODS. The most important recalculations in this category were in 2019, when emissions of F gases for the years 1993 and 1994 have been included in the inventory for the first time what has also the influence on the disposal emissions in the later years. In the same submission the methodology for calculation of HFC-134a emissions from MAC was improved in the way that actual data on vehicle fleet and recycled vehicles are used. However, the F-gases database is improving every year and small recalculations are made in every GHG submission. Regarding other IPPU categories the most recalculations are in the 4.5 Non-energy products from fuels and solvents use, where lubricants and urea use are related to the road transport and every change in this sector causes changes also in the IPPU sector.

For emissions from Agriculture sector emissions of air pollutants NO_x and NH₃ which are calculated for the CLRTAP and NECD reporting are of big importance. Many recalculations of the N₂O emissions in this sector were therefore due to the new EMEP/EEA 2019 guidelines, and new default EFs and nitrogen excretion rates. The Agriculture sector has also the specific that recalculations in one category trigger recalculations also in other categories. For all this reasons the recalculations in this sector are frequent and numerous but they are not significant. Other recalculations in this sector were due to the inclusion of new sources like emissions from rabbits, emissions due to the application of urban compost and biogas digestate to soil, and emissions from CAN. In the previous submission also the MCF values were corrected and are now more appropriate for climate conditions in the country.

Similar as Agriculture, the LULUCF sector has also numerous recalculations in all categories in every submission. When one parameter is improved in one category this affects all other categories due to the land use change. In 2018 large recalculations were made due to inclusion of new emissions factors for agricultural soil, which affected the figures in the whole period. But the main recalculations was in the forest land in 2020 due to the new forest data (i.e. growing stock, dead wood) from the fourth repetition of national forest inventory (i.e. FECS in 2018) For 2021 submission the total forest area was carefully stratified into forest land

remaining forest land and land converted to forest land. Sampling plots of the national forest inventory were assigned to each subcategory, and carbon stocks in the living biomass were recalculated accordingly. Based on the carbon stock changes new emission factors were calculated for each subcategory. In the other land categories recalculations were also due to the changes in the following parameters: the carbon stock value in orchards, vineyards and soil, improved EFs and litter in perennial cropland and improved emission factors for soil organic carbon (SOC) for cropland, grassland and settlements.

In the Waste sector the most important recalculations were in the category solid waste disposal in 2020 submission. CH₄ emissions were recalculated due to the improved estimates for historical amount of deposited household and industrial waste and improved composition data for each type of waste. For emission calculation advanced IPCC FOD model was used which enables differentiation of the DOC_f with respect to the decomposability. In 2018 and 2019 some recalculations were also in the 5.D Waste water treatment. For domestic WW, emissions of CH₄ have been recalculated due to modification in methodology used. New methane conversion factor was used for centralized aerobic treatment plants and updated number of inhabitants included into various types of WW treatment. For Industrial WW the reasons for the recalculations were the new methane conversion factor for centralized aerobic treatment plants, the inclusion of emissions from organic chemical and pharmaceutical industry, and the inclusion of data from a biogas facilities.

Despite many recalculations there are still some recommendations that we are not able to implement. The most important is development of country-specific CO₂ EFs for gasoline and gas/diesel oil.

3.4.6 Information on the QA/QC Plan and Verification

In 2014, Slovenia developed and implemented a new Quality Assurance and Quality Control Plan as recommended by the IPCC Guidelines (IPCC 2000 and 2006). The QA/QC plan is part of the Manual of Procedures, elaborated in 2005 and updated in 2014. This update was necessary due to the new methodology guidance (IPCC, 2006), which become official guidance for GHG reporting since 2015. The manual is improved and updated regularly.

QUALITY CONTROL (QC)

Quality Control is a system of routine technical activities to measure and control the quality of the inventory as it is being developed. The QC system is designed to:

- provide routine and consistent checks to ensure data integrity, correctness and completeness;
- identify and address errors and omissions;
- document and archive inventory material and record all QC activities.

The final part of this system was incorporated in an Oracle database (ISEE – "Emission inventory" information system). ISEE enables and ensures that all necessary built-in QA/QC checks have been performed before data and emission estimates are entered in the reporting format tables. It also keeps a record of all changes made to data in the database.

In the beginning emissions from all sectors except LULUCF was included in the ISEE. However, with the development of GHG inventory and the introduction of higher tiers, more

and more categories were excluded from ISEE, as the application did not allow for more complex calculations. In addition, with development of CRF Reporter a transfer of data to the CRF tables became simple and no longer time consuming, so this ISEE feature has also become unnecessary. However, the ISEE is still used in the stationary fuel combustion for the harmonization of data between pollutants and GHG reporting and for their control.

In 2006, an additional quality control checking point was introduced by forwarding the assessment of verified emission reports from installations included in the National Allocation Plan to the SORS. The role of SORS is to compare data from installations included in EU ETS with data from their reporting system and to propose corrective measures if necessary. The outcome of data consistency checks is used as preliminary information for the Ministry of the Environment and Spatial Planning⁹ for performing on-site inspections. The use of EU ETS data is described in detail in the relevant chapter on Energy and Industrial Processes sectors in the NIR.

CHECK OF EMISSIONS ESTIMATES

The main Emissions are calculated in the excel and many years no changes have been made to the formulas or structure of the calculation spreadsheets, so the QA/QC of emissions is focused on the newly added categories or in the case of stationary combustion when new fuels are added. However, a regular check like comparison of last year emissions with emissions in the previous year are made on the national level as well as by EU reviewers during initial checks of our January submission. The time series consistency checks of emissions are also part of the CRF Reporter.

CHECK OF UNCERTAINTY ESTIMATES

According to the QA/QC plan checks of uncertainty were performed in 2015. The checks consisted of the following:

- Check that the qualifications of individuals providing expert judgement for uncertainty estimates are appropriate.
- Check that qualifications, assumptions and expert judgements are recorded.
- Check that calculated uncertainties are complete and calculated correctly.
- Check that there is detailed internal documentation to support the uncertainty estimates.

While first two QC have been performed, the last two QC showed that detailed documentation is not available for the most of uncertainty estimate which are indicated as expert judgements. For this reason the majority of such uncertainties have been revaluated taking into account data on uncertainties from the 2006 IPCC GL.

CHECK OF THE NATIONAL INVENTORY REPORT

⁹ From 2023 onward ministry responsible for EU ETS is Ministry of the Environment, Climate and Energy.

- Check that all chapters from annotated NIR are included in the NIR
- Check that AD, EF and other numerical information mentioned in the text is correct
- Check all AD data is presented in the tables in the NIR
- Check all EF and other parameters used in the tables in the NIR
- Check all graphs for accuracy and presence in the whole period
- Check all titles for tables and pictures
- Check that all Annexes to the NIR are included and updated

CHECKS OF DOCUMENTATION AND ARCHIVING

- QA/QC checks of documentation and archiving procedures:
 - Check that inventory data, supporting data and inventory records are archived and stored to facilitate detailed review.
 - Check that all supporting documentation on QA/QC procedures is archived
 - Check that results of QC analysis and uncertainty estimates are archived
 - Check that there is detailed internal documentation to support the estimates and enable duplication of emissions estimates.
 - Check that documentation of the database is adequate and archived.
 - Check that bibliographical data references are properly cited in the internal documentation and archived.
 - Check that inventory improvements plan is updated and archived.

Following recommendation from 2013 in country review an instructions have been prepared to determine the form and the names of archived documents.

QUALITY ASSURANCE (QA)

QA generally consists of independent third-party review activities to ensure that the inventory represents the best possible estimates of emissions and removals and to support the effectiveness of the QC program.

Since 2008 only two peer reviews were performed. In May 2009, a peer review of the Slovenian inventory was performed for the Energy sector. Since then the Energy sector and Industrial processes sector is regularly checked by experts from Jožef Stefan Institute - Energy efficiency centre (CEU/IJS). In 2011, the peer review for the Waste sector was performed, no important errors were found.

In 2016, we received many useful comments from the team preparing our fourth National Communication Report. Although the comments were not presented as an official report, we accepted many of the suggestions and corrected a number of errors.

It is quite difficult to provide a peer review of the Agriculture and LULUCF sector in Slovenia, as experts from the main institutions (Agricultural Institute of Slovenia and Slovenian

Forestry Institute) are already involved in the inventory preparation. Nevertheless, to date, the LULUCF sector has been reviewed three times by the external experts, namely in 2012 by the JRC, in 2014 by Zoltan Somogyi in the context of MS technical assistance, and in 2017 by Denitsa Svobodova (independent expert). In 2021 a Slovenian LULUCF sector was reviewed during the voluntary EU review of this sector.

QA/QC procedures performed by other institutions (Agricultural Institute of Slovenia and Slovenian Forestry Institute) are described in the relevant chapters in the NIR (Agriculture, LULUCF). Data based on agricultural statistics are mainly from SORS and the Agricultural Institute and data based on forest statistics are produced by the Slovenian Forestry Institute and SORS. All data have been checked.

The Statistical Office of Slovenia (SORS) is our main data provider. In 2005, the European Statistics Code of Practice was adopted, bringing considerable changes to the SORS QA/QC system. The main pillars (factors) of quality are defined and thoroughly described in the Medium-term Programme of Statistical Surveys 2018-2022.

<https://www.stat.si/StatWeb/File/DocSysFile/9809/MTPSS%202018-2022-eng.pdf>

EU EXPERT REVIEW OF GHG EMISSIONS

According to the [Regulation \(EU\) 525/2015](#) (MMR) the member states' GHG inventories are subject to the annual review. In the first phase of this review the European commission carries out checks to verify the transparency, accuracy, consistency, comparability and completeness of submitted inventories. In addition the comprehensive review is performed every few years or more often if needed. More details are available in the [Commission implementing regulation \(EU\) 749/2014](#) in the Chapter III.

3.4.7 Official consideration and approval of the inventory

Before the inventory is reported to the EU, EEA or UNFCCC Secretariat, it goes through an approval process. The institution designated for approval is the Ministry of the Environment, and Spatial Planning¹⁰. The inventory is usually sent to the Ministry according to the following plan:

- draft CRF tables on January 5-7
- final CRF tables and draft NIR on March 9-11
- final report on April 9-11

The inventories are publicly available on the following web page:

<https://www.gov.si teme/emisijske-evidence/>

3.5 National Registry

Directive 2009/29/EC adopted in 2009, provides for the centralization of the EU ETS operations into a single European Union registry operated by the European Commission as well as for the inclusion of the aviation sector. At the same time, and with a view to increasing efficiency

¹⁰ From 2023 onward ministry responsible for GHG inventory is Ministry of the Environment, Climate and Energy.

in the operations of their respective national registries, the EU Member States who are also Parties to the Kyoto Protocol (26) plus Iceland, Liechtenstein and Norway decided to operate their registries in a consolidated manner in accordance with all relevant decisions applicable to the establishment of Party registries - in particular Decision 13/CMP.1 and Decision 24/CP.8.

The consolidated platform which implements the national registries in a consolidated manner (including the registry of the EU) is called the Union registry and was developed together with the new EU registry on the basis the following modalities:

- Each Party retains its organization designated as its registry administrator to maintain the national registry of that Party and remains responsible for all the obligations of Parties that are to be fulfilled through registries;
- Each Kyoto unit issued by the Parties in such a consolidated system is issued by one of the constituent Parties and continues to carry the Party of origin identifier in its unique serial number;
- Each Party retains its own set of national accounts as required by paragraph 21 of the Annex to Decision 15/CMP.1. Each account within a national registry keeps a unique account number comprising the identifier of the Party and a unique number within the Party where the account is maintained;
- Kyoto transactions continue to be forwarded to and checked by the UNFCCC Independent Transaction Log (ITL), which remains responsible for verifying the accuracy and validity of those transactions;
- The transaction log and registries continue to reconcile their data with each other in order to ensure data consistency and facilitate the automated checks of the ITL;
- The requirements of paragraphs 44 to 48 of the Annex to Decision 13/CMP.1 concerning making non-confidential information accessible to the public is fulfilled by each Party through a publicly available web page hosted by the Union registry;

All registries reside on a consolidated IT platform sharing the same infrastructure technologies. The chosen architecture implements modalities to ensure that the consolidated national registries are uniquely identifiable, protected and distinguishable from each other, notably:

- With regards to the data exchange, each national registry connects to the ITL directly and establishes a secure communication link through a consolidated communication channel (VPN tunnel);
- The ITL remains responsible for authenticating the national registries and takes the full and final record of all transactions involving Kyoto units and other administrative processes such that those actions cannot be disputed or repudiated;
- With regards to the data storage, the consolidated platform continues to guarantee that data is kept confidential and protected against unauthorized manipulation;
- The data storage architecture also ensures that the data pertaining to a national registry are distinguishable and uniquely identifiable from the data pertaining to other consolidated national registries;

- In addition, each consolidated national registry keeps a distinct user access entry point (URL) and a distinct set of authorisation and configuration rules.

Following the successful implementation of the Union registry, the 28 national registries concerned were re-certified in June 2012 and switched over to their new national registry on 20 June 2012. Croatia was migrated and consolidated as of 1 March 2013. During the go-live process, all relevant transaction and holdings data were migrated to the Union registry platform and the individual connections to and from the ITL were re-established for each Party.

The European Commission is responsible for test procedures and all relevant functionality tests related to operations and of software and hardware updates of Union registry of Consolidated System of EU Registries. The disaster recovery plan of the Consolidated System of EU Registries is updated regularly. The complete description was provided in the common readiness documentation and specific readiness documentation for the national registry of EU and all consolidating national registries and the changes is provided and assessed in the yearly Supplementary Independent Assessment Report (SIAR). As the disaster recovery plan is treated as confidential, a further descriptions cannot be provided.

The following changes to the national registry have occurred since the last National Communication report (Table 9).

Table 9: Changes to the Union registry, including changes to the Slovenian national registry

Reporting Item	Description
15/CMP.1 Annex II.E paragraph 32.(a) Change of name or contact	No change in the name or contact information of the administrator occurred since the last National Communication report (NC). The administrator designated by Slovenia to maintain the national registry is: Slovenian Environment Agency Address: Vojkova 1b, SI-1000 Ljubljana Phone: +386 1 478 40 00 Contact for registry - email: registerCO2.arso@gov.si
15/CMP.1 Annex II.E paragraph 32.(b) Change regarding cooperation arrangement	There was a change in the cooperation arrangement during the reported period as the United Kingdom of Great Britain and Northern Ireland no longer operate their registry in a consolidated manner within the Consolidated System of EU registries, CS EUR.
15/CMP.1 Annex II.E paragraph 32.(c) Change to database structure or the capacity of national registry	Versions of the Union registry released after the production version at the time of the last NC submission introduced minor changes in the structure of the database limited and only affected EU ETS functionality. The updated database model is provided in Annex A submitted in the NIR each year also all new EUCR releases are yearly provided in the NIR, Chapter 14. No change was required to the application backup plan or to the disaster recovery plan. No change to the capacity of the national registry occurred during the reported period.

Reporting Item	Description
15/CMP.1 Annex II.E paragraph 32.(d) Change regarding conformance to technical standards	The changes that have been introduced are presented in Annex B in the NIR each year. Each release of the registry is subject to both regression testing and tests related to new functionality. These tests also include thorough testing against the DES and were successfully carried out prior to the relevant major release of the version to Production (see Annex B in the NIR). No other change in the registry's conformance to the technical standards occurred for the reported period.
15/CMP.1 Annex II.E paragraph 32.(e) Change to discrepancies procedures	No change of discrepancies procedures occurred during the reported period.
15/CMP.1 Annex II.E paragraph 32.(f) Change regarding security	The use of soft tokens for authentication and signature was introduced for the registry end users.
15/CMP.1 Annex II.E paragraph 32.(g) Change to list of publicly available information	The public has access via the national registry website, URL: https://www.gov.si/teme/trgovanje-s-pravicami-do-emisije/ under the title "Poročila za javnost skladna s sklepi Kjotskega protokola" where are available all non-confidential information required by the decision 13/CMP.1 annex II.E, which are listed below: <ul style="list-style-type: none"> - Account Information (Paragraph 45), - Joint Implementation Project Information (Paragraph 46), - Unit Holding and Transaction Information (Paragraph 47), - Entities Authorised to hold Units (Paragraph 48). <p>The public information could also be found on the website of the Slovenian part of the Union Registry, maintained by the European Commission, at: https://unionregistry.ec.europa.eu/euregistry/SI/public/reports/publicReports.xhtml</p>
15/CMP.1 Annex II.E paragraph 32.(h) Change of Internet address	The registry internet address changed during the reported period. The new URL is https://unionregistry.ec.europa.eu/euregistry/SI/index.xhtml Direct link to the registry is also published on the Slovenian Environment Agency web page (https://www.gov.si/teme/trgovanje-s-pravicami-do-emisije/) under "Slovenski del registra Unije".
15/CMP.1 Annex II.E paragraph 32.(i) Change regarding data integrity measures	No change of data integrity measures occurred during the reporting period.
15/CMP.1 Annex II.E paragraph 32.(j) Change regarding test results	Both regression testing and tests on the new functionality were successfully carried out prior to release of the version to Production. The site acceptance tests are carried out by quality assurance consultants on behalf of and assisted by the European Commission.

4 POLICIES AND MEASURES

4.1 Climate policy at national level

As an EU Member State, Slovenia actively participates in the formulation and implementation of common EU policies and measures. Under these processes, it develops its targets for reducing GHG emissions.

4.1.1 Climate policy objectives

4.1.1.1 Long- and medium-term objectives for 2050 and 2030

The Environmental Protection Act¹¹ defines Slovenia's long-term objective of achieving climate neutrality by 2050. The objective of achieving net zero GHG emissions (sinks equal to the rest of anthropogenic GHG emissions) or climate neutrality by 2050 is consistent with the Paris Agreement.

Slovenia will reduce GHG emissions in all sectors and maintain sinks by 2050. The political decision for climate neutrality was taken by the National Assembly of the Republic of Slovenia in 2021 in the *Resolution on Slovenia's Long-Term Climate Strategy until 2050 (ReDPS50)*¹². According to the *ReDPS50*, Slovenia will reduce its GHG emissions by 80-90% compared to 2005, while encouraging the implementation of policies to adapt to climate change and ensure climate security of the population (see chapter 4.1.1). The *ReDPS50* also identifies strategic sectoral targets for 2050. The climate neutrality objective was enacted in 2022 in an amendment to the Environmental Protection Act¹¹.

In the period until 2030, Slovenia has set itself the objective of reducing GHG emissions within the policy and legal order of the EU. Slovenia will contribute to the EU's 2030 target of reducing GHG emissions by at least 40% compared to the 1990 base year. The EU has made a political decision to increase the target for reducing GHG emissions to 55%, as is described below. The current regulation obliges Slovenia, within the EU, to achieve the target as follows:

- In the period up to 2030, part of the GHG emission reductions will be achieved by installations covered by the EU ETS. *Directive (EU) 2018/410*¹³ sets an EU-level target of a 43% reduction in GHG emissions by 2030 compared to 2005 emissions.

¹¹ Environmental Protection Act, (The Official Gazette of the Republic of Slovenia, No 44/22)

¹² Resolution on Slovenia's Long-Term Climate Strategy until 2050 (The Official Gazette of the Republic of Slovenia, No 119/21 and 44/22 – ZVO-2)

¹³ Directive (EU) 2018/410 of the European Parliament and of the Council of 14 March 2018 amending Directive 2003/87/EC to enhance cost-effective emission reductions and low-carbon investments, and Decision (EU) 2015/1814

- The objective for the sectors not covered by the EU ETS¹⁴ is a 30% decrease in the amount of emissions by 2020 compared to 2005 emissions for the EU as a whole. For these sectors, in 2018 Member States adopted national legally binding targets for reducing GHG emissions by 2030 under *Regulation (EU) 2018/842*¹⁵, which sets a target for Slovenia of reducing GHG emissions by at least 15% by 2030 compared to 2005.
- By adopting *Regulation (EU) 2018/841*¹⁶ (the LULUCF Regulation), the EU has included greenhouse gas emissions and carbon dioxide removals due to land use, land-use change and forestry (LULUCF) in its climate and energy targets for 2030. The LULUCF Regulation provides that emissions do not exceed removals in the period 2021-2030.

Slovenia has set more ambitious national as well as sectoral targets for reducing GHG emissions by 2030 in the *Integrated National Energy and Climate Plan of the Republic of Slovenia (NECP)*¹⁷:

- national targets to reduce GHG emissions by at least 20% by 2030 compared to 2005 in sectors outside the EU ETS. This target exceeds Slovenia's obligation under *Regulation (EU) 2018/842* by 5 percentage points¹⁸;
- sectoral targets for GHG emission reduction by 2030 compared to 2005: 76% reduction in widespread use (other sectors), 1% in agriculture, 65% in waste, 43% in industry not covered by EU ETS, 34% in energy transformations not covered by EU ETS. In transport, the aim is to limit growth during this period, with emissions rising by a maximum of 12%;

¹⁴ According to Regulation (EU) 2018/842, the reduction of greenhouse gas emissions refers only to emissions from sectors which are not included in the European Emissions Trading System with greenhouse gas emission allowances in accordance with Directive (EU) 2018/410, and thus including emissions from fuel burning in households and in the service, transport, industry and energy sectors (only installations not covered by the EU ETS), fugitive emissions from the energy industry, process emissions from industrial processes (without EU ETS), solvents and other product use, agriculture, and waste management.

¹⁵ Regulation (EU) 2018/842 of the European Parliament and of the Council of 30 May 2018 on binding annual greenhouse gas emission reductions by Member States from 2021 to 2030 contributing to climate action to meet commitments under the Paris Agreement and amending Regulation (EU) No 525/2013

¹⁶ Regulation (EU) 2018/841 of the European Parliament and of the Council of 30 May 2018 on the inclusion of greenhouse gas emissions and removals from land use, land use change and forestry in the 2030 climate and energy framework, and amending Regulation (EU) No 525/2013 and Decision No 529/2013/EU

¹⁷ Integrated National Energy and Climate Plan of the Republic of Slovenia (NECP), Government of the Republic of Slovenia, 28. 2. 2020

¹⁸ Regulation (EU) 2018/842 of the European Parliament and of the Council of 30 May 2018 on binding annual greenhouse gas emission reductions by Member States from 2021 to 2030 contributing to climate action to meet commitments under the Paris Agreement and amending Regulation (EU) No 525/2013

- no net emissions from LULUCF by 2030 (after implementation of accounting rules);
- a specific target is set for buildings, to reduce GHG emissions from buildings by at least 70% by 2030 compared to 2005.

Slovenia has the following targets for fossil fuel phase-out:

- phasing out the use of coal for electricity generation, with a reduction of at least 30% by 2030 (NECP target) (Note: the target year for coal phase-out is 2033, see below)
- coal phase-out by 2033 at the latest. The target is defined in the *National Strategy for Coal Exit and Restructuring of the Coal Regions in Accordance with the Principles of a Just Transition*, adopted in 2022¹⁹
- limiting the sale of new liquid fuel boilers by 2023 (NECP target);
- an indicative target of 10% climate-neutral syngas in the gas network by 2030 (the NECP target).

In 2018, the EU also set its objectives for energy efficiency and renewable energy through the *Directive on Energy Efficiency (Directive (EU) 2018/2002*²⁰) and the *Renewable Energy Directive (Directive (EU) 2018/2001)*²¹. The EU aims to achieve an improvement in energy efficiency (EEU) by at least 32.5% compared to the 2007 baseline scenario and a 32% RES share in final energy consumption by 2030. In line with the Directives, Slovenia has set out the following targets in the NECP:

- improve energy efficiency by at least 35% by 2030 compared to the 2007 baseline scenario. The target is defined in another way, namely that final energy consumption in 2030 will not exceed 54.9 TWh (4,717 ktoe) and primary energy consumption will not exceed 73.9 TWh (6,356 ktoe);
- achieve at least 27% share of renewables in final energy consumption by 2030. Sectoral RES target shares are also defined.

The NECP sets an additional energy efficiency target for buildings, to reduce energy use in buildings by 20% by 2030 compared to 2005.

Summarized above are most of NECP's decarbonisation and energy efficiency targets. A comprehensive overview, including objectives for the dimensions of energy security, energy market and research, innovation and competitiveness, can be found in the NECP. By 2030, the EU is set to increase its ambition and tighten its targets for reducing GHG emissions, improving energy efficiency and increasing the share of renewable energy sources. Two plans within the EU are associated with these issues: "Fit for 55" and "RePowerEU". While the

¹⁹ National Strategy for Coal Exit and Restructuring of the Coal Regions in Accordance with the Principles of a Just Transition, Government of the Republic of Slovenia, 13. 1. 2022

²⁰ Directive (EU) 2018/2002 of the European Parliament and of the Council of 11. 12. 2018 amending Directive 2012/27/EU on energy efficiency

²¹ Directive (EU) 2018/2001 of the European Parliament and of the Council of 11. 12. 2018 on the promotion of the use of energy from renewable sources

political decisions have been made, the legal framework for the “Fit for 55” and RePowerEU plans is still in the process of being adopted.

The European Commission has also proposed an amendment to *the LULUCF Regulation* as part of the "Fit for 55" plan, which aims to strengthen the LULUCF sector's contribution to the 2030 climate ambition. The EU's general objective for net GHG removals in the LULUCF sector is to reach 310 million tonnes of CO₂ equivalent by 2030, with the proposal setting a target for Slovenia of 146 kt of CO₂ equivalent in 2030.

All Member States will adapt to the new objectives. Slovenia will tighten its targets within the framework of the update of the *Integrated National Energy and Climate Plan*, which is under preparation and will be adopted in 2024.

4.1.1.2 Targets from previous periods - up to 2020 and in the period 2008-2012

In 2002, the Republic of Slovenia ratified the *Kyoto Protocol*, and committed itself to emitting on an average yearly basis 8% less greenhouse gases (GHG) in the period 2008–2012 than in the base year, which were determined as the sum of CO₂, CH₄ and N₂O emissions in 1986 and F-gases in 1995. This results in average annual target emissions of 18,726 Gg CO₂ eq, which was Slovenia's target in the period 2008–2012. In the Accession Treaty, Slovenia also adopted the same objectives as EU Member States.

In the period 2013-2020, Slovenia has set itself the objective of reducing GHG emissions within the policy and legal order of the EU. The EU objective until 2020 was to reduce GHG emissions by 20% compared to 2005. Slovenia's aim was to ensure that GHG emissions do not increase by more than 4% by 2020 compared to 2005 in sectors not covered by the Emissions Trading System²². Both Slovenia and the EU have met their 2020 targets. Slovenia was on its way to meet the target throughout the period 2013-2020.

For the period up to 2020, Slovenia has also set objectives for energy efficiency and renewable energy sources, which are described in detail in the NC7 SI. Slovenia met both 2020 targets; the energy efficiency target through domestic measures and the RES target through the purchase of so-called statistical transfers in another Member State that has exceeded its target.

²² During this period the EU's target for reducing GHG emissions was split between installations covered by the EU ETS and other emissions for which Member States have made a reduction commitment. For the installations which are not included in the EU ETS in accordance with Directive 2009/29/ES; the objective was determined at the EU level, i.e. to decrease GHG emissions by 2020 by 21% compared to 2005 emissions. The objective for the sectors not covered by the EU ETS was a 10% decrease in the amount of emissions by 2020 compared to 2005 emissions for the EU as a whole. Decision 406/2009/EC distributed this target among Member States, set national targets for the reduction (limitation) of GHG emissions, and restricted this obligation to emissions from sectors not covered by the EU ETS under Directive 2009/29/EC. Slovenia's 2020 objectives are described in more detail in the NC6 SI or NC6 EU.

4.1.2 Overarching climate policy documents in Slovenia

The transition towards a low-carbon circular economy is one of the development objectives of Slovenia's policy, as defined in the *Slovenian Development Strategy 2030*, and which was already reported in NC7-SI.

The overarching document in the field of climate policy, the *Resolution on Slovenia's Long-Term Climate Strategy until 2050 (ReDPS50)*²³, was adopted by the National Assembly in 2021. The document is prepared in accordance with the requirements of the *Paris Agreement* and the *European Regulation (EU) on the Governance of the Energy Union*²⁴. The ReDPS50 contains: the climate policy vision, the overarching national target for the transition to climate neutrality by 2050 and sectoral targets for reducing GHG emissions (see chapter 4.1.1), the principles, vision and guidelines for achieving the GHG targets, the key foundations of the strategy, including guidelines for protecting biodiversity in achieving the climate objectives, and the vision, targets, guidelines for achieving the objectives for the efficient use and renewable energy sources. This is followed by sectoral chapters on gross inland consumption, industry, transport, buildings, agriculture, LULUCF and other sectors, which set out sectoral visions and targets for 2050 and summarize preliminary decisions, including objectives for 2030, strategic orientations for the period up to 2050, areas for action, factors for attaining the objectives, human resources needed for their implementation and indicators for monitoring progress. In the same way, the strategy also addresses the following horizontal issues: consumption and production processes for the transformation to a low-carbon circular economy, education and training, research, development and innovation. The section on financing and financial measures is based on the guidelines provided by the *EU Green Deal*²⁵ and places particular emphasis on the financing model for the transition to a low-carbon society and on a just transition. An important horizontal section addresses organizational aspects, including the role of national and local politics. The strategy includes chapters on the organization for implementation and on climate policy implementation monitoring (see chapter 4.1.5.4).

The key implementation document related to climate policy for the period 2021-2030, the *Integrated National Energy and Climate Plan of the Republic of Slovenia (NECP)*, was adopted by the Government of the Republic of Slovenia in February 2020 and sets out national targets, policies and actions for the period up to 2030. In line with the requirements of *Regulation (EU) 2018/1999*, the policies and actions are set out in five chapters, the so-called dimensions: (1) decarbonisation, including renewable energy sources, (2) energy efficiency, (3) energy security, (4) the internal energy market and (5) research, innovation and competitiveness.

²³ Resolution on Slovenia's Long-Term Climate Strategy until 2050 (The Official Gazette of the Republic of Slovenia, No 119/21 and 44/22 – EPA-2)

²⁴ Regulation (EU) 2018/1999 of the European Parliament and of the Council of 11 December 2018 on the Governance of the Energy Union and Climate Action, amending Regulations (EC) No 663/2009 and (EC) No 715/2009 of the European Parliament and of the Council, Directives 94/22/EC, 98/70/EC, 2009/31/EC, 2009/73/EC, 2010/31/EU, 2012/27/EU and 2013/30/EU of the European Parliament and of the Council, Council Directives 2009/119/EC and (EU) 2015/652 and repealing Regulation (EU) No 525/2013 of the European Parliament and of the Council

²⁵ COM(2019) 640 final, Communication from the Commission - The European Green Deal

Specific targets are set for all dimensions (for the GHG targets, see 4.1.1.1), measures to achieve the targets are given with responsibilities and deadlines for implementation (key climate policy measures are described in chapter 4.2). The NECP continues a series of measures from the previous implementation programme, *the Operational Programme to Reduce Greenhouse Gas Emissions by 2020 (OP GHG)*, with a significant increase in implementation intensity. In the context of the NECP, the impact of the measures was assessed on the basis of two scenarios: the with existing measures (WEM) scenario and the NECP scenario with planned, i.e. with additional measures (WAM). Assessed were the impacts of the NECP on GHG emission reductions, macroeconomic impacts (employment, impact on private consumption, economic activity, investments), the public financial resources needed for incentives, impacts on security of supply and air pollutant emissions. Impact assessments are provided in the NECP and in the accompanying expert bases²⁶. Reporting on the implementation of the NECP is defined in *Regulation (EU) 2018/1999*.

4.1.2.1 Sectoral strategic and implementation plans and funding plans

Financial programmes are among the key policies for the implementation of the NECP and the strategy and the achievement of the objectives. The following was adopted: The *Climate Change Funding Programme for 2022 and 2023 (PrPSSPS)*²⁷, the *Recovery and Resilience Plan (RRP)*²⁸ under which 42.45% of the funds are earmarked for the green transition, the *Common Agricultural Policy Strategic Plan 2023-2027 for Slovenia*²⁹ (CAP) and the *European Cohesion Policy Programme 2021-2027 in Slovenia*³⁰, which will allocate at least 30% of the funds for climate action, in line with EU requirements. Climate Change Funding Programmes will also be prepared for the coming years.

Most of the measures already taken and planned are implemented by pursuing several objectives at the same time and in this respect, the costs of implementing measures decrease significantly and they maximise the benefits due to synergy and multiplicative effects. An example is the use of EEU and RES measures, which simultaneously reduce air pollution from air pollutants, reduce GHG emissions, increase the security of supply and reduce energy costs.

The climate objectives and actions of the NECP and ReDPS50 relate closely to the implementation of sectoral and developmental programmes.

²⁶ Summary of Scenario Analysis for Policy Makers for Mid-Century Climate Strategy for Slovenia, Deliverable C3.2 LIFE ClimatePath2050, IJS-DP-13286, Ver. 1. 1. 2020.

²⁷ Ordinance on the Climate Change Funding Programme for the period 2022 and 2023 (The Official Gazette of the Republic of Slovenia, No 49/22)

²⁸ Slovenia's recovery and resilience plan, Government of the Republic of Slovenia, 28. 7. 2021, Council Implementing Decision (2021/10612). More information: https://ec.europa.eu/info/business-economy-euro/recovery-coronavirus/recovery-and-resilience-facility/slovenias-recovery-and-resilience-plan_en

²⁹ Common agricultural policy strategic plan 2023-2027, draft, Ministry of Agriculture, Forestry and Food (SI), More information: (<https://www.gov.si/zbirke/javne-objave/javna-razgrnitev-okoljskega-porocila-skp/>)

³⁰ Programme of the European Cohesion Policy in Slovenia 2021-2027, Government of the Republic of Slovenia, 26. 9. 2022

The development documents in the building sector also address measures and objectives to reduce GHG emissions and are fully aligned with the objectives of the NECP and the ReDPS50. However, the industry and transport documents are only partially aligned with the objectives and actions of the NECP and ReDPS50. A list of strategic documents can be found in the table below (Table 10).

Table 10: Strategic documents of the Republic of Slovenia relevant to the mitigation of climate change.

Document title	Adoption	Implementation management	Gross Inland Consumption	Transport	General use	Industry	Agriculture	LULUCF	Waste	Notes
General development and climate policy documents										
Resolution on Slovenia's Long-Term Climate Strategy until 2050 (ReDPS50) ²³	2021, National Assembly of the Republic of Slovenia	Ministry responsible for climate change	✓	✓	✓	✓	✓	✓	✓	Overarching strategic climate policy document for the period up to 2050 and for all sectors. Prepared in accordance with the requirements of the Paris Agreement and Regulation (EU) 2018/1999.
Integrated National Energy and Climate Plan of the Republic of Slovenia (NECP) ¹⁷	2020, Government of the Republic of Slovenia	Ministry responsible for energy	✓	✓	✓	✓	✓	✓	✓	Operational climate policy programming document for the period up to 2030 and for all sectors. Prepared in accordance with the requirements of Regulation (EU) 2018/1999 and the Energy Act. The document builds upon measures contained in the previous OP GHG documents, the NEEAP, NREAP and other measures.
Resolution on National Environmental Action Programme 2030 (ReNPVO20-30)	2020, National Assembly of the Republic of Slovenia	Ministry responsible for environmental protection	General document						Overarching development document for the environment for the period up to 2030. Prepared in accordance with the requirements of the Environmental Protection Act.	
Slovenian Development Strategy 2030 (SRS)	2017, Government of the Republic of Slovenia	Government Office for Development and Cohesion Policy	General document						Slovenia's overarching general development documents for the period up to 2030. Climate change mitigation is addressed as Development Goal 8: A low-carbon circular economy.	
Sectoral documents										
National Strategy for Coal Exit and Restructuring of the Coal Regions in Accordance with the Principles of a Just Transition ¹⁹	2022, Government of the Republic of Slovenia		✓							The strategy sets an objective of coal phase-out by 2033. It defines the strategic and operational objectives of a just transition for the two coal-mining regions.

Document title	Adoption	Implementation management	Gross Inland Consumption	Transport	General use	Industry	Agriculture	LULUCF	Waste	Notes
Transport Development Strategy of the Republic of Slovenia 2030 (TDS)	2015, Government of the Republic of Slovenia	Ministry responsible for transport		✓						Key long-term development document for the transport sector for the period up to 2030. It integrates the indicative targets for the transport sector from OP GHG for the period up to 2030.
Resolution on the National Programme for the Development of Transport in the Republic of Slovenia until 2030 (ReNPRP)	2016, National Assembly of the Republic of Slovenia	Ministry responsible for transport		✓						Operational implementation document for the transport sector until 2030. In conformity with TDS
Strategy regarding market development for the establishment of adequate infrastructure related to alternative fuels in the transport sector of the Republic of Slovenia ³¹	2017, Government of the Republic of Slovenia	Ministry responsible for transport		✓						National policy framework for market and infrastructure development for alternative fuels by 2030. Prepared in accordance with Directive 2014/94/EU
Action Programme for Alternative Fuels in Transport for 2022 and 2023 ³²	2021, Government of the Republic of Slovenia	Ministry responsible for transport		✓						Biennial Action Plan, an implementation document prepared in line with the strategy in this field
Investment Plan for Transport and Transport Infrastructure in the Republic of Slovenia for the period 2020-2025 ³³	2019, Government of the Republic of Slovenia	Ministry responsible for transport		✓						The investment plan defines national projects with an estimate of the resources needed to achieve the objectives and a timetable

³¹ Strategy regarding market development for the establishment of adequate infrastructure related to alternative fuels in the transport sector of the Republic of Slovenia, Government of the Republic of Slovenia, 12. 10. 2017

³² Action Programme for Alternative Fuels in Transport for 2022 and 2023, Government of the Republic of Slovenia, 23. 12. 2021

³³ Investment Plan for Transport and Transport Infrastructure in the Republic of Slovenia for the period 2020-2025. Government of the Republic of Slovenia, 5. 12. 2019

Document title	Adoption	Implementation management	Gross Inland Consumption	Transport	General use	Industry	Agriculture	LULUCF	Waste	Notes
Long-Term Building Energy Renovation Strategy for 2050 (DSEPS 2050) ³⁴	2021, Government of the Republic of Slovenia	Ministry responsible for energy			✓					Strategic document for the period up to 2050 and an implementation document for building renovation for the period up to 2030.
Waste Management Plan and Waste Prevention Programme of the Republic of Slovenia (2022) ³⁵	2022, Government of the Republic of Slovenia	Ministry responsible for the environment							✓	Strategic and operational document for the period up to 2050
Slovenian Industrial Strategy 2021-2030	2022, Government of the Republic of Slovenia	Ministry responsible for the economy				✓				Sectoral strategy document for the period up to 2030, with green development as one of its priorities. ³⁶
Smart Specialisation Strategy 2030 (draft)	In preparation	Government Office for Development and Cohesion Policy		✓	✓	✓		✓		Designed to bring together business and research and development. It also addresses horizontal issues.

³⁴ Long-term energy renovation strategy for 2050, Government of the Republic of Slovenia, 24. 2. 2021

³⁵ Waste Management Plan and Waste Prevention Programme of the Republic of Slovenia (2022), Government of the Republic of Slovenia, 28. 4. 2022

³⁶ *Slovenian Industrial Strategy 2021-2030* sets out guidelines for the economy's transition towards a green, creative and smart economy, which would also boost competitiveness. The Industrial Strategy 2030 aims to achieve EUR 66,000 of added value per employee, to move towards a circular economy and to significantly boost the innovation of companies. To implement the strategy, a range of actions will be available over the next few years to foster green, creative and smart development, helping companies to transform their business processes and strengthen their long-term position in the global market. It includes a range of actions/instruments in areas such as research, development and innovation, entrepreneurship, internationalisation, human resources and the business environment, as well as guidelines for integrated green, creative and smart development. With this strategy, Slovenia is joining the broader story of the EU Industrial Strategy, which establishes a shared commitment of the EU, its Member States and regions, the industry, SMEs and everyone interested in a renewed partnership.

Document title	Adoption	Implementation management	Gross Inland Consumption	Transport	General use	Industry	Agriculture	LULUCF	Waste	Notes
Resolution on the National Forestry Programme (ReNGP) ³⁷	2007, National Assembly of the Republic of Slovenia	Ministry responsible for forestry						✓		A key strategic document for setting a national policy on sustainable development of forest management.
Resolution on the National Programme on Strategic Orientations for the Development of Slovenian Agriculture and Food Industry "Our Food, Rural Areas and Natural Resources for the Period from 2021" ³⁸	2020, National Assembly of the Republic of Slovenia	Ministry responsible for agriculture					✓			A strategic document that demonstrates the development of Slovenian food production and processing industry, and of the integrated rural area, it is the basis for future national measures for the implementation of the Common Agricultural Policy. It is based on a new concept, which puts more emphasis on environmental objectives.
Financing programmes										
Climate Change Funding Programme for 2022 and 2023 (PrSSPS) ³⁹	2022 Government of the Republic of Slovenia	Ministry responsible for climate change	✓	✓	✓	✓	✓	✓	✓	Climate Change Funding Programme financial plan. All measures are taken with the intention of climate change mitigation and adaption. Prepared in accordance with EPA. The previous documents are described in the NC7 SI.

³⁷ Resolution on the National Forestry Programme (The Official Gazette of the Republic of Slovenia, No 111/07)

³⁸ Resolution on the National Programme on Strategic Orientations for the Development of Slovenian Agriculture and Food Industry "Our Food, Rural Areas and Natural Resources for the Period from 2021" is a political and strategic document reflecting the current situation and the needs for future interventions. It demonstrates the development of Slovenian food production and processing industry, and of the integrated rural area, and forms the basis for future national measures. Defining the objectives and principles of future development, a new concept is being put forward, which puts people's demands and expectations towards agriculture at the forefront in terms of providing safe and quality food, protecting natural resources, responding to climate change and preserving the vitality of rural areas. It is also the basis for national measures and an integrated strategic plan for the implementation of the Common Agricultural Policy.

³⁹ Ordinance on the Climate Change Funding Programme for the period 2022 and 2023 (The Official Gazette of the Republic of Slovenia, No 49/22)

Document title	Adoption	Implementation management	Gross Inland Consumption	Transport	General use	Industry	Agriculture	LULUCF	Waste	Notes
Recovery and Resilience Plan (RRP) ⁴⁰	2021, Government of the Republic of Slovenia, Council of the EU	Ministry of Finance, Recovery and Resilience Office of the Republic of Slovenia	✓	✓	✓	✓		✓	✓	The operational programme and financial plan for the use of the Recovery Instrument or the Recovery and Resilience Fund (RRF). Period: 2021-2026. The largest share of the funds, 42.45%, is allocated to the Green Transition development field and is contributing to achieving climate objectives in the economic and transport sectors, as well as in the building sector. Part of the funds is intended for sectoral measures such as research, training for the green transition, etc.
Common Agricultural Policy Strategic Plan 2023-2027 for Slovenia ⁴¹ (CAP)	In preparation	Ministry responsible for agriculture					✓	✓		Operational programme and financial plan for the implementation of the European Agricultural Fund for Rural Development in Slovenia. Period 2023-2027 (or 2030). Sectors: IPCC agriculture and forestry, influencing other sectors to a lesser extent (energy use in agriculture and biofuel supply).
European Cohesion Policy Programme 2021-2027 in Slovenia ⁴²	2022 Government of the Republic of Slovenia (under validation by the EC)	Government Office for Development and Cohesion Policy	✓	✓	✓	✓			✓	Operational programme and financial plan for the implementation of the European Cohesion Fund, the European Regional Development Fund and the European Social Fund in Slovenia. At EU level, 30% of funding is dedicated to meeting climate objectives in all sectors except agriculture and forestry. Part of the funds is intended for sectoral measures such as research, training for the green transition, etc.
Other documents										

⁴⁰ Slovenia's recovery and resilience plan, Government of the Republic of Slovenia, 28. 7. 2021, Council Implementing Decision (2021/10612).

⁴¹ Common agricultural policy strategic plan 2023-2027, Government of the Republic of Slovenia, 28. 9. 2022 (SI)

⁴² Programme for the Implementation of the European Cohesion Policy in Slovenia in the 2021-2027, Government of the Republic of Slovenia, 28. 9. 2022 (SI)

Document title	Adoption	Implementation management	Gross Inland Consumption	Transport	General use	Industry	Agriculture	LULUCF	Waste	Notes
Territorial Just Transition Plan of the Savinja-Šalek Coal-mining Region ⁴³	2022 Government of the Republic of Slovenia (under validation by the EC)		✓		✓	✓			✓	The Plan identifies key projects to promote a just transition of the Savinja-Šalek coal-mining region during coal phase-out with the help of measure or training programmes, as well as investments in the development of new generations of household appliances, recovery of waste, wood processing, etc.
Resolution on the Slovenian Scientific Research and Innovation Strategy 2030 ⁴⁴	2022, National Assembly of the Republic of Slovenia	Ministry responsible for science	Horizontal policy						Slovenia's overarching strategic document for scientific research and innovation up to 2030, including a public investment plan for the period 2021-2030.	

⁴³ Territorial Just Transition Plan of the Savinja-Šalek Coal-mining Region, Government of the Republic of Slovenia, 28. 9. 2022 (https://www.eu-skladi.si/sl/dokumenti/kljucni-dokumenti/drugi-osnutek-onpp_sasa.docx)

⁴⁴ Resolution on the Slovenian Scientific Research and Innovation Strategy 2030 (The Official Gazette of the Republic of Slovenia, No 49/22)

4.1.3 Climate policy at regional level

There is no regional governance level in Slovenia, because Slovenia is divided administratively only into municipalities. Promoting climate action is therefore organised at either national or local (municipal) level. However, municipalities do occasionally cooperate in the planning and implementation of policies, examples of which are provided in the next chapter. They mainly cooperate on projects that deal with functional regions and have different, sometimes even cross-border, areas of cooperation (e.g. transport, energy transition) (e.g. a cross-border regional sustainable mobility strategy for the region of Goriška is under preparation).

4.1.4 Climate policy at municipal level

There are 212 municipalities in Slovenia, 12 of which are urban municipalities. As municipalities are small and there is no regional level of government, most of the incentive measures and programmes are implemented at national level. However, local authorities have an important role in the planning and implementation of climate policy, as they are active and responsible for measures in the areas of waste management, heat supply, public transport and other sustainable mobility measures, energy use in buildings owned by municipalities, and the promotion of measures to other target groups. Municipalities have a role to play in all phases of the development and implementation of policies and measures, and in particular in the development and implementation of projects in the above-mentioned areas. The following instruments are in the domain of municipalities: planning, implementation of public environmental and utility services, concessions, promotional activities, financing of measures related to local infrastructure, etc.

Of the 212 Slovenian municipalities, 63 have set GHG emission reduction targets as part of the *Covenant of Mayors*⁴⁵. 6 of these have already set the goal of achieving climate neutrality by 2050. Three Slovenian cities want to become climate neutral by 2030 and are part of the *EU Mission for Climate-neutral and Smart Cities*⁴⁶, an initiative involving 100 EU cities. Municipalities also set climate objectives as part of their Local Energy Concepts (LECs) in the areas of energy use or energy efficiency and the share of renewable energy sources over a ten-year period. In the context of Integrated Transport Strategies (ITS), municipalities mainly set overall strategic objectives for reducing GHG emissions, but not quantitative targets.

Planning obligations of municipalities relevant for designing their climate policies and measures are:

⁴⁵ Source: Covenant of Mayors website, 10. 8. 2022

⁴⁶ Slovenian cities involved in the initiative are Kranj, Ljubljana and Velenje. More information: https://research-and-innovation.ec.europa.eu/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe/eu-missions-horizon-europe/climate-neutral-and-smart-cities_en

- Local Energy Concepts (LECs) are mandatory for all municipalities under the *Energy Act* and must be aligned with national objectives. The methodology for producing LECs is being revised;
- Integrated Transport Strategies (ITS), the adoption of which is a prerequisite for certain state subsidies. In total, 87 municipal ITSs have been adopted by the end of 2021. The preparation and implementation of ITSs can serve as a model for other countries and is well documented on the Sustainable Mobility Platform web portal⁴⁷. During the preparation of transport strategies, municipalities cooperate on a regional level. The region of Koroška has adopted a regional transport strategy, the Julian Alps and the Ljubljana Urban Region have strategies under preparation, whereas a cross-border regional strategy is underway for the region of Goriška;
- Sustainable Energy and Climate Action Plans (SECAPs) are prepared by municipalities as part of the Covenant of Mayors. Municipalities are working together on this issue; e.g. 18 municipalities in the Gorenjska Statistical Region have joined together to prepare the SECAPs and have set a common target of reducing GHG emissions by at least 40% in the period 2020-2030;
- Environmental protection programmes are mandatory for all municipalities and include climate change mitigation;
- A municipal spatial plan is mandatory for all municipalities, while a detailed municipal spatial plan is mandatory for urban municipalities.

When adopting the above-mentioned documents, municipalities must ensure adequate public participation. See BR4-SI for more information.

Seven local energy agencies (LEAs), created by municipalities with the support of the state and European programmes in 2006, are highly active in supporting municipalities in the preparation of local energy concepts, the implementation of EEU measures and the use of RES. Every agency cooperates the municipalities that have established it in a wider geographical area, and acts as a promoter of projects and supports local communities in preparing and implementing their projects. Municipalities are also cooperating with the help of LEAs, e.g. in the preparation of technical and financial documentation for the energy renovation of public buildings with funding by ELENA international technical assistance, or for the implementation of energy renovation and sustainable mobility projects (PM4PM and the region of Primorska, EOL in Ljubljana, EOMO, SMP in Novo Mesto, SE-EST in Northwest Slovenia). LEAs are also an important element in the cross-border and cross-regional cooperation of municipalities in the field of sustainable energy and mitigation of climate change.

Municipalities are also cooperating when it comes to the implementation of climate change mitigation measures, especially in the construction of waste management infrastructure and sustainable mobility, including infrastructure for the development

⁴⁷ <https://www.sptm.si/>

of public passenger transport, non-motorised forms of transport and the introduction of alternative fuels into transport. Other municipal instruments include mandatory and non-mandatory municipal public services (public utility and environmental protection services): Mandatory municipal public services are active in areas such as waste management (collection, treatment and disposal of waste) and wastewater management (wastewater and rainwater treatment and discharge), whereas provision of district heat is performed by public utility services. It should be noted that municipalities play an important role in putting new instruments into practice, such as energy performance contracting, energy management, etc.

With 54 indicators, 45 of which are designed for all municipalities, the Local Climate Action Scoreboard (a web-based application) has been developed to help municipalities monitor and show the progress of individual municipalities in energy renovation of buildings, expansion of cycling networks and other measures. The LIFE IP Care4Climate project is also implementing a campaign to involve local communities in the transition to a low-carbon society (LCS). The aim is to empower local communities, in particular municipalities, to contribute to GHG emission reduction targets by implementing community projects in the fields of energy, mobility, local circular economy and food supply.

4.1.5 Climate Policy Implementation Monitoring

This chapter describes the monitoring system, the institutional and legal framework for monitoring and implementing climate policy, and the procedures for responding in cases of non-achievement of targets.

4.1.5.1 Description of implementation monitoring

The Ministry responsible for climate prepares a **Report on the Implementation of Climate Policy or on the Implementation of the OP GHG**⁴⁸, which is shared with the Government. This ensures that the appropriate Ministry and the Government can regularly review emission reduction targets, the progress achieved in individual sectors according to key indicators, the implementation of measures and financial data. The report also includes recommendations to improve on the measures, so that corrections can be made if necessary.

In addition, monitoring, reporting and verification of targets for sources not covered by the EU ETS (ESD or ESR) is also carried out at EU level. Since 2015, EU Member States have been obliged to provide the European Commission with full information

⁴⁸ Third Annual Report on the Implementation of the Operational Programme to Reduce Greenhouse Gas Emissions by 2020, prepared by the Ministry for the Environment and Spatial Planning (MESP), was presented to the Government of the Republic of Slovenia at its 13th regular session on 20 December 2018.

Fourth Report on the Implementation of the Operational Programme to Reduce Greenhouse Gas Emissions by 2020, prepared by the MESP (approved by the Government of the Republic of Slovenia on 17. 9. 2020).

on national climate change mitigation measures and instruments by 15 March every two years, in accordance with *Regulations 525/2013*⁴⁹ and *2018/1999*²⁴. For more details see chapter 3.2.2 BR4-SI⁵⁰.

In Slovenia, the following data and analytical basis is produced on a yearly basis for the purposes of monitoring progress and to enable action to be taken if necessary:

- the trend of greenhouse gas emissions is monitored through the **greenhouse gas emissions inventory** prepared by the Slovenian Environment Agency (SEA). The Slovenian Environment Agency also monitors EU ETS emissions. EU ETS and non-ETS emissions are reported annually to the European Commission in accordance with *Implementing Regulation (EU) No 749/2014*⁵¹, which has been replaced by *Regulation (EU) 2020/1208*⁵².
- In recent years, a comprehensive system for monitoring the progress of climate policy implementation in Slovenia has been gradually developed, called the **Climate Action Mirror**⁵³. The system analyses all emission sources (including EU ETS), all measures contributing to climate targets, including measures approved after the adoption of the Operational Programme for Reducing Greenhouse Gas Emissions (OP GHG). The Climate Action Mirror covers (see also Figure 19):

⁴⁹ Regulation (EU) No 525/2013 of the European Parliament and of the Council of 21 May 2013 on a mechanism for monitoring and reporting greenhouse gas emissions and for reporting other information at national and Union level relevant to climate change and repealing Decision No 280/2004/EC

⁵⁰ Chapter III of Commission Implementing Regulation No 749/2014 sets out strict criteria on the basis of which the national greenhouse gas inventories and greenhouse gas emissions of Member States are reviewed annually at the EU level. Based on this review, the European Commission issues an implementing decision on Member States' ESD emissions in the given year, which might lead to Member States facing penalties or other consequences. The ESD and the MMR have introduced an annual compliance cycle, requiring a review of Member States' greenhouse gas inventories to ensure compliance with their obligations under the ESD in the period 2013-2020. These reviews are carried out within a shorter timeframe than the current UNFCCC inventory review so as to enable using flexibility provisions and taking corrective action, where necessary, at the end of each relevant year.

⁵¹ Commission Implementing Regulation (EU) No 749/2014 of 30 June 2014 on structure, format, submission processes and review of information reported by Member States pursuant to Regulation (EU) No 525/2013 of the European Parliament and of the Council.

⁵² Commission Implementing Regulation (EU) No 2020/1208 of 7 August 2020 on structure, format, submission processes and review of information reported by Member States pursuant to Regulation (EU) 2018/1999 of the European Parliament and of the Council and repealing Commission Implementing Regulation (EU) No 749/2014.

⁵³ [Climate Action Mirror](#) 2022: Part 0: Summary for Decision-Making, Part 1: Assessment of Target Achievement, Part 2: Transport, Part 3: Buildings, Part 4: Agriculture, Part 5: Other Sectors, Part 6: Multisectoral Measures, JSI, AIS, SFI; PNZ, 2022.

- indicators for monitoring the achievement of national targets for GHG, RES and EEU (status indicators⁵⁴); and
- indicators for monitoring progress on climate action against pre-defined sectoral indicators⁵⁵ for transport, buildings, agriculture, LULUCF, other sectors, green growth and EU ETS, which are part of the Climate Action Mirror;
- reports containing reviews and analyses of the implementation of nearly 100 instruments for the reduction of greenhouse gas emissions, known as the “catalogue of measure”. Reports contain a general description of the measure, its classification, information on the implementation of the measure in the previous year and planned implementation in the next two years, financial data, and impact assessments where foreseen;
- summary data on the use of stimulus funding and on the emission reduction achieved are also provided;
- in case of insufficient implementation of the measure, recommendations for upgrading the measures are also provided, with justification;
- in 2018-2020, the report also included a detailed analysis of the obstacles to implementation for the three measures in the centre of attention.

The Climate Action Mirror is prepared each year and forms the basis used by the Ministry responsible for the environment for the preparation of the **report on the implementation of the OP GHG**. All Climate Action Mirror reports are available on the LIFE ClimatePath2050 website⁵⁶, while the OP GHG implementation reports are available on the websites of the Government of the Republic of Slovenia and the Ministry responsible for Climate Action⁴⁸.

⁵⁴ Online version of the indicators: <http://kazalci.arso.gov.si/en/themes/po-target-achievement>

⁵⁵ Online version of the indicators: <http://kazalci.arso.gov.si/sl/themes/climate-mirror>

⁵⁶ Climate Action Mirrors for the years 2018 to 2022 are available here: <https://podnebnapot2050.si/results-for-slovenia/annual-climate-action-mirror/?lang=en>

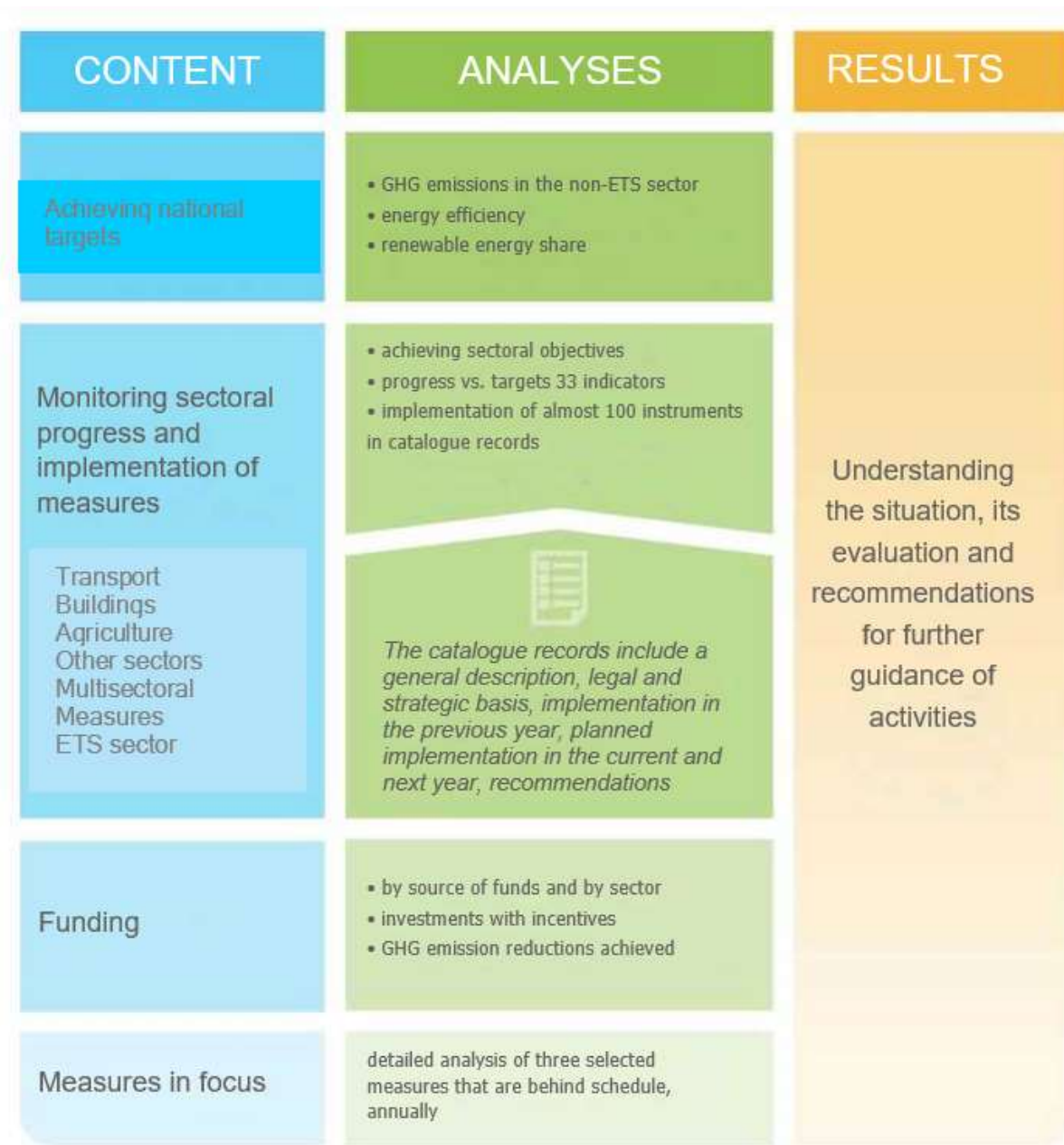


Figure 19: The main components of the Climate Action Mirror – the analytical basis for climate policy implementation monitoring

The Climate Action Mirror also serves as one of the most important basis for monitoring the implementation of the NECP¹⁷ regarding decarbonisation and energy efficiency. From 15 March 2023 onward, reporting to the EC on the implementation of the NECP will take place every two years. The National Assembly requested that the competent ministry submit the first report on the implementation of the NECP as early as 2022. The ministry prepared the report and aligned it with other ministries, and will present it to the National Assembly.

4.1.5.2 Institutional framework for climate policy implementation monitoring

The main body responsible for achieving the climate targets and for the national system for climate policy implementation monitoring is the Ministry responsible for the climate, the *Ministry of the Environment, Climate and Energy (MECE)*. MECE is responsible for the preparation and monitoring of basic strategic documents and strategic guidelines in the field of climate change mitigation and adaptation, reduction of greenhouse gas emissions and other air pollutants, as well as for the implementation of Slovenia's international commitments in this field and reporting. In addition, MECE is also responsible for implementing most of the GHG emission reduction measures for the waste sector⁵⁷.

In the area of greenhouse gas emissions, the Ministry of the Environment, Climate and Energy and Ministry of Infrastructure (MI) are responsible for the two sectors that contribute most to greenhouse gas emissions, namely the transport and energy sectors. In the field of transport, MI is responsible for preparing strategic documents, expert documents, regulations and measures in the field of transport infrastructure, while MECE is responsible for the fields of sustainable mobility and public passenger transport, as well as international transport issues. In the field of energy, the MECE prepares national programmes and regulations in the field of energy efficiency and renewable energy policies. It also implements, coordinates and participates in incentive programmes for these policies. The MECE is also responsible for implementing most of the measures in the building, industry, energy and transport sectors⁵⁷.

The Ministry of Agriculture, Forestry and Food (MAFF) is responsible for monitoring and regulating the forestry sector and is primarily responsible for drafting and adopting regulations and strategic acts. The MAFF is also involved in guiding forest management by adopting or participating in the adoption of forest management plans. The MAFF is responsible for implementing all GHG emission reduction measures for the agriculture sector⁵⁷.

The basic system for monitoring and ensuring the achievement of the national targets has been established by the MECE (see chapter *Description of implementation monitoring*) and consists of the annual reporting on the implementation of the climate policy, the report on the implementation of the OP GHG prepared by the Ministry and the Climate Action Mirror, which also includes the analytical basis for reporting or monitoring and measures in case of non-implementation. A broad group of experts in the fields of energy, buildings, industry, energy/emissions related transport issues (Jožef Stefan Institute), non-energy transport issues (PNZ, d.o.o.), agriculture (Agricultural Institute of Slovenia), LULUCF (Slovenian Forestry Institute) is involved in the monitoring assessment/reporting tasks of the Climate Action Mirror. In doing so, they draw on reports from, and consultations with a wide range of institutions responsible for implementing specific measures and instruments, through team

⁵⁷ Audit Report on the Effectiveness of meeting the targets to reduce greenhouse gas emissions, Court of Auditors of the Republic of Slovenia, 2021.

meetings, etc. Through workshops and/or online consultation, the process is open to stakeholders and the general public.

The responsibility for achieving the NECP targets for GHG emissions, which fall under the decarbonisation dimension, lies with the Ministry responsible for the climate, which is also responsible for climate policy implementation monitoring. The NECP sets strategic GHG emission reduction targets for each sector. The programme clearly defines the activities for achieving the targets and the responsibilities for their implementation. 11 institutions (7 ministries, the Eco Fund, the energy markets regulator, municipalities and the distribution system operator) are responsible for the implementation of the climate policy measures from the NECP (in dimensions of decarbonisation and energy efficiency). Among the ministries, the Ministry of Environment, Climate and Energy is responsible for the highest number of measures, that is 86, the Ministry of the Environment and Spatial Planning for 29, the Ministry of Agriculture, Forestry and Food for 26, the Ministry of Economic Development and Technology and the Ministry of Finance for 5 each, the Government Office for Development and European Cohesion Policy for 3 and the Ministry of Labour, Family and Social Affairs for 1.

The basic system for monitoring and ensuring that national targets are met is in place, but will need to be further formalised in the context of the forthcoming climate act. Formal procedures for dealing with non-implementation will also need to be formalised and measures in the event of non-implementation will need to be strengthened, which is also expected to be regulated in the climate act. The Ministry responsible for climate is also responsible for the preparation of the integrated report on greenhouse gas policies and measures and on projections in the framework of EU reporting under *Regulation 2018/1999*²⁴.

In 2021, the Court of Auditors of the Republic of Slovenia prepared an audit report on the *Effectiveness of meeting the targets to reduce greenhouse gas emissions*, assessed that the Republic of Slovenia was partially successful in achieving its greenhouse gas emission reduction targets⁵⁸. This is a unique report on Slovenia's performance in this area.

In accordance with the provisions of Article 145 of the *Environmental Protection Act (ZVO-2)*⁵⁹, the Government of the Republic of Slovenia establishes the Climate Council, an independent national scientific advisory body on climate policy. The Climate Council is made up of nine independent experts in the field of greenhouse gas emission reduction and climate change adaptation. In the nomination of candidates by the ministry responsible for climate change, natural and technical sciences as well as

⁵⁸ By 2020, Slovenia achieved its targets under the ESD and has made a more than proportionate contribution to the overall EU target in the EU ETS sector. The report found that most of the measures were being implemented, but in no sector had all the measures foreseen been implemented at the time of the audit. The Court of Auditors highlighted the extent to which environmentally harmful subsidies have led to an increase in emissions.

⁵⁹ Environmental Protection Act, (The Official Gazette of the Republic of Slovenia, No 44/22)

social sciences and humanities must be represented, with four members of the Climate Council proposed by public universities, three members by the Slovenian Academy of Sciences and Arts, and two members by non-governmental organisations. The tasks of the Climate Council are to provide scientific advice to the Government on existing and proposed climate policy measures, in particular in implementation monitoring and revision of the Slovenia's Long-Term Climate Strategy, NECP and other strategic documents, to formulate views on reports on their implementation, and to make proposals for improved measures and additional measures in line with the latest scientific knowledge. The Climate Council cooperates with expert institutions in the field of climate change and with local communities. In August 2022, the Government of the Republic of Slovenia adopted the Rules of Procedure of the Climate Council, and the Council is in the process of being formed.

4.1.5.3 Legal framework for implementation monitoring

The legal framework for implementation monitoring is based on national and EU law. A number of EU acts related to climate policy implementation monitoring apply directly to Slovenia as a Member State.

Since 2015, EU Member States have been obliged to provide the European Commission with full information on national climate change mitigation measures and instruments by 15 March every two years, in accordance with *Regulations 525/2013 and 2018/1999*. For more details see chapter 3.2.2 BR4-SI⁶⁰.

The *Environmental Protection Act (ZVO-2)* plays an important legislative role in achieving climate objectives and climate policy implementation monitoring⁵⁹. The Environmental Protection Act provides a legal basis for climate policy implementation monitoring, and the detailed implementation monitoring system has been planned in the OP GHG. The amended Environmental Protection Act (ZVO-2) also defines the obligation to monitor the climate strategy and to establish an advisory body (see chapter *Institutional framework for climate policy implementation monitoring*).

The content of the reports on the implementation of the OP GHG is defined in the OP GHG itself. The system has been extended and upgraded over the years, as described in the chapter *Description of implementation monitoring*.

⁶⁰ Chapter III of Commission Implementing Regulation No 749/2014 sets out strict criteria on the basis of which the national greenhouse gas inventories and greenhouse gas emissions of Member States are reviewed annually at the EU level. Based on this review, the European Commission issues an implementing decision on Member States' ESD emissions in the given year, which might lead to Member States facing penalties or other consequences. The ESD and the MMR have introduced an annual compliance cycle, requiring a review of Member States' greenhouse gas inventories to ensure compliance with their obligations under the ESD in the period 2013-2020. These reviews are carried out within a shorter timeframe than the current UNFCCC inventory review so as to enable using flexibility provisions and taking corrective action, where necessary, at the end of each relevant year.

Reporting on the implementation of the NECP is governed by *Regulation (EU) 2018/1999*, which requires Member States to produce an *integrated national energy and climate progress report* every two years, the first one on 15 March 2023, focusing on assessments of progress accomplished towards reaching the objectives and targets, on impact of the measures, and on updating the measures. In addition, an *integrated report on greenhouse gas policies and measures and on projections* is produced, containing information on policies, measures and projections that are also consistent with UNFCCC reporting requirements.

In September 2021, the Committee on Infrastructure and Environment of the National Assembly of the Republic of Slovenia adopted a decision⁶¹ and ordered the competent ministry to prepare a report on the implementation of the NECP in the first half of 2022, i.e. before it is required under the *EU Regulation (2018/1999)*. The ministry prepared the report and aligned it with other ministries, and is planning to present it to the National Assembly.

Municipalities report annually on the implementation of the LECs, on the activities carried out and those planned for the following year, and on progress in the areas of energy efficiency, renewable energy sources and GHG emission reduction. The legal framework is provided by *the Rules on the methodology and mandatory content of the local energy concept (Official Gazette of the RS, No 56/16)* and *the Rules on data submitted by energy service providers and other liable entities (Official Gazette of the RS, No 110/22)*. Reporting on the implementation of integrated transport strategies is currently optional. Reporting on climate policy is also included in reporting on the state of environment, which is mandatory for municipalities every fourth year under the Environmental Protection Act.

4.1.5.4 Implementation monitoring in the future

Resolution on Slovenia's Long-Term Climate Strategy until 2050 (*ReDPS50*)¹² includes a plan on how to improve implementation monitoring in the future. It is envisaged that implementation monitoring will be a fundamental element of the process of continuous improvement of climate policy – plan, do, check, act – to allow measures implementation to adapt to changing circumstances and, where necessary, to be upgraded to better achieve the set objectives. The implementation monitoring system will continue to include indicators.

An important step in this direction will be the *climate act*, which the Ministry has started to prepare with a public consultation on its content in September and October 2022. This ambitious act is envisaged to serve as the legal framework for the implementation, management, monitoring and reporting on all aspects of climate policy in Slovenia. It will also incorporate the provisions of the Environmental Protection Act, i.e. the climate neutrality objective, the Climate Council, the provisions governing the operation of the EU ETS scheme in Slovenia, the climate fund and others. It will also further formalise the implementation monitoring system and the

⁶¹ Decision of the Committee on Infrastructure and the Environment adopted at the 45th emergency meeting, held on 1 September 2021 (801-08/21-7/3)

procedures for responding to non-achievement of targets or gaps in the implementation of measures.

4.2 GHG Emission Reduction Measures

4.2.1 Cross sectoral Measures

M-1 EU EMISSIONS TRADING SYSTEM (EU ETS)

Sectors affected by the implementation of the measure: *energy industries, manufacturing industries and construction, industrial processes*

The objectives of EU Emissions Trading System are to enable lower costs for corporate entities by enabling a decrease in emissions where this is the cheapest, to equalise the costs of the reduction of GHG emissions in the entire EU area by permitting trading between member states – this will minimise the restriction of competition and discrimination of the position of corporate entities (operators of plants responsible for GHG emissions) in the common internal EU market, and to facilitate the reduction of GHG emissions in the future by rewarding innovation contributing to the reduction of GHG emissions.

The aim of the scheme is for Member States to meet their commitment to reduce GHG emissions in a cost-effective manner or at the lowest possible cost for industrial companies that are major emitters or have processes in their production that require a permit to emit GHG. This is the implementation of the EU acquis (Directives 2003/87/EC, 2008/101/EC, 2009/29/EC and Implementing acts 2010/2/EU, 2011/278/EU, 2011/638/EU, 176/2014/EU and Decision (EU) 2015/1814) by Slovenia in the Environmental Protection Act and implementing acts.

The Ministry of the Environment, Climate and Energy (MECE) is responsible for its implementation, while the tasks encompass implementation of the provisions of the Environmental Protection Act referring to trading with emission allowances. The establishment of the system falls within the competence of the EU.

In the 2013–2020 period, 49 operators in Slovenia were included in the EU ETS: all thermal power plants and heating plants (Šoštanj Thermal Power Plant, Brestanica Thermal Power Plant, Energetika Ljubljana), production of steel, glass, ceramics, cement, lime, paper, etc. In the 2021–2025 period, 34 operators are included in the scheme. In 2020, 1,611,271 allowances were distributed free of charge to installation operators, whereas 6,095,593 allowances were surrendered.

EU ETS companies completed their third trading period in 2020, and the last report and the last surrender of allowances took place by April 2021. At the beginning of the trading period, the allowances allocated were sufficient to cover all emissions, but by the end of the period, the quantities had already fallen to such a level that virtually all companies have to buy allowances on the market, where the price of allowances rose to an average price of €24.6/tCO₂ in 2019, €24.3/tCO₂ in 2020 and €52.9/tCO₂ in 2021. This has led to a re-examination of all options for reducing the required number of

coupons in companies included in the EU ETS, especially in those with energy-intensive processes.

In the fourth period (2021–2030), free allocation will continue to decrease at a rate of 2.2%⁶² (-1.74% in the third period of 2013–2020), while further reducing the number of sectors at risk of the so-called carbon leakage (companies would relocate production and emit GHGs elsewhere if GHG emissions were capped further). Companies at risk of carbon leakage are entitled to an annual amount of around 80% of free allowances, based on the 2014–2018 average, decreasing to around 70% by 2025 and 60% by the end of 2030. Companies not exposed to carbon leakage will receive significantly fewer free allowances, being entitled to an annual amount of around 25% of free allowances compared to the 2014–2018 average, decreasing to around 20% by 2025. By the end of 2030, there will be no more free allowances.

In the 2005–2020 period, emissions of the EU ETS sector decreased by 30.4%, by 31.2% in the transformations sector and industrial emission from fuel consumption and by 28.0% in processes. The EU ETS sector accounts for just under 40% of total emissions.

Table11: Overview of EU ETS GHG emissions in 2005, 2019 and 2020

	Annual GHG emissions or sinks			Change	
	2005	2019	2020	2005–2020	2019–2020
	kt CO ₂ eq			%	
Emissions covered by EU ETS	8,752	6,254	6,096	-30.4	-2.5
Electricity and heat production	6,384	4,452	4,390	-31.2	-1.4
Industry	2,369	1,802	1,706	-28.0	-5.4
<i>ETS share of total emissions</i>	<i>43%</i>	<i>37%</i>	<i>38%</i>		
Total emissions	20,462	17,074	15,851	-22.5	-7.2

M-2 ENVIRONMENTAL TAX ON AIR POLLUTION DUE TO CO₂ EMISSIONS

Sectors affected by the implementation of the measure: *manufacturing industries and construction, other sectors (energy use in households, the service sector and agriculture) and transport*

⁶² Provisional deal has been reached on revised EU ETS directive from Fit for 55 package which sets new linear reduction factor: in the period 2024-27 4.3 % and in the period 2028-30 4.4 %.

The legal basis addressing environmental tax for air pollution due to CO₂ include the Environmental Protection Act⁶³ and the Decree on the environmental tax on air pollution caused by carbon dioxide emissions⁶⁴.

The Environmental Protection Act presents the umbrella document and addresses the fundamental prerequisite for sustainable development and protection against environmental stress. Within this scope, the Act lays down a framework of the fundamental principles and measures of environmental protection, a framework for environmental monitoring, a framework for economic and financial instruments of environmental protection, as well as public services for environmental protection and other issues related to environmental protection.

The environmental tax instrument has been introduced in order to internalise the external costs of air pollution due to CO₂ emissions and, being an economic instrument, was aimed at reducing CO₂ emission through the fuel price supplement and therefore aimed at reducing environmental pollution. The CO₂ tax improves the competitiveness of renewable energy sources and of other energy products with lower specific emissions and the competitiveness of energy efficiency measures. The Decree on the environmental tax on air pollution caused by carbon dioxide emissions⁶⁵, which imposes an obligation to pay environmental tax for air pollution due to CO₂ emissions was updated in 2018. The updated decree does not bring major changes. Changes relate in particular to effective implementation and harmonisation with the Excise Duty Act and the minimum level of taxation applicable to fuel. The unit of air pollution with CO₂ emission remains €17.3/t CO₂. The measure has effects simultaneously with other measures for promoting improvements in energy efficiency and fuel substitution in transport and in buildings. Companies included in the EU ETS system and operators of small installations that have been granted an exclusion from the EU ETS by the European Commission (greenhouse gas emission permit holders) are exempt from the environmental tax.

M-3 TAXES AND LEVIES ON ENERGY THAT REDUCE EMISSIONS

Sectors affected by the implementation of the measure: *manufacturing industries and construction, energy use in households, service sector, agriculture and transport*

In the Republic of Slovenia, the taxation of energy products and electricity is regulated by the Excise Duties Act, which was adopted by the National Assembly in December

⁶³ Environmental Protection Act (Official Gazette of the Republic of Slovenia, No. 39/06 – official consolidated text, 49/06 – ZMetD, 66/06 – Constitutional Court Decision, 33/07 – ZPNačrt, 57/08 – ZFO-1A, 70/08, 108/09, 108/09 – ZPNačrt-A, 48/12, 57/12, 92/13, 56/15, 102/15, 30/16, 61/17 – GZ, 21/18 – ZNOrg in 84/18 – ZIURKOE)

⁶⁴ Decree on the environmental tax on air pollution caused by carbon dioxide emissions (Official Gazette of the Republic of Slovenia, No. 48/18)

⁶⁵ Decree on the environmental tax on air pollution caused by carbon dioxide emissions (Official Gazette of the Republic of Slovenia, No. 48/18)

1998 and entered into force on 1 July 1999. The Act transposes Council Directive 2003/96/EC of 27 October 2003 restructuring the Community framework for the taxation of energy products and electricity (ETD), which establishes a common framework for the taxation of energy products and electricity in the Union. In 2016, the revised Excise Duty Act-1⁶⁶ was adopted. According to the Excise Duty Act-1, excise duty is payable on energy products and electricity imported or produced and consumed in Slovenia. The amounts of excise duty are prescribed for energy products, when used for heating purposes or when used for propulsion, for electricity and for coal. Partial or full reimbursement of excise duty may be claimed for certain uses of energy products. Under the ETD, certain uses of energy products and electricity are not subject to taxation, while certain uses are subject to mandatory or optional exemptions. Such exemptions are to be progressively reduced in the framework of the ETD reform in line with the policy to reduce greenhouse gas emissions. A more detailed description of the beneficiaries of excise duties is presented in Slovenia's fourth biennial report to the UNFCCC (BR 4).

The excise duty is a tax measure implemented by the Ministry of Finance and is combined and policies that are implemented by ministries responsible for energy, infrastructure, environment, economy, agriculture and forestry. An appropriate energy and electricity taxation policy improves the competitiveness of renewable and low-impact energy sources through energy and electricity prices, thereby contributing to the achievement of environmental and energy objectives. The aim of the measure is to ensure that fuel prices also cover negative external costs, thus contributing to the implementation of the principle of inclusion of external costs according to the polluter-pays principle. The main objective of this tax measure is to provide a stable source of revenue for the state budget, to which the achievement of the objectives of other government policies is subordinated (social, economic, energy, environmental).

In addition to excise duties, the price of energy products is significantly affected by global market prices, the environmental tax on CO₂ emissions, RES and EEU contributions. The latter have been in force since 2014 with the entry into force of **the Decree on energy savings requirements**⁶⁷, which sets the level of the energy efficiency contribution at national (state) level at 0.08 cents per kilowatt-hour. The contribution is paid to the operator by final energy consumers. The funds are used by the Eco Fund to implement its programme (energy efficiency measures in buildings and transport, financial incentives for households and businesses). Also in 2014, the contribution for the provision of support for RES and CHP was introduced, which is currently determined by **the Act on the Promotion of the Use of Renewable Energy Sources (ZSROVE)**⁶⁸ and **the Decree on the method of determining and calculating the contribution for ensuring support for the production of electricity from high-**

⁶⁶ Excise Duty Act Official Gazette RS, No. 47/16, 92/21, NPB1, 192/21 and 140/22

⁶⁷ <http://www.pisrs.si/Pis.web/pregledPredpisa?id=URED6636>

⁶⁸ <http://www.pisrs.si/Pis.web/pregledPredpisa?id=ZAKO8236&d-49683-p=3&tab=analitcni&scrollTop=1280>

efficiency cogeneration and renewable energy sources⁶⁹. The contribution payable by consumers is determined separately for energy produced from fossil fuels and energy produced from other non-renewable sources. The amount of the contribution also varies according to the power and voltage level of the delivery point, the category of consumers and the intended use of the energy. The amount of the contribution is determined by the Energy Agency on the basis of an estimate of the annual volume of funds needed to provide the support, which is collected by the Centre for RES/CHP and used to finance the support scheme for subsidising the production of electricity from renewable energy sources and high-efficiency cogeneration of electricity and heat. The promotion scheme is also due to be renewed by the end of 2025.

In line with the objectives and orientations of the NECP, the ReDPSS and the objectives of the European climate policy, it will be necessary in the future to develop implementing measures that will reduce the favourable tax treatment of fossil energy use, so that the tax treatment of energy products is in line with these policies and promotes the reduction of greenhouse gas emissions. In 2022, in a period of high energy and electricity prices, Slovenia is providing measures in the form of tax and levy reductions (excise duties, RES, RE contributions, URE, CO₂ levies) and non-refundable financial incentives to mitigate energy prices⁷⁰. The measures are of a temporary nature. Similar measures have been implemented in other Member States of the Union.

M-4 CHANGES TO ENVIRONMENTAL TAXES AND CHARGES THAT REDUCE CO₂ AIR POLLUTION, AND THE PHASING DOWN AND PHASING OUT OF INCENTIVES FOR FOSSIL FUELS

Sectors affected by the implementation of the measure: *manufacturing industries and construction, energy use in households, service sector, agriculture and transport*

In the NECP, the CO₂ environmental tax is expected to increase, bringing it closer to the price of EU ETS vouchers. Slovenia is also expected, along with other EU Member States, in line with the European Green Deal and the renewed ETD, to limit fossil fuel subsidies including the current full exemptions for aviation and navigation. The NECP foresees a gradual reduction and phasing out of incentives for fossil fuels. The most problematic among the types of incentives in Slovenia is the refund of excise duties for commercial diesel, which accounts for the largest share of the total amount of all excise duty refunds paid on energy products. The NECP also foresees that Slovenia will gradually limit the favourable tax treatment of energy products and electricity in industry and encourage beneficiaries to redirect the tax benefits to investments in process transformation leading to the use of renewable energy and greater energy efficiency. In order to achieve the set objectives through energy efficiency measures, the Eco Fund will need to provide a sufficient number of grants, which will require a

69 <http://www.pisrs.si/Pis.web/pregledPredpisa?id=URED8405>

70 <https://www.energetika-portal.si/nc/novica/n/podaljsanje-ukrepa-znizanih-trosarin-za-energente-in-elektricno-energijo/>

gradual increase of the EEU contribution from € 0.08 c/kWh to € 0.27 c/kWh by the end of 2030⁷¹.

M-5 USE OF BEST AVAILABLE TECHNIQUES – ENVIRONMENTAL PERMITS

Sectors affected by the implementation of the measure: *industrial processes, manufacturing industries and construction, energy industries, waste, agriculture*

The Directive 2010/75/EU on industrial emissions is the key instrument regulating the emissions of harmful substances, while the most important instrument in regard to emissions from fuel use or for the promotion of energy efficiency and substitution of fuels in industry is the EU Emissions Trading System, EU ETS (measure M-1), with the Directive 2010/75/EU merely complementing it. The aim of the Directive is the introduction and the promotion of the best available technologies (BAT) through environmental permits for installations and their control. In this manner, the selection of new installation is influenced and the replacement of existing installation is encouraged so that the equipment must meet the conditions and provisions from the directive or standards from the reference documents. The Directive also sets emission limit values for large combustion plants, which have been tightened considerably from July 2020. The Directive is also complemented with other EU measures, such as Directive on the reduction of national emissions of certain atmospheric pollutants (“NEC Directive”) (2016/2284).

In Slovenia, this instrument contributed to the key reduction of GHG gases emissions in industrial processes, when an old electrolysis unit was stopped since it failed to meet the standards of the best available technologies. Consequently, the PFC emissions were reduced by approximately 85%. The measure also contributed to the technological modernisation of the thermal power sector.

M-6 EDUCATION, TRAINING, AWARENESS-RAISING, COMMUNICATION AND PROMOTION

Sectors affected by the implementation of the measure: *all sectors*

Various players in Slovenia (government and the non-governmental sector, media, business sector, professional institutions etc.) have been carrying out activities for education, training, communication and awareness-raising in regard to mitigating climate change. The activities are financed from different sources, including the state budget, EU funds and various international sources. In accordance with the OP GHG-2020, the targets for the period up to 2020 were oriented towards education and training for the transition to a competitive low-carbon society, the strengthening of human resources to create new green jobs and for communicating about the benefits of mitigating climate change and practical aspects of implementing measures.

Future orientations are set by the NECP, which aims to accelerate the implementation of communication, awareness-raising and training programmes for different target

⁷¹ <https://www.ekosklad.si/informacije/o-skladu/poslovni-nacrt/poslovna-politika-eko-sklada-2021-2025>

groups. The NECP envisages several instruments in the field of training, education, communication, energy and climate literacy in a total value of approximately €17 million. This measure also foresees activities to raise awareness and educate users on the correct use of wood biomass appliances, thereby reducing the impact of promoting the use of wood biomass on air quality.

For more information, see chapter 9.

M-7 GREEN ECONOMIC GROWTH

Sectors affected by the implementation of the measure: *manufacturing industries and construction, energy use in households, service sector, agriculture and transport*

The NECP identified the need to increase public spending on R&D to at least 1% of GDP by 2030, with a particular focus on supporting the transition to a climate-neutral society. It sets out the following actions to promote green growth:

- At least doubling (as possible) of the SRA funding for targeted research projects (TRPs);
- Preparation of a long-term TRP to support the transition to a climate-neutral society (MECE), ensuring the ongoing implementation of TRPs and support to ministries in the fields of energy, low-carbon technologies, circular economy, sustainable agriculture and forestry, social science skills, etc. (co-financing to be programmed also from the climate fund – at least 1% per year);
- Increase in the scope of SRA multidisciplinary research programmes on the transition to a climate-neutral society;
- At least 4% of the climate fund's resources (annual inflows) dedicated to research on the transition to a climate-neutral society in each programme, including strengthening the institutions responsible for distributing these funds;
- Development of new instruments to accelerate cooperation between research and development institutions and the economy (public-private research and development cooperation and the creation of competitive conditions for innovative research work in public enterprises), and joint involvement in international projects;
- Further encouraging state-owned enterprises with project management skills and experience to take the lead in setting up innovation and development polygons/platforms. The polygons/platforms are run by state-owned companies and bring together universities, research institutions and agencies. Joint projects develop targeted innovations that change technologies, train new staff, etc.

In 2021, the Research and Innovation Strategy of Slovenia 2030 was prepared, which is a key strategic document for research and innovation, and will be the basis for policy-making related to social and economic development and societal challenges. The Strategy was adopted in March 2022 and is complementary to other sectoral strategic documents at national level (e.g. the Slovenian Industrial Strategy, the Slovenian Smart Specialisation Strategy, the National Energy and Climate Plan, Digital Slovenia and the National Programme for Promoting the Development and Use of

Artificial Intelligence in the Republic of Slovenia until 2025). At the implementation level, it will be complemented by action plans and sectoral strategy documents (for example: Research Infrastructures Development Plan, Open Science Action Plan, Technology Transfer Offices Action Plan, Equal Opportunities Action Plan), which will define the objectives and build on them with measurable monitoring indicators.

Incentives for companies to transition to a climate-neutral society will be available from 2021 onwards under the Recovery and Resilience Plan (RRP), which was adopted in 2021 and will be the basis for the use of the Recovery and Resilience Fund (RRF).

M-8 GREEN PUBLIC PROCUREMENT

Sectors affected by the implementation of the measure: *other sectors (energy use in the public sector, energy use in transport)*

This area is covered by *the Decree on green public procurement*⁷², which aims to reduce the negative impact on the environment through the public procurement of environmentally less burdensome goods, services and works, thereby improving the environmental performance of existing supply, encouraging the development of environmental solutions and setting an example for the private sector and consumers. The Decree sets out the subjects of public procurement, defining environmental aspects as well as the objectives of green public procurement (GPP). The Decree, Annex 1, specifies 78 items for which public procurement is compulsory. Annex 2 sets out the objectives and conditions for the public procurement of clean and zero-emission road transport vehicles. In 2020, 16,872 contracts were awarded (for almost €3.9 billion) and 4,361 contracts (€752 million) included at least one environmental aspect. Among the 78 items listed as subjects of GPP, the most important in terms of reducing GHG emissions are contracts for electricity, vehicles, transport services, building construction and design, road design, electronic office equipment, lighting and others. The LIFE IP Care4Climate project specifically addresses this area, where an analysis of the impact of green public procurement in Slovenia was carried out in 2021 and 24 workshops were held to strengthen and transfer knowledge on GPP. It is planned to continue the activities to promote the GPP in the future, namely the preparation of model documentation for selected products, further transfer of knowledge to clients and providers through workshops and regular training, assistance and pilot projects.

M-9 ENERGY LABELLING AND MINIMUM STANDARDS FOR PRODUCTS AND DEVICES

Sectors affected by the implementation of the measure: *other sectors (energy use in the public sector, service sector and households), transport*

The purpose of energy labelling is to enable consumers to buy energy-efficient appliances, thereby helping to reduce energy use and costs. In addition to contributing

⁷² Decree on Green Public Procurement (Official Gazette of the RS, No. 51/17, 64/19 and 121/21)

to environmental objectives, ecodesign also aims to establish circular economy. The two measures are legislative and have been in place since 2002, with many upgrades.

Ecodesign requirements for energy related products are defined in Article 47 of the Act on Energy Efficiency⁷³; they come from Directive 2009/125/EC establishing a framework for the setting of ecodesign requirements for energy-related products⁷⁴. The requirements for energy labelling of products are defined in Article 48 of the Act on Energy Efficiency and on the basis of Regulation (EU) 2017/1369 establishing a framework for energy labelling⁷⁵. The requirements for both measures are transposed to the Slovenian legal order directly with Commission Regulations. The implementation of the measures in Slovenia is supervised by the Market Inspectorate of the Republic of Slovenia.

In the area of energy labelling, the biggest changes are related to the gradual transition to labelling products with a simpler scale from A to G, as the lowest categories from the previous scale (from A+++ to G) will no longer be necessary due to the development of more energy efficient products. Rescaled labels were introduced for fridges and freezers, dishwashers, washing machines, tumble dryers and TVs from 1 March 2021 and for light bulbs from 1 September 2021. Other product groups will gradually follow in the future. For products with rescaled energy labels, the changes to the ecodesign of products adopted by the European Commission in 2019 also entered into force in March 2021. An important part of this measure is also working towards more repairs and increased recycling of appliances. Since 2021, the European Product Database for Energy Labelling (EPREL) has been available to give consumers easy access to energy label details and other product information via a QR code on the energy label.

In March 2022, the Commission presented a proposal for a legislative framework for the design of more environmentally sustainable and circular products to replace the current Directive 2009/125/EC. The proposal was published together with the Ecodesign and Energy Labelling Work Plan 2022-2024, which includes new energy-using product groups and increases the targets for already regulated products. The proposal emphasises circular product design and increases labelling requirements for energy-related products and tyres. As of March 2022, the ecodesign regulations are in force for 29 product groups and the energy labelling regulations for 15 product groups.

⁷³ Official Gazette of the Republic of Slovenia No. [158/20](#)

⁷⁴ Directive 2009/125/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for the setting of ecodesign requirements for energy-related products (recast), OJ L 285, 31. 10. 2009

⁷⁵ Regulation (EU) 2017/1369 of the European Parliament and of the Council of 4 July 2017 setting a framework for energy labelling and repealing Directive 2010/30/EU, OJ L 198, 28. 7. 2017

Savings from energy labelling and ecodesign are estimated at 230 Mtoe at EU level by 2030⁷⁶.

In Slovenia, loans with favourable interest rates from the Eco Fund are available for the purchase of energy-efficient large household appliances. For stoves, drying machines, kitchen hoods, air conditioners, etc, which are still subject to Directive 2010/30/EU⁷⁷, loans can be obtained for appliances classified into A+ energy class or higher, and for refrigerators and freezers, dishwashers, washing machines and washer-dryers with rescaled labels classified at least into C energy class. The purchase of energy-efficient household appliances is also one of the measures by which the obliged parties can achieve the necessary savings under the mandatory end-use energy-savings scheme, which is presented in more detail under M-10.

M-10 ENERGY SAVINGS ACHIEVED AT END-USERS THROUGH THE NATIONAL ENERGY EFFICIENCY OBLIGATION SCHEME FOR ENERGY SUPPLIERS

Sectors affected by the implementation of the measure: *other sectors (energy use in the public sector, service sector and households), manufacturing industries and construction, transport*

This is a legislative measure that obliges energy suppliers to achieve reductions in energy use and greenhouse gas emissions by implementing various energy efficiency measures at the end-user level, thus contributing to the achievement of national targets in this area. The first scheme for mandatory final energy savings for energy traders was launched in Slovenia in 2011. In 2015, it was replaced by a new scheme in accordance with Article 7 of the Energy Efficiency Directive (EED)⁷⁸, Article 318 of the Energy Act (EZ-1) of 2014 and the Decree on energy savings requirements⁷⁹. In the scheme, all suppliers of electricity, gas, liquid and solid fuels were obliged to ensure the achievement of energy savings among final consumers, while the amount of savings that had to be achieved, varied from 0.25% of the energy sold in the previous year in 2015, up to 0.75% in 2018 and from 2018 onwards. The Energy Efficiency Action Plan 2014-2020 (AN URE 2020)⁸⁰ sets a target of achieving a cumulative reduction in

⁷⁶ About the energy label and ecodesign website (https://ec.europa.eu/info/energy-climate-change-environment/standards-tools-and-labels/products-labelling-rules-and-requirements/energy-label-and-ecodesign/about_en)

⁷⁷ Directive 2010/30/EU of the European Parliament and of the Council of 19 May 2010 on the indication by labelling and standard product information of the consumption of energy and other resources by energy-related products (recast), OJ L 153, 18. 6. 2010

⁷⁸ Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/08/EC and 2006/32/EC, OJ L 315, 14. 11. 2012

⁷⁹ Official Gazette of the Republic of Slovenia, No. [96/14](#), [158/20](#) – ZURE, [84/22](#), [86/22](#) and [107/22](#)

⁸⁰ Energy Efficiency Action Plan 2014–2020, Government of the Republic of Slovenia, May 2015

energy consumption of 4,263 GWh over the 2014–2020 period. The 2020 target has been exceeded.

From the end of 2020 onwards, the operation of the scheme is governed, in addition to the aforementioned regulation, by the Act on Energy Efficiency (ZURE), which defines the obligation to achieve energy savings in Articles 10 to 14. In accordance with the ZURE, solid fuel suppliers to final consumers who supply less than 100 MWh of energy per year are now exempt from the scheme, and the obliged parties must achieve savings of 0.8% of the energy sold in the previous year in the current calendar year. Article 78 of the ZURE also provides for a transitional period for suppliers of liquid fuels for transport. Their obligation increases gradually over the period 2020–2025, from 0.25% to 0.70% of the previous year's petrol and diesel sales. According to the National Energy and Climate Plan (NECP) adopted in 2020, the scheme is planned to continue operating until at least 2030. Together with the alternative measure, i.e. the Eco Fund programmes, the energy savings under Article 7 of the EED for the 2021–2030 period are estimated at 458.7 GWh per year. There is no separate target for the scheme.

Table12: Summary of the description of multi-sectoral measures.

Label	Measure and/or policy	Objective	Gas influenced by the measure	Type of measure	Status of implementation	Implementing entity	Effect of the measure [kt CO ₂ eq]		Reference to the measure from the previous National Report
							2025	2030	
M-1	EU EMISSIONS TRADING SYTEM (EU ETS)	Reduction of GHG emissions where this is most cost efficient	CO ₂ , PFC	Economic, regulatory	Implemented	MECE	IE ⁸¹	IE	M-1 GHG EMISSION ALLOWANCE TRADING (EU ETS)
M-2	ENVIRONMENTAL TAX ON CO ₂ EMISSIONS	Internalisation of external costs due to CO ₂ emissions	CO ₂	Fiscal	Implemented	MECE, MF	IE ⁸²	IE	M-2 ENVIRONMENTAL TAX ON AIR POLLUTION DUE TO CO ₂ EMISSIONS
M-3	TAXES AND LEVIES ON ENERGY THAT REDUCE EMISSIONS	Promotion of the competitiveness of cleaner fuels	CO ₂	Fiscal	Implemented	MF	IE ⁸²	IE	M-4 TAXES AND CHARGES
M-4	CHANGES TO ENVIRONMENTAL TAXES AND CHARGES THAT REDUCE CO ₂ AIR POLLUTION, AND THE PHASING DOWN AND PHASING OUT OF INCENTIVES FOR FOSSIL FUELS	Internalisation of external costs of CO ₂ emissions and promotion of the competitiveness of cleaner fuels	CO ₂	Fiscal	Planned	MECE, MF	IE ⁸³	IE	/

⁸¹ The effect of this measure is included in the effect of M-11 and also M-18

⁸² The effect of this measure is included in the effect of all implemented and accepted measures supporting EEU and RES in industry, households, services and transport.

⁸³ The effect of this measure is included in the effect of all planned measures supporting EEU and RES in industry, households, services and transport.

Label	Measure and/or policy	Objective	Gas influenced by the measure	Type of measure	Status of implementation	Implementing entity	Effect of the measure [kt CO ₂ eq]		Reference to the measure from the previous National Report
							2025	2030	
M-5	USE OF BEST AVAILABLE TECHNIQUES	Reduction of energy use and emissions by using the best available techniques	CO ₂ , PFCs	Legislative	Implemented	MECE	IE ⁸⁴	IE	M-3 USE OF BEST AVAILABLE TECHNIQUES
M-6	EDUCATION, TRAINING, AWARENESS-RAISING, COMMUNICATION AND PROMOTION	Creating an environment favourable to the implementation of GHG emission reduction measures	CO ₂ , N ₂ O, CH ₄	Information, Educational	Implemented	Various ministries	NE	NE	M-5 EDUCATION, TRAINING, AWARENESS-RAISING, COMMUNICATION AND PROMOTION
M-7	GREEN ECONOMIC GROWTH	Long-term reduction of GHG emissions	CO ₂	Economic, Research	Implemented	GODECP, MEDT	NE	NE	M-6 GREEN ECONOMIC GROWTH

⁸⁴ Effect of this measure is included in the effect of measures in industry and industrial processes.

Label	Measure and/or policy	Objective	Gas influenced by the measure	Type of measure	Status of implementation	Implementing entity	Effect of the measure [kt CO ₂ eq]		Reference to the measure from the previous National Report
							2025	2030	
M-8	GREEN PUBLIC PROCUREMENT	Public procurement of goods, services and works with a lower environmental impact	CO ₂	Regulation	Implemented	MPA, MECE	NE	NE	The measures include: M-15 PROMOTION OF EFFICIENT ENERGY USE AND RENEWABLE ENERGY SOURCES IN THE PUBLIC SECTOR M-18 INCREASING VEHICLE EFFICIENCY, ENCOURAGING ECONOMIC DRIVING, INCREASING VEHICLE OCCUPANCY AND ENCOURAGING THE USE OF FUELS WITH LOW CO ₂ EMISSIONS M-27 WASTE PREVENTION
M-9	ENERGY LABELLING AND MINIMUM STANDARDS FOR PRODUCTS AND APPLIANCES	Improvement of energy efficiency of devices	CO ₂	Legislative, Information	Implemented	MECE	NE	NE	M-7 ENERGY LABELLING AND MINIMUM STANDARDS FOR PRODUCTS AND APPLIANCES
M-10	ENERGY EFFICIENCY OBLIGATION SCHEME FOR ENERGY SUPPLIERS	Increased efficiency of energy use at final consumers	CO ₂	Legislative	Implemented	MECE	IE ⁸⁵	IE	M-8 ENERGY EFFICIENCY OBLIGATION SCHEME FOR ENERGY SUPPLIERS

⁸⁵ Effect of this measure is included in the effect of EEU measures in industry, services, households and transport.

4.2.2 Energy Industries

M-11 TECHNOLOGICAL MODERNISATION OF THERMAL POWER SECTOR]

Sectors affected by the implementation of the measure: *electricity and heat generation*

In line with its decarbonisation objectives, Slovenia is modernising its thermal power sector. Measures are based on the requirements of *the Directive on industrial emissions*⁸⁶ or directives prior to this one, which means that when a unit reaches the end of its lifetime, it is replaced by more environmentally acceptable units with substantially higher efficiency and also with high-efficiency cogeneration (CHP). Measures of a change in fuel are also carried out – primarily a partial transition to natural gas and higher use of wood biomass in co-firing. Before 2020, the following measures as described in more detail in the NC7-SI and BR4-SI were implemented: the closing down of Units 1–4 and the construction of Unit 6 at Šoštanj Thermal Power Plant; Trbovlje Thermal Power Plant (TET) stopped generating electricity by burning brown coal, and, at the same time, Trbovlje Hrastnik Mine stopped coal mining; the investment in wood biomass co-firing in Unit 3 was realised at the Ljubljana Heat and Power Plant (TE TOL) .

The measures continued in 2021 with the completion of the investment in a new gas turbine at Brestanica Thermal Power Plant, Unit 7 with a rated capacity of 56 MW, intended for reserve capacities, carried out as part of the project to replace the gas units 1–3, which are reaching the end of their lifetime. In 2022, the construction of a gas-steam cogeneration unit (142 MW) at Ljubljana Thermal Power Plant (TE TOL) is being finalised to replace the output of the two existing coal-fired steam power plants. At TE TOL, only the co-firing unit on wood biomass will remain in operation.

M-12 ADDITIONAL MEASURES TO REDUCE GHG EMISSIONS FROM THERMAL POWER PLANTS

Sectors affected by the implementation of the measure: *electricity and heat generation*

In Slovenia, the year 2033 is the target year for coal phase-out (for objectives in this area see chapter 4.1.1 Climate policy objectives). In addition to the existing measures, the following additional measures to reduce the use of coal are foreseen for this purpose in the Integrated National Energy and Climate Plan of the Republic of Slovenia (NECP)⁸⁷, adopted in 2020, in subsequent decisions in the National strategy for coal exit and restructuring of the coal regions in accordance with the principles of

⁸⁶ Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control)

⁸⁷ Integrated National Energy and Climate Plan of the Republic of Slovenia (NECP), Government of the Republic of Slovenia, 28. 2. 2020

a just transition⁸⁸ of 2022 and the Territorial plan for just transition of Savinjsko-Šaleška coal region⁸⁹:

- Shutdown of Unit 5 at Šoštanj Thermal Power Plant (TEŠ) by 2030 (NECP measure);
- Reduced lignite extraction by 2030 (NECP measure);
- Preparation of an act on the gradual closure of the Velenje Coal Mine and an act on the restructuring of the region (NECP measure). The act will be prepared in accordance with the objective of coal phase-out by 2033 defined in *the National strategy for phasing out coal and restructuring coal regions in line with the principles of a just transition*, adopted in 2022;
- The phase-out of imported coal for electricity generation at Energetika Ljubljana, Ljubljana Heat and Power Plant by 2030 (NECP measure).

In this context, the implementation of the Territorial plan for just transition of Savinjsko-Šaleška coal region is foreseen, which will enable the region to exit coal production with appropriate measures, while ensuring a just transition. Measures are foreseen to develop employment competences and economic growth in the region, which will make the measure more feasible and mitigate undesirable effects.

Measures to replace electricity generation from coal-fired units are also under preparation and will be further specified in the NECP update.

M-13 PROMOTION OF ELECTRICITY GENERATION FROM RES AND HIGH EFFICIENT ELECTRICITY AND HEAT CO-GENERATION

Sectors affected by the implementation of the measure: *electricity and heat generation*

PROMOTION SCHEME

The operating support in the scheme (in the form of a premium or a fixed price) is intended to promote the production of electricity from RES and/or high-efficiency cogeneration (CHP) in all sectors, in CHP plants producing less than 20 MW or RES plants producing less than 10 MW, with the exception of wind farms, which must produce less than 50 MW. The majority of the scheme's effects are achieved in the EU ETS sector, with the promotion of CHP, in particular RES CHP installations that reduce GHG emissions from heat use in the ESD sector, being particularly relevant for the ESD sector (see also M-16).

The promotion scheme for high efficiency co-generation of electricity and heat (CHP) and renewable energy sources was introduced by Slovenia in 2002. The scheme has evolved over time, as detailed in the BR4-SI, NC7-SI and previous reports. The legal

⁸⁸ National strategy for coal exit and restructuring of the coal regions in accordance with the principles of a just transition, Government of the Republic of Slovenia, 13. 1. 2022

⁸⁹ Territorial plan for just transition of Savinjsko-Šaleška coal region, Government of the Republic of Slovenia, 28. 9. 2022

basis for the current support scheme is defined in the *Act on the Promotion of the Use of Renewable Energy Sources (ZSROVE)*⁹⁰ and the *Decree on support for electricity generated from renewable energy sources and from high-efficiency cogeneration*⁹¹ as well as other implementing regulations in this area. Since 2014, investors enter in the promotion scheme on the basis of public calls by the Energy Agency. Projects are selected on the basis of the available funds, the project's consistency with the operation plan and the objectives of the promotion scheme, and the offered price for the electricity generated, as defined by the provider when applying to the public call. Since 2016, when the Agency launched the first public call following the entry into force of the amendment to the promotion scheme, 10 open calls have been launched for the entry of generation installations into the promotion scheme. Out of the 1,191 projects submitted and 516 selected in all 10 public calls, only 130 were implemented, with a total rated electric power of 58.65 MW.

Including entries before 2016, 3811 installations with the total rated electric power of 415.26 MW were included in the promotion scheme in 2021, generating 973.9 GWh of electricity, which was 11 GWh more than in 2020. RES installations in the promotion scheme contributed to a reduction of 361.5 kt CO₂ eq of GHG emissions in 2021, while high-efficiency fossil-fuel CHP installations contributed 31.58 kt CO₂ eq

INCENTIVES FOR SELF-SUPPLY OF ELECTRICITY FROM RES

The self-supply system under the *Decree on the self-supply of electricity from renewable energy sources*⁹² allows consumers to self-supply electricity from renewable energy sources to cover all or part of their own electricity consumption with a self-supply installation. For installation owners, the net-metering, i.e. the difference between the electricity taken and the electricity delivered, read at the same metering point at the end of the billing period, is taken into account when calculating the cost of electricity from the grid.

The principle of “net-metering” at the annual level has had a strong impact on the number of installations entering the self-supply system in Slovenia. This self-supply mode expires at the end of 2023, after which self-supply will still be possible, but grid charges will have to be paid for the energy taken, while excess energy will be allowed to be sold on the market or transferred between metering points.

In 2021, 14,451 self-supply installations were in operation, with a total connected load of 195 MW and an average connected load of 13.5 kW. Based on the data from the last six years, an estimate of the growth in the number and total capacity of self-supply installations up to 2023 has been made, showing that by the end of 2023, almost 29,000

⁹⁰ Act on the Promotion of the Use of Renewable Energy Sources (Official Gazette of the Republic of Slovenia, Nos. [121/21](#), [189/21](#) and [121/22](#) – ZUOKPO)

⁹¹ Decree on support for electricity generated from renewable energy sources and from high-efficiency cogeneration (Official Gazette of the RS, No. [26/22](#))

⁹² [Decree on the self-supply of electricity from renewable energy sources \(Official Gazette of the RS, No. 43/22\)](#)

consumers are expected to be self-supplying electricity, with a total capacity of self-supply installations of almost 375 MW.

Investment incentives for households are also available for self-supply installations. In the period 2017-2021, the Eco Fund disbursed €21m in subsidies for the self-sufficiency measure (solar power plants)⁹³.

CONSTRUCTION OF LARGE HYDROELECTRIC POWER PLANTS

In Slovenia, four hydroelectric power plants (HPPs) with a total capacity of 156 MW were built on the lower branch of the Sava River between 2006 and 2017. Activities are underway for the construction of the last power plant in this chain, the 27.5 MW HPP Mokrice, where the building permit procedure has been suspended pending the court's decision on an appeal against decisions taken in the procedure of overriding the public interest for the preservation of nature by the public interest of the production of electricity from renewable energy sources.

Procedure for the preparation of the National Spatial Plan (NSP) for three hydroelectric power plants on the middle branch of the Sava River is underway: Suhadol, Trbovlje and Renke, with a total capacity of 96 MW and a projected average annual generation of 383 GWh. These facilities are not included in the existing 2030 NECP. The Litija and Ljubljana branch of the middle Sava River also has the potential for hydro energy. In the future, the construction of HPPs will as priority take place in areas that are not protected by the Natura instrument; however, for the implementation of most projects, it will be necessary to implement the principle of overriding the public interest for the preservation of nature by the public interest for protection of the climate or production of electricity from renewable energy sources. The outcome of these procedures is uncertain and the question remains to what extent these projects will be implemented.

OTHER INCENTIVES FOR RES AND CHP

Also important for the promotion of CHP is the mandatory share of heat from RES, CHP and waste heat that all district heating systems (DHS) must achieve, as set out in Article 50 of the *Act on Energy Efficiency (ZURE)*⁹⁴. This mechanism, which changed slightly in 2020, is described in more detail in chapter M-16.

Fuels used for electricity and heat co-generation are exempt from the payment of excise duty, in accordance to the *Excise Duty Act (ZTro-1)*⁹⁵ (See M-3).

⁹³ Non-refundable financial incentives form the Eco Fund subsidies:

https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKEwjC5sDIpN_6AhUfhP0HHeDODcEQFnoECBgQAQ&url=https%3A%2F%2Fwww.ekosklad.si%2Finformacije%2Finformacije-javnega-znacaja%2Fdokumenti%2Fpodatki-o-izplacanih-nepovratnih-sredstvih-po-obcinah-in-ukrepih-za-obdobje-2016-2021&usg=AOvVaw2tm1IvL4fp8-qGxqNF-zsc

⁹⁴ Act on Energy Efficiency (ZURE), Official Gazette of the Republic of Slovenia, No. 158/20
Act on Energy Efficiency, Official Gazette of the RS, No. 158/20

⁹⁵ Official Gazette of the Republic of Slovenia, No. 47/16.

The installation of high efficiency CHP units and the generation of electricity in solar power plants are also promoted by the *Rules on Efficient Use of Energy in Buildings with a Technical Guideline*⁹⁶, which defines that the energy performance of a building is met if at least 50% of final energy for the heating and cooling of the building and for providing hot water is obtained from such systems.

The production of electricity from RES is also promoted by certificates of origin⁹⁷, which aim to facilitate the trading of electricity produced from renewable energy sources or cogeneration, and to improve transparency in the electricity market. The issuance of and transactions in certificates of origin are carried out within the Certificate of Origin Register, which is managed by the Energy Agency.

M-14 ADDITIONAL MEASURES FOR PROMOTION OF ELECTRICITY GENERATION FROM RES AND HIGH EFFICIENCY ELECTRICITY AND HEAT CO-GENERATION

Sectors affected by the implementation of the measure: *electricity and heat generation*

UPGRADE OF EXISTING FINANCIAL INCENTIVES

High electricity prices have led to a number of mature RES electricity generation technologies being competitive today without subsidies (e.g. for solar and wind power plants), so with longer-term trends of such prices financial incentives will no longer be necessary. Financial incentives will therefore be targeted at promoting more expensive technologies that bring other benefits, e.g. to achieve the objectives of security of energy supply (e.g. diversification of sources, contribution to production in winter months e.g.) or other benefits. The Eco Fund is already preparing a public call, which will be launched at the end of 2022, to provide grants from the Climate Change Funding Programme for investments in solar energy installations for self-supply, with priority given to installations with storage or battery systems.

Financial incentives will also be able to be more targeted towards advanced and innovative technologies.

The NECP also plans to overhaul the existing promotion scheme, splitting it into three smaller promotion schemes, depending on technology, capacity and the way how support is allocated. Investment incentives are also expected to become the dominant form of financial incentives in the coming years, gradually replacing the promotion scheme. In the future, the funds raised through the RES and CHP contribution will also be used to promote the production of heat from RES, such as the use of waste heat, geothermal energy in large-scale installations, etc.; see chapter M-16.

⁹⁶ Rules on efficient use of energy in buildings (Official Gazette of the Republic of Slovenia, No. 70/22)

⁹⁷ The instrument was introduced on the basis of the RES directives. In Slovenia, the legal basis is defined in the Energy Act (EZ-1, Official Gazette of the Republic of Slovenia, Nos. 60/19 – Official consolidated text, 65/20 and 158/20 – ZURE) and the Decree on issuing declarations for generation units and guarantees of electricity origin (Official Gazette of the Republic of Slovenia, No. 182/2020).

In addition to the RES and CHP contribution, funds under the European Cohesion Policy (ECP) programme, the Recovery and Resilience Plan (RRP) and the Climate Change Funding Programme (CCF) are also available for the promotion of electricity generation from RES in Slovenia. Under these programmes, €306 million is available for investment incentives for electricity generation from RES, namely:

- €130 million under the RRP programme for 2021-2026 for strengthening the electricity distribution network (€80 million) and electricity generation from RES (€50 million)
- €161 million under the ECP programme for 2021-2027 for smart energy systems (€59 million) and electricity generation from RES (€102 million: solar and wind power plants)
- €15 million under the CCF for 2022-2023 for subsidies for electricity self-supply

INCENTIVES FOR BETTER INTEGRATION OF RES INTO THE ELECTRICITY SYSTEM

Ensuring conditions for accelerated development of the electricity distribution network to enable better integration of RES and additional consumers into the network

In order to achieve the ambitious energy and climate policy objectives, the NECP foresees that Slovenia will provide better conditions for the accelerated development of the electricity distribution network, as this network is the cornerstone of the transition to a climate-neutral society, and only a strengthened network will allow for the accelerated connection of heat pumps, the fulfilment of the requirements related to the accelerated introduction of e-mobility and the accelerated integration of renewable energy production facilities. It is therefore necessary to provide additional financial, human and technical resources to accelerate the comprehensive development and management of the electricity distribution network. The NECP provides for investments in the electricity distribution network of €4.2 billion over the period 2020-2030, which is around three times the current investment intensity.

The RRP provides for investments in the modernisation of the low-voltage distribution network in the amount of €80 million for the integration of dispersed RES generation sources in the form of strengthening of the distribution network, new transformer stations, which is also the basis for the integration into advanced networks. In addition, the Just Transition Fund (SAŠA region) provides for investments of €7 million in increasing the production capacity for electricity generation from RES, including distribution network capacity and the establishment of community self-supply to alleviate energy poverty and the use of brownfield areas.

Other additional financial resources needed have not yet been secured, nor have the additional human resources. While the regulatory framework adequately encourages the deployment of new technologies and the implementation of pilot projects, it is lagging behind in adapting to the new needs of developing the distribution network for the transition to a climate-neutral society. The implementation of the NECP will require the provision of additional funds for investments and/or an increase in the credit potential of the electricity distribution companies, as, given the current

framework, the credit potential is sufficient for about one year of the additional investments foreseen in the NECP.

Ensuring the conditions for further integration of markets and building the necessary infrastructure

It will be one of the most important measures to enable greater dissemination of low-carbon technologies in the future. The Heat Supply from Distribution Systems Act and the Gas Supply Act require distributors and system operators to consider, in the context of a specific analysis, the possibilities for cross-sectoral integration and the exploitation of synergies with the electricity distributor in their area of operation. The results of these analyses will help to create a supportive environment for the implementation of projects. Option analyses are in the early stages and some pilot projects are underway.

Incentives for better grid integration of RES generation installations and demand-side flexibility

Targeting of investments into RES and charging stations for electric vehicles to areas where significant additional investments in the grid are not needed is foreseen - mapping of areas with potential for RES electricity generation and consumption in the vicinity of the transformer stations and distribution transformer substations, etc. The measure should have been implemented in 2020. However, based on ongoing activities, it should be completed by the end of 2022.

The Energy Agency has prepared a baseline for the revision of the tariff system for the use of electricity networks, which should promote demand-side flexibility and improve the conditions for the integration of additional RES generation installations. The changes are planned to take effect in two phases, the first starting on 1 January 2023 and the second after 2026. There will be a much greater emphasis on the payment of network tariffs for power, less for energy, the billing of power will no longer be a flat rate (rated power) but will depend on the leased power in each time interval and season. The same applies for the network tariffs for the electricity received (phase one). In phase two, billing according to the actual network loads and real-time demand adjustment is foreseen (advanced metering and ICT technology needed).

Ensuring the conditions for efficient market development to enable new market roles (active customer, aggregator)

The Energy Agency already successfully concluded a public consultation for the establishment of a market with active EE demand-side flexibility in Slovenia in 2020. The consultation was one of the basis for the preparation of the Electricity Supply Act (ZOEE), which was approved in 2021. The ZOEE provided the legal basis for the development of the market with flexibility and for further development of system services. The Just Transition Fund provides for investments of €5 million in production capacity and infrastructure, including digitalisation, to enable the gradual start of energy-efficient decentralised production of heat and/or cold from RES sources.

Beneficiaries will include economic operators, the public sector and individuals in the areas defined in the regional plans (SAŠA Region) ⁹⁸.

Promoting investments and technologies for the conversion of surplus electricity from RES and grid integration for energy storage needs

The aim is to support investments in the conversion of surplus electricity into other forms of energy (e.g. heat) or energy products such as hydrogen (H₂), climate-neutral synthetic methane, biogas, etc. for captive use in energy-intensive industries. The measure will support various options and technologies for storing and converting surplus electricity generated from RES (solar, wind, etc.). Slovenia has already identified key challenges in this area in the NECP, where it stated the importance of integrating the gas and electricity sectors. Seasonal supply adequacy, storage of surplus electricity from RES through sectoral integration, and adequate resources will need to be ensured. In line with the NECP, the measure is part of a comprehensive strategy to transform the energy system and develop individual sectors to meet energy and climate goals.

Slovenia wants to actively engage in the development of centralised and decentralised solutions and to support the implementation of as many energy storage projects as possible by 2030, including the installation of battery storage and other storage capacities on the transmission and distribution grid, heat storage in district heating systems and the use of gas pipeline systems to store surplus electricity in the form of climate-neutral synthetic gas/H₂. Investments will also support seasonal storage of renewable energy. Storage of renewable gases will also be needed only for short periods of time or to compensate for short intra-day fluctuations in consumption (within the storage capacity of the transmission pipeline, heat storage, etc.), which the gas pipeline system and district heating systems enable to a greater extent than the electricity system. Energy conversion will optimise the construction and use of the electricity and gas grids, as the grid that is best suited to the situation can be used to transmit the energy. This reduces the investment costs of transitioning to a climate-neutral society. In order to maximise the share of RES in gross final energy consumption by 2030, the NECP envisages the construction of a sufficient number of different energy storage facilities, suitable in terms of technology, size and storage time, connected to the transmission grid or distribution network, to ensure the storage of as large a share as possible of the daily electricity demand in the Slovenian electricity system.

The legislative conditions (ZOEE) for the connection and use of storage facilities are appropriate. The use of battery storage is being piloted or operationally deployed on both the transmission and distribution grids. Private individuals and companies are increasingly investing in individual and large-scale battery storage systems. The Gas Supply Act has enabled the admission of renewable gases into the gas grid, improving the potential for energy storage by converting it into gas.

⁹⁸ Information from the Ministry of [Infrastructure, Current and planned financial incentives of the Ministry of Infrastructure | GOV.SI](#)

The implementation of the new tariff system for the use of electricity networks (expected on 1 January 2023) and the abolition of annual net-metering for self-supply (1 January 2024) will certainly increase the interest in installing individual storage facilities. The flexibility market is evolving, where storage will play an important role. However, given the significant share of RES expected from solar power plants, battery storage will not be enough. It will be necessary to build at least one additional large-scale pumped storage plant as soon as possible and to consider building a large-scale system for converting (international) surplus of RES into hydrogen/climate-neutral synthetic gas in at least one of the major energy hubs.

The 2021-2027 ECP provides for promoting investments and technologies in the amount of €22.12 million for the conversion of surplus electricity from RES and grid integration for energy storage at the time of conversion. Beneficiaries will include businesses, the public sector, households, municipalities, cooperatives and institutions. The funds from the Just Transition Fund are also to be used for investments in surplus storage capacities, including digitalisation and the establishment of smart energy infrastructure, amounting to €8 million (SAŠA Region)⁹⁸, and €22 million to support projects for hydrogen production from RES, including solutions in the field of electricity and hydrogen storage, also in connection with the promotion of e-mobility, pilot projects for the production of synthetic methane and the gasification of waste biomass (SAŠA Region)⁹⁸.

Also of interest are the interregional, cross-border and transnational actions to promote the development of smart energy systems, networks and storage outside the trans-European energy network (TEN-E), which are complementary to the Interreg Slovenia-Croatia, Slovenia-Hungary, Interreg Alpine Space, Euro-Mediterranean and Interreg Central Europe programmes. Actions are also addressed in the framework of the Adriatic-Ionian macro-region (EUSAIR), with an important project under the theme of Energy networks: Power networks and market for a green Adriatic Ionian region, which aims to reduce costs and improve services through the interconnection of the electricity grids of the countries of the macro-region through electricity storage, grid digitalisation and smart grids. The integration and interconnection of electricity markets aims to create a wholesale electricity market in the Adriatic-Ionian region.

OBLIGATION FOR ENERGY COMPANIES TO INVEST IN SUSTAINABLE ENERGY PROJECTS

As an additional measure to promote electricity generation from RES, the NECP also foresees reinvesting part of the profits of energy companies in sustainable energy projects and increasing the share of RES or increasing the capacity and expansion of the electricity distribution network to integrate RES. The groundwork is to be prepared for the mandatory reinvestment of at least 15% of the financial year net profit of majority state-owned energy companies into the implementation of investment projects approved by the relevant governance bodies.

ADDITIONAL ACTIVITIES IN THE SPATIAL PLANNING OF RES POWER PLANTS

The NECP also envisages a proactive approach by the State to the siting of RES power plants, in particular an upgrade of the related planning and decision-making

procedures. *The Act on the siting of installations for the production of electricity from renewable energy sources*⁹⁹ is under preparation as an amendment to the existing legislation. It will regulate the way in which priority areas for the exploitation of RES and the conditions for the placing of power plants in these and other areas are identified. The NECP also foresees further regulation of the public interest override procedures and the preparation of appropriate analyses of alternatives to support decision-making on the subject.

Option analyses are also underway to support the identification of areas for RES exploitation, which will serve to guide investments towards environmentally, socially and economically acceptable locations. The RES Slovenia project, which Slovenia obtained as a technical assistance from the European Commission, is underway and one of its main tasks is to study the optimal areas for setting up RES infrastructure. The results will provide an important basis for action. Additional stakeholder training is also planned. This analysis is being carried out in parallel with the preparation of the two options analyses mentioned in the previous section, which concern the identification of areas of potential for RES electricity generation in terms of the investments needed to develop electricity distribution and transmission networks.

M-15 INCENTIVES FOR THE DEVELOPMENT OF LOCAL ENERGY COMMUNITIES AND RES COMMUNITIES

Sectors affected by the implementation of the measure: *electricity and heat generation*

The NECP identifies energy communities as an instrument to achieve the goals of a just transition to a climate-neutral society. The NECP foresees the establishment of an incentive legislative framework to accelerate the development of renewable energy communities (community power plants), which saw its realisation in 2021 and 2022 (Act on the Promotion of the Use of Renewable Energy Sources (ZSROVE)¹⁰⁰, the Electricity Supply Act (ZOEE)¹⁰¹, the new Decree on the self-supply¹⁰²). A scheme to promote the development of local energy communities is foreseen, including technical and human resources support for the implementation of projects at local level and financial incentives for demonstration projects.

To achieve a sustainable and just transition to a climate-neutral society, we will have to tackle a number of development challenges, including measures to better integrate energy-intensive industries into local grids and to accelerate the use of RES. Local energy communities can help to pursue the interests of their members and contribute to national environmental and energy objectives as a driver for bottom-up sustainable development. Local Energy Communities (LECom) have long been recognised as informal forms of local grouping to jointly pursue energy objectives, but their legal

⁹⁹ [The draft proposal of the Act on the siting of installations for the production of electricity from renewable energy sources](#)

¹⁰⁰ Official Gazette of the Republic of Slovenia, Nos. 121/21, 189/21 and 121/22 – ZUOKPOE

¹⁰¹ Official Gazette of the Republic of Slovenia, No. 172/21.

¹⁰² Official Gazette of the Republic of Slovenia, No. 43/22.

status has not really been regulated. Local energy production is essential to promote energy production from RES, support energy democracy and reduce energy poverty. European environmental and energy legislation has laid the foundations for formalised forms of energy communities, which Slovenia is implementing in new legislation in 2021 and 2022.

Community self-supply is still very rare in Slovenia. Final consumers may join a self-supply community on the basis of a contract under the rules of the law of obligations or by setting up a community which is a legal person.

Similar to EU law, there are two formal forms of energy communities. The ZOEE defines a Citizen Energy Community (CEC) and the ZSROVE defines a Renewable Energy Community (REC), the latter being a legal person. The details of the measures to promote the use of electricity from RES with a self-supply installation, the detailed conditions for each type of self-supply, the method of electricity billing and charges for consumers, the detailed conditions for granting investment aid, the conditions for connecting a self-supply installation, the content and reporting and the implementation monitoring of the support measure are defined in the Decree on self-supply.

Enabling energy communities at the level of electricity distribution networks is an important step towards achieving binding RES targets and follows the European trend towards a low-carbon society. Investments in projects that will contribute to increasing RES energy production and support energy self-sufficiency are therefore key, and so are investments in projects to convert excess RES electricity and to connect the networks for energy storage needs at the time of conversion. This specific objective will therefore accelerate investments in the acceleration of new energy communities, the conversion of excess electricity from RES and the connection of networks for energy storage needs. These measures are identified as one of the key challenges under the NECP, without which the green transformation will not be possible. Participation in energy communities is open to all end-consumers, including those from low-income or vulnerable households. The measure also provides for technical and human resources support for the establishment of a scheme to promote the development of local energy communities and other projects at local level. The 2021-2027 ECP foresees €20 million for promoting of local energy communities. Beneficiaries will include businesses, the public sector, households, municipalities, cooperatives and institutions. Call for tenders is expected to be published in June 2024. Local energy communities will be able to build larger shared electricity installations through all forms of incentives for the construction of RES, such as funds in the amount of €76 million for the promotion of electricity production from RES (solar and wind power plants) foreseen under the 2021-2027 ECP, for which a call for tenders is foreseen in July 2023, and €5 million for the measure for the construction of renewable energy generation capacities under the Just Transition Fund (Zasavska region).

M-16 PROMOTING THE PRODUCTION OF DISTRICT HEAT FROM RENEWABLE ENERGY SOURCES AND HIGH EFFICIENCY CHP

Sectors affected by the implementation of the measure: *electricity and heat generation, energy use in industry and construction, energy use in private service sector, public sector and households*

This measure is based on the implementation of two types of instruments, namely regulations on efficient district heating systems (DHS) with mandatory shares of RES, CHP and waste heat, and financial incentives for the development of RES-based district heating under the Operational Programme for the Implementation of the European Cohesion Policy (OP ECP), the Rural Development Programme (RDP) and the Eco Fund's open calls for new investments in efficient energy use (EEU) and renewable energy sources (RES), and for crediting environmental investments.

REGULATIONS ON EFFICIENT DISTRICT HEATING SYSTEMS – MANDATORY SHARE OF RES, CHP AND WASTE HEAT IN DHS

Requirements and/or the efficiency criteria for DHSs (mandatory shares of heat from RES, CHP and waste heat) are prescribed by the Energy Efficiency Act (ZURE), which stipulates that distributors must provide heat from at least one of the following sources on an annual basis: (i) at least 50% of the heat produced from renewable energy sources (RES), (ii) at least 50% of the waste heat (WH), (iii) at least 75% of the heat from combined heat and power (CHP) or (iv) at least 50% of the combination of the first three elements. The deadline for this obligation, initially set for the end of 2020 by the Energy Act (EZ-1), was extended until the end of 2025 by the ZURE in October 2020. The Act on the Promotion of the Use of Renewable Energy Source (ZSROVE) sets out the obligations for district heating distributors to increase the share of RES at the level of DHS by 2025 or 2030 and to develop a sustainable plan for the development of DHS, and also prescribes the method for recalculating the values of the effect indicators and implementation monitoring of the plan. The monitoring of the achievement of the efficiency of the DHS is foreseen by the ZURE, which requires annual reporting by distributors to the Energy Agency, and the implementation monitoring of measures to increase the share of RES and WH will also be regulated by a new general act to be prepared by the Energy Agency.

Since 2017, the Energy Agency has been checking each year which DHSs (or heat distribution systems) meet the energy efficiency criteria and publishes a list of energy-efficient DHSs on its website. In 2021, 67 or 60% of the 112 registered DHSs were efficient, in 2020 67 or 61% of the 108 registered DHSs were efficient, and in 2019 65 or 66% of the 90 registered DHSs were efficient. In 2021, 20.4% of the heat in all DHSs in Slovenia was produced from RES, 74.8% of the distributed heat was produced from CHP (of which 14% from RES).

FINANCIAL INCENTIVES FOR THE DEVELOPMENT OF RES-BASED DHS

Under the 2014-2020 OP ECP, subsidies for RES-based DHSs were planned as part of the priority investments for promoting the production and distribution of energy from renewable sources under the priority Sustainable use and production of energy and smart grids. The Cohesion Fund has been used to invest in new wood biomass and solar DHSs and RES-based micro-DHSs, to expand existing RES-based DHSs and to

build new boiler plants with wood biomass boilers as a source for an existing district grid. A total of EUR 39 million in grants were made as part of three tenders by MI.

As part of the European Cohesion Policy Programme 2021-2027 Slovenia also wants to promote the use of energy from RES for DHS. Planned as one of the measures of the programme for “promoting energy use from renewable resources in line with Directive (EU) 2018/2001, together with sustainability criteria from the aforementioned Directive” (specific objective 3.2) is to encourage investment in the promotion of new heating and cooling DS for RES. Foreseen are financial incentives for the construction of new sustainable, efficient and competitive DH systems, and a continuation of the use of current instruments for the promotion of DHS development, as well as cooling with RES or WH. Especially encouraged is the cogeneration of heat and electricity in DHS and the combining of sectors (energy storage devices, “power2heat”, etc.) due to a high development potential of the forest and wood sector in Slovenia, as well as energy recovery of wood biomass waste that accumulates in industrial processes and forest restoration. Co-financing will be done with the help of grants and a correspondingly reduced co-financing rate, which will take into account the savings over the useful life of the investment and will be in line with State aid rules. Financing beneficiaries include businesses, the public sector, municipalities, institutions and cooperatives, and households. EUR 19.2 million of ERDF funds and 13 million from the Cohesion fund are foreseen for the investments. The foreseen fund budget for 2021-2027 is 18% lower than the budget in the previous programming period (2014-2020).

RDP’s financial incentives were planned as part of a programme to support investment in the establishment and development of non-agricultural activities. Grants of the M06.4 sub-measure are intended for agricultural holdings and micro and small businesses in settlements of up to 5 thousand inhabitants, including for investments in the production of electricity and heat from renewable energy sources such as wood mass, biomass, manure and liquid manure, water, wind, sun. The first public tender was published by MAFF in the second half of 2020 and the second in the last quarter of 2021. As part of this sub-measure a total of 14 RES investment applications were approved until the end of 2021, amounting in total to EUR 1.74 million, with the predominant investments being the construction of solar power plants and the purchase of equipment for wood chip production, whereas none was meant for DH.

As part of financial incentives for measures relating to DH in the context of EEU and RES investments, the Eco Fund has published several public calls (PC) in 2020. Under PC 82FS-PO20 (EUR 11 million for grants, interest rate subsidies and loans) that is intended for legal entities, eligible actions included the replacement or installation of a heating station for the connection to DHS. The two PCs for environmental investment crediting for enterprises (64PO20 and 66PO21, EUR 10 million of funding each) also included measures to reduce greenhouse gas emissions for the construction of the distribution system for district heating and/or cooling (distribution network, customer connections, control systems, heating stations, etc.).

M-17 ADDITIONAL MEASURES FOR THE PROMOTION OF PRODUCTION OF DISTRICT HEAT FROM RES AND HIGH EFFICIENCY CHP

Sectors affected by the implementation of the measure: *electricity and heat generation, energy use in industry and construction, energy use in private service sector, public sector and households*

This measure provides additional financial incentives to promote the development and restructuring of DHSs into efficient systems with a high share of RES and WH from the financial envelope for the implementation of the Recovery and Resilience Plan (RRP) and, for the target areas, from the Just Transition Fund as part of the ECP 2021-27 programme.

Under the RRP the ministry, responsible for energy has provided EUR 11 million in grants to support investments in the total of EUR 41 million under the Green Transition development field and Renewable Energy Sources in the period 2021-2026 to promote the restructuring of district heating systems to RES, which include the use of new technologies. Foreseen are investments in heat generation and storage equipment, as well as in network renovation and expansion. The funds will be allocated as part of public tenders which are not yet prepared and whose implementation conditions are not yet known. Foreseen is an approximate of 30% co-financing of eligible costs, related to the State aid scheme. According to the timeline, the implementation of measures is foreseen from 2022 onwards. The aim of co-financing is to support various measures for promoting the use of RES and WH, to promote CHP from RES, heat generation from RES using biomass, the use of heat pumps, geothermal energy and solar panels through the integration of sectors, including the use of energy storage devices, “power2heat” technologies, etc. The criteria for awarding financial support to projects will be set out in the terms of each tender. Incentives will primarily be targeted at district heat producers and operators of the DHS. Preliminary assessments of the investment value needed to achieve a 10% share of RES in heat supply from district heating systems (DHS) in Slovenia by 2030 are between EUR 6 and EUR 7 million per year, corresponding to the total of planned investments over the period of the RRP. Taking into account that the criteria for efficient DHS, foreseen in the proposal to update the EED Directive (DHS should provide at least 50% of heat from RES and WH by 2035, with a RES share of at least 20%), are at least twice as high as the current targets, achieving the new targets will probably require much higher investments in the renovation and restructuring of DHS.

ECP 2021-2027 foresees earmarked funding for the restructuring of the Savinjsko-Šaleška coal-mining region (SAŠA), as part of the Just (Energy) Transition Plan. Furthermore, it includes measures to convert the district heating system into an energy-efficient, sustainable and low-emission system. The funds will be allocated from the Just Transition Fund (JTF), for which EUR 7.75 million is earmarked.

Table13: Summary of the description of measures in the energy industries sector

	Measure and/or policy	Objective	Gas influenced by the measure	Type of measure	Status of implementation	Implementing entity	Effect of the measure [kt CO ₂ eq]		Reference to the measure from the previous National Report
							2025	2030	
M-11	TECHNOLOGICAL MODERNISATION OF THE THERMAL POWER SECTOR	Reduction of CO ₂ and other emissions (air pollutants) in electricity generation	CO ₂	Legislative	Implemented	MECE	1,003	1,256	M-9 TECHNOLOGICAL MODERNISATION OF THE THERMAL POWER SECTOR
M-12	ADDITIONAL MEASURES TO REDUCE GHG EMISSIONS FROM THERMAL POWER PLANTS	Electricity generation coal phase-out	CO ₂	Planning, Economic, Legislative	Planned	MECE	233	771	/
M-13	PROMOTION OF CO-GENERATION OF ELECTRICITY AND HEAT FROM RES AND CHP WITH HIGH EFFICIENCY	Increasing electricity and heat production from RES and in CHP units	CO ₂	Economic, Legislative, Planning	Implemented	MECE, Borzen, AGEN-RS	715	982	M-10 PROMOTION OF CO-GENERATION OF ELECTRICITY AND HEAT FROM RES AND CHP WITH HIGH EFFICIENCY
M-15	ADDITIONAL MEASURES FOR THE PROMOTION OF CO-GENERATION OF ELECTRICITY AND HEAT FROM RES AND CHP WITH HIGH EFFICIENCY	Increasing electricity and heat production from RES and in CHP units	CO ₂	Economic, Legislative, Planning	Planned	MECE, Borzen, AGEN-RS, CES and SODO	IE ¹⁰³	IE	/

¹⁰³ The effect of the measure is included in the impact assessment of the measure M-12

	Measure and/or policy	Objective	Gas influenced by the measure	Type of measure	Status of implementation	Implementing entity	Effect of the measure [kt CO ₂ eq]		Reference to the measure from the previous National Report
							2025	2030	
M-14	INCENTIVES FOR THE DEVELOPMENT OF LOCAL ENERGY COMMUNITIES AND RES COMMUNITIES	Increasing the supply of electricity and heat from RES	CO ₂	Other	Planned	MECE	IE ¹⁰⁴	IE	/
M-16	PROMOTION OF DISTRICT HEAT GENERATION FROM RES AND CHP WITH HIGH EFFICIENCY	Increasing energy and emission-efficient generation of district heat	CO ₂	Economic, Legislative, Information	Implemented	MECE, GODECP, MAFF, AGEN-RS	IE ¹⁰⁵	IE	M-11 PROMOTION OF DISTRICT HEAT GENERATION FROM RES AND CHP WITH HIGH EFFICIENCY
M-17	ADDITIONAL MEASURES FOR THE PROMOTION OF PRODUCTION OF DISTRICT HEAT FROM RENEWABLE ENERGY SOURCES AND HIGH EFFICIENCY CHP	An additional increase in energy and emission-efficient generation of district heat	CO ₂	Economic	Planned	MECE, GODECP	IE ¹⁰³	IE	/

¹⁰⁴ The effect of the measure is included in the impact assessment of the measure M-13

¹⁰⁵ The effect of the measure is included in the impact assessment of the measure M-11

4.2.3 Energy Use

M-18 PROMOTION OF EFFICIENT ENERGY USE IN INDUSTRY

Sectors affected by the implementation of the measure: *manufacturing industries and construction, all economic sectors*

The promotion of energy efficiency in the industry has been mainly implemented through three framework financial mechanisms in the period up to 2021, namely the Cohesion Fund, the mandatory final energy savings scheme for companies selling energy (281 GWh of energy savings in 2019, of which around 120 GWh in the economy¹⁰⁶) and the reimbursable and especially the direct grants from the Eco Fund (estimated savings of 36 GWh for the period 2019-2021). No energy savings were estimated for the financial incentives from cohesion funds, as the monitoring of the funding was not done in a way that would allow for such analyses.

Measures for reducing the use of electricity (e.g. energy-efficient lighting, energy-efficient household appliances, installation of energy-efficient electric motors and frequency converters etc.) were carried out under the final energy savings scheme (“obligated parties”). The savings made under this scheme are estimated at 39 GWh in 2016.

For the period 2021-2025 the Eco Fund is providing EUR 34.0¹⁰⁷ million in non-reimbursable financial assistance to companies and other legal entities to promote energy efficiency measures in buildings and the use of renewable energy sources, as well as to promote efficient energy use measures, more specifically for the installation of energy-efficient lighting systems, energy-efficient electric motor drives, the optimisation of technological processes and the recovery of waste heat. The number of investments is limited by the fund budget, whereas calls on companies for project applications are open until the exhaustion of funds. In the period 2019-2021, the Eco Fund has financed investments in the economy that save 36 GWh of energy per year and reduce CO₂ emissions by 9,100 tonnes¹⁰⁶.

The Eco Fund also provides financial assistance for energy audits in small and medium-sized enterprises in the industry and in the service sector and for implementing new energy management systems.

By 2030, the industry will still have funds to invest in EEU and RES through the mandatory final energy savings target for companies selling energy, funds from the

¹⁰⁶ Analysis of the financial, economic, legal and organisational aspects of a support scheme for EEU and RES in SMP and industry, Care 4 Climate, JSI-CEU Handout, 2021, https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKEwirpK6vt7f6AhVfR_EDHRyYBPIQFnoECA8QAQ&url=https%3A%2F%2Fwww.care4climate.si%2F_files%2F1430%2FIzrocek_IJS_C64-1.pdf&usg=AOvVaw2NKufGy3dTohJfy3SVU8xc

¹⁰⁷ Business and Financial Plan by the Eco Fund, Slovenian environmental public fund, for 2021-2025, Eco Fund, February 2017

Eco Fund and various sources of business incentives, which will include requirements for more efficient energy use and the integration of RES.

In 2018, the SID bank started drafting debt and equity financial instruments related to the financing of sustainable economic growth and development, innovation investments and regular operations in four areas; research, development and innovation, small and medium-sized businesses, energy efficiency and urban development.

An important area for the industry is also the development and production of new sustainable products and services in the field of EEU and the use of RES; the funds from the OP ECP are planned within the priority “International competitiveness of research, innovation and technological development in line with smart specialisation for enhanced competitiveness and greening of the economy”. This area also relies strongly on the Smart Specialisation Strategy (S4)¹⁰⁸, which served as one of the bases for the absorption of the European funds from the new financial perspective, which was confirmed in September 2015 and is strategically oriented towards sustainable technologies and services for a healthy life. In every field of the S4 application, a Strategic Research and Innovation Partnership (SRIP¹⁰⁹) was formed at the end of 2016, due to a spontaneous bottom-up decision to cooperate and integrate key players in the field of application. Over 400 companies and more than 100 education institutions have joined in, and it is worth mentioning that the partnerships are open-ended. This means that in the future, the key players will continue to collaborate in these partnerships. This will be particularly important for involving small and medium-sized enterprises. The cooperation between stakeholders in SRIPs is built on: coordination of R&D activities, sharing of capacities, development of human resources, exchange of knowledge and experience, networking and collective representation of interests abroad. Some of these SRIP partnerships, which will have a long-term impact on the industry development, are: *Smart cities and communities, Smart buildings and homes, including wood chain, Networks for the transition to a circular economy, Factories of the future, Development of materials as products, and Mobility.*

All the measures mentioned in the chapter on multi-sectoral instruments are also important for the industry.

M-19 ADDITIONAL ACTIONS TO PROMOTE EFFICIENT ENERGY USE IN INDUSTRY

Sectors affected by the implementation of the measure: *manufacturing industries and construction, all economic sectors*

Preparation of expert bases for deciding on whether voluntary agreements with industry, that would commit to achieving energy savings, should be used is planned.

¹⁰⁸ Slovenia’s Smart Specialisation Strategy (S4), Government of the Republic of Slovenia, September 2015

¹⁰⁹

http://www.svrk.gov.si/si/delovna_podrocja/strategija_pametne_specializacije/strateska_razvojno_inovacijska_partnerstva_srip/

Support is planned for targeted training for the preparation and implementation of projects in the areas of EEU, RES and green energy technologies.

The NECP foresees an expansion of the areas and an increase in the funds available for improving energy efficiency in companies as well as the use of RES.

Demonstration and pilot projects on solutions for the transition to a climate-neutral and circular economy in industry are going to be supported, giving priority to projects on the use of waste heat, the production and use of low-carbon fuels (syngas, H₂, recycled carbon fuels, etc.), cascading use of heat and cold, EEU measures, measures to improve material efficiency, the use of RES in industry;

Incentives for Slovenian companies to apply for EU's development and demonstration project tenders will also be available.

An important set of measures is dedicated to the transition to a circular economy. An incentive scheme for measures for the transition to a low carbon circular economy will be developed in line with the NECP:

- the existing measures and instruments need to include conditions and criteria of circular management;
- new incentives for measures that reduce GHG emissions through a transition to production by introducing new products (lighter products, products with longer life cycle, reuse of products or materials, waste reduction and recycling, replacement of natural gas with synthetic gas or H₂) are also foreseen to be implemented in 2023;
- the implementation of circular economy pilot projects will be encouraged;
- other incentives to reduce emissions in industry according to the new European Green Deal.

M-20 PROMOTION OF EEU AND THE USE OF RES IN BUILDINGS IN GENERAL

Sectors affected by the implementation of the measure: *other sectors (energy use in the public sector, private service sector and households)*

LEGISLATION ON EEU AND THE USE OF RES IN BUILDINGS

Together with the *Technical Guideline - Efficient Energy Use TSG-1-004: 2010*, the new *Rules on efficient use of energy in buildings (REEUB)*¹¹⁰, accepted in 2022, set minimum energy efficiency requirements for new buildings and major renovations of existing buildings, as well as the minimum requirements for maintenance and technical improvements¹¹¹. An important addition to REEUB is the minimum required ratio of RES (RRES)¹¹², currently amounting to 50%. Another addition is the methodology for

¹¹⁰ Rules on efficient use of energy in buildings (Official Gazette of the Republic of Slovenia, No. 70/22)

¹¹¹ Technical improvements to be done before the end of life of a building element, system and subsystem.

¹¹² The RES ratio (RRES) is the ratio between the use of renewable and primary energy in a building. Energy can be generated on site or nearby or fed from remote systems.

calculating energy indicators and criteria for minimum energy efficiency requirements for buildings, which now define detailed technical requirements for the design of new nearly zero-energy buildings.

The *Long-Term Strategy for Energy Renovation of Buildings for 2050 (LTSERB 2050)* that was adopted in 2021 has the primary objective of: renovating the national stock of existing public and private residential and non-residential buildings into a highly energy-efficient and decarbonised building stock by 2050. By 2030 the aim is to reduce greenhouse gas (GHG) emissions in buildings by at least 70% compared to 2005 and to move towards net zero GHG emissions in the buildings sector by 2050, which will be done by a further promotion of high levels of building energy renovations and heating with RES technologies, including district heating systems using RES. The strategy also aims to achieve near-zero emissions over the lifetime of the building. The planned measures simultaneously address other aspects of building renovation (seismic and fire safety, indoor environmental quality, etc.), which will have a long-term effect on reducing GHG emissions and other environmental effects due to the efficient use of resources and materials over the lifetime of the building. More information about the LTSERB 2050 measures is available in the following section.

SUPPORT SCHEME FOR THE RENOVATION OF CULTURAL HERITAGE BUILDINGS

Due to their special nature, the renovation of cultural heritage buildings usually requires higher investments and certain deviations from the required renovation parameters applicable to other buildings, which is why it has often not been possible for these buildings to qualify for the available public funding for EEU and RES measures. In 2016, the *Guidelines for Improving Energy Performance of Cultural Heritage Buildings*¹¹³ were adopted, providing guidance on the architectural and design aspects of energy renovation, in line with the protection and guidance objectives for pilot projects. As part of LTSERB 2050 a renovation of guidelines is planned.

Energy renovations of cultural heritage buildings were co-financed with grants as part of the OP ECP programme. Tenders for cohesion funding assess cultural heritage buildings according to specific criteria set out in the *Instructions for work with intermediate bodies and beneficiaries for energy renovation of public sector building measures (updated in October 2020)*¹¹⁴, which also allow for the implementation of EEU and RES measures in these buildings.

In the programming period 2021-2027, grants from European funds will also be available for energy renovations of cultural heritage buildings.

¹¹³ [Guidelines for improving energy performance of cultural heritage buildings](#), Ministry of Infrastructure and Ministry of Culture, 2016.

¹¹⁴ [Instructions for work with intermediate bodies and beneficiaries for energy renovation of public sector building measures](#), version 1.09, Ministry of Infrastructure, October 2020.

The promotion of energy renovation of cultural heritage buildings has important additional benefits, as such buildings are identity carriers of a location, while they are also important for the economy.

M-21 ADDITIONAL MEASURES FOR EEU AND THE USE OF RES IN BUILDINGS IN GENERAL

Sectors affected by the implementation of the measure: *other sectors (energy use in the public sector, private service sector and households)*

The LT SERB 2050 foresees additional measures of a fiscal nature that will increase the autonomy of local communities in designing and managing fiscal revenue sources. Under the revised legislation local communities will be able to set up funds to encourage private owners of cultural heritage buildings to carry out energy renovations.

PREPARATION OF SUSTAINABILITY CRITERIA FOR BUILDINGS

Besides energy renovation, sustainable renovation also takes into account all other important aspects of building renovation: seismic and fire safety, radon issues, etc. The instrument foresees the development and testing of a system of sustainable development indicators, including the establishment of a support environment, the designing of evaluation criteria and the training of experts. Furthermore the plans include an expansion of the incentive for a sustainable renovation of buildings and the implementation of pilot projects in the public sector.

In 2019, the *LIFE IP CARE4CLIMATE* project was started under the leadership of MECE, (<https://www.care4climate.si/en>), a part of which is also the development of sustainable construction indicators for Slovenia (SLO SCi). The first version of SLO SCi indicators was based on the Level(s) European framework, testing of the first version of SLO SCi was completed in June 2022, whereas now testing in three pilot projects in Slovenia is being prepared. A special web page is dedicated to this topic (<https://kazalnikitrajnostnegradnje.si/>). Sustainable renovation aspects are included in the upgraded Quality Mark in Construction (QMC) to support the decarbonisation of buildings (www.trajnostnagrada.si). Targeted training and information campaigns for the target public are also provided, e.g. with the help of video content (<https://kazalnikitrajnostnegradnje.si/courses/uvod-v-kazalnike-video-usposabljanje/>) and in other ways.

The NECP and the LT SERB 2050 foresee the establishment a comprehensive system for a sustainable evaluation of buildings (acts, human resources, procedures, training, etc.) and the preparation of the ground for the promotion and financing of sustainable renovation of buildings, as well as for the implementation of pilot projects in the public sector. In this context, NECP foresees a financing plan for sustainable or wider renovation of buildings.

REDUCING THE USE OF FOSSIL FUELS FOR HEATING IN BUILDINGS

The use of fuel oil for heating new buildings and the installation of new oil-fired boilers is foreseen to be banned. In mid-2021, the *Act on the Promotion of the Use of Renewable*

Energy Sources (ZSROVE) was adopted¹¹⁵, which with its Article 53 prohibits the design and installation of oil-, heavy fuel oil- and coal-fired boilers, except where the use of light fuel oil, heavy fuel oil and coal is part of an industrial or production process. Article 53 will enter into force on 1 January 2023.

Priorities for heating and cooling sources and technologies will also be specified. Based on the assessment of the potentials for efficient heating and cooling¹¹⁶, presented in more detail in section 4.2.2, the priorities for heating and cooling sources and technologies will be set in the next update of the NECP.

ESTABLISHING AN ENERGY AND EMISSIONS REGISTER FOR BUILDINGS

To have a comprehensive insight into the state of buildings and their emissions and to plan measures, the LT SERB 2050 plans to establish a building energy performance portal, which will also enable the monitoring of dust particulate emissions and thus ensure air quality. The implementation of the instrument is foreseen for 2024.

M-22 PROMOTION OF EEU AND THE USE OF RES IN HOUSEHOLDS

Sectors affected by the implementation of the measure: *energy use in households*

MANDATORY SHARING OF HEATING COSTS BASED ON ACTUAL USE IN MULTI-APARTMENT BUILDINGS

Energy billing according to actual use encourages efficient energy use. The instrument was introduced in autumn 2011 and is now implemented on the basis of the *Rules on Dividing and Billing Heating Costs in Multiple-Dwelling and Other Buildings with Several Units* from 2016¹¹⁷. Foreseen are the continuation of instrument implementation and its development.

ENERGY ADVISORY NETWORK FOR CITIZENS - ENSVET

ENSVET, a network of energy advisory offices active since 1993, provides citizens with independent energy advice and information, education and awareness-raising activities to promote EEU measures and the use of RES in the local environment. ENSVET is also a part of the Household Energy Efficiency Aid Scheme for vulnerable groups of the population.

In 2021, there were 51 qualified independent energy consultants operating in 59 offices of the ENSVET network. Altogether, they participated in 8,064 activities (providing advice in the form of written reports, online advice, articles, broadcasts on the national television, lectures, schools, etc.), which is 24% more than the year before. The cost of operating ENSVET over the period 2014-2021 amounted to EUR 5 million, while the

¹¹⁵ Act on the Promotion of the Use of Renewable Energy Sources (Official Gazette of the Republic of Slovenia, No [121/21](#), [189/21](#) and [121/22](#) - ZUOKPO)

¹¹⁶ [Comprehensive assessment of options for efficient heating and cooling in Slovenia](#), Ministry of Infrastructure, based on JSI Progress Report, 2021,

¹¹⁷ Rules on Dividing and Billing Heating Costs in Multiple-Dwelling and Other Buildings with Several Units (Official Journal of the Republic of Slovenia, No [82/15](#), [61/16](#) and [158/20](#) - ZURE).

contribution to annual GHG emission reductions in 2021 is estimated at around 40 kt CO₂ eq

The plan is to continue with the counseling and, in line with LTSEB 2050, to strengthen the network, expand into new municipalities and extend the counselling. It is also foreseen to strengthen the support to commonhold owners in the planning of energy renovations of multi-apartment buildings and to train the Network's consultants to prepare the relevant content for the building performance certificate. The ENSVET network is planned to be funded at €1 million/year¹¹⁸, but as ENSVET's role will be strengthened in the future, the need for more funding for the programme can be expected.

FINANCIAL INCENTIVES FOR INVESTMENTS IN ENERGY EFFICIENCY AND RES IN HOUSEHOLDS

The main instrument for increasing energy efficiency and the use of RES in households are financial incentives which have been granted by the Eco Fund to investments in single- and two-dwelling buildings since 2008 and in multi-apartment buildings since 2009. The set of measures¹¹⁹ funded by grants differ in regard to the invitation to tender and in regard to the amount of the received grant.

The Eco Fund grants have been financed from two sources since 2014: the Contribution paid per energy use in order to increase energy efficiency and the Climate Change Funding Programme which amounted to €214 million in the period 2014-2021 (€36.9 million disbursed in 2021), with an estimated effect on annual GHG emission reductions of 227 kt CO₂ eq

Grants for investments in RES are also available for households under the Rural Development Programme, where funds are drawn from the European Agricultural Fund for Rural Development (EAFRD), but to a lesser extent.

Favourable Eco Fund loans can also be obtained by households for the implementation of the EEU measures and the use of RES, while household measures are also implemented under the scheme for mandatory final energy savings for obligated parties (details under the measure M-10).

AID SCHEME FOR EEU MEASURES AND THE USE OF RES IN LOW-INCOME HOUSEHOLDS

The Aid scheme, managed by the Eco Fund, is currently based on three pillars: low-income households are eligible for incentives covering 100% of the investment costs for energy renovations of multi-apartment buildings and the replacement of old solid fuel heating equipment; under the ZERO project, low-income households are entitled

¹¹⁸ [Business Policy of the Eco Fund 2021-2025](#), Eco Fund, 2021.

¹¹⁹ These include measures on the building envelope (insulation of the roof, ceiling, floor, installation of energy-efficient wooden windows), heating systems (heat pumps, wood biomass boilers, solar heating systems,) solar power plants (see section 2.2.2, self-supply of electricity) and others (ventilation).

to a visit by an energy consultant and a package for the implementation of free or low-cost energy efficiency measures; and under the ZERO500 project, cohesion funding is available to low-income households for the implementation of EEU and RES measures in single- or two-dwelling buildings. Although the public call for this funding ended in March 2022, the actions will continue until the end of 2023. The whole set of economic and advisory instruments under the aid scheme is aimed at reducing energy poverty with the help of concrete measures that contribute to reducing energy consumption and costs, as well as to an improvement of living conditions. The scheme is witnessing a growing interest in both the replacement of old solid fuel heating equipment and participation in the ZERO project, while the ZERO500 programme will use all of its funds available. The effects of the first pillar of the aid scheme are monitored as part of financial incentives for investments in energy efficiency and RES in households. Energy poverty reduction instruments will continue to be implemented and further developed in the period up to 2030, in line with the EU's guidelines on this subject.

M-23 ADDITIONAL MEASURES FOR THE PROMOTION OF EEU AND THE USE OF RES IN HOUSEHOLDS

Sectors affected by the implementation of the measure: *energy use in households*

FURTHER STRENGTHENING OF THE HOUSEHOLD ENERGY EFFICIENCY AID SCHEME FOR VULNERABLE GROUPS OF THE POPULATION

One of EU's most important guidelines from 2030 onward is reducing energy poverty in the field of energy use. To ensure a just transition to a low-carbon society for all EU citizens, the 2019 *Clean Energy for All Europeans* package gave emphasis to energy poverty. Member States were required to include energy poverty in their *National Energy and Climate Plans (NECP)*. In July 2021 with its *Fit for 55* package, European Commission proposed a revision of the *Directive on Energy Efficiency* and further highlighted the importance of reducing energy poverty. The same can be expected for the proposal to revise the *Energy Performance of Buildings Directive*.

In line with these guidelines, Slovenia is strengthening its efforts to reduce energy poverty. A set of instruments, together with the establishment of a comprehensive scheme to improve energy efficiency of low-income households, including through the provision of additional investment funds, the long-term implementation and coordination of energy poverty reduction measures, and the integration of energy poverty into broader development and housing policies, is planned as part of the *NECP*. Additional incentives are planned for the period up to 2027 under the Cohesion Policy (proposal of EUR 15 million, the document is not yet adopted), whereas the *Climate Change Funding Programme* of the Ministry of the Environment, Climate and Energy (proposal EUR 24 million, not yet confirmed) is also expected to provide funding in short-term term. In line with the *Long-Term Strategy for Energy Renovation of Buildings for 2050 (LTSEB 2050)*, scientific basis is being prepared (see the supporting environment in the next paragraph), which will form the basis for long-term and sustainable energy poverty reduction measures in 2023. The most important measures will be included in the updated *NECP*. From 2024 onward a gradual implementation of new and updated measures is to be expected.

SUPPORTING ENVIRONMENT TO REDUCE ENERGY POVERTY

The preparation of poverty reduction measures requires the development of an appropriate supporting environment, in this case the definition and the way of assessing energy poverty, as well as the development of indicators to monitor energy poverty and their target values by 2030. This is a planning and legislative measure. In line with the *LT SERB 2050*, scientific background is being prepared which, in addition to the proposal of measures to reduce energy poverty (see further strengthening of the support scheme in the previous paragraph), will also serve as a basis for the establishment of this supporting environment and for the preparation of an action plan to fight energy poverty, planned for 2023. The Ministry of the Environment, Climate and Energy is currently in the process of drafting a decree on criteria for defining and assessing energy poverty. The decree is important because of its emergency measures to alleviate the rising energy prices, which are currently targeted at social transfer recipients, while a wider range of the population is affected by energy poverty.

FURTHER DEVELOPMENT OF FINANCIAL INCENTIVES FOR INVESTMENT IN EEU AND RES IN HOUSEHOLDS

Planned as a part of *LT SERB 2050* and the *NECP* is the upgrade of financial incentives for investments in EEU and RES in households, with the following broad set of activities: preparation of a financial plan for the promotion of measures in households, introduction of a separate call for partial and comprehensive renovations, preparation of new financial instruments for the housing sector, provision of incentives for the preparation of projects in the housing sector, implementation of pilot projects and strengthening of the Eco Fund's activities, in particular in the area of raising awareness and spreading information, analysis of the possibilities for the implementation of EEU and RES measures achievable through incentive mechanisms, simplification of administrative procedures for granting of incentives, etc.

According to the *LT SERB 2050*, EUR 725 million in subsidies are needed over the period 2021-2030 to promote the renovation of household buildings. Around 75% of funds for subsidies have so far been secured for the period up to 2025, whereas for the period up to 2030 only 42% is secured. Additional measures are planned. As part of the implementation of Article 7 of the *EED*, by 2030 the *NECP* foresees additional financial resources for Eco Fund programmes through a gradual increase in the EEU contribution, which will provide sufficient resources to achieve the planned targets. To promote the renovation of residential buildings, this source is foreseen to provide EUR 20 million per year in 2022 and 2023, however, an increase is not yet guaranteed. In addition to the funds from the EEU contribution, funds from other sources of funding are already available for EEU and RES measures in households, in a total of EUR 95.6 million:

- EUR 67.4 million for measures regarding energy efficiency in buildings¹²⁰ under the *CCF* programme (2022-23), most of which is earmarked for the

¹²⁰ For measures related to energy renovation of buildings, investments into higher energy efficiency of buildings, sustainable construction (zero-energy and wood building), measures to reduce energy poverty and measures to replace old heating equipment.

replacement of old heating equipment with new wood biomass combustion installations or heat pumps;

- EUR 28.2 million for measures to renovate the housing stock for greater energy efficiency, including demonstration projects and supporting measures under the ECP programme (2021-27).

Additional measures are planned to eliminate obstacles to the renovation of multi-apartment buildings.

The first measure aims to amend the rules governing consent regarding the decisions on the renovation of buildings with multiple owners and on borrowing. The current regulation states that a comprehensive energy renovation requires the consent of 75% of commonhold owners, whereas the decision to borrow and repay a loan debited to a reserve fund requires the consent of all owners. The NECP and the 2050 LTSERB foresee the re-regulation of the consenting process, to make the implementation of energy renovations of multi-apartment buildings easier. The second measure aims at regulating energy performance contracting and related energy services in multi-apartment buildings (legal basis, incentive mechanisms, etc.). As a third measure, the NECP and the LTSERB 2050 plan to build on existing incentives to allow the incentive or its effects to be shared between owners and tenants in multi-apartment buildings.

The LIFE IP CARE4CLIMATE project (<https://www.care4climate.si/en>), led by MECE, is developing the above-mentioned financial instruments to stimulate investment in a comprehensive energy renovation of multi-apartment buildings. Based on the analysis, two financial instruments were selected as the most promising for further development: energy performance contracting, where the comprehensive renovation of multi-apartment buildings is co-financed by energy service companies, and the financial instrument, where commonhold owners can request loans debited to the reserve fund to carry out the renovation. Both financial instruments include investment grants, the amount of which depends on the scale of the comprehensive sustainable renovation. The two proposed financial instruments will be tested in practice - Eco Fund's public tender for the two pilot projects has already been published, and the basis for it has been prepared under the LIFE IP CARE4CLIMATE project.

ESTABLISHING A GUARANTEE SCHEME

The LTSERB 2050 and the NECP foresee a new instrument to promote energy renovation of buildings. Possibilities will be explored for a new guarantee scheme for the implementation of a building energy renovation project to provide individual guarantees to borrowers or to the reserve fund in the event of the loan being debited to the reserve fund.

OTHER MEASURES

LTSERB 2050 foresees another new instrument, a building performance certificate, an updated version of the energy performance certificate. This instrument will make it a legal obligation for the commonhold owners of multi-apartment buildings to have a building performance certificate, which will contain information on energy efficiency, fire safety, seismic risk and general condition of the building. The certificate will also

include information on the suggested and mandatory measures for a comprehensive renovation of the building.

M-24 PROMOTION OF EEU AND THE USE OF RES IN THE PUBLIC SECTOR

Sectors affected by the implementation of the measure: *other sectors (energy use in the public sector)*

ENERGY MANAGEMENT IN THE PUBLIC SECTOR

Mandatory energy management was introduced in 2016 and consists of: energy accounting, implementation of EEU and RES measures, and reporting on energy costs, types of energy sources and implementation of measures. This is mandatory for all buildings with a usable area of more than 250 m² that are owned or managed by a public administration in the broad sense. The legal basis is defined by the *Energy Act (EZ-1)*, and from 2020 it is regulated by the *Act on Energy Efficiency (ZURE)*, whereas, at the implementation level, by the *Decree on Energy Management in the Public Sector*¹²¹.

NON-REIMBURSABLE FINANCIAL INCENTIVES

Grants have been available for the energy renovation of public buildings since 2010. Beginning with EU Cohesion Fund funding under the *Operational Programme of Environmental and Transport Infrastructure Development 2007-2013 (OP ROPI)*¹²², where the funds were earmarked for hospitals, nursing homes, public higher education and scientific institutions, and local communities. The first energy renovation projects were completed in 2012 and the last in 2015. Almost 154 million in grants in total supported the renovation of 1.24 million m² of building floor area, resulting in a reduction of energy consumption by 148.2 GWh and a reduction of CO₂ emissions by 40.4 kt/year (Table 1). Cohesion Fund funding is also available in the next programming period of 2014-2020 under the *Operational Programme for the Implementation of the EU Cohesion Policy 2014-2020 (OP ECP)*¹²³, specifically for the public sector, municipalities and the wider public sector for state-owned buildings. In order to achieve a larger scale of energy renovations, most of the incentives in the second period were aimed at co-financing projects implemented under the Energy Performance Contracting (EPC) model, with funds earmarked for renovating the building envelope. The first projects were completed in 2018, and a total of EUR 56 million of grants was used to renovate 0.7 million m² of building floor space over the period, reducing emissions by 21 kt/year. The ratio of subsidies granted to investments stimulated (leverage) has also improved significantly over the period, decreasing from 0.62 in 2014 to 0.34 by 2020.¹²⁴

¹²¹ Decree on energy management in the public sector (Official Gazette of the Republic of Slovenia, No. [52/16](#), [116/20](#) and [158/20](#) – ZURE)

¹²² http://www.eu-skladi.si/kohezija-do-2013/predpisi/operativni-programi/2007-2013/operativni-program-razvoja-okoljske-in-prometne-infrastrukture/OPROPIcistopis_9_9_2015.pdf

¹²³ https://www.eu-skladi.si/sl/dokumenti/kljucni-dokumenti/op_slo_web.pdf

¹²⁴ In 2020, an average of EUR 1 of subsidy in the public sector stimulated EUR 3 of investments.

The Eco Fund also provides grants to the public sector to implement measures, in particular for the construction of nearly zero-energy buildings, where the sources of funding are the Energy Efficiency Contribution and the Climate Change Funding Programme. In addition to grants, loans are also available to reduce energy use and GHG emissions and increase RES energy production (Eco Fund and other providers).

To promote and support the renovation of public buildings, the Project Office for Energy Renovation of Buildings (PP-EPS) has been operating within the ministry responsible for energy since 2016. The office allocates grants to the public sector, monitors the implementation of energy renovation projects in public buildings, it has implemented a project of co-financing the preparation of technical and economic documentation for energy renovation projects in buildings of the narrower public sector, it prepares and issues instructions or guidelines, and maintains and updates the inventory of buildings owned and used by the narrower public sector.

Municipalities are very successful in renovating their buildings, as the majority of the above-mentioned energy renovations in buildings as part of the OP ROPI and OP ECP programmes, 63% of the renovated floor area (59% in the 2007-2013 period and 70% in the 2014-2020 period) took place in municipalities. Local communities have successfully undertaken all the organisation for the implementation of energy renovations, which can be attributed mainly to the ELENA (EIB/EBRD international financial assistance) technical assistance provided to the municipalities of Ljubljana (EOL projects), Novo mesto, Velenje, Kranj (EOMO project) and 23 affiliated municipalities, mainly from the Primorska region (PM4PM project). Local Energy Agencies (LEAs) also play an important role in the preparation and implementation of energy renovation projects in municipally owned buildings (see section 4.1.3).

MANDATORY SHARE OF PUBLIC SECTOR BUILDING RENOVATIONS

Article 5 of the EED provides that each Member State shall ensure that, starting with 1 January 2014, 3% of the total floor area of buildings owned and used by central government, which are heated and/or cooled, is renovated each year, or take alternative measures. The aim of this measure is to place public buildings as role models in the field of building energy renovations.

The multi-sectoral measure M-8 Green public procurement, described in section 4.2.1, is also very important for promoting action in the public sector.

M-25 ADDITIONAL MEASURES TO PROMOTE EEU AND THE USE OF RES IN THE PUBLIC SECTOR

Sectors affected by the implementation of the measure: *other sectors (energy use in the public sector)*

In NECP and LT SERB 2050, additional activities are planned to develop financial mechanisms to support the energy renovation of buildings in the narrower public sector, namely the exploration of additional energy contracting models (e.g. building energy renovation model of the narrower public sector, implemented by an internal contractor, a public-public partnership). The legislative, technical and economic

aspects of this implementation framework will also be examined and common documentation, tools and procedures for its implementation will be developed.

The Project Office for Energy Renovation of Buildings (PP-EPS) plans update its activities to encourage the preparation of comprehensive energy renovation projects in public buildings by providing expert support in the prioritisation of projects, the preparation of these projects, the definition of the implementation model, the monitoring and verification of energy savings, etc. PP-EPS will actively develop and promote new financial models to encourage the renovation of public buildings, inclusion of energy savings in contracts, and ensure the establishment of a quality system for energy renovation projects in public buildings.

The LT SERB 2050 plan requires EUR 364.5 million of grant funding over the period 2021-2030 to promote the renovation of buildings in the public sector, 58% of which has been ensured so far. In 2022 and 2023 EUR 10 million are earmarked from this source annually, and EUR 4.5 million from the Climate Change Funding Programme. In addition, EUR 146 million of co-financed grants from EU sources are already available to promote EEU and RES measures in the public sector:

- EUR 59 million for measures to ensure energy efficiency of public infrastructure, including demonstration projects and supporting measures under the ECP programme (2021-2027);
- EUR 86 million for sustainable renovation and building management measures, under the RRP programme (2021-26).

Additional measures are foreseen to ensure that all the necessary incentives are available.

Table14: Summary description of energy use measures.

	Measure and/or policy	Objective	Gas influenced by the measure	Type of measure	Status of implementation	Implementing entity	Effect of the measure [kt CO ₂ eq]		Reference to the measure from the previous National Report
							2025	2030	
M-18	PROMOTION OF EFFICIENT ENERGY USE IN INDUSTRY	Efficient energy use in industry	CO ₂	Economic, Legislative	Implemented	MEDT, MECE, Eco Fund	500	645	M-12 PROMOTION OF EFFICIENT ENERGY USE IN INDUSTRY
M-19	ADDITIONAL ACTIONS TO PROMOTE EFFICIENT ENERGY USE IN INDUSTRY	Efficient energy use in industry	CO ₂	Economic, Legislative	Planned	MEDT, MECE, Eco Fund	207	400	/
M-20	PROMOTION OF EEU AND THE USE OF RES IN BUILDINGS IN GENERAL	Increasing the EEU and use of RES as a heat source	CO ₂	Economic, Legislative, Information	Implemented, Adopted	MECE, MC, MF	362* ¹²⁵	531*	M-13 PROMOTION OF EFFICIENT ENERGY USE AND RENEWABLE ENERGY SOURCES IN BUILDINGS IN GENERAL
M-21	ADDITIONAL MEASURES FOR EEU AND THE USE OF RES IN BUILDINGS IN GENERAL	Increasing the EEU and use of RES as a heat source	CO ₂	Economic, Legislative, Information	Planned	MECE, MC, MF, Eco Fund	68	105	/
M-22	PROMOTION OF EEU AND THE USE OF RES IN HOUSEHOLDS	Increasing the energy efficiency and use of RES in households	CO ₂	Economic, Legislative, Information	Implemented	MECE, Eco Fund	187	288	M-14 PROMOTION OF EFFICIENT ENERGY USE AND RENEWABLE ENERGY SOURCES IN HOUSEHOLDS

¹²⁵ Effect of measure presents only part that is attributed to the service sector buildings. Effect of measure for households is presented under measure M-22

	Measure and/or policy	Objective	Gas influenced by the measure	Type of measure	Status of implementation	Implementing entity	Effect of the measure [kt CO ₂ eq]		Reference to the measure from the previous National Report
M-23	ADDITIONAL MEASURES TO PROMOTE EEU AND THE USE OF RES IN HOUSEHOLDS	Increasing the energy efficiency and use of RES in households	CO ₂	Economic, Legislative, Information	Planned	MECE, Eco Fund	IE ¹²⁶	IE	/
M-24	PROMOTION OF EEU AND THE USE OF RES IN THE PUBLIC SECTOR	Increasing the energy efficiency and use of RES in the public sector	CO ₂	Economic, Legislative, Educational, Research	Implemented	MECE	IE ¹²⁷	IE	M-15 PROMOTION OF EFFICIENT ENERGY USE AND RENEWABLE ENERGY SOURCES IN THE PUBLIC SECTOR
M-25	ADDITIONAL MEASURES TO PROMOTE EEU AND THE USE OF RES IN THE PUBLIC SECTOR	Increasing the energy efficiency and use of RES in the public sector	CO ₂	Economic, Legislative, Educational, Research	Planned	MECE	IE ¹²⁶	IE	/

¹²⁶ Effect taken into account in the effect of the measure M-21

¹²⁷ Effect taken into account in the effect of the measure M-20

4.2.4 Transport

M-26 PROMOTION OF SUSTAINABLE TRANSPORT IN GENERAL

Sectors affected by the implementation of the measure: *transport*

DEVELOPING INTEGRATED TRANSPORT STRATEGIES IN MUNICIPALITIES AND OTHER MEASURES OF INTEGRATED TRANSPORT PLANNING

The measure aims to enable sustainable transport planning in Slovenian municipalities through the development of Comprehensive Transport Strategies (CTS). The preparation of the CTS is co-financed by grants from the European Cohesion Fund and the Climate Change Funding Programme. Adoption of CTS is a prerequisite for certain state subsidies. The National Guidelines for the Preparation of a Municipal Integrated Transport Strategy were also developed and revised in 2021 within the LIFE IP CARE4CLIMATE project. The implementation of strategies has already delivered results for some municipalities in tackling traffic problems and implementing sustainable mobility measures. The preparation and implementation of CTSs can serve as a model for other countries and is well documented on the Sustainable Mobility Platform web portal¹²⁸.

In the coming years, municipal CTSs are planned to be upgraded into regional strategies, with a focus on improving the organisation of public transport. Some activities are already underway, and municipalities are coming together in different ways to prepare regional transport strategies. One regional transport strategy has been adopted by the end of 2021, whereas two strategies for Slovenian regions and a cross-border strategy for the Goriška region are under preparation. The CROSSMOBY project - Cross-border Integrated Transport Planning and Intermodal Passenger Transport Services (Slovenia-Italy) is also coming to an end (the main outcomes are the establishment of cross-border rail passenger services and a cross-border strategic action plan for sustainable mobility).

Apart from GHG emission reductions, strategic transport management, in particular municipal CTSs, have additional benefits: better use of transport infrastructure, lower mobility costs in the budgets of municipal residents and organisations, fewer congestions, more efficient investments, higher resident satisfaction and less air pollution. An integrated approach to dealing with the transport sector also brings significant improvements to the quality of life of residents and increases the municipality's chances of successful development.¹²⁹

TRANSPORT MANAGEMENT MEASURES

The aim of transport management measures is to promote public passenger transport and non-motorised forms of transport, including measures for sustainable urban parking policies measures, along with measures for traffic calming and restrictions in urban centres (parking restrictions, parking tariffs, regulation of deliveries of goods in city centres, etc.), and the promotion of the development of institutional mobility plans.

¹²⁸ <https://www.sptm.si/>

¹²⁹ National Guidelines for the Preparation of Municipal Integrated Transport Strategy, Urban Planning Institute of Slovenia, Publisher: Ministry of the Environment and Spatial Planning, 2021

Non-reimbursable financial incentives are available for sustainable mobility management projects. The preparation of mobility plans for institutions, high-traffic locations, etc., is co-financed by the European Cohesion Fund, tendered by the MECE, and the Climate Change Funding Programme, tendered by the Eco Fund. MECE is leading the preparation of the National Guidelines for Urban Logistics Management; the drafted guidelines will be tested in two pilot projects (in Ptuj and Ljubljana). Several action plans for urban logistics management are under preparation: the Piran city centre plan and the freight plan for Nova Gorica, both prepared under the European Capital of Culture and LIFE IP CARE4CLIMATE projects. In 2021, the Municipality of Celje has launched the Mobility Management in the City Municipality of Celje project (funded by the European Regional Development Fund) to establish an integrated management system that will provide users with the information to optimise their journeys. With a single app the system enables the use of KolesCE, CeleBUS, train/bus IPPT tickets, etc. The aim is to change people's travel habits. More visible actions have been taken at local level. For example, the Municipality of Trebnje has adopted a new parking regime (paid parking, permits, monitoring, etc.). The Municipality of Ljubljana has increased parking tariffs in the city centre. Parking policies for the municipalities of Zreče and Nova Gorica are under preparation, whereas the municipalities of Idrija, Velenje and Vrhnika already have them prepared. Within the LIFE IP CARE4CLIMATE project, the Municipality of Maribor has developed a mobility plan to close the Koroška street for traffic.

During the epidemic, the proportion of people working from home increased sharply. At the start of 2021, 9% of people worked from home, whereas 21% worked from home at least once a week (still less than in 2020). In certain public administration sectors, working from home is allowed or encouraged even after the epidemic.

SUSTAINABLE MOBILITY AS PART OF SPATIAL PLANNING

In the field of *transport planning within the scope of spatial planning*, in 2020 the Ministry of Natural Resources and Spatial Planning (MNRSP) has prepared recommendations, i.e. *Stationary Traffic in Urban Settlements (2020)*, which suggest municipalities to take into account the location and the minimum and maximum proportions of the parking norm. In the same year, a *Recommendation for creation of an Urban Design* was prepared, and in 2021 the MNRSP started working on the tasks *City of Short Distances - Promoting Accessibility* and *Linking Urban Development to Public Passenger Transport - Promoting the Distribution of Activities and Employment Areas along the PPT lines*. The tasks are foreseen to be finished in 2022 and after that a preparation of recommendations or guidelines as part of the recommendations of the National Spatial Plan is planned.

The Amendment to the Spatial Management Act (ZUreP-3)¹³⁰ introduces some new features, including the definition of accessibility, in the sense whether a location, activity or service is accessible to different users by means of sustainable mobility (walking, cycling, public passenger transport), and is measured in units of length and time. The law takes a greater consideration of climate change, as it complements the principle of sustainable spatial planning and requires spatial development to be designed in a way that is climate-safe, climate-neutral and mitigates the impacts of climate change.

¹³⁰ Spatial Management Act (ZUreP-3) (Official Gazette of the Republic of Slovenia, No. 199/21)

M-27 ADDITIONAL MEASURES TO PROMOTE SUSTAINABLE TRANSPORT IN GENERAL

Sectors affected by the implementation of the measure: *transport*

Transport planning foresees additional measures to ensure integrated transport planning at all levels (local, regional and national), to provide a systemic source of funding for sustainable mobility and to regulate the field. Regional transport strategies will also be drafted. The NECP also includes the development of guidelines for the preparation of regional CTSs, guidelines for public involvement, parking management and the preparation of mobility plans for planned exceptional events.

An analysis of international projects and practices to introduce new forms of logistics into the legislative framework in EU Member States has also been carried out. The situation in the Republic of Slovenia has also been analysed, and proposals will be made to amend measures and legislation.

Additional funding for sustainable mobility measures is approved in the National Recovery and Resilience Plan (RRP), where EUR 311.9 million is foreseen for sustainable mobility, including EUR 218.9 million in grants, to stimulate EUR 521.42 million of investment. Two important rail infrastructure projects are earmarked for funding.

In line with the Integrated National Energy and Climate Plan of the Republic of Slovenia (NECP), the implementation of the instrument is planned to be continued and accelerated, including the implementation of pilot projects under the Sustainable Parking Policy measure, the reduction of traffic in city centers and the use of modern mobility management technologies. In the coming years, the NECP also foresees a change in the concept of parking norms by limiting long-term parking with increasing costs, especially for commuting, and encouraging the development of sustainable mobility plans for public sector bodies and businesses to promote the use of public transport and reduce the use of private cars, including the abolition of free parking spaces for public employees.

M-28 PROMOTION OF PUBLIC PASSENGER TRANSPORT

Sectors affected by the implementation of the measure: *transport*

Passenger kilometres in public transport (PPT) in 2019 were estimated at 1,506 million pkm, up from 1,430 million pkm in 2014 and down from 1,620 million pkm in 2010. The year 2020 with 733 million pkm was not taken into account due to the pandemic-related long closure of PPT. The indicative targets the OP GHG 2020 has set for PPT were higher than those achieved, namely 1.763 million pkm in 2020. Rail transport accounted for 46% of PPT journeys in 2019 and 50% in 2014.

Policies and measures for the promotion of public passenger transport are included in the following documents: Transport Development Strategy of the Republic of Slovenia, Resolution on the National Programme for the Development of Transport of the Republic of Slovenia until 2030 (ReNSRP) and the Integrated National Energy and Climate Plan (NECP). See also section 4.2.1.

Several measures have been put into effect, the main purpose of which is to reduce the need to use a personal vehicle in cities and to accelerate the development of public passenger transport.

Public passenger transport is governed by the Road Transport Act, the Railway Transport Act and the Public Passenger Transport Management Act adopted in 2022 (Official Gazette of the Republic of Slovenia, No 54/22). The new Act aims to create a public passenger management company that will bring together the management functions in a single body. The Act is the first step towards optimising public passenger transport organisation and management, improving the procurement of public passenger transport, increasing the integration between bus and rail transport, improving the economic acceptability of public passenger transport and facilitating new types of passenger transport. In accordance with the Act, a three-tier governance structure (strategic, tactical and operational levels) will be established. A new funding model for public bus services is also envisaged.

The Integrated Public Passenger Transport (IPPT) project, whose aim was to integrate different modes of public transport, is described in more detail in BR4. An integrated electronic ticket was introduced, timetables were adjusted and Public Passenger Transport (PPT) services were improved. The last fiscal year saw the implementation of some updates to the integrated electronic ticket and simplification of its use for students. Subsidising of PPT tickets will continue. Subsidising of tickets for high-school and university students, regardless of their social status, has been introduced in 2013. For pensioners and people over 65, war veterans and holders of the European Disability Card, free interurban public passenger transport was introduced by an amendment to the Road Transport Act in 2020. Since 2021 cheaper weekend and public holiday bus tickets are also available for all passengers, with additional discounts for families. Free tickets are in force in some parts of the urban public transport system, and in 2022 they were introduced for pensioners in Ljubljana and Maribor.

Financial incentives under the OP ECP and the Climate Change Funding Programme are designed to encourage municipalities to set up an efficient public passenger transport system and to promote its use. These incentives are intended for investments in public passenger transport infrastructure, such as access to PPT stations and stops, park and ride (P+R) systems, bicycle rental projects, bicycle parking spaces at bus stops, etc. Other measures are being implemented to improve public transport services, such as introducing yellow lanes, increasing the frequency of public transport journeys, ensuring comfortable and easy transfers between public transport modes, and introducing new services (PPT dial-a-ride services). The Eco Fund also grants subsidies to municipalities for the purchase of new passenger and school transport vehicles in order to expand or create new urban or intercity public passenger transport lines or to replace outdated vehicles with higher emissions (see measure 0).

Financial incentives to improve public rail infrastructure are also important to improve public passenger transport in general. New electric and diesel-powered trains are introduced, with higher travelling speeds and more space for bicycles. Upgrades of railway lines, stations and nodes funded by the OP ECP are underway (see measure M-30).

To be able to perform public transport services, carriers have a concession for the operation of public passenger transport services. The transport prices are regulated and part of the costs for performing the service is reimbursed from the state budget. The tender for the new concession contracts saw an increase of 20% in the accessibility standard, i.e. at the expense of morning and afternoon rush hours, more remote locations and tourism.

Within the ministry responsible for transport, a directorate for sustainable mobility and transport policy was established with the aim of carrying out professional and administrative

tasks in the field of public passenger transport, subsidising tickets for high school and university students, sustainable mobility and transport policy.

M-29 ADDITIONAL ACTIONS TO PROMOTE PUBLIC PASSENGER TRANSPORT

Sectors affected by the implementation of the measure: *transport*

The NECP plans to change the way travel and commuting costs are calculated to encourage the reduction of GHG emissions during these journeys, through additional subsidies to the PPT in the form of reimbursement of commuting costs. The aim is to find a sustainable solution for the reimbursement of the commuting costs in dialogue with the social partners and civil society initiatives. Under the LIFE IP CARE4CLIMATE project the Proposal for a New Model for Commuting Costs Reimbursement was published in 2021. A change to the commuting reimbursement model is proposed, whereby workers are still reimbursed in full, but only if they travel by public transport. The model includes simultaneous improvements to public transport to encourage and enable commuting, simplification of the fare system and the operations of the PPT operator.

Three expert reports have been prepared and published under the LIFE IP CARE4CLIMATE project, which will enable further improvements to the integrated PPT: analysis of the Quality of Service and Competitiveness of PPT and proposals for possible improvements, Guidelines for the Organisation of Public Transport in Rural Areas and Scheme for Improved Public Transport in Selected Corridors, with recommendations for improvements.

See measure M-27.

M-30 SUSTAINABLE FREIGHT TRANSPORT

Sectors affected by the implementation of the measure: *transport*

The share of rail transport in the total freight transport in 2019 was 24.8%, slightly lower than the indicative target of 25.2% from OP GHG-2020. The share was the highest in 2017, accounting for 26.2%. This is one of the two indicators in the transport sector that shows performance close to the objectives set. The number of tonne-kilometres travelled by heavy goods vehicles in 2019 was 12,185, the highest ever. In 2019, their number was 20.8% higher than in 2011. In railway transport, the volume increased by 30 %. These data only include journeys carried out by domestic road haulage operators whereas a large proportion of freight transport is of transit nature.

In regard to sustainable freight transport, the emphasis is placed on co-modality, for which the construction and modernisation of the existing transport infrastructure, especially, the railway, is of essential importance. The measure is further supported by the Strategy and the Programme for the Development of Transport in the Republic of Slovenia and by grant funding from EU sources.

October 2021 saw the development of Vision 2050+, a comprehensive document addressing the development of rail infrastructure. Vision 2050+ provides a strategic framework for rail development over the next 50 years. The starting point for the design of new rail routes is environmental, as it follows the requirements of climate policy and sustainable mobility, while aiming to change travel habits, reach competitive journey times and improve accessibility. The Vision proposes actions and outlines a possible, but not definitive, proposal

for measures, including upgrading the rail network, integrating transport, decoupling freight and passenger transport, and new connections. It sets out the separate phases, conditions and resources needed for implementation. These infrastructure measures (new railway lines) have been analysed in terms of spatial and functional feasibility on a very coarse scale, while more detailed solutions and their assessment and comparison in terms of functional, spatial, environmental, economic and social acceptability are yet to follow in further planning phases. The set of measures for the period up to 2035 is already well-defined, and in the meantime it is proposed to plan the new railway lines.

The railway infrastructure improvement projects are implemented within the budget of the Slovenian Infrastructure Agency and EU funds in Slovenia. To achieve these specific objectives, non-reimbursable financial incentives for rail transport infrastructure are available for the 2014-2020 period, as well as other measures for the development of rail passenger and freight transport under the implementation of the OP ECP with funding from the Cohesion Fund. Funding for projects through the Connecting Europe Facility is also foreseen. Additional funding is available under the Recovery and Resilience Plan. For the sustainable mobility segment of the RRP EUR 311.9 million is allocated, of which EUR 218.9 million is the non-reimbursable part, with more than 90% allocated to the funding for railways.

By 2030, all sections of the TEN-T network will be modernised, upgraded and constructed by way of measures for the electrification of the whole Slovenian railway network, the introduction of ERTMS (ETCS Level 2) on the entire TEN-T network, by way of the modernisations, upgrade and newly built facilities on the regional network.

A number of projects have been completed, some are still underway: public passenger traffic on the Ljubljana-Kočevje line was restored in January 2021, along with some international connections (e.g. between Ljubljana and Trieste), the safety and technical upgrade of the Karawanks railway tunnel has been completed, and the implementation of a data network for remote traffic management on the public railway infrastructure has been completed. A project for the construction of a second Karawanks tunnel tube is under preparation, construction work on the Zidani Most-Celje railway section has been completed, and upgrades are underway on several sections of the railway line in the region of Gorenjska, the Ljubljana-Divača line, the Ljubljana-Brezovica section, and the Pragersko junction. Under preparation is an upgrade of the Ljubljana railway station area, the Dobova-Zidani Most line, along with the Ljubljana-Kamnik, Ljubljana-Jesenice-state border double-tracking projects. The project to introduce remote traffic management on the main lines of the public railway infrastructure Zidani Most-Ljubljana and Zidani Most-Šentilj-state border is also being continued and will be completed by 2027.

Slovenia is highly exposed to transit transport due to its position at the crossroads between the V. and X. European corridor which, for the main part, represents a section of the TEN-T core network and corridors of the core network. Since Slovenia is also small, with an attractive price ratio for oil derivatives as compared to neighbouring countries, the increase in transit transport has a significant impact on the sale of liquid motor fuels in the country and, thus, on GHG emissions. A long-term solution to the problem is possible only by redirecting goods transport from the roads to the railways; however, a precondition for this is a modern and reliable railway, the construction of which has commenced. In 2008, when energy use in transport reached its peak, the portion of fuels sold to transit transport amounted to 30% of

the total volume of fuels sold in the country. This was followed by a decrease in the portion due to economic crisis and changes in price ratios. In the last few years, the share has amounted to around 20%.

M-31 INCREASING THE EFFICIENCY OF VEHICLES, ENCOURAGING ECONOMIC DRIVING, HIGHER VEHICLE OCCUPANCY AND ENCOURAGING THE USE OF FUELS WITH LOW CO₂ EMISSIONS

Sectors affected by the implementation of the measure: *transport*

INCREASE IN THE EFFICIENCY OF VEHICLES

The measure is based on three pillars:

- the obligation of the automotive industry to reduce CO₂ emissions per kilometre for new vehicles,
- awareness raising regarding fuel consumption and vehicle emissions and
- promotion of the fuel consumption efficiency of vehicles through tax measures.

In 2009, the European Commission adopted the first binding targets for average CO₂ emission for new cars. Pursuant to the Regulation 443/2009¹³¹, emissions should not exceed 95g/km after 2021. Pursuant to the Regulation 2019/631, CO₂ emission of new cars must be reduced by 15% by 2025, and by 37.5% by 2030 compared to 2021. This Regulation also introduces targets for light goods vehicles, namely a reduction of 15% by 2025 and 31% by 2030 compared to 2020. Until 2020, targets for light goods vehicles were set in the Regulation 510/2011. For 2020, the target was 147 gCO₂/km.

In 2021, average emissions from new passenger vehicles in Slovenia amounted to 114 g CO₂/km. Due to a large discrepancy between the factory emissions measurements and fuel consumption and the actual values, a new measurement standard was introduced, the so-called WLPT. The new standard entered into force in September 2018 for all newly registered vehicles. From 2021, the European Commission will collect data on actual emissions and compare them with laboratory measurements.

In 2019, the EU also adopted CO₂ emission targets for heavy good vehicles in Regulation 2019/242. The target for 2025 is to reduce emissions by 15% relative to the reference emissions in the period from 1 July 2019 to 1 June 2020, and by 30% in 2030. Pursuant to the Regulation, the targets currently apply to large lorries, while in 2022 the Commission will propose, along with the assessment of the measure, the extension to other heavy goods vehicles, including buses.

¹³¹ Regulation (EC) No. 443/2009 on setting emission performance standards for new passenger vehicles as part of the Community's integrated approach to reduce CO₂ emissions from light goods vehicles.

Informing and awareness-raising is mostly carried out through the fuel consumption labelling on passenger vehicles. Slovenia transposed the Directive 1999/94/EC¹³² relating to the availability of consumer information on fuel economy and CO₂ emissions into Slovenian law in 2014 with the Decree on consumer information on fuel economy, carbon dioxide emissions and ambient air pollutants as regards new passenger cars¹³³, which replaced the previously applicable Decree from 2010. In accordance with the Regulation, suppliers of passenger vehicles must provide data on fuel consumption and vehicle emissions at the point of sale and in the promotional brochure. They must also prepare a manual on fuel economy and CO₂ emissions.

Efficient use of vehicles is also encouraged by the Green Public Procurement (see M-8) as vehicles and transport services are also subject to GPP.

The third pillar concerns tax measures. Motor Vehicle Tax (MVT) is paid on motor vehicles that are placed on the market for the first time or are registered for the first time in the territory of the Republic of Slovenia. In 2020, a new Motor Vehicle Tax Act (ZDMV-1) was enacted, which changed taxation so that it now depends only on CO₂ emissions. The tax is progressive, but the break is relatively high, so compared to similar taxes in the EU, it gives relatively less incentive to buy a more emission- efficient car.

In 2022, an amendment to the Income Tax Act brought into force a reduction in the benefit for the private use of a company car for electric vehicles. The benefit has been reduced to 0% of the vehicle purchase price per month (previously 0.3%).

PROMOTING ENERGY-EFFICIENT DRIVING

In accordance with Directive 2003/59/EC (driver training) and Regulation 1071/2009/EC (training of transport managers), training for drivers and goods vehicle fleet managers, including in terms of energy-efficient driving and logistics, is carried out by authorised transport operators. According to the Drivers Act (Official Gazette of the Republic of Slovenia No. 85/2016), learning the basics of energy-efficient and environmentally friendly driving techniques is integral to the practical part of driver training. Tips for energy-efficient driving are already included in driving lessons.

PROMOTING THE USE OF FUELS WITH LOW CO₂ EMISSIONS

Policies and measures for the promotion of public passenger transport are included in the following documents: Strategy regarding market development for the establishment of adequate infrastructure related to alternative fuels in the transport sector of the Republic of Slovenia¹³⁴, the Action Programme for Alternative Fuels in Transport for 2022 and 2023¹³⁵ and

¹³² EUROPEAN PARLIAMENT AND COUNCIL DIRECTIVE 1999/94/EC of 13 December 1999 relating to the availability of consumer information on fuel economy and CO₂ emissions in respect of the marketing of new passenger cars.

¹³³ (Official Gazette of the Republic of Slovenia, Nos. 24/14 and 44/22 - ZVO-2)

¹³⁴ [Strategy regarding market development for the establishment of adequate infrastructure related to alternative fuels in the transport sector of the Republic of Slovenia, Government of the Republic of Slovenia, 12 October 2017](#)

¹³⁵ [Action Programme for Alternative Fuels in Transport for 2022 and 2023, Government of the Republic of Slovenia, 23 December 2021](#)

the Integrated National Energy and Climate Plan of the Republic of Slovenia (NECP). See also section 4.2.1.

The purchase of electric and alternative fuel vehicles and the construction of charging infrastructure is promoted by Eco Fund through non-reimbursable financial incentives. In the period 2015-2021, €40 million of non-reimbursable financial incentives were paid for the purchase of new low-emission vehicles and €1 million for charging infrastructure, resulting in an estimated reduction of 8,000 t CO₂ eq¹³⁶. Most of the funds were allocated to electric and hybrid vehicles. The calls have changed slightly over the years, with the following calls for non-reimbursable financial incentives being launched in 2021:

- for citizens and legal entities to purchase battery powered electric vehicles (passengers cars, motorcycles, mopeds and electric or hybrid bicycles),
- for municipalities to purchase new CO₂-free electric and hydrogen vehicles for public passenger transport and for transporting schoolchildren,
- for the purchase of more energy-efficient tires for trucks and buses.

The NECP provides for a gradual annual reduction of vehicle incentives and a cap on the value of vehicles to qualify for the incentive. Additional incentives are also foreseen for deregistration of an old vehicle, for electrification of the urban vehicle fleet (PPT - buses, taxis) and for active sustainable mobility.

Implementation of the measure continues. For the future period, more funding is earmarked for the construction of charging infrastructure (see action M-32).

In addition to non-reimbursable financial incentives, the Eco Fund also provides soft lending for legal entities, sole proprietors and citizens.

In Slovenia, the Decree on renewable energy sources in transport (Official Gazette of the Republic of Slovenia, No. 64/16) has been in force since 2016. The Decree defines the obligations for fuel distributors who have to achieve an energy share of renewable energy in each calendar year, namely at least 6.2% in 2017, at least 7.0% in 2018, a minimum of 8.4% in 2019, and a minimum of 10.0% in 2020. The distributor achieves the share of renewable energy through the sale of biofuels that comply with sustainability criteria, electricity from renewable energy sources, hydrogen from renewable energy sources and through a combination of these fuels. In accordance with the EU Directive 2015/1513, the Decree limits the maximum contribution of biofuels produced from cereals and other field crops with high starch content, sugar crops, oilseeds and crops grown on agricultural land as main crops specifically for energy purposes to 7% of the country's final transport energy consumption in 2020. The NECP sets a target of 11% for transport biofuels in 2030¹³⁷, whereby the share of advanced biofuels must be increased in accordance with the EU Directive 2018/2001.

In 2020, the share of RES in transport in Slovenia was 10.9%, thus reaching the target. The successful achievement of the target is also due to the adoption of the amended Decree on setting prices of regulated petroleum products in 2017, which also introduces a bio-component additive in the calculation of the price of regulated fuels, allowing fuel distributors

¹³⁶ Together for charging stations and sustainable mobility.

¹³⁷ The share of biofuels in the consumption of liquid fuels in road and railway transport without LPG

to transfer part of the costs of biofuels to the fuel final price, and as a result, the share of RES was approaching the target and reached it in 2020.

M-32 ADDITIONAL ACTIVITIES TO INCREASE VEHICLE EFFICIENCY, ENCOURAGE ENERGY-EFFICIENT DRIVING, INCREASE VEHICLE OCCUPANCY AND ENCOURAGE THE USE OF FUELS WITH LOW CO₂ EMISSIONS

ADDITIONAL MEASURES TO PROMOTE ENERGY-EFFICIENT DRIVING AND HIGHER VEHICLE OCCUPANCY RATE

The NECP envisages the development of new innovative approaches to promote energy-efficient driving: new mobile applications for monitoring efficiency, examining the possibilities for lowering the permitted speed on motorways, and incentives for insurance or deletion of penalty points.

In comprehensive transport strategies, municipalities have also identified measures to encourage higher occupancy of passenger vehicles. In larger cities, commuters represent a major problem, since most of them use their own car to drive to work. The following measures were identified: managing parking policy in order to reduce car traffic in cities, introducing new car mobile services to optimise personal transport (“carsharing”, “carpooling”), and introducing entry fees for cities. These measures are also stated in the NECP in addition to providing system support for carpooling.

MANDATORY SHARE OF RENEWABLE ENERGY SOURCES IN MOTOR TRANSPORT - ADDITIONAL MEASURES

The mandatory share of RES in transport is regulated by *the Act on the Promotion of the Use of Renewable Energy Sources*, in Articles 59 and 60. The Act defines that the share of RES in transport must reach 14% by 2030, and not less than 10% in any given year. The existing *Decree on renewable energy sources in transport* was amended in March 2021 with the provision that this share must amount to 10% in 2021 as well (Official Gazette No. 31/21). For 2022, the new *Decree on renewable energy sources in transport* (Official Gazette No. 208/21), which came into force on 1 January 2022, sets the share of RES in transport to be at least 10.1% in 2022 and at least 10.3% in 2023. The methodology for calculating the share of RES in transport changed after 2020 (change in the energy factors for electricity).

In accordance with the *Integrated National Energy and Climate Plan of the Republic of Slovenia (NECP)*, the implementation of the instrument is to be continued, including the removal of all technical and other barriers to increase the share of RES in transport, a sustainable focus on advanced biofuels and hydrogen (also on railways), including a change in the liquid fuel price regulation model, and a sustainable orientation towards the introduction of RES gases in CNG and LNG filling stations.

According to the new proposal of the RES Directive, the Fit for 55 legislative package will no longer set a target for the share of RES in transport, but will determine a target for the reduction of the intensity of GHG emissions from fuels in transport.

FINANCIAL INCENTIVES FOR ALTERNATIVE FUELS AND E-MOBILITY INFRASTRUCTURE - ADDITIONAL MEASURES

It is planned to promote the construction of charging infrastructure on a larger scale than with the existing measure. A total of €36 million is provided for non-reimbursable financial incentives, namely:

- €19 million for measures related to alternative fuels charging infrastructure from the European Cohesion Funds for the period 2021–2027;
- €8 million for measures related to establishing alternative fuels infrastructure in transport (network of electric charging stations) under the RRP Programme for the period 2021-2026;
- €11 million for measures related to building alternative fuels infrastructure and charging stations under the Climate Change Funding Programme for the period up to 2023.

M-33 PROMOTING NON-MOTORISED MODES OF TRANSPORT

Within the framework of the ECP (2021-2027) strategic basis, the NECP, and the ReNPRP30, the construction of cycling and pedestrian infrastructure continues to be encouraged in Slovenia. The EU funding for cycling infrastructure is €74.5 million, or just over €90 million including the Slovenian contribution. Based on past experience, additional inputs from the beneficiaries' own participation are expected, as well as project funding from the state and municipality budget. Priority is given to investments in urban commuter mobility and measures that increase intermodality (e.g. parking along rail lines, cycle sheds) and improve the connectivity of regions with cycling infrastructure. During this period, 162 km of additional separate cycling surfaces are planned.

In 2022 and 2023, €18.371 million is also available from the Climate Change Funding Programme for the construction of cycling infrastructure, the purchase of electric bicycles and company bicycles, the construction of bicycle parking facilities at railway stations and the construction of cycle routes under the Regional Development Agreement.

An Inter-Ministerial Working Group was established in 2021 to prepare a Draft Strategic Plan for the development of the national cycling network by the end of 2022. By the end of 2023, a further 400 km of national cycling infrastructure will have been built.

Since 2011, the BicikeLJ bicycle rental system has been available in the capital city of Ljubljana, with more than 9.6 million rentals to date. In 2022, 840 bicycles can be rented at 84 stations. In 2022, this system was transferred to Maribor, the second largest city in Slovenia, where 22 stations and 220 bicycles are currently available to residents. Smaller bicycle systems also operate in towns such as Velenje, Šoštanj, Ravne na Koroškem, Jesenice, Kranj, Piran and Ptuj. In 2021, new systems were also set up in the municipalities of Litija, Dol pri Ljubljani and Šmartno pri Litiji, as well as automated systems for renting electric bicycles in Zagorje, Nova Gorica and Ljubljana. Thus, there are already 30 bicycle rental systems in Slovenian municipalities.

A Mobility Centre has opened in Ljubljana, allowing citizens to rent cargo bikes to improve delivery around town in an environmentally friendly way.

Table15: Summary description of transport measures.

	Measure and/or policy	Objective	Gas influenced by the measure	Type of measure	Status of implementation	Implementing entity	Effect of the measure [kt CO ₂ eq]		Reference to the measure from the previous National Report
							2025	2030	
M-26	PROMOTION OF SUSTAINABLE TRANSPORT IN GENERAL	Establishing sustainable transport planning in municipalities, spatial planning	CO ₂	Economic, Legislative	Implemented, Adopted	MECE, MI, Local communities	115	159	M-20 DEVELOPING COMPREHENSIVE TRANSPORT STRATEGIES
M-27	ADDITIONAL MEASURES TO PROMOTE SUSTAINABLE TRANSPORT IN GENERAL	Additional measures to reduce car traffic	CO ₂	Economic, Legislative, Information	Planned	MECE, MI, Local communities	205	405	
M-28	PROMOTING PUBLIC PASSENGER TRANSPORT	Increasing the share of public passenger transport	CO ₂	Economic, Legislative, Information	Implemented, Adopted	MECE, MI, Slovenian Railways, Local communities	22	56	M-16 PROMOTING PUBLIC PASSENGER TRANSPORT
M-29	ADDITIONAL ACTIONS TO PROMOTE PUBLIC PASSENGER TRANSPORT	Increasing the share of public passenger transport	CO ₂	Economic, Legislative, Information	Planned	MECE, MI, Slovenian Railways, Local communities	9	17	/
M-30	SUSTAINABLE FREIGHT TRANSPORT	Increasing the share of railways in freight transport and thereby increasing the efficiency of road freight transport	CO ₂	Economic, Planning	Implemented, Adopted	MECE, MI	34	52	M-17 SUSTAINABLE FREIGHT TRANSPORT

	Measure and/or policy	Objective	Gas influenced by the measure	Type of measure	Status of implementation	Implementing entity	Effect of the measure [kt CO ₂ eq]		Reference to the measure from the previous National Report
							2025	2030	
M-31	INCREASING THE EFFICIENCY OF VEHICLES, PROMOTING ENERGY-EFFICIENT DRIVING, INCREASING VEHICLE OCCUPANCY RATE AND PROMOTING THE USE OF FUELS WITH LOW CO ₂ EMISSIONS	Reducing CO ₂ emissions per kilometre by improving vehicle efficiency and changing behaviour, and increasing the share of RES in transport	CO ₂	Fiscal, Information, Legislative, Educational, Economic	Implemented, Adopted	MECE, MF, Eco Fund	519	829	M-18 INCREASING VEHICLE EFFICIENCY, PROMOTING ENERGY-EFFICIENT DRIVING, INCREASING VEHICLE OCCUPANCY RATE AND PROMOTING THE USE OF FUELS WITH LOW CO ₂ EMISSIONS
M-32	ADDITIONAL ACTIVITIES TO INCREASE VEHICLE EFFICIENCY, PROMOTE ENERGY-EFFICIENT DRIVING, INCREASE VEHICLE OCCUPANCY RATE AND PROMOTE THE USE OF FUELS WITH LOW CO ₂ EMISSIONS	Further reduction of CO ₂ emissions per kilometre by improving vehicle performance and changing behaviour, and increasing the share of RES in transport	CO ₂	Fiscal, Information, Legislative, Educational, Economic	Planned	MECE, MF, Eco Fund	180	791	/
M-33	PROMOTING NON-MOTORISED MODES OF TRANSPORT	Increasing cycling and walking	CO ₂	Economic, Planning	Implemented	MECE, MI, GODECP	iE ¹³⁸	iE	M-19 PROMOTING NON-MOTORISED MODES OF TRANSPORT

¹³⁸ Included in the effect of the measures M-26 and M-27

4.2.5 Industrial Processes

M-34 REDUCING THE EMISSIONS OF F-GASES FROM STATIONARY INSTALLATIONS

Sectors affected by the implementation of the measure: *industrial processes*

The reduction of F-gas emissions from stationary installations is influenced by the implementation of the provisions of the Regulation (EU) No. 517/2014 on fluorinated greenhouse gases from 2014 and its implementing regulations. The main impact of the Regulation is through limiting the placement of F-gases on the EU market by means of a quantitative cap and also by limiting the use of F-gases with a high greenhouse potential. The Regulation and implementing regulations also regulate the handling of devices containing F-gases in order to reduce leakage and ensure correct handling of F-gases.

In Slovenia, the implementation is regulated by way of the Decree on the use of fluorinated greenhouse gases and ozone-depleting substances (Official Gazette of the Republic of Slovenia, No. 60/2016).

Implementation of this measure will contribute to substantially lower HFC emissions.

In mid-2022, the EU published a proposal for a renewed F-Gas Regulation, which will tighten measures to reduce HFC emissions even faster.

M-35 REDUCING EMISSIONS OF F-GASES FROM MOBILE AIR-CONDITIONING SYSTEMS

Sectors affected by the implementation of the measure: *industrial processes*

EP and Council Directive 2006/40/EC relating to emissions from air-conditioning systems in motor vehicles and amending Council Directive 70/156/EEC (OJ L No. 161 of 14/6/2006) was transposed into the Slovenian legal order by the technical specification TSV - 161/01 on emissions from air-conditioning systems in motor vehicles regulating the area of emissions from air-conditioning systems in vehicles of category M1 and N1 (passenger motor vehicles and goods vehicles up to a total mass of 3.5 t). The Directive was implemented in three phases. The last phase entered into force on 1 January 2017, banning the registration of all vehicles with a built-in air conditioning system containing fluorinated greenhouse gases with a global warming potential above 150.

Table16: Summary description of industrial process measures

	Measure and/or policy	Objective	Gas influenced by the measure	Type of measure	Status of implementation	Implementing entity	Effect of the measure [kt CO ₂ eq]		Reference to the measure from the previous National Report (7NC)
							2025	2030	
M-34	REDUCING F-GASES EMISSIONS FROM STATIONARY INSTALLATIONS	Reducing leakage and promoting the use of low GWP gases by means of a cap	F-gases	Legislative, Educational	Implemented	MECE	188	287	M-21 REDUCING F-GASES EMISSIONS FROM STATIONARY INSTALLATIONS
M-35	REDUCING EMISSIONS OF F-GASES FROM MOBILE AIR-CONDITIONING SYSTEMS	Limiting the use of high-GWP gases	F-gases	Legislative	Implemented	MECE, MI	81	111	M-22 REDUCING F-GASES EMISSIONS FROM MOBILE AIR-CONDITIONING SYSTEMS

4.2.6 Agriculture

M-36 INCREASING THE EFFICIENCY OF DOMESTIC ANIMAL PRODUCTION

Sectors affected by the implementation of the measure: *agriculture*

By improving the efficiency of animal husbandry, it is possible to significantly reduce the amount of methane released and nitrogen excreted per unit of milk and meat produced. Since methane and nitrous oxide emissions represent energy and nitrogen losses, breeders have a direct economic interest in reducing emissions. There is still a lot of opportunities for improvement in this sector, which can be used by training breeders in the direction of improving breeding efficiency. Due to the specific structure of Slovenian agriculture (high number of small farms), this is a special challenge for agricultural policy. Agricultural policy contributes to the reduction of emissions in this regard through measures provided for by the Rural Development Programme (mostly through investments in physical assets), as well as through financing breeding programmes for breeds of cattle and small ruminants, and financing public advisory services for farmers in regard to forage production, animal nutrition and general cattle farming. The maintenance of the existing Govedo Information System is ensured within the scope of breeding programmes; the said system provides support to dairy farmers in making decisions that lead to the reduction of greenhouse gas emissions, and informs them about the emissions on their farms.

M-37 PROMOTING BREEDING METHODS WITH LOW EMISSIONS

Sectors affected by the implementation of the measure: *agriculture*

Greenhouse gas emissions can be reduced through breeding methods. This includes mainly pasture grazing of grass-feeding animals and the production of biogas from livestock manure. Both breeding methods reduce emissions from the storage of livestock manure.

By grazing, it is possible to avoid the methane emissions that would otherwise result from storing livestock manure. Pasture grazing also helps to reduce emissions from fossil fuel use in the harvesting and transport of feed for animals kept indoors. Due to the subdivision of agricultural land, traditional siting of farms in compact villages and because animals are traditionally kept indoors, pasture grazing is rarely used in Slovenia. The Ministry of Agriculture, Forestry and Food has contributed to an increase in grazing management by financing the public agricultural advisory service. The Ministry also encourages pasture grazing through the animal welfare measure of the Rural Development Programme, which, with financial assistance, encourages farmers to adopt above-standard forms of rearing, including grazing. Within the Agri-Environment-Climate Payment (AECF) the "Planinska paša" project is implemented, which directly promotes above-standard forms of summer grazing on the mountain pastures. In terms of reducing GHG emissions, it is also important to adequately address the problem of the spread of large carnivores to areas that are suitable for grazing, and in the framework of the AECF, the operation of Raising farm animals in areas of appearance of large carnivores is also being implemented.

By producing biogas from livestock manure, we avoid emissions of methane from the storage of livestock manure and reduce ammonia emissions and thereby indirect emissions of nitrous oxide. The Investments in Physical Assets of the Rural Development Programme allows for co-funding the construction of biogas plants, but the option has not been exploited so far.

M-38 RATIONAL FERTILISATION OF AGRICULTURAL PLANTS WITH NITROGEN

Sectors affected by the implementation of the measure: *agriculture*

Efforts in this area are directed into more efficient use of mineral and livestock manure. In this manner, with reduced use of nitrogen, the quantity of agricultural production is maintained or even increased, and direct emissions of nitrous oxide from agricultural land and indirect emissions of nitrous oxide are reduced. The agricultural policy contributes to reducing emissions in this area through measures provided by the Rural Development Programme (Investments in Physical Assets, Agri-Environment-Climate Payments (AECF), Organic Farming etc.) and through financing public advisory services for farmers. All farms entering the AECF must have a programme of activities, which includes record-keeping on the use of mineral and livestock manure. If farms use mineral fertilisers, they are obliged to make fertilisation plans based on soil analyses. In addition to general conditions, specific requirements implemented within the scope of individual AECF operations contribute to more efficient use of fertilisers. These include requirements for multiannual crop rotation, fertilisation based on soil mineral nitrogen analysis, low-emission fertilisation, greening of arable land, etc.

M-39 ADDITIONAL MEASURES IN AGRICULTURE

Sectors affected by the implementation of the measure: *agriculture*

Additional measures in agriculture include measures that have not been implemented so far, as well as measures that have already been implemented but need to be significantly upgraded or, in order to continue their implementation, new program documents and funding is needed. In this regard it is important to continue and upgrade the measures implemented so far in the scope of the Rural Development Programme 2014-2020 (RDP 2014-2020), and in the future their implementation will be regulated by the Common Agricultural Policy Strategic Plan 2023-2027 (CAP SP 2023-2027). The description of the intervention strategy of the proposed CAP SP 2023-2027 shows that both the basic requirements that all beneficiaries of CAP funds must follow (the so-called enhanced conditionality), as well as payments for climate and environment schemes, the agri-environmental-climate payments (AECF) and the payments for organic farming will contribute to climate change mitigation. Specific investments in buildings and equipment will also contribute to achieving climate targets. As the common policy measures are redesigned at the transition to each new programming period, they are treated as new (additional) measures.

A GENERAL MEASURES TO REDUCE EMISSIONS IN AGRICULTURE

UPGRADING AGRICULTURAL POLICY - THE INTEGRATION OF CLIMATE POLICY AND CLIMATE CHANGE ADAPTATION

The instrument defined in the NECP is intended to upgrade agricultural policy and measures to reduce GHG emissions in the long term, especially for greater efficiency in animal husbandry and its restructuring. It foresees: reducing intensive animal husbandry and replacing crop species to be used in human diet rather than animal feed, strengthening cooperation between organic producers, promoting local food production and processing, introducing advanced methods and new (green) farming technologies, introducing precision farming technologies, including accelerated investment in ICT infrastructure and the digitalisation of agriculture, and providing incentives for the collection of agricultural biomass at the sites of larger biogas installations. It is also planned to develop policies and measures to successfully adapt agriculture to climate change, promote sustainable organic farming, and reduce the impact of natural resources consumption on the environment. “Upgrading agricultural policy - the integration of climate policy and climate change adaptation” measure can be seen as an umbrella instrument, as many of the foreseen activities are being implemented under existing measures (M-36, M-37, M-38), and activities will also be implemented under other general measures to reduce GHG emissions, as part of incentives for the implementation of above-standard farming practices, and as part of investment measures to reduce emissions in agriculture (all within M-39).

In 2021, the Ministry of Agriculture, Forestry and Food (MAFF) prepared a draft of the CAP SP 2023-2027 for Slovenia. The Strategic Plan documents were approved by the Government of the Republic of Slovenia on 23 December 2021 and officially forwarded to the European Commission for review. The coordination with the European Commission took place in 2022. For the first time in the history of the CAP, climate change mitigation and adaptation measures are planned separately under Specific Objective 4: Contributing to climate change mitigation and adaptation, including by reducing greenhouse gas emissions and increasing carbon sequestration, as well as promoting sustainable energy and energy efficiency.

The amendment of the Law on Agriculture (Official Gazette of the Republic of Slovenia No. 44/2022) also represents progress in the implementation of agricultural policy. The amendment requires the Ministry of Agriculture, Forestry and Food to prepare annual reports on climate change adaptation, climate change mitigation and emissions of greenhouse gases, ammonia and other air pollutants in agriculture. In addition, for the implementation of EU rules regulating the governance of the Energy Union and climate measures, and for the implementation of agricultural policy measures, the Ministry is required to collect and process the data needed to assess the effectiveness of the measures in the area of reducing emissions of greenhouse gases, ammonia and certain other air pollutants in agriculture.

UPGRADING THE PUBLIC ADVISORY SERVICE

MAFF finances the work programme of the agricultural public advisory service, which also includes technological and environmental consultancy and protection of productive resources. Particularly important in terms of greenhouse gas emissions are

feed production, animal nutrition, animal housing and breeding, grazing and fertilisation of agricultural crops. The NECP provides for the continuation and upgrading of the work of the agricultural public advisory service, with an emphasis on cattle and small ruminants feeding and focusing on farms and categories of animals that do not yet achieve adequate results in the area of efficient breeding.

TRAINING PROGRAMMES, CONSULTING AND DEMONSTRATION PROJECTS

This is a measure already foreseen in the Operational Programme for Reducing GHG Emissions until 2020 (OP GHG) and its continuation is also foreseen in the NECP. It is currently being implemented under the Knowledge Transfer and Information Activities of the RDP 2014-2020, which has been extended to 2021 and 2022. The aim of the activity is to increase the level of competence of the target groups through various forms of knowledge transfer. Among the highlighted topics are agri-environment-climate issues. Many activities of the RDP 2014-2020 will be regulated in future by the CAP SP 2023-2027. These activities are foreseen in a slightly modified form for the period 2023-2027.

AGRICULTURAL RESEARCH AND INNOVATION

This measure was already foreseen in the OP GHG and its continuation is also foreseen in the NECP. It is currently being implemented as part of the Cooperation measure of the RDP 2014-2020. The measure supports various forms of cooperation to help actors in rural areas overcome the economic, environmental and other constraints they face as a result of fragmentation and disconnection. Among the content sets of this measure is also the set called Support for joint action to mitigate or adapt to climate change and for joint approaches to environmental projects and ongoing environmental practices. The Cooperation measure is also foreseen for the period 2023-2027. At the same time, the draft CAP SP 2023-2027 also sets a horizontal objective to modernise the agricultural sector by promoting and sharing knowledge, innovation and digitalisation in agriculture and rural areas and encouraging their use. To achieve this objective, a more comprehensive approach to improving the agricultural system of knowledge and innovation is envisaged.

LOCAL ACTION GROUPS

Local action groups operate under the measure called Support for local development withing the LEADER programme, which is implemented under the RDP 2014–2020. One of the areas of action, which has been recognised as key in the pursuit of EU objectives and addressing local development needs, is also “environmental protection and nature conservation”. This measure was already foreseen in the OP GHG and its continuation is also foreseen in the NECP. Funding is planned to continue after the end of the RDP 2014–2020 as part of the CAP SP 2023-2027. Proposals for LEADER operations come bottom-up, so it is difficult to predict whether and to what extent operations will address climate change mitigation. In the past, there were no activities that would significantly contribute to the reduction of greenhouse gas emissions from agriculture. Given the increased awareness of the population, it is expected that more initiatives will be launched in the future to address this issue.

B INCENTIVES FOR THE IMPLEMENTATION OF ABOVE-STANDARD FARMING PRACTICES THAT CONTRIBUTE TO THE REDUCTION OF GREENHOUSE GAS EMISSIONS

INCENTIVES FOR THE IMPLEMENTATION OF ABOVE-STANDARD FARMING PRACTICES THAT CONTRIBUTE TO THE REDUCTION OF NITROGEN OXIDE EMISSIONS

This is a continuation and upgrade of the measure called Rational fertilisation of agricultural plants with nitrogen (M-38). The above-standard farming practices will be financed under the CAP SP 2023-2027. According to the RDP 2014-2020, incentives for low-ammonia fertilisation, which is a source of indirect emissions of nitrous oxide, will be increased in line with the NECP, while direct emissions resulting from the use of mineral fertilisers can also be reduced by implementing these techniques. The draft CAP SP 2023-2027 also adds incentives for the use of urease, nitrification and denitrification inhibitors when applying mineral fertilizers, which are not yet foreseen in the NECP. Interventions will also be implemented to reduce nitrogen excretion in domestic animals.

INCENTIVES FOR THE IMPLEMENTATION OF ABOVE-STANDARD FARMING PRACTICES THAT CONTRIBUTE TO THE REDUCTION OF METHANE EMISSIONS

In the PRP 2014-2020 programming period, measures to reduce methane emissions were limited to the promotion of grazing and treatment of livestock manure at biogas plants (Measure M-37, Promoting breeding methods with low emissions). The draft CAP SP 2023-2027 provides for the introduction of incentives to improve the quality of feed and planned feeding of cattle and small ruminants, as set out in the NECP. Incentives are also intended for the planned feeding of pigs and for the use of feed additives that reduce methane production in the digestive tract of dairy cows (these incentives are not yet foreseen in the NECP).

COMMON BASIC BREEDING PROGRAMME FOR BOVINE AND SMALL RUMINANT BREEDS

The tasks are carried out as part of the public service in the field of animal husbandry and involve breeders and operators throughout Slovenia. The activities were originally intended for other objectives (selection progress), but they also contribute to the reduction of GHG emissions, namely selection towards more efficient animals, which are also characterised by lower GHG emissions. The GOVEDO information system, which supports dairy farmers in making decisions to reduce greenhouse gas emissions and provides information on the status of emissions on individual farms, is also part of the implementation of the breeding programmes. This measure was already foreseen in the OP GHG and is to be continued and built upon in the NECP. Increased emphasis is expected on selection for more efficient use of feed energy and on finding ways for direct selection for reducing methane emissions from the digestive tracts of domestic animals.

C INVESTMENT MEASURES TO REDUCE EMISSIONS IN AGRICULTURE

INCENTIVES FOR INVESTMENT IN FIXED ASSETS THAT IMPROVE THE OVERALL EFFICIENCY OF THE AGRICULTURAL HOLDING AND IN INFRASTRUCTURE LINKED TO THE DEVELOPMENT AND ADAPTATION OF AGRICULTURE

Incentives for fixed assets investments on farms include, among other things, investments that contribute to the reduction of greenhouse gas emissions. The measure is implemented under the RDP 2014-2020 and will be co-financed in the future under the CAP SP 2023-2027. The instrument covers a variety of investments which contribute directly or indirectly to the reduction of nitrous oxide or methane emissions (e.g. modernisation of stables, construction of livestock manure storage facilities, construction of biogas production facilities, purchase of specialised equipment to use nitrogen more efficiently, costs of setting up pastures). The measure was already programmed under the OP GHG, but the NECP upgraded it by focusing on additional incentives for the construction of small and micro biogas plants which use livestock manure, and on increased investment in fertiliser equipment with low ammonia emissions.

Table17: Summary description of agricultural measures

	Measure and/or policy	Objective	Gas influenced by the measure	Type of measure	Status of implementation	Implementing entity	Effect of the measure [kt CO ₂ eq]		Reference to the measure from the previous National Report (7NC)
							2025	2030	
M-36	INCREASING THE EFFICIENCY OF DOMESTIC ANIMAL PRODUCTION	Increasing the efficiency of cattle farming to reduce GHG emissions per unit of milk and meat produced	CH ₄ , N ₂ O	Educational, Information, Research	Implemented	MAFF	20	20	M-23 INCREASING THE EFFICIENCY OF DOMESTIC ANIMAL PRODUCTION
M-37	PROMOTING BREEDING METHODS WITH LOW EMISSIONS	Reducing methane emissions from livestock manure management	CH ₄ , N ₂ O	Economic, Research	Implemented	MAFF	13	13	M-24 PROMOTING BREEDING METHODS WITH LOW EMISSIONS
M-38	RATIONAL FERTILISATION OF AGRICULTURAL PLANTS WITH NITROGEN	Improving the effectiveness of the nitrogen cycle on farms and thereby reducing the need for nitrogen from mineral fertilisers	N ₂ O	Economic, Information, Research	Implemented	MAFF	34	34	M-25 RATIONAL FERTILISATION OF AGRICULTURAL PLANTS WITH NITROGEN
M-39	ADDITIONAL MEASURES IN AGRICULTURE	New measures, upgrading existing measures or continuation of their implementation, if new programming documents and funding are needed	CH ₄ , N ₂ O	Economic, Information, Educational	Planned	MAFF	17	60	/

4.2.7 Waste

M-40 REDUCING LANDFILLED BIODEGRADABLE WASTE

Sectors affected by the implementation of the measure: *waste management*

The quantity of landfilled biodegradable waste in Slovenia has been almost zero since 2016.

In 2018, as a step towards implementing the 2015 Circular Economy Action Plan, the European Commission adopted a new waste legislative package containing five directives with new recycling, packaging and disposal targets. The package sets ambitious targets: the common EU target is 55% of municipal waste to be recycled by 2025, 60% by 2030 and 65% by 2035, and a binding target to reduce the amount of waste ending up in landfills to a maximum of 10% of municipal waste by 2035. The package stipulates that separate collection of biodegradable waste will be mandatory from 2023, and of textiles from 2025. A renewed Circular Economy Action Plan was adopted in 2020, as part of the new European Green Deal.

The main measures that contributed to reducing the quantities of landfilled biodegradable waste in the past are separating waste at the source and the mechanical biological treatment of mixed municipal waste. The share of separately collected waste increased from 18% to 69% between 2009 and 2015, then rising very slowly to 74% in 2021. In most municipalities, door-to-door collection systems are used for waste packaging, bio-waste, and in some cases also for paper. However, there are large differences in the share of separately collected waste between municipalities; so the aim in the future is to transfer the good practices of municipalities with good results to less successful municipalities. The separate collection of biodegradable waste has been compulsory since July 2011. Since 2016, the mechanical biological treatment of mixed municipal waste prior to disposal in municipal waste management centres has been mandatory. Therefore, plants for mechanical and biological treatment of mixed municipal waste were upgraded.

In 2022, Slovenia adopted a new Waste Management Plan and Waste Prevention Programme, which provide the basis for achieving ambitious EU targets. In addition to separate waste collection and the mechanical biological treatment of mixed waste, the following measures of the waste management plan will contribute to minimum quantities of deposited biodegradable waste:

- Upgrading the separate collection system for packaging waste and promoting the reuse of packaging.
- Introducing payments for public services according to the “Pay as you throw” principle in order to encourage users to reduce the generation of waste.
- Regulating the reprocessing and further use of biodegradable waste.

M-41 WASTE PREVENTION

Sectors affected by the implementation of the measure: *waste management*

The EU Circular Economy Action Plan will help make products more sustainable and make a key contribution to reducing waste. A key objective of the plan is to reduce the burden on the planet by reducing waste and reusing materials.

The Waste Prevention Programme of the Republic of Slovenia, adopted in 2022, contains the following measures:

- Preventing municipal waste in households through informing and awareness-raising;
- Preventing household waste - plastic bags through a monitoring system for the consumption of lightweight plastic bags;
- Preventing food waste through informing, awareness-raising of the various members in the food production and preparation process, changing eating habits, finding ways to reduce food waste in the hospitality industry;
- Preventing electronic waste through informing, awareness-raising and the establishment of an infrastructure network for collection and preparation for re-use;
- Preventing certain plastic waste and single-use products by prohibiting the placing on the market, regulating obligations regarding plastic bottle production, setting targets for reduced consumption;
- Preventing bulky waste through incentives for reuse and preparation for re-use, awareness-raising;
- Preventing textile and clothing waste by promoting the reuse of clothing, encouraging cooperation between actors in the clothing chain;
- Preventing waste in the public sector through record-keeping, product life extension, awareness-raising, green procurement.

M-42 COLLECTION OF LANDFILL GAS

Sectors affected by the implementation of the measure: *waste management*

All landfill operators were obliged to build landfill gas recovery systems by the end of 2005. In 2017, 4.0 kt of methane was recovered, representing 21% of landfill methane generated. Most landfill gas is used to generate electricity.

M-43 WASTE WATER MANAGEMENT

Sectors affected by the implementation of the measure: *waste management*

The Directive 91/271/EEC concerning urban waste-water treatment binds Slovenia to regulate the management of urban waste water. For this purpose, the Republic of Slovenia adopted the Operational Programme for the Discharge and Treatment of Urban Waste Water in 2020 (hereinafter: Operational Programme). The Operational Programme is one of the key implementing acts for achieving the objectives of water protection against pollution through discharge of urban waste water. The Operational Programme lays down measures to comply with the fitting requirements and to improve the level of infrastructure equipment for the discharge and treatment of urban waste water. The main objective of the measures set out in the Operational Programme is the gradual reduction in methane emissions from urban waste water. The

Programme provides for various measures to achieve the necessary objectives, namely:

- Gradual increase in the population's connection to well-managed public sewage systems.
- Due to the expansion of the public sewage system, the number of septic tank systems that have a significant impact on methane emissions and pollution of surface and underground water is reduced.
- The expansion and improvement of the public sewage system helps to remove poorly managed sewage systems; the greatest emphasis in the measure is on the last element of the sewage system, i.e. the urban waste water treatment plant. The measure provides for improvements and upgrading of waste water treatment plants.

These measures will increase the connection rate to well-managed public sewerage systems to 100% by 2028 (the Operational Programme period). At the same time, the share of septic tanks will gradually decrease towards 0%. Septic tanks that will be omitted from the measures due to unjustified investment will be dealt with by an individual small urban waste water treatment plant (which complies with regulations and is therefore classified as a well-managed system). The final aim of the measures is to collect and properly treat most of the municipal waste water in urban waste water treatment plants, where all methane emissions generated in the treatment of urban waste water is captured and then used in co-generation plants to produce electricity and heat, or is burned by flaring or used for other purposes.

Table18: Summary description of measures in the waste sector

	Measure and/or policy	Objective	Gas influenced by the measure	Type of measure	Status of implementation	Implementing entity	Effect of the measure [kt CO ₂ eq]		Reference to the measure from the previous National Report (7NC)
							2025	2030	
M-40	REDUCING LANDFILLED BIODEGRADABLE WASTE	Reducing waste disposal, increasing recycling rates and improving waste management	CH ₄	Legislative, Fiscal, Information	Implemented , Adopted	MECE, MAFF	237	448	M-26 REDUCING LANDFILLED BIODEGRADABLE WASTE
M-41	WASTE PREVENTION	Reducing the generated waste volume	CH ₄	Legislative, Fiscal, Information	Adopted	MECE, Companies, MAFF	IE ¹³⁹	IE	M-27 WASTE PREVENTION
M-42	COLLECTION OF LANDFILL GAS	Collection of landfill gas and its use	CH ₄	Legislative	Implemented	MECE	229	172	M-28 COLLECTION OF LANDFILL GAS
M-43	WASTE WATER MANAGEMENT	Connecting households to well-managed public sewage systems	CH ₄	Economic, Information, Educational	Adopted	MECE, Municipalities	87	145	/

¹³⁹ Included in effect of measure M-40

4.2.8 Land Use, Land Use Change, and Forestry (LULUCF)

M-44 SUSTAINABLE FOREST MANAGEMENT

Sectors affected by the implementation of the measure: *sinks/forestry*

Slovenia pursues a policy of sustainable development of forest management based on the principles of sustainability, greenness and multifunctionality, as set out in the National Forest Programme. The protection, cultivation, exploitation and use of forests are regulated by the Forest Act, with the aim of ensuring sustainable, green and multifunctional management in accordance with the principles of environmental protection and natural values, as well as sustainable and optimal functioning of forests as an ecosystem and the realisation of their functions. Forest management is carried out in accordance with forest management plans, which are prepared for all forests, regardless of ownership, taking into account the specific characteristics of each area.

Forest management plans, which specify the highest possible felling, are prepared by the Slovenia Forest Service (SFS). The plans for forest management areas is valid for 10 years. The Slovenia Forest Service issues felling decisions and permits for felling of trees, as well as approval for other interventions in the forest area. The Slovenia Forest Service is also responsible for the education and training of forest owners and for advising them in the scope of the public forestry service. Individual counselling is done through personal contact and through various communication channels, while group training covers a variety of topics (for example, workshops on forest protection).

Most forests in Slovenia are privately owned (around 80%), which poses a major challenge in terms of their management. The state provides subsidies to private owners for silvicultural and conservation work, and for maintaining wildlife habitats. Subsidies for silvicultural and conservation work in forests are made available to forest owners each year under the Forest Investment Programme, which is provided by the state budget. Forest owners can also obtain funds for maintenance and construction or reconstruction of forest roads and tracks, for rehabilitation and restoration of damaged forests, acquisition of new machinery and equipment for felling and timber harvesting, and investment in pre-industrial timber processing. These funds are financed from integral budget for investments in forests, the Forest Fund and the Rural Development Programme.

Sustainable forest management, realised through the implementation of forest management plans, is the most important measure in the LULUCF sector, as activities such as felling, reforestation, clearing, adjustment of natural tree species composition, and other conservation and cultivation work have the greatest impact on the net emissions trend in the sector.

M-45 UPGRADING SUSTAINABLE FOREST MANAGEMENT AND OTHER ACTIVITIES TO REDUCE EMISSIONS AND INCREASE SINKS

Sectors affected by the implementation of the measure: *LULUCF*

In November this year, the Government of the Republic of Slovenia adopted a new Operational Programme for the implementation of the National Forest Programme for the period 2022-2026. The Programme sets out five priorities, including the provision of CO₂ sinks in forests and forest adaptation to climate change, in particular to maintain their resilience and stability, as well as vitality and health. The Programme summarises and includes valid and implemented documents related to forests, forestry and wildlife management or the forest-wood chain at the national and international level. Given the operational nature of the programme, the document for monitoring the design and implementation of forest policy, together with indicators and targets, also defines the responsible institutions, the necessary financial resources and the implementation deadlines.

The final phase of the renewal of the regional forest management and hunting management plans for the period 2021-2030 is also underway in 2022. The new draft plans set the highest possible felling at around 7.6 million m³, representing an 87% increment. For the first time, a carbon sink indicator was included in the plans, showing the trend for the past planning period and a projection for the period 2021-2030, based on assumptions about the amount of possible felling in each forest management area. In line with the targets, actions will be directed towards adjustment of natural tree species composition, maintaining and/or increasing forest sinks, including increasing the utilisation of the productive potential of forest stands by promoting active management in private forests.

The additional measures planned and included in the CAP Strategic Plan 2023-2027 for Slovenia are expected to have a positive impact on reducing emissions and increasing sinks in the LULUCF sector. These measures are mainly economic in nature, as they cover different types of investments, such as investments in the rehabilitation and restoration of forests after natural disasters and adverse weather conditions, investments in primary wood processing and digitalisation, investments in the establishment and development of forest nurseries. In the area of agricultural land use, in addition to the existing measures relevant to the LULUCF sector (e.g. agri-environmental-climate payments, organic farming), another measure or intervention was included, namely the Climate and Environment Scheme. The latter focuses on good practices for maintaining extensive grassland, growing cover crops over winter, conservation tillage, etc. The Climate and Environment Scheme is a decoupled support with direct payments, for which more than €160 million will be available in the coming period. Additional measures include preventing the further spread of individual settlements and supporting the establishment of start-ups in the forest-wood chain, but their effect on reducing emissions is estimated to be lower than the others.

Table 19: Summary description of forestry measures.

	Measure and/or policy	Objective	Gas influenced by the measure	Type of measure	Status of implementation	Implementing entity	Effect of the measure [kt CO ₂ eq]		Reference to the measure from the previous National Report
							2025	2030	
M-44	SUSTAINABLE FOREST MANAGEMENT	Carbon storage in forests, maintaining/increasing sinks	CO ₂	Legislative, Planning	Implemented	MAFF, SFS	NE	NE	M-29 SUSTAINABLE FOREST MANAGEMENT AND CO ₂ EMISSION SINKS
M-45	UPGRADING SUSTAINABLE FOREST MANAGEMENT AND OTHER ACTIVITIES TO REDUCE EMISSIONS AND INCREASE SINKS	Improving forest management, storing carbon in forests and wood products, avoiding deforestation, ensuring spatial development and sustainable land use	CO ₂	Educational, Information, Economic, Planning	Planned	MAFF, SFS	NE	NE	/

4.3 How Measures and Policies Affect Long-term GHG Emission Trends

Most of the measures presented in this chapter are long-term measures, which means that their effect and implementation are not planned to end by 2030. On the contrary, in accordance with the national and EU policies in this area, the implementation of measures will even strengthen.

The total effect of the measures in 2025, 2030, 2035 and 2040 is shown in chapter 5.6. A number of measures are long-term and will have an impact on reducing emissions even after 2040; including the construction of hydropower plants, improving energy performance in buildings, the development of district heating systems using renewable energy sources, waste management systems, and in particular measures in the areas of technological development, innovation, information, awareness-raising, and education.

4.4 Measures No Longer Applicable

Most of measures are planned to be implemented over a long-term period and the necessary changes were introduced over the years, as presented in chapter on individual measures.

The CO₂ tax is no longer paid for F-gases. The reason for the cancellation was the fact that the measures taken at the EU level in *Regulation (EU) 517/2014* significantly limited the amount of F-gases on the market from 2015 onwards.

The CO₂ tax on energy products was changed significantly. The tax is still in force, but the way in which it is implemented has changed, with the abolition of the tax exemption scheme that was part of this measure. The exemptions were implemented on the basis of contracts between the operators of the installations and the Ministry responsible for climate concluded for the period 2005-2010. The reason for the abolition of the CO₂ tax exemption scheme was that the 10-year period for which these exemptions had been granted under EU environmental state aid rules, according to which tax exemptions can only be valid for a limited period of time, had expired.

4.5 Implementation of Mechanisms Defined in Articles 6, 12 and 17 of the Kyoto Protocol

Slovenia has been reducing its GHG emissions exclusively through domestic measures, including the EU measures implemented in Slovenia.

Slovenia has met its 2020 commitments exclusively by implementing domestic measures, as evidenced by the 2020 emission inventories.

Even in the first commitment period of the Kyoto Protocol, Slovenia did not use the mechanisms provided for in Articles 6, 12 and 17 of the Kyoto Protocol. However, in achieving this target, it has used the activities under Articles 3.3 and 3.4. For more information, see the UNFCCC reports: *Report upon expiration of the additional period for*

fulfilling commitments by Slovenia in Final compilation and accounting report for Slovenia for the first commitment period of the Kyoto Protocol.

4.6 Measures and Policies Under Article 2 of the Kyoto Protocol

4.6.1 Promoting Sustainable Development

Slovenia follows the principle of sustainable development in its development policy, as shown by the new Slovenian Development Strategy 2030. As an EU Member State, Slovenia actively participates in the formulation and implementation of common EU policies and measures in this area.

As explained in the EU 7NC report and previous reports, sustainable development is a horizontal objective of the Union that guides the EU policy. It is defined in the founding Charter of *the Treaty on European Union* and is implemented through a wide range of documents and decision-making processes at the EU and national level. At the EU level, sustainable development is making headway especially in the *EU Sustainable Development Strategy (SDS)* and other key strategies and programmes such as: *8th Environment Action Programme, the EU Green Deal*, etc. In this context, the EU pursues, monitors and achieves the objective of promoting sustainable development, including through Member States' development policies and actions.

In the *Slovenian Development Strategy 2030 (SDS)*, adopted in 2017, Slovenia also incorporated the UN Sustainable Development Goals, which placed it among the countries that have recognized the importance of global responsibility towards the environment and society. The important strategic orientations presented in the SDS are preserved healthy natural environment and competitive economy that creates added value for everyone. Two of the Strategy's objectives are also a low-carbon circular economy and a sustainable management of natural resources. To monitor sustainable development in Slovenia, the Statistical Office of the Republic of Slovenia (SORS) annually updates the Sustainable Development Goals indicators¹⁴⁰, which are based on the 2030 Agenda for Sustainable Development. In addition, the Institute for Macroeconomic Analysis and Development (IMAD) annually prepares a report on the implementation of the Slovenian Development Strategy in the so-called Development Reports¹⁴¹.

Other national, regional or sectoral programmes and strategies (such as the *Integrated National Energy and Climate Plan, the Resolution on the Transport Policy of the Republic of Slovenia, the Resolution on the National Environmental Action Programme* are listed in section 4.1) and other development or implementation programmes must be consistent

¹⁴⁰ <https://www.stat.si/Pages/cilji>

¹⁴¹

https://www.umar.gov.si/fileadmin/user_upload/razvoj_slovenije/2022/slovenski/POR2022_splet2.pdf

with the general strategic orientations of the *Slovenian Development Strategy* and take sustainable development into account as a horizontal principle.

4.6.2 Reduction of International GHG Emissions in Aviation and Shipping

Slovenia is aware of the need to reduce GHG emissions in the field of maritime and air transport, and supports the EU activities related to the reduction of GHG emissions from international transport in the IMO and ICAO. The EU, with Slovenia's support, has included aviation in the EU ETS since 2012, leading to a reduction in emissions below the historical level of 2004-2006. The EU is also a key player in ICAO's global market-based measure to reduce emissions from aviation (CORSIA - *Carbon Offsetting Scheme for International Aviation*), which has been in force since 2021. Slovenia, together with other EU Member States, has been among the participants in this international agreement since the beginning of the first pilot phase. For maritime transport, relevant activities are also carried out at the EU level, i.e. monitoring and reporting of emissions from ships. The EU is also working towards an international agreement on reducing emissions from maritime transport. IMO, with an important contribution from the EU, adopted an Initial Strategy in 2018¹⁴², on the basis of which it adopted some short-term measures in June 2021 that will contribute to reducing the CO₂ emissions from international maritime transport by 40% by 2030 compared to 2008. The EU also plans to further reduce emissions from aviation and maritime transport as part of the Fit for 55 legislative proposals, which are still in the process of being adopted by the EU. All these measures will provide additional arguments in negotiations with IMO and ICAO on further emission reductions.

4.6.3 Minimising Adverse Effects

Slovenia is working together with other Parties and the EU to ensure that the Kyoto Protocol commitments are met. Slovenia's key climate policies are based on the framework established at the EU level (Effort Sharing Decision, EU ETS, etc.). The EU reports in great detail on how it minimises adverse effects in its annual emission inventory report, where comprehensive information is available (EU NIR 2022, Chapter 15). The EU has an effect assessment system in place for all new policy initiatives, as a mandatory element of the decision-making process for new legislation and for all policy initiatives with far-reaching implications. Through this approach, the EU ensures that adverse social, economic and environmental effects are identified and mitigated when decisions are taken.

The EU also follows this process in the context of so-called burden-sharing of GHG emission reductions between Member States, where national targets are set in the context of a common EU target. In doing so, it incorporates into its policies measures that minimise adverse effects, including adverse effects on climate change, effects on international trade and social, environmental and economic effects on other countries,

¹⁴² IMO, 2019, Initial IMO Strategy, <https://www.imo.org/en/MediaCentre/HotTopics/Pages/Reducing-greenhouse-gas-emissions-from-ships.aspx>

in particular on developing countries. Examples of measures embedded in the EU climate policy, which minimise these adverse effects as much as possible and which are also implemented at Member State level, include mandatory sustainability criteria for biofuels under the RES policy and measures to prevent carbon leakage under the EU Emissions Trading System. The last measure is a central measure of the EU and the Member States to reduce GHG emissions from industry and transformation sectors. Examples are described in the EU report (EU NIR 2022, chapter 15).

The minimization of adverse effects in achieving national targets has therefore been integrated into the procedure for adopting measures through the assessment of the *decision on the efforts of Member States* and the EU Emissions Trading System, where the effects of national targets and the related measures adopted at the EU level are also assessed. In the legislative process, Slovenia also uses a system similar to that at the EU level for assessing the impact of decisions at the national level. The procedure follows the requirements of the ESPOO Convention (*The United Nations/Economic Commission for Europe Convention on Environmental Impact Assessment in a Transboundary Context of 25 February 1991*) and the SEA Directive (*Directive 2001/42/EC of the European Parliament and of the Council of 27 June 2001 on the assessment of the effects of certain plans and programmes on the environment*). The procedure ensures that all decisions with far-reaching effects are subject to an assessment of domestic and cross-border effects, in particular environmental and social effects. The interested domestic public and the public from countries with cross-border effects are also involved in the procedure. The procedure obliges the state to adopt mitigation measures that minimise the adverse effects, or to make a different decision if the adverse effects cannot be adequately minimised. Examples of policies and measures that have recently been subject to such an assessment include the *National Energy and Climate Plan*, the *CAP Strategic Plan 2023-2027 for Slovenia*, etc.

Slovenia also provides climate financial aid and other forms of international development and humanitarian aid, which it is working to increase. See chapter 7 for more information. In addition, within the framework of implementing international development cooperation and humanitarian aid in general, Slovenia is concerned with preventing the negative consequences of climate change and has therefore exempted the promotion of the use of fossil fuels from such aid, as defined by the Government of the Republic of Slovenia in the *Decree on the implementation of the international development cooperation and humanitarian aid of the Republic of Slovenia*¹⁴³. For more information see (SI NIR 2022, chapter 15 and chapter 7 of this report). As an EU Member State, Slovenia performs additional international aid activities in this area. The EU adopted an action plan regarding climate change and development, the objective of which is to provide aid to developing countries to achieve economic progress.

¹⁴³ <http://www.pisrs.si/Pis.web/pregledPredpisa?id=URED7517>

4.7 State Programmes and/or Legislative or Administrative Measures

The first sub-chapter of the chapter *Measures and Policies* presents the *Operational Programme for Reducing Greenhouse Gas Emissions by 2020* and the implementation monitoring system of the programme, with which Slovenia ensured fulfilment of the targets for the reduction of GHG emissions by 2020 as set out in the *Effort Sharing Decision, ESD (406/2009/EC)*, thereby meeting the targets in the second Kyoto commitment period. In 2020, Slovenia adopted a new action plan, the *Integrated National Energy and Climate Plan of the Republic of Slovenia*, which sets out the achievement of the 2030 GHG emission reduction targets under the *Regulation on binding annual greenhouse gas emission reductions by Member States from 2021 to 2030, ESR (EU Regulation, 2018/842)*. The Ministry of the Environment, Climate and Energy is the main competent authority for GHG emissions and their reduction in line with the objectives of the ESD and the ESR. Emissions included in the EU ETS fall within the competence of the EU.

The Environmental Protection Act plays an important legislative role in achieving climate objectives. The Act provides a legal basis for all other environmental legislation that directly or indirectly affects GHG emissions; for instance, in the areas of waste, environmental permits, comprehensive assessment of environmental impacts, ecolabels, environmental management of organisations, economic and financial instruments for the environment (e.g. environmental tax on environmental pollution, EU ETS), etc.

The Environment and Nature Inspection Service is responsible for monitoring the implementation of the *Environmental Protection Act* and all executive acts; the competences of the Service also include prohibiting the operation of plants or installation, the revocation of an environmental permit, etc. In case of infringement, the Act stipulates the payment of fines.

Other important legislative frameworks for the implementation of measures for the reduction of GHG emissions include the *Construction Act*, the *Energy Act* and other acts in the field of energy management¹⁴⁴, the *Agriculture Act* and the *Act on Forests*, which also provide the basis for the preparation, adoption and implementation of integrated sectoral policies and measures for the two above-mentioned areas. The area of transport is regulated by many acts.

Slovenia annually monitors the target achievement and implementation progress of measures, as described in chapter 4.1. The achievement of the ESD target in Slovenia is also monitored by the EU on the basis of the MMR (525/2013) and the Governance Regulation (2018/1999), which require Member States to report relevant information on an annual and semi-annual basis.

¹⁴⁴ [Act on Energy Efficiency \(ZURE\)](#), [Act on the Promotion of the Use of Renewable Energy Sources \(ZSROVE\)](#), [Heat Supply from Distribution Systems Act \(ZOTDS\)](#)

4.7.1 Procedures for Public Participation

The *Environmental Protection Act* (ZVO) provides for the participation of the public in the preparation of all programmes regarding environmental protection. In compliance with international conventions (Espoo and Aarhus), public participation in decision-making on plans (within the framework of a comprehensive environmental impact assessment) and projects (within the framework of an environmental impact assessment) is provided for all plans and projects with significant environmental impacts, among others for spatial planning, water management, forest management, agriculture, energy, industry, transport, waste and wastewater management. Owing to their size, extent, location or other characteristics that may have an impact on the environment, the environmental impact assessment is obligatory for projects which include certain types of intervention in the environment.

Applying the partnership principle with social and regional partners and civil society, and the involvement of the professional public in document preparation procedures, is mandatory for the preparation of all planning documents.

The Environmental Protection Act (ZVO) ensures access to environmental information and data to all interested persons. In accordance with the Environmental Protection Act, the Ministry has to prepare a report on the state of the environment every four years. Environmental data are available on the websites of the Environmental Agency of the Republic of Slovenia, while programmes and legislation are available on the websites of the competent ministries.

4.7.2 Participation in Kyoto Flexible Mechanisms

The national coordination point for mechanisms of joint investments (JI and CDM) is the Ministry of the Environment, Climate and Energy.

For additional information, see chapter 4.2 *Implementation of Mechanisms under Articles 6, 12 and 17 of the Kyoto Protocol*. Slovenia did not use these mechanisms in the first and second Kyoto commitment periods.

4.7.3 Description of the National Registry

The Slovenian Environmental Agency is stipulated as the operator of the emissions trading registry, which started to operate in November 2005 for the needs of the Kyoto Protocol and the EU Directive relating to the EU Emissions Trading System, on the basis of the Environmental Protection Act, the Rules on the general terms and conditions for the operation of the emissions coupon registry, and the Decree on detailed criteria and conditions for establishing and operating the emissions allowance registry.

Detailed information on the registry can be found in the chapter on inventories (chapter 3.5).

4.7.4 Procedures in Connection with the Implementation of Articles 3.3 and 3.4 of the Kyoto Protocol for Preserving Biodiversity [SFI]

The Natura 2000 areas cover 36% of the Slovenian territory, which ranks us first in the European Union. Due to a long tradition of sustainable forest management and well-preserved forests, more than 50% of the forest area was included in Natura 2000 sites. Effective forest management is therefore very important for maintaining the favourable state of qualifying species and habitat types.

The Natura 2000 Management Programme sets the framework for determining nature conservation guidelines and actions. Slovenia has developed a specific system for managing Natura 2000 sites, based on the integration of nature conservation guidelines into all sectoral plans. On forest land, the implementation of these measures is based on forest management plans. The nature conservation guidelines are drawn up by the Institute of the Republic of Slovenia for Nature Conservation which are later incorporated in the plan preparation process by the Slovenia Forest Service. When planning measures, it is also necessary to take into account forestry legislation, which allows for the planning and implementation of all necessary measures to ensure the favourable state of forest habitat types and species linked to forest ecosystems. With closer cooperation between the two institutions, nature conservation guidelines are becoming an important part of forest management plans, and thus shaping forest management in Natura 2000 sites. Measures to conserve biodiversity are financed from budgetary resources as part of the regular operations of aforementioned institutions, through projects or through contractual cooperation.

Environmental reports, which include a comprehensive environmental impact assessment, are also part of the regional forest management plans. The report identifies, describes and evaluates the significant impacts of the plans on natural resources, nature conservation, the protection of human health and cultural heritage, and possible alternatives, taking into account the environmental objectives and the characteristics of the area to which the plans relate. The significant effects identified are further specified in the environmental report by assigning them a type or character of the effect.

5 PROJECTIONS AND THE TOTAL EFFECT OF POLICIES AND MEASURES

The emission projections shown in this chapter are almost identical to the projections from the previous biennial report (BR4). They had been prepared in 2019 with a base year of 2017 and had taken into account the developments since the previous projections as far as possible. The projections were made up to 2050 in five-year steps. For the purpose of this report, projections up to 2040 are presented in comparison with the latest available records.

New projections are being prepared and have not yet been finished at the time of writing. The impact of SARS-CoV-2 preventive measures on emissions in 2020 was significant, especially for the transport sector, but data for 2021 and especially for 2022 show that its long-term impact on emissions in Slovenia will not be significant. Another important event that could have a long-term impact is the war in Ukraine, together with the sanctions against Russia and its retaliation, which is impacting fossil fuel prices, in particular gas. The long-term impact on emissions is difficult to assess as it is unclear how the situation will play out. This is certainly reflected in a more ambitious EU policy, which makes the situation more predictable, as Slovenia will still be required to reach more ambitious targets that are set by the EU, regardless of the possible price reductions related to the improvement of the situation. Therefore, it can be concluded that the new projections, coming in 2023, will certainly show reduced GHG emissions, even though the existing projection with additional measures already meets the necessary reductions from sources not covered by EU ETS to meet the reduction target under the proposal to amend the Regulation 2018/842 (EU) of the Fit for 55 package.

5.1 Definition of Scenarios

The projections were calculated for scenarios with measures, with additional measures – moderate, with additional measures – ambitious, and without measures. This report presents a scenario with measures (WM), a scenario with additional measures – ambitious (WAM)¹⁴⁵ and a scenario without measures (WOM). The scenario with measures takes into account all measures taken or adopted by the end of 2018. The scenario with additional measures by 2050 tries to reach net-zero emissions, which is why, in addition to existing measures, it envisages intensive implementation of additional measures that contribute to a significant reduction in emissions. The scenario without measures shows emissions that would arise if the existing and additional measures were not implemented. The projection tries to simulate the situation without measures, which is a very complex task, as the effects of measures to reduce GHG emissions are highly diverse and it is often difficult to separate the effects

¹⁴⁵ This scenario will be used for projections with additional measures

of measures to reduce GHG emissions and other measures, and it is often difficult to determine development of the situation without measures. For this reason, the projection should only be taken as an illustration. For the majority of sectors, the base year for this scenario is 2005, and for some sectors one of the years before that. The only exceptions are other sectors and agriculture with 2017 as the base year. Unfortunately, this means that the scenario is not internally harmonised, but nevertheless it represents a sufficiently good indication of the impact of existing measures, and is therefore presented nonetheless.

The projections were prepared under the LIFE ClimatePath2050 project, during which GHG emissions projection by 2050 were prepared, i.e. as a basis for the preparation of strategic documents. The first of the documents based on these projections was the National Energy and Climate Plan, adopted in February 2020.

Table 20: Presentation of main assumptions in the scenarios with measures and with additional measures

Sector	Projection with measures	Projection with additional measures
Energy Supply - TRANSFORMATIONS	<p>Fossil energy sources: Gradual reduction of electricity production in coal units (shutdown of TEŠ Unit 5 and TE-TOL by 2040); coal units are replaced by natural gas units</p> <p>RES: Construction of one new hydropower plant, current dynamics of development in other RES (PV, wind, etc.)</p> <p>Nuclear power: Operation of the existing unit up to 2043, no new unit foreseen</p> <p>District heating systems: current dynamics of development – energy product structure changes in order to meet the requirement of the Energy Act regarding the share of heat from RES and/or CHP</p>	<p>Fossil energy sources: More rapid reduction of electricity production in coal units (shutdown of TEŠ Unit 5 and TE-TOL by 2030, TEŠ Unit 6 CCU by 2035); coal units are replaced by natural gas units; natural gas is gradually replaced by synthetic gas¹⁴⁶</p> <p>RES: Construction of the last hydropower plant on the lower Sava River and majority of hydropower plants on the middle Sava River, intensive dynamics of development in other RES (PV, wind, etc.)</p> <p>Nuclear power: Operation of the existing unit to 2043, scenario without a new unit¹⁴⁷</p> <p>District heating systems: intensive dynamics of development – energy mix accelerated to a higher share of RES (including waste heat) and/or CHP on synthetic gas</p>
Energy use - INDUSTRY	<p>EEU: Improving the energy efficiency of the processes in line with developments so far</p> <p>Fossil fuels: Transition to natural gas, reducing the use of light fuel oil, liquefied petroleum gas, abandonment of coal by 2035</p>	<p>EEU: Intensive improvement of energy efficiency of processes with a more rapid replacement of inefficient technologies</p> <p>Fossil fuels: The replacement of natural gas with electricity, with RES and also hydrogen where possible,</p>

¹⁴⁶ It is assumed that synthetic gas is climate neutral

¹⁴⁷ Scenarios with and without new nuclear power plant were analysed in the LIFE ClimatePath2050 project. This report presents a scenario without a new nuclear power plant, but this does not prejudice the decision on the second unit of nuclear power plant. The scenario is selected for the demonstration because emissions are slightly higher.

Sector	Projection with measures	Projection with additional measures
	<p>CHP: Preserving the existing installations</p> <p>RES: Increasing use in line with the current dynamics</p> <p>Waste heat: Minimum use</p> <p>Material efficiency: Individual measures that have a minimal impact on energy demand are introduced</p>	<p>synthetic gas replaces natural gas by 2050</p> <p>CHP: Increase in volume</p> <p>RES: Intensive increase in use</p> <p>Waste heat: Significant increase in use</p> <p>Material efficiency: Measures that have an impact on the reduction of energy demand for the production of new materials and products are introduced</p> <p>CCU: For cement production</p>
Energy use - BUILDINGS	<p>EEU: Maintaining the current level of renovations. Increasing the share of deep renovations.</p> <p>Fossil fuels: Transition to natural gas – expansion of the network, phasing-out of other fossil fuels (light fuel oil, liquefied petroleum gas)</p> <p>District heating: Expanding the existing network and construction of new networks where economically viable</p> <p>RES: Used where there are no alternatives (excluding natural gas and district heating networks)</p>	<p>EEU: Increase in the current level of renovations, intensive removal of obstacles. High share of deep renovations.</p> <p>Fossil fuels: Gradual phasing-out of natural gas. By 2050, the remainder (in particular floor heating and CHP) is replaced by synthetic gas. Prohibition on the purchase of boilers on light fuel oil.</p> <p>District heating: More intensive expansion of the existing systems and construction of new systems</p> <p>RES: Intensive increase in use (heat pumps and wood)</p>
Energy use - TRANSPORT	<p>Infrastructure: Construction of all road network axes, modernisation of the railway network (TEN-T and certain regional connections), improvement of the existing cycling infrastructure</p> <p>Change in modes of transport: implementing measures that lead to an increased share of PPT, but the car pkm are still increasing. The share of railway freight transport is maintained in freight transport. Implementation of the transport development strategy.</p> <p>Vehicle fleet: Compliance with EU legislation on average CO₂ emissions for new vehicles.</p> <p>Biofuels: The increase in biofuels of first generation to a technically acceptable share (7% diesel, 5% gasoline). The introduction of biofuels of the second generation in line with EU RES directive.</p>	<p>Infrastructure: Accelerated investments in rail infrastructure – construction of all planned connections (including regional), and in cycling infrastructure</p> <p>Change in modes of transport: decline of the concept of passenger car ownership, intensive implementation of measures that lead to an increased PPT share (stop car transport growth). The share of railway freight transport is increased in freight transport</p> <p>Vehicle fleet: More rapid electrification of the passenger car and light duty vehicle fleet, higher shares of alternative powertrains also for heavy duty vehicles and buses, replacement of liquid fossil fuels with synthetic fuels.</p> <p>Biofuels: The increase in biofuels to 11%. The introduction of biofuels of the second generation in line with EU RES directive.</p>

Sector	Projection with measures	Projection with additional measures
Industrial Processes	Implementation of the F-gas Regulation and the Directive on the use of F-gases in mobile air conditioning systems	CCU for cement production, reduction of F-gases as in the projection with measures
Agriculture	Implementation of the Strategic plan on implementing the resolution on strategic guidelines for agricultural and food industry development by 2040.	Measures to enhance the efficiency of breeding, accelerated construction of anaerobic digesters, fertilisation with low emissions.
Waste	Solid waste disposal: Projections of waste flows in the operational programme for municipal waste management from 2016. No biodegradable waste being landfilled. Wastewater: Expansion of sewage network and replacement of septic tanks with biological wastewater treatment plants.	The same as in the projection with measures.

5.2 Definition of sectors in projections

The projections use a sectoral breakdown as appears in Slovenian strategic documents to reduce GHG emissions (e.g. Operational Programme for the Reduction of GHG Emissions by 2020, Integrated National Energy and Climate Plan) that differs from the CRF classification. The link between the sectors used in the projections with CRF classification is shown in the table below.

Table 21: Comparing sectors in projections with CRF sectors

Sector in projections	CRF sector
Energy industries and fugitive emissions (or transformations)	1.A.1 Energy industries 1.B Fugitive emissions
Manufacturing Industries and Construction	1.A.2 Manufacturing Industries and Construction
Transport	1.A.3 Transport
Other sectors	1.A.4 Other Sectors 1.A.5 Other
Industrial Processes	2. Industrial Processes
Agriculture	3. Agriculture
Waste	5. Waste
Sinks	4. LULUCF

5.3 Projection results

5.3.1 Total Emissions of Greenhouse Gases

According to the projection with measures, the emissions in 2025 amount to 17,011 kt CO₂eq, an increase of 7.3% compared to 2020 emissions. Due to a large impact of SARS-CoV-2 preventive measures on emissions, 2020 is not the most appropriate year for

projection comparison. This is why in addition to 2020, 2019 will also be used for comparison. Compared to 2019 emissions are 0.4% lower in 2025. According to the projection with measures, emissions in 2030 are expected to reach 16,931 kt CO₂ eq, a 0.5% decrease compared to 2025. By 2040, emissions are expected to be reduced even further, by 5.1% as compared to 2030. The projection with additional measures sees emissions in 2025 at 15,841 kt CO₂ eq, almost equal to 2020 emissions. By 2030, they are reduced significantly to 13,148 kt CO₂ eq, 17% lower than in 2025, and in 2040 even more, 47% lower than in 2030.

As expected, the projection without measures records significantly higher emissions and a reverse trend. In 2020, emissions are estimated at 20,634 kt CO₂ eq, in 2030 at 22,010 kt CO₂ eq, and in 2040 at 23,544 kt CO₂ eq

Annex C provides tables with detailed results of emission projections.

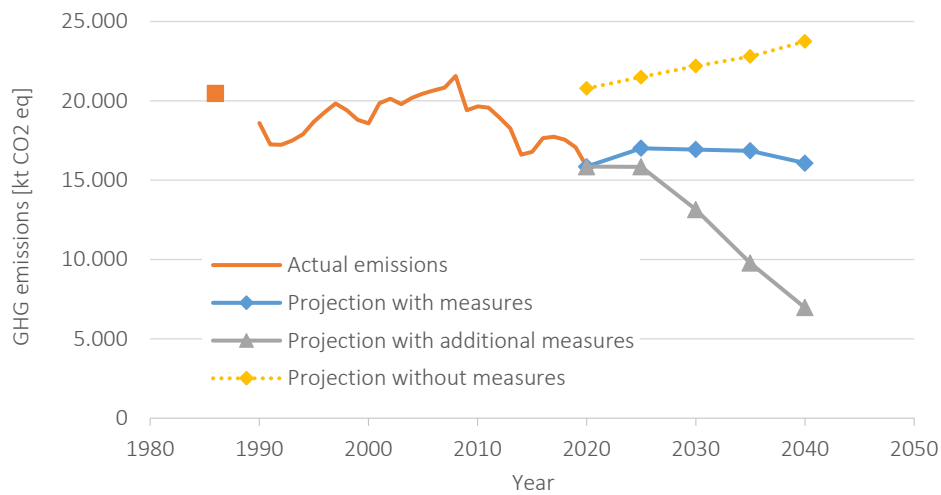


Figure 20: Current emissions trend up to and including 2020, and emissions trend according to projections with measures, with additional measures and without measures from 2025 to 2040 (source: SEA, JSI-EEC, AIS)

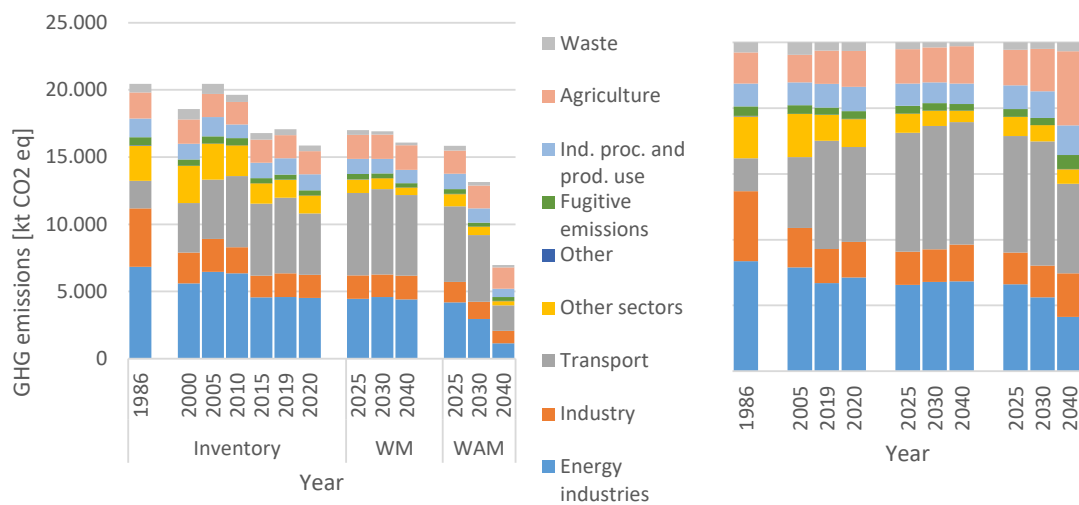


Figure 21: Sectoral GHG emission structures in selected years and by projections with measures and with additional measures for 2025, 2030 and 2040 - left: total emissions; right: structure of emissions in percentages (source: SEA, JSI-EEC, AIS)

5.3.2 Carbon Dioxide

According to the projection with measures, CO₂ emissions are 14,057 kt CO₂ in 2025, which is 9% more than in 2020 and almost the same as in 2019. By 2030, they increase by less than 1% compared to 2025, whereas between 2030 and 2040 they are reduced by 5%. According to the projection with additional measures, the emissions throughout the period 2025-2040 are significantly lower than emissions according to the projection with measures. In 2025 emissions are 0.9% higher than in 2020, in 2030 they are 18% lower than in 2020 and in 2040 they are 63% lower than in 2020.

CO₂ emissions represent a major part of greenhouse gas emissions in Slovenia. According to the projection with measures, their share in total GHG emissions is increased from 81% in 2020 to 84% in 2030 and 2040. In the projection with additional measures, the share is slowly decreasing. Emissions drop in 2025 to 82%, in 2030 to 80% and after 2030 they are reduced significantly and amount to 68% in 2040.

According to the projection without measures that tries to demonstrate the situation if measures to reduce GHG emissions are not taken, the emissions in 2020 are significantly higher than the inventory shows, which is a result of the non-implementation of measures introduced from 2005 onwards or even earlier. The projection sees an increase in emissions, reaching 19,240 kt CO₂ in 2040, 15% more than in 2020 under the same projection.

The main source of CO₂ emissions is transport, which represents 35% in 2020, and its share increases in all projections. It increases to 44% in 2030 and 2040 under the projection with measures, and to 46% in 2030 and 39% in 2040 under the projection with additional measures. The increase of the respective share is due to a slower reduction in transport emissions compared to other sectors, as the delay in implementing measures in this sector is the largest. In addition, the implementation of measures requires greater efforts. Transformations in 2020 follow with a matching share of 35%, then industry with 13%, other sectors with 9%, industrial processes with 6% and fugitive emissions with 1%. The share of industry is maintained at a similar level (12-13%) in the projection with measures, whereas in the projection with additional measures it rises to 19% after 2030. The situation is similar with industrial processes and fugitive emissions, which increase its share in 2040 to 11% and 2% respectively, according to the projection with additional measures. The other sectors have a decreasing share.

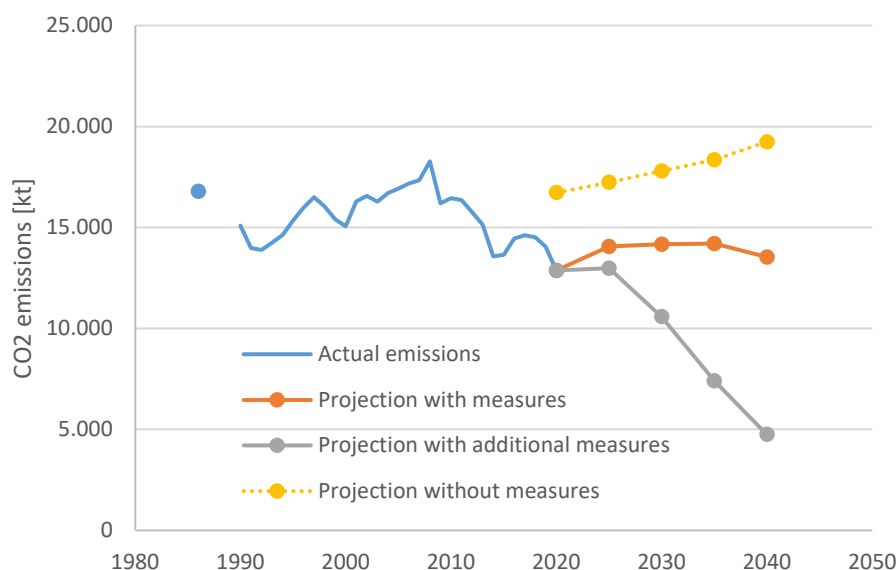


Figure 22: The development of CO₂ emissions without sinks up to and including 2020 and projections up to 2040 (SEA, JSI-EEC, AIS)

5.3.3 Methane

According to the projections with measures and with additional measures, methane emissions are reducing. Compared to 2020, emissions are 6% lower in 2030 according to the projection with measures and 13% lower according to the projection with additional measures. In 2040 emissions are reduced by 12% and 24% respectively. The main contributor to the reduction in emissions is the waste sector, where emissions are reduced by 6.4 kt CH₄ according to both projections. The sector of fugitive emissions, due to its rapid coal phase-out, and agriculture, being the biggest source of methane emissions (with a share somewhere between 62% and 74%), contribute the most to emission reductions according to the projection with additional measures. According to the projection with measures, agriculture emissions are increasing. Combustion of wood is another important source of methane emissions.

According to the projection without measures, emissions are significantly higher than in other two projections, indicating a reverse trend. In 2030, they are 113.8 kt CH₄, and in 2040, 115.9 kt CH₄.

In total emissions of 2020 methane represents 12%. In projections with measures, the share is slowly decreasing and is 11% in 2030, and 10% in 2040. In projections with additional measures, the share after 2030, when it is 12%, is increasing rapidly, reaching 21% in 2040.

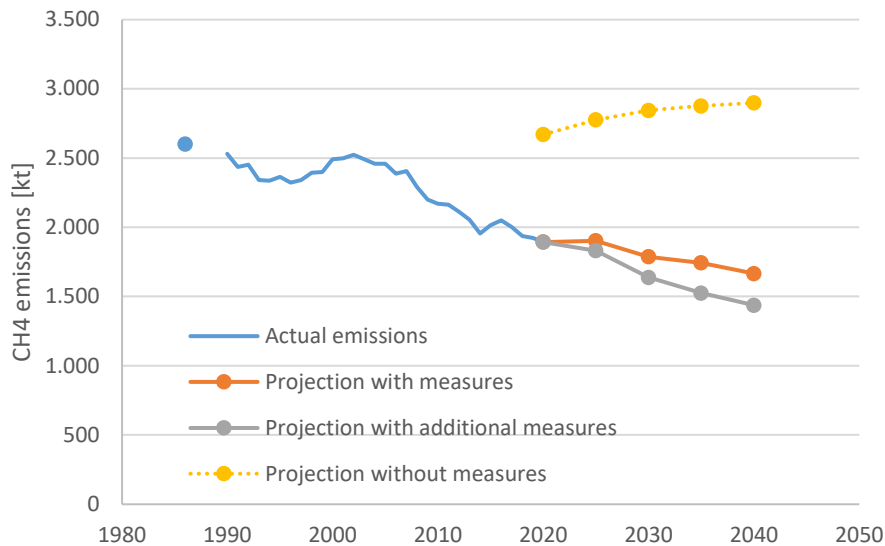


Figure 23: CH₄ emissions trend without sinks up to and including 2020, and emissions trend according to the projection with measures, with additional measures and without measures up to 2040 (source: SEA, JSI-EEC, AIS)

5.3.4 Nitrous Oxide

N₂O emissions are the only emissions with no pronounced reduction. According to the projection with measures, emissions increase compared to 2020. In 2030, they are up by 3% and in 2040 by 5%. According to the projection with additional measures, emissions are reducing. Compared to 2020, emissions are down by 3% in 2030 and by 6% in 2040. Agriculture is the main source of emissions, with a share of around 70%. Its share increases slowly, except in the projection with additional measures, when it reaches 75% in 2040. They are followed by emissions from transport, where they reduce the most due to electrification of the vehicle fleet. In 2030 the share amounts to around 9% in the projection with measures and 8% in the projection with additional measures, whereas in 2040 it drops to 4%. The waste sector and other sectors contribute more than 5% to emissions, while emissions are also generated in industrial and combustion processes in other sectors (transformations and industry).

The projection without measures indicates a high growth in emissions. Compared to 2020, emissions are 12% higher in 2030 and 17% higher in 2040.

Nitrous Oxide contributes 5% to total emissions in 2020. By 2030, the share according to the projection with measures remains at this level (5%), while according to the projection with additional measures it is at 6% in 2030 and at 10% in 2040.

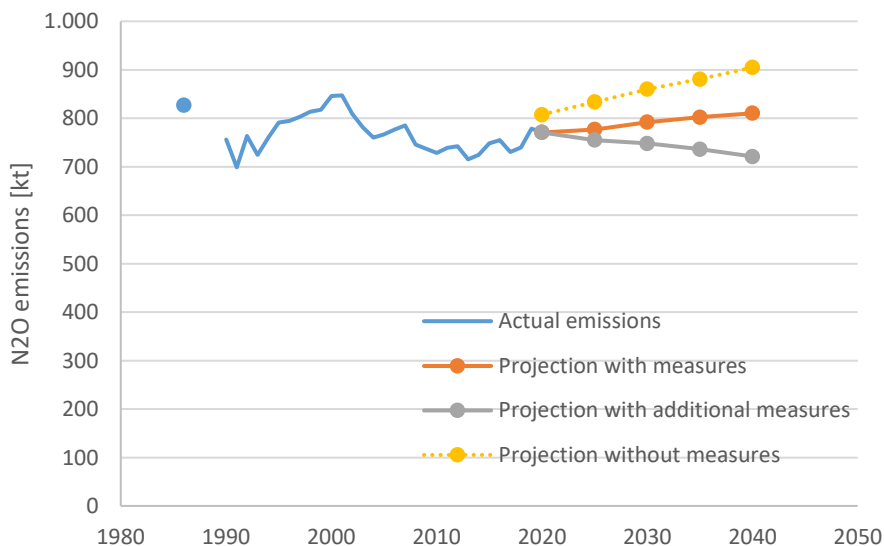


Figure 24: N₂O emissions trend without sinks up to and including 2020, and emissions trend according to the projection with measures, with additional measures and without measures up to 2040 (source: SEA, JSI-EEC, AIS)

5.3.5 F-gases

According to the projections, F-gas emissions will be significantly reduced by 2040. The projections with measures and additional measures are the same until 2040, since all measures taken into account are already adopted (measures laid down by EU regulation covering products and installations containing F-gases, and the directive governing the field of air conditioners in vehicles). In 2030, amounting to 181 kt CO₂ eq, emissions are 44% lower compared to 2020, and 79% lower in 2040.

The highest share of emissions is due to HFC. It amounted to 92% in 2020, but it will be reduced to 83% in 2030 and to 52% in 2040. In 2020, PFC emissions represent 3% of emissions, but their share increases to 9% by 2030 and to 23% by 2040. In 2025 SF₆ accounts for 5%, rising to 9% in 2030 and 25% in 2040, because it is the only F-gas with growing emissions.

In 2020, F-gases represent 2% of total GHG emissions, but their share decreases to 1% by 2030. In 2040, they represent 0.4% in the projection with measures and 1.0% in the projection with additional measures.

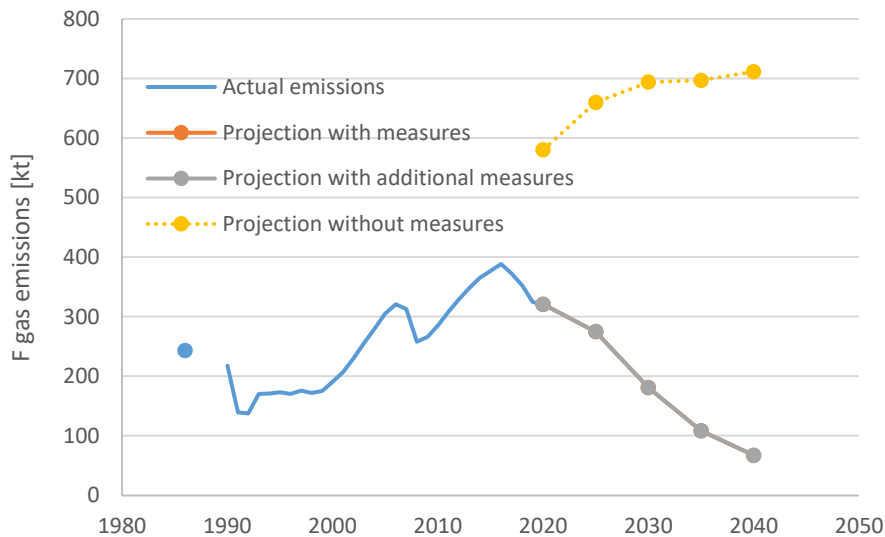


Figure 25: F-gas emissions trend up to and including 2020, and emissions trend according to projections until 2040 (source: SEA, JSI-EEC)

5.3.6 Emissions by Sector

5.3.6.1 Energy industries and Fugitive Emissions

Energy industries (1.A.1) mostly include emissions from the production of electricity and heat where the greatest share of emissions is generated from coal-based thermal power plants. Emissions are also generated by gas-powered units and production of district heat by district heating systems. The emissions trend in the future is mostly characterised by the reduction in the electricity production generated by coal-based units and their replacement by gas-powered units (partially also by small CHPs), where natural gas is gradually replaced also by synthetic carbon neutral gas, and an increase in the use of renewable energy sources (RES). The share of RES is also increased in the district heating systems. Synthetic gas and combustible RES are assumed to be CO₂ neutral.

Fugitive emissions (1.B) include emissions generated by the distribution of gas and liquid fuels, coal mining and flue gas desulphurisation. By way of reducing coal use, the fugitive emissions from coal mining and desulphurisation decrease.

After a marked reduction in emissions in 2014, emissions no longer increase to a level above 5,400kt CO₂ eq, which is due to the closure of certain coal units and constructing a new more efficient coal unit. According to the projection with measures, coal for electricity production is being phased-out very gradually, and thus the reduction in emissions is very slow. Also, additional electricity demand is covered mainly by new gas units. As a result, emissions from energy industries and fugitive emissions in 2030 are 1% higher than in 2020, and 4% lower in 2040. A completely different situation is indicated in the projection with additional measures. Here, the phasing out of coal production is much faster and the additional electricity demand is mainly covered by renewable energy sources, in particular solar power plants. Since all the requirements cannot be covered by RES, particularly in winter time, additional gas units are needed (they are replacing natural gas with synthetic gas), or a new nuclear power plant. This

has a significant impact on the reduction in emissions, i.e. they are 34% lower in 2030, and 71% in 2040 compared to 2020. Electricity generation will increase according to both projections, by 16% by 2040 compared to 2020 according to the projection with measures and by 47% according to the projection with additional measures.

The greatest share of emissions in the sector is incorporated into the EU Emissions Trading System. In 2020, the share amounted to 90%. According to the projection with measures, the share stands at 91% in 2030, and at 90% according to the projection with additional measures, whereas in 2040 the share is at 90% and 81%, respectively.

In total emissions in 2020, the share of this sector is 31%. According to both projections, the share is reduced, i.e. according to projection with measures to 29% in 2030 and to 25% in 2040, and according to the projection with additional measures to 25% in 2030 and to 18% in 2040.

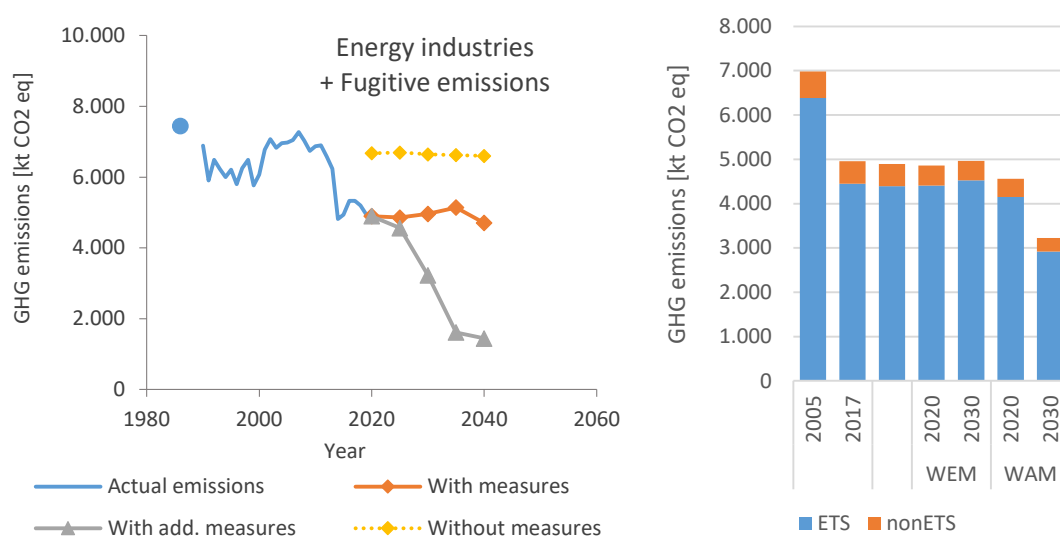


Figure 26: GHG emissions in the energy industries and fugitive emissions sectors – emissions trend in 1986–2020 period and projections without measures, with measures and with additional measures by 2040 (left), including the distribution of emissions into EU ETS and non-ETS (right) (source: SEA and JSI-EEC)

5.3.6.2 Manufacturing Industries and Construction

Emissions from fuel combustion in manufacturing industry and construction (1.A.2) will increase according to the projection with measures by 2040, but in 2040 they will not exceed the value from 2010, even though the added value will increase significantly. The smaller increase in emissions will be achieved by changing the structure of fuels – increasing the share of RES and increasing the share of synthetic gas. Energy Efficiency measures have an impact on the fact that the growth in energy use is significantly lower than the growth in the added value. Compared to 2020, energy use in 2040 is 18% higher according to the projection with measures and 4% higher according to the projection with additional measures. Emissions are 2% lower in 2030 compared to 2020, and 4% higher in 2040. According to the projection with additional measures, more intensive implementation of measures is assumed, which has an impact on the minimum energy use growth (in 2040 only 4% higher than in 2020), and significantly higher share of RES, electricity and synthetic gas than in the

projection with measures, which is reflected in a more pronounced reduction in emissions. Emissions are 26% lower in 2030 and 46% lower in 2040, compared to 2020.

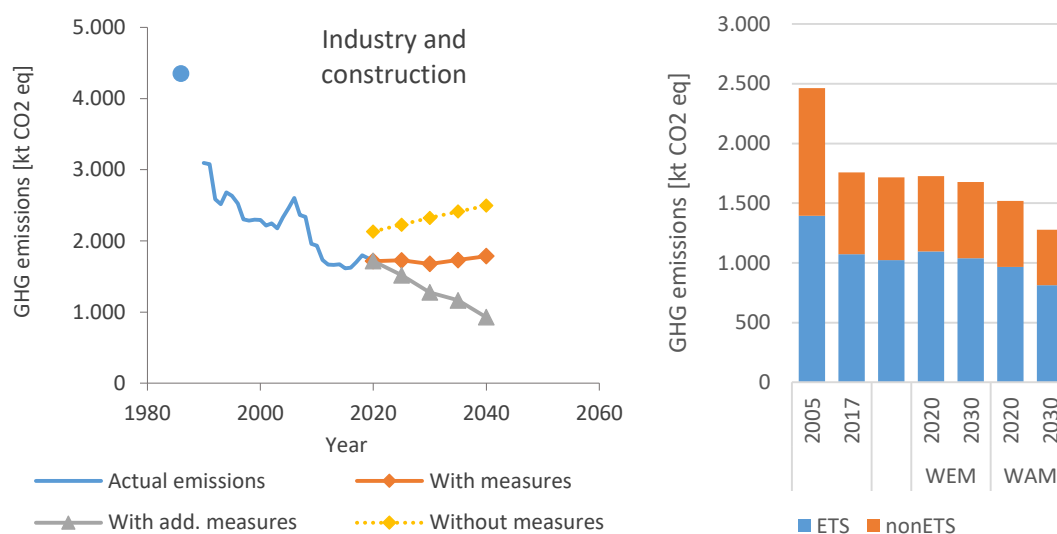


Figure 27: GHG emissions from fuel combustion in manufacturing industry and construction – emissions trend in the 1986–2020 period and projections with measures, with additional measures and without measures by 2040 (left), and the distribution of emissions into EU ETS and non-ETS (right) (source: SEA and JSI-EEC)

In industry, as in transformations, EU ETS emissions are prevailing, but less pronounced. EU ETS emissions account for 57% in 2005 and 60% in 2020, according to the projection with measures the share slightly decreases by 2040, to 61%, whereas, according to the projection with additional measures and after the increase to 64% by 2030, the share decreases to 58% by 2040.

In 2020, combustion of fuels in manufacturing industry and construction contributed 11% to the total emissions. In 2030, the sector holds 10% according to both projections, in 2040 the shares represent 11% according to the projection with measures and 13% according to the projection with additional measures.

5.3.6.3 Transport

Transport has been the main source of emissions in Slovenia since 2014 when it took over the long-held top position occupied by emissions from the transformation sector. Transport is the sector where more than 10% of the annual growth has been recorded in the past. Weaker growth and a significant reduction of emissions are expected in the future, however, the projections for this sector are the most uncertain, especially due to the impact of gas purchases of foreign drivers.

Further growth of transport on Slovenian roads is expected by 2040. The projection with measures foresees the domestic vehicle passenger transport to increase by 35% in the 2017-2040 period, and freight transport by 79%, while according to the projections with additional measures the passenger transport increases by 24% and freight transport by 58%. In addition to domestic vehicles, Slovenia is also heavily exposed to the transport of foreign vehicles. In passenger transport, the growth is lower than for domestic vehicles, while in freight transport the growth of 95% and 69% is significantly

higher than the growth of domestic vehicle transport. The construction of railway infrastructure will result in rail freight transport increasing, which will suffice for a minimum increase in the share of rail transport. The promotion of public passenger transport along with the construction of railway infrastructure, has an impact on the increase in share of railway passenger transport, particularly according to the projection with additional measures, to 3% or 5%, and maintains the current share or slight increase in bus transport. Energy use due to significant improvement in vehicle efficiency, changes in the structure of vehicle fleet, in particular electrification, and partially due to changes in behaviour and transport mode, increases significantly less than transport activity or it actually decreases. In the projection with measures, energy use is 14% higher in 2040 than in 2017, while in the projection with additional measures it is 36% lower. Energy use in transport in 2019 was very similar to 2017, namely 0.3% lower. Due to the impact of SARS-COV-2 preventive measures, energy use decreased drastically in 2020 (by 19%), which is why the comparison with 2017 was retained. The use of biofuels also contributes to a reduction in emissions, accounting for 1.3% in 2017 and 5.9% in 2020. In the projection with measures, the share of biofuels remains at a similar level as in 2020, while in the projection with additional measures it increases to 11% by 2030 and to 15% by 2040.

The implementation of measures described above maintains transport emissions just above the emissions levels recorded in 2008, according to the projection with measures for 2030. In 2008, emissions amounted to 6,165 kt CO₂ eq, while according to the projection with measures, the highest emissions levels are achieved in 2030, amounting to 6,356 kt CO₂ eq, i.e. 15% more compared to 2017 and 39% more than in 2020. By 2040, emissions are reduced to 5,995 kt CO₂ eq. In the projection with additional measures, emissions are rapidly falling from 2025 onwards. Emissions in 2030 are 10% lower than in 2017 and 8% higher than in 2020. In 2040 emissions are 68% lower than in 2017 and 59% lower than in 2020. All emissions from transport are included in non-ETS emissions.

Transport accounted for 33% of total emissions in 2017 and 29% in 2020. According to both projections the share represents 38% in 2030, 37% in 2040 according to the projection with measures, and 27% according to the projection with additional measures.

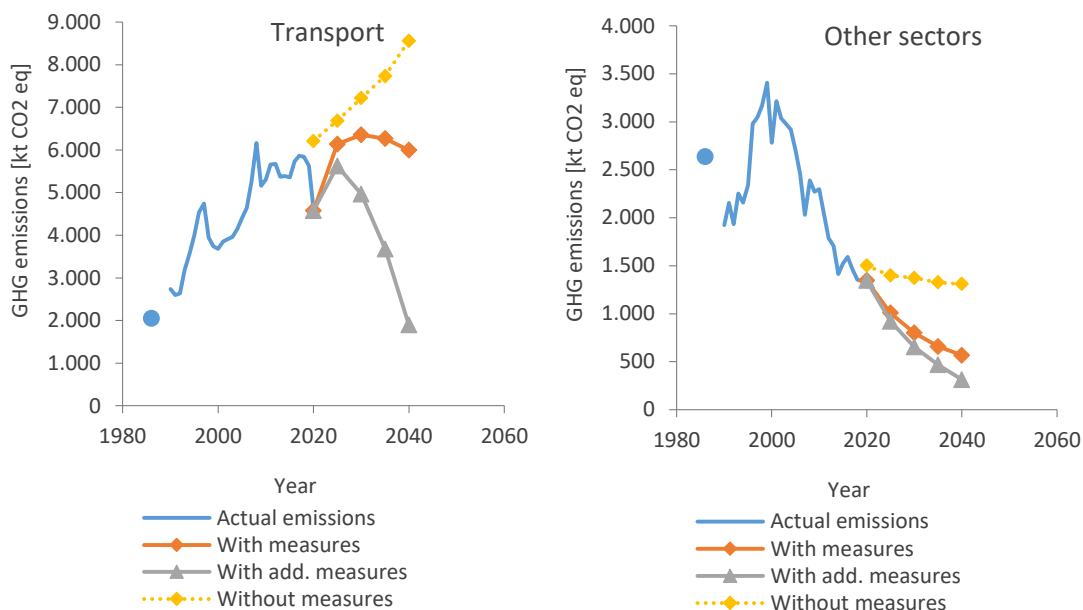


Figure 28: GHG emissions from transport (left) and from the other sectors (right) in the 1986–2020 period and according to the projections with measures, with additional measures and without measures by 2040 (source: SEA and JSI-EEC)

5.3.6.4 Other sectors

GHG emissions generated in other sectors which includes energy use in households, services and agriculture, decrease significantly. In fact, the projection anticipates a very ambitious implementation of measures in these areas, specifically, reducing the use of natural gas and phasing-out of fuel oil-powered boilers, which are being replaced with boilers using wood biomass and heat pumps, connecting to district heating and a high level of energy renovation of residential and non-residential buildings, turning them into energy efficient buildings. The remainder of natural gas is replaced by synthetic gas in the projection with additional measures. In spite of an increase in the surface of residential buildings (by 6% in the 2017–2040 period) and non-residential buildings (by 29% in the 2017–2040 period), these measures have an effect on the reduction of emissions. In agriculture, diesel fuel, which has no suitable alternative, is replaced by synthetic liquid fuels, which are CO₂ neutral, and with biofuels.

According to the inventory, emissions in 2020 were 8% lower than in 2017. By 2030, under the projection with measures emissions are reduced to 801 kt CO₂ eq, a 40% decrease compared to 2020, and under the projection with additional measures to 655 kt CO₂ eq, a 51% decrease compared to 2020. Emissions are further reduced by 2040, being 58% or 77% lower than in 2020 according to the projection with measures and 58% lower according to the projection with additional measures.

With regard to total emissions, other sectors represented 8% in 2020, while the sector share is reduced to 5% by 2030, and to 4% by 2040 according to both projections.

5.3.6.5 Industrial Processes

Following a reduction in emissions in 2008 due to the economic crisis and closure of certain plants not fulfilling the requirements of environmental permits, emissions were increasing until 2019. In 2020, emissions decreased to 1,715 kt CO₂ eq. Emissions are

projected to decrease further. The difference between both projections occurs in 2040, as a result of the carbon capture and utilisation technology (CCU) and thus cement production with lower CO₂ emissions under the projection with additional measures, whereas under the projection with measures this is not foreseen. Cement production is the main source of emissions in this sector. Emissions from this process are increasing by 2035 in both projections. In 2040, they are further increased according to the projection with measures, while they reduce significantly according to the projection with additional measures due to the employment of installations for carbon capture and utilisation (CCU). The second largest source of emissions in 2020 are emissions of F-gases. These are declining rapidly due to the substitution of currently used substances with substances that have a much lower greenhouse effect. Metal production is the third largest source of emissions. Emissions are projected to remain close to the current level. Total emissions in 2030 amount to 1,073 kt CO₂ eq, 9% less than in 2020. Compared to 2020, emissions are 15% lower in 2040 according to the projection with measures and 46% lower according to the projection with additional measures.

The bulk of emissions in the industrial process sector is included in the EU ETS (58% in 2020, 69% in 2030, 77% or 63% in 2040). The sector contributes 7% to total emissions in 2020, 6% in 2030 and 2040 according to the projection with measures, and 8% in 2030 and 9% in 2040 according to the projection with additional measures.

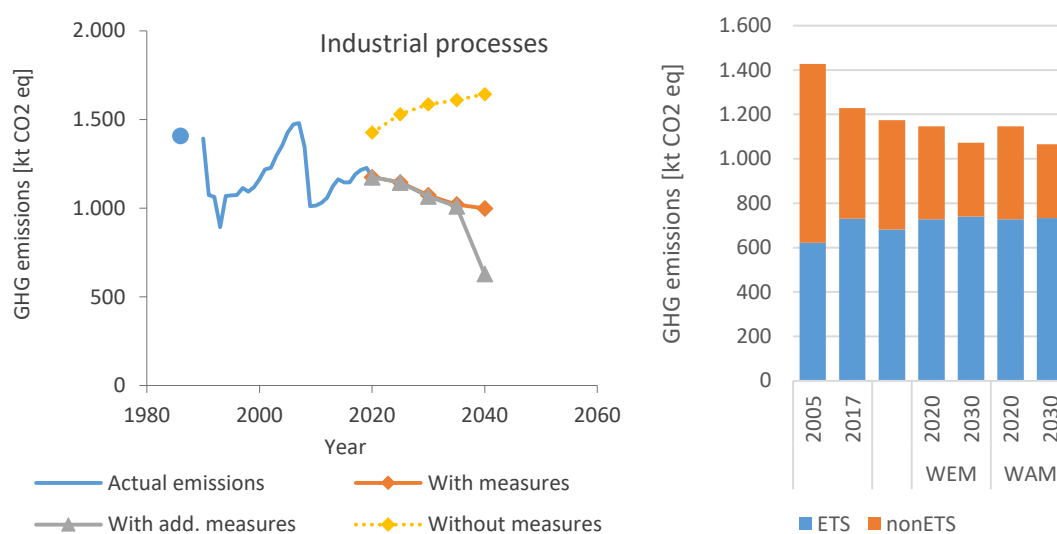


Figure 29: GHG emissions due to industrial processes – emissions trend in the 1986–2020 period and projections with measures, with additional measures and without measures by 2040 (left) and the distribution of emissions into EU ETS and non-ETS (right) (source: SEA and JSI-EEC)

5.3.6.6 Agriculture

Agriculture emissions do not vary significantly from year to year. In 2020 they were by 1% higher than in 2017. A significant decrease in this sector is not projected. According to the projection with measures the emissions increase, whereas according to the projection with additional measures they decrease.

According to the projection with measures, average annual growth in the 2020–2030 period is 0.4% and in the following decade 0.2%. Emissions in 2030 are 4% higher

compared to 2020, and 6% higher in 2040. Additional measures contribute to reducing agriculture emissions after 2020. According to the projection with additional measures, emissions are 1% lower in 2030, and 9% lower in 2040. In 2020, agriculture accounts for 10% of total emissions. According to the projection with measures, the share is stabilised at 11%, while according to the projection with additional measures it increases to 13% by 2030, and to 23% by 2040.

The projections with measures foresee the preservation of the number of livestock at the level from previous years. The exception is pig farming, where the volume of farming has decreased significantly after 2007. In this sector, the weight gain is projected to return to approximately 70% of the increment which has already been achieved in a decade before the reduction. In crop production, the increase in the yield by 2050 is projected to be approximately 40% compared to the average from the 2013–2017 period. The amount of nitrogen in the yield of agricultural plants (including grassland) is expected to increase by approximately 8% by 2030.

The projections with additional measures foresee an increase in breeding efficiency. This allows for similar quantities of milk and beef to be produced with a smaller number of animals and smaller greenhouse gas emissions. It is planned that in the context of the consistent implementation of the measure “Increase in the efficiency of domestic animal production” the total number of bovine animals will be reduced by 15% and the number of dairy cows by 11% by 2030. Within the scope of the measure “Promoting breeding methods with low emissions”, an increased volume in livestock manure processing on biogas installations is foreseen (in pig farming from 12% to 20% and in cattle farming from 0.4% to 8% by 2030). In cattle farming, an increase in livestock grazing is foreseen (in dairy cows from 6% to 8%, in suckler cows from 26% to 31% and in young bovine animals from 12% to 15%). Within the scope of “Rational fertilisation of agricultural plants with nitrogen” measure, an increased volume of urea retention (50%), an increase in the immediate tilling of manure on fields to 30%, in terms of slurry manure an increase in use of low-emission fertilising techniques to 100% on fields and to 50% in grassland are foreseen. Model calculations indicate that, due to measures to improve the efficient use of nitrogen, the use of mineral fertilisers will increase by less than 2% despite a significant increase of nitrogen in agricultural products.

5.3.6.7 Waste

Emissions from waste and waste waters have been decreasing fast since 2004, amounting to 415 kt CO₂ eq in 2020. Projections with measures and with additional measures are identical. In 2030, emissions amount to 262 kt CO₂ eq, which is 37% less than in 2020. In 2040, emissions are reduced by 46%. Waste contributes 3% to total emissions in 2020. By 2030, the share is reduced to 2%, and according to the projection with measures by 2040 to 1%. According to the projection with additional measures, the share returns to 3% in 2040.

The reduction of emissions in the past is the result of the reduction in landfilled biodegradable waste. This will be achieved by reducing the volume of mixed waste (separate collection of waste and packaging, reduced volume of waste), sorting and processing in collection centres and by mechanical biological treatment. Since 2016,

biodegradable waste cannot be disposed on landfills. The emissions from wastewater treatment are also reduced significantly due to connections to the sewage networks, upgrading of treatment plants and replacing septic tanks with small biological waste water treatment plants.

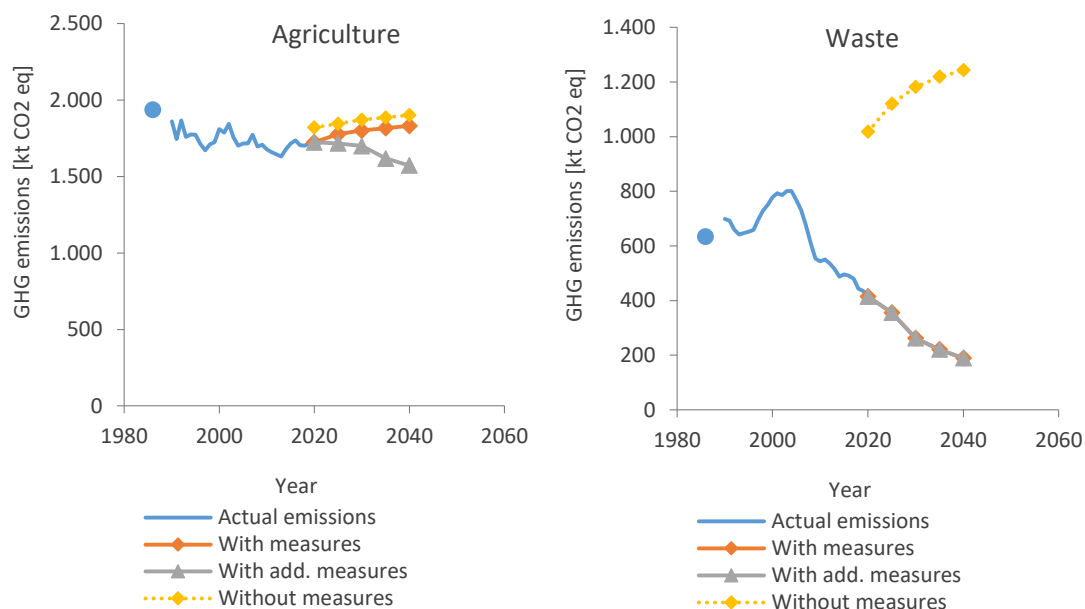


Figure 30: GHG emissions from agriculture (left) and from waste (right) in the 1986–2020 period and according to the projections with measures, with additional measures and without measures by 2040 (source: SEA, AIS, JSI-EEC)

5.3.7 International bunkers

In accordance with instructions, fuels for navigation and international aviation are not included in the projections presented above. In 2020, the emissions from international bunkers represented 2.4% of emissions in the Republic of Slovenia. Emissions from international aviation represented 0.2% or 26 kt CO₂ eq, and emissions from international navigation represented 2.2% or 354 kt CO₂ eq. The year 2020 was specific for both aviation and navigation, as a result of the measures taken to prevent the spread of SARS-CoV-2. The measures contributed to a sharp decline in aviation and navigation, resulting in significant emission reductions.

According to projections, emissions from both categories will increase in the long term, without taking into account recent developments in aviation (EU legislative proposals in the Fit for 55 package) and navigation (IMO commitments). International aviation emissions will be 78% higher in 2030 and 120% higher in 2040 compared to 2020, while emissions from international navigation will be 32% higher in 2030 and 68% higher in 2040. Due to the very low emissions from international aviation in 2020, the growth rates are significantly higher – 406% by 2030 and 523% by 2040 compared to 2020. In international navigation, emissions will increase by 89% by 2030 and 139% by 2040 compared to 2020.

Projections for international aviation were made on the basis of GDP growth, as a high correlation between these two variables has been shown in the past, and for international navigation, the projection was made on the basis of a transshipment

projection in Port of Koper from the Transport Development Strategy of the Republic of Slovenia.

Table 22: Projections of emissions from the sales of fuels to international aviation and international navigation (source: JSI-EEC)

		2017	2020	2025	2030	2035	2040
International aviation	[kt CO ₂ eq]	74	26	118	133	148	163
International navigation	[kt CO ₂ eq]	505	354	552	668	786	846

5.3.8 Projections of CO₂ Sinks

CO₂ sinks resulting from forest management in Slovenia are an important factor in reducing emissions and mitigating climate change. In 2020, sinks resulting from forest management amounted to -3,092 kt CO₂, which is 20% of total GHG emissions in Slovenia. According to emissions and sinks from other subsectors in the sector “Land use, land use change and forestry”, sector is a net emissions sink of -3.280 kt CO₂ eq In 2014-2018, the LULUCF sector was a source of emissions due to natural disasters and salvage harvesting. In 2019, the sector was a sink once again.

According to the projection with measures, the sinks will be again at -4,780 kt CO₂ eq by 2030. After 2030, sinks decline as a result of increased need for logging, also due to the unfavourable age structure of forests. In the projection with additional measures, sinks are at a lower level in 2030 than in the projection with measures, but at a higher level in the long term, in 2040 and 2050. This is because this projection takes into account measures that ensure a stable level of sinks in the long term at a level between 1,800 kt CO₂ eq and 2,300 kt CO₂ eq

The main assumptions in terms of the total volume of felling resulting from thinning, final felling (reforestation) or salvage harvesting have the major impact on the fluctuation of sinks. It is assumed that the volume of felling under the scenario with measures will in average amount to 6 million m³ per year by 2030. According to the scenario with additional measures felling is assumed to slowly increase towards the allowable felling according to the forest management plans. CO₂ storage in wood products also has an important impact on sinks, which is more pronounced in the projections with additional measures than in the projection with measures. The projections include all categories in the LULUCF sector.

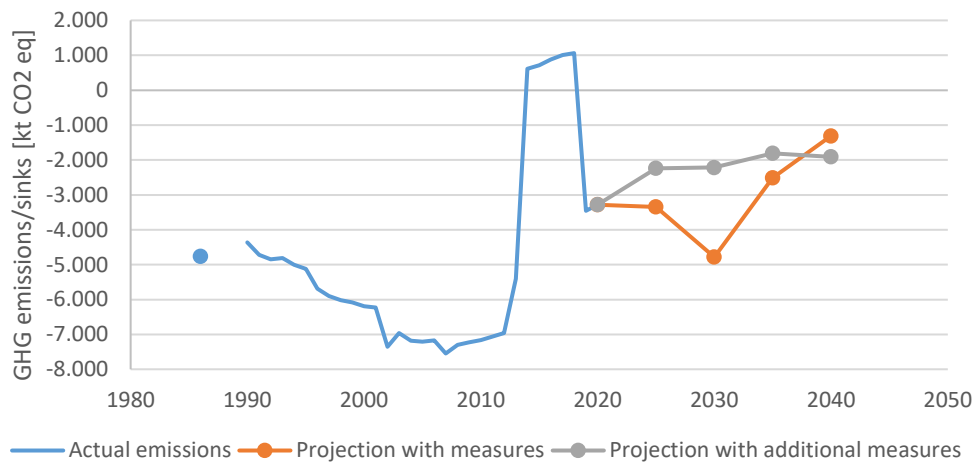


Figure 31: The development of sinks by 2020 and according to projections with measures and with additional measures by 2040 (source: SEA, GIS)

5.4 EU ETS in the Projections

Emissions projections for operators included in the EU ETS system have been determined by applying the following assumptions: In the production of electricity and heat sector, all central-supply companies have been included in the EU ETS (TEŠ, TE-TOL, TEB, all new large units), while in regard to companies providing local supply of electricity and heat (district heating), the EU ETS share has been determined for each fuel separately for the units of co-generated electricity and heat and for boilers on the basis of shares from 2017. For the combustion of fuels in industry, the EU ETS share has been determined on the basis of EU ETS share per individual sector and fuel in 2017 while the EU ETS share in industrial processes has been determined according to processes. All assumptions have been further tested on 2020 data.

In 2013, the EU ETS volume changed in accordance with the EU legislation – quite a few companies left the system, but on the other hand, the Talum company, which produces primary and secondary aluminium, fully entered the system. To allow for the comparability of results, the same EU ETS scope has been assumed for the period prior to 2013 and for the period after 2013. Differences are in industry emissions (both from the combustion of fuels and from industrial processes).

Table 23: Actual EU ETS emission in 2005, 2017, 2020, using post 2012 scope, and emission projections by 2040 according to projections with measures and additional measures (source: SEA, JSI-EEC, AIS)

		2005	2017	2020	2025	2030	2040	2025	2030	2040
		Actual emissions			Projection with measures			Projection with additional measures		
1. Energy	[kt CO ₂]	7,779	5,878	5,414	5,506	5,562	5,434	5,116	3,730	1,680
A. Fuel combustion	[kt CO ₂]	7,696	5,804	5,350	5,447	5,511	5,396	5,062	3,691	1,641
1. Energy industries	[kt CO ₂]	6,301	4,741	4,327	4,352	4,474	4,298	4,097	2,879	1,102
2. Manufacturing Industries and Construction	[kt CO ₂]	1,395	1,063	1,024	1,095	1,037	1,098	965	813	539
B. Fugitive emissions	[kt CO ₂]	82	74	63	59	51	38	55	38	38
2. Industrial processes and product use	[kt CO ₂ eq]	622	692	682	727	740	765	727	733	394
TOTAL	[kt CO ₂ eq]	8,400	6,570	6,096	6,232	6,302	6,199	5,843	4,463	2,074

Table 24: Share of EU ETS emissions in total GHG emissions by sector

		2005	2017	2020	2025	2030	2040	2025	2030	2040
		Actual emissions			Projection with measures			Projection with additional measures		
1. Energy industries	[%]	98%	96%	96%	98%	97%	98%	98%	98%	96%
2. Manufacturing Industries and Construction	[%]	57%	63%	60%	63%	62%	61%	64%	64%	58%
B. Fugitive emissions	[%]	16%	18%	17%	15%	14%	12%	15%	14%	13%
2. Industrial processes and product use	[%]	44%	58%	58%	63%	69%	77%	63%	69%	63%
TOTAL	[%]	41%	37%	38%	37%	37%	39%	37%	34%	30%

According to the projection with measures, the emissions from EU ETS sources are being maintained at a level around 6,200 kt CO₂ eq, while according to the projection with additional measures the emissions are significantly reduced, so that in 2030 they are 27% lower than in 2020, and 66% lower in 2040. Emissions are the most reduced in transformations, which also represent by far the largest share of emissions in the EU ETS. According to the projection with measures, emissions are 3% higher in 2030, and 1% lower in 2040. According to the projection with additional measures, emissions are 33% lower in 2030, and 75% lower in 2040 compared to 2020.

The share of emissions from sources covered by the EU ETS varies by sector, which is clearly shown in the presentation of emission trends by sector in the figures at sectoral descriptions and in the Table 24. Practically all emissions of the transformation sector are covered in the EU ETS; only smaller units in district heating are not covered by the system. In manufacturing industry and construction, the emissions of EU ETS sources represent 56% in 2005, and this share is increased to 63% by 2017, and then it stays around 60%. This means that the energy intensive industry in Slovenia is preserved. In terms of fugitive emissions, emissions from flue gas desulphurisation are included in the EU ETS system. In industrial processes, the share of EU ETS in sector emissions is changing the most. It increases according to the projection with measures, as F-gases emissions reduce significantly, whereas the emissions in EU ETS are not reduced to the same extent, while in the projection with additional measures, the share is reduced in 2040 after an increase in 2030 due to carbon capture in cement production.

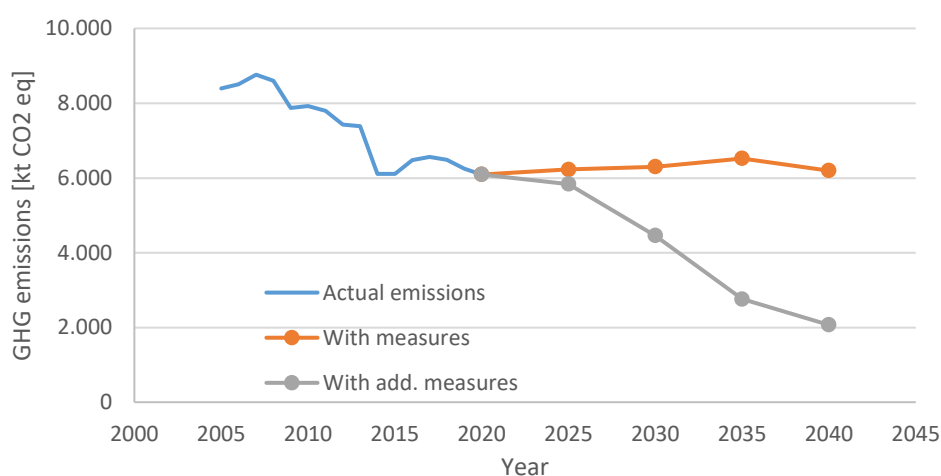


Figure 32: Actual EU ETS emissions and projections with measures and with additional measures by 2040 (source: SEA, JSI-EEC, AIS)

5.5 Non-ETS in Projections

Within the scope of the EU objective for reducing GHG emissions by 20% by 2020, the target set for Slovenia for the non-ETS sector allows for an increase in emissions of 4% compared to 2005. In addition to the 2020 target, the Commission has also set interim yearly emissions (for 2013–2019), which (for Member States with permitted emission

increase) follow a linear trajectory from 2009 to 2020. The linear trajectory was set by Commission acts¹⁴⁸ and is shown in the table below.

Table 25: Target trajectory for non-ETS emissions in the 2013–2020 period (source: EC)

		2013	2014	2015	2016	2017	2018	2019	2020
Slovenia	[kt CO ₂ eq]	12,324	12,354	12,384	12,413	12,203	12,238	12,273	12,307

The Commission has set a target for Slovenia to reduce emissions by 15% by 2030 compared to 2005. This target has also been converted into annual emissions for the period 2021–2020. In the NECP, Slovenia has set a more ambitious target of reducing non-ETS emissions by at least 20%. The new proposal for the Effort Sharing Regulation, which has been prepared as part of the Fit for 55 package, set a target for Slovenia to reduce its non-ETS (ESR) emissions by 27% by 2030

The emission projections from sources not covered by the EU ETS have been calculated as the difference of total emissions and EU ETS emissions.

According to the projection with measures, non-ETS emissions from 2020, when they amounted to 9,756 kt CO₂ eq, increase to 10,779 kt CO₂ eq by 2025, and then they start to fall and amount to 10,629 kt CO₂ eq in 2030, and 9,876 kt CO₂ eq in 2040. According to the projection with additional measures, emissions by 2025 are reduced to 9,998 kt CO₂ eq, by 2030 they are reduced by 13% compared to 2025, and by 44% by 2040, i.e. to 4,898 kt CO₂ eq, compared to 2030.

Emissions in 2020 were below the target trajectory. Compared to 2005, emissions are 12% lower in 2030 according to the projection with measures and 28% lower according to the projection with additional measures. The target reduction in 2030 is therefore achieved in the projection with additional measures.

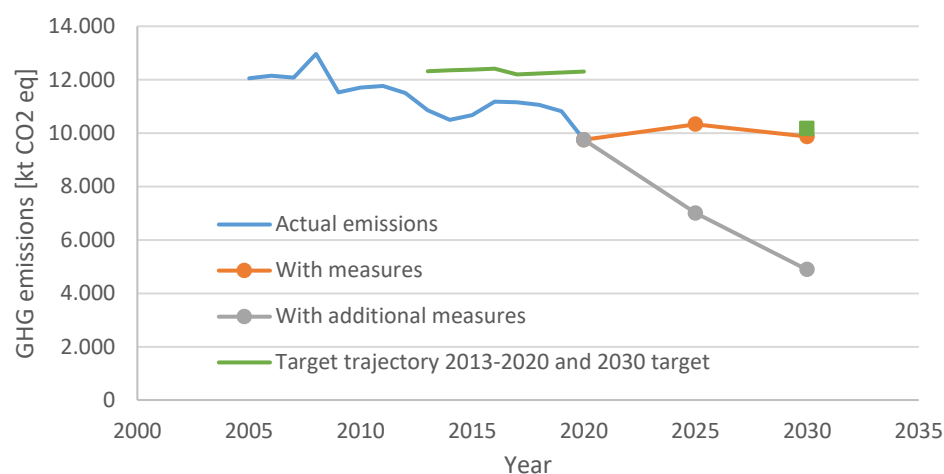


Figure 33: Non-ETS emissions development in the 2005–2020 period and emissions trend according to the projection with measures and with additional measures from 2025 to 2040 compared to target trajectory 2013–2020 and the 2030 target (source: SEA, JSI-EEC, AIS)

¹⁴⁸ 2013/162/EU, 2013/634/EU, 2017/1471/EU

By far the greatest share of emissions in the non-ETS sector is generated by transport, which represented 53% of all non-ETS emissions in 2017, while its share amounted to 37% in 2005. In 2020, the share fell to 47% due to the pandemic and related measures. According to the projection with measures, its share increases to 60% in 2030 and to 61% in 2040. In the projection with additional measures, its share increases to 57% by 2030, and then decreases strongly to 39% due to the significant reduction in emissions. In terms of the importance in 2020, the agriculture and other sectors follow, although with different trends by 2040. According to the projections with measures, agriculture, in addition to transport, is the only sector where emissions are increasing by 2040, so the share rises to 19%. The increase in the share is much higher in the projection with additional measures, although emissions are reduced; however, the reduction in other sectors is much higher. In 2030, the share is 20%, and in 2040, 32%. In 2030, other sectors share, which represented 14% in 2020, is only 8%, and in 2040 it is 6% according to both projections. In terms of the share, this sector is overtaken by non-ETS emissions from manufacturing industry and construction, accounting for 7% or 8% in 2040.

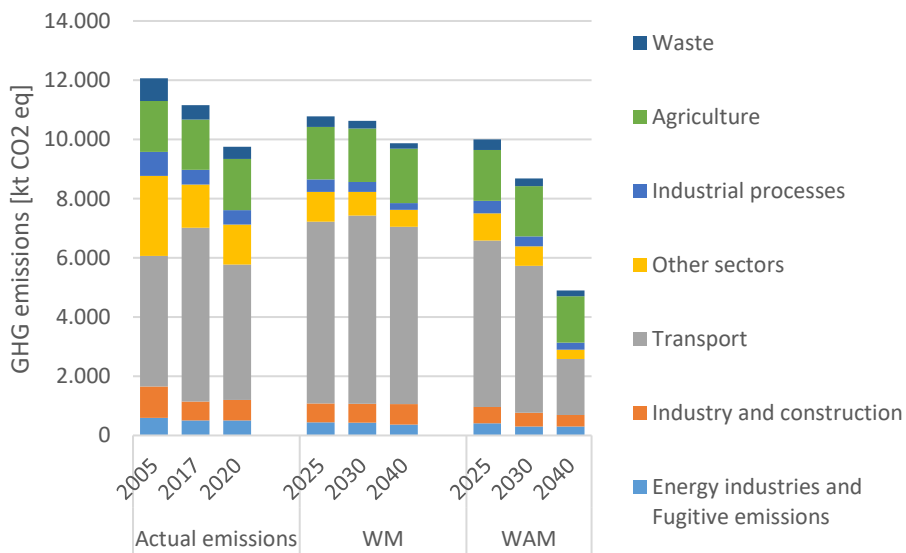


Figure 34: Non-ETS emission structure in 2005, 2017 and 2020 and according to the projections for 2025, 2030 and 2040 (source: JSI-EEC, AIS)

Table 26: Emissions from sources which are not covered by the EU ETS (non-ETS) in 2005, 2017, 2020 and projection with measures and with additional measures by 2040

GHG [kt CO ₂ eq]	Actual emissions			Projection with measures			Projection with add. measures			With measures	With add. measures
	2005	2017	2020	2025	2030	2040	2025	2030	2040	2030/2005	2030/2005
Sector \ Year											
Electricity and heat generation and fugitive emissions	595	516	507	449	437	370	410	308	303	-27%	-48%
Manufacturing Industries and Construction	1,068	637	691	631	639	688	554	464	388	-40%	-57%
Transport	4,406	5,863	4,581	6,140	6,356	5,995	5,623	4,964	1,899	44%	13%
Other sectors	2,705	1,459	1,345	1,008	801	567	921	655	313	-70%	-76%
Industrial Processes	805	499	493	419	333	234	419	333	234	-59%	-59%
Agriculture	1,717	1,703	1,724	1,776	1,801	1,831	1,716	1,700	1,572	5%	-1%
Waste	766	480	415	355	262	189	355	262	189	-66%	-66%
TOTAL	12,062	11,157	9,756	10,779	10,629	9,876	9,998	8,685	4,898	-12%	-28%
Target trajectory and TARGET 2020		12,203	12,307								

5.6 The Total Effect of Measures

The total effect of the implemented and adopted measures was determined by comparing the projection with measures and the projection without measures, and the overall impact of additional measures by comparing the projection with additional measures and the projection with measures.

The total effect of adopted and implemented measures for 2025 amounts to 4,491 kt CO₂ eq and the total effect of additional measures amounts to 1,170 kt CO₂ eq. The high effect of the adopted and implemented measures is due to the fact that the base year for the projection without measures is not the year 2017 (with the exception of the other sectors and agriculture), but one of years before 2017. The effect is expected to increase over the years, so in 2030, it amounts to 5,267 kt CO₂ eq for adopted and implemented measures, and 3,783 kt CO₂ eq for additional measures. In 2040, the effect is 7,680 kt CO₂ eq or 9,102 kt CO₂ eq, the impact of the additional measures therefore exceeds the impact of the adopted and implemented measures. By far the greatest effect is accounted for by CO₂, followed by CH₄. More interesting is the effect of measures across sectors. The biggest effect of the measures is seen in the transport sector due to improved efficiency of vehicles, increase in the use of low-carbon fuels, and changes in the structure of modes of transport; however, the effect is increased mainly after 2030. It is followed by the energy industries sector resulting from overhauling of thermal power plants and increasing the RES share in electricity generation. The effect in waste is very large, as the projection without measures foresees the complete non-implementation of measures. The effect of measures in other sectors is also significant, despite the fact that the base year is 2017. With an earlier base year, the effect would be significantly higher, as there was already a significant reduction in emissions in 2017 with regard to 2005 (by 45%). In industrial processes, the reduction in HFC emissions is taken into account in adopted and implemented measures and other measures are taken into account in the additional measures. The smallest effect of measures among large sectors is seen in agriculture, which confirms how difficult it is to reduce emissions in this sector.

Table 27: Total effect of adopted and implemented measures and additional measures by gas

Effect of implemented and adopted measures		2025	2030	2035	2040
CO ₂	[kt CO ₂ eq]	3,177	3,628	4,149	5,709
CH ₄	[kt CO ₂ eq]	873	1,057	1,134	1,233
N ₂ O	[kt CO ₂ eq]	57	68	78	94
F-gases	[kt CO ₂ eq]	385	513	588	644
TOTAL	[kt CO ₂ eq]	4,491	5,267	5,950	7,680
Effect of additional measures					
CO ₂	[kt CO ₂ eq]	1,076	3,590	6,798	8,784
CH ₄	[kt CO ₂ eq]	72	149	219	229
N ₂ O	[kt CO ₂ eq]	22	44	66	89
F-gases	[kt CO ₂ eq]	0	0	0	0
TOTAL	[kt CO ₂ eq]	1,170	3,783	7,083	9,102

Table 28: Total effect of measures by sector

Effect of implemented and adopted measures		2025	2030	2035	2040
Energy industries	[kt CO ₂ eq]	1,772	1,589	1,399	1,739
Industry	[kt CO ₂ eq]	501	646	681	710
Transport	[kt CO ₂ eq]	546	862	1,466	2,565
Other sectors	[kt CO ₂ eq]	390	573	667	744
Fugitive emissions	[kt CO ₂ eq]	63	94	79	154
Industrial Processes	[kt CO ₂ eq]	385	513	588	644
Agriculture	[kt CO ₂ eq]	69	70	70	71
Waste	[kt CO ₂ eq]	766	919	999	1,054
TOTAL	[kt CO ₂ eq]	4,491	5,267	5,950	7,680
Effect of additional measures					
Energy industries	[kt CO ₂ eq]	271	1,645	3,447	3,248
Industry	[kt CO ₂ eq]	207	400	566	859
Transport	[kt CO ₂ eq]	517	1,392	2,589	4,096
Other sectors	[kt CO ₂ eq]	87	146	191	254
Fugitive emissions	[kt CO ₂ eq]	27	91	81	14
Industrial Processes	[kt CO ₂ eq]	0	7	11	371
Agriculture	[kt CO ₂ eq]	60	102	198	259
Waste	[kt CO ₂ eq]	0	0	0	0
TOTAL	[kt CO ₂ eq]	1,170	3,783	7,083	9,102

5.7 Additionality in relation to Articles 6, 12 and 17 of the Kyoto Protocol

The Kyoto Protocol also allows countries to achieve their emission reduction targets through the Kyoto mechanisms: the Joint Implementation (JI), the Clean Development Mechanism (CDM) and the International Emission Trading (IET), in order to reduce costs. Slovenia does not plan to use these mechanisms until 2030.

The EU Emissions Trading System is one of the important mechanisms within the EU that contributes to reducing emissions in Member States. For more information on this mechanism, see the description of the measure in chapter 4.2.1.

5.8 Comparison with the Projections in Previous Reports

Projections with measures and additional measures in the Sixth National Communication are higher than the last projections. The main reason for the lower emissions in 2015 in the newer projections is the prolonged economic crisis, which resulted in lower emissions in the industry and transport sectors, faster replacement of fuel oil with, in particular, wood biomass in households and the service sector, and lower emissions in transformations. In the transport sector, the impact of the changed ratio between the prices of motor fuel in Slovenia and the neighbouring countries is also important, since the share of foreign vehicles that buy fuel in Slovenia is decreasing. In addition to the above-mentioned, there were also lower emissions

in agriculture, in particular due to smaller number of animals, and the waste sector, in particular due to faster implementation of measures than envisaged (faster reduction in deposited biodegradable waste). Implementation of measures beyond 2020 is similar to older projections, since emissions in 2030, in contrast to emissions in 2020, are 6% or 7% lower in all three projections (Sixth NC and 2nd BR projections), while according to the projection in the Seventh National Communication they are reduced by 9%. The emissions projections with measures and with additional measures presented in this report are very similar to those in the 4th Biennial Report, which is to be expected given that they are more or less the same projections. The differences are due to minor refinements of the projections after the BR 4 submission date. The emissions according to the projection with measures presented in this report are absolutely comparable to the projections in the previous ones. The projection with additional measures clearly stands out compared to previous reports (with the exception of BR 4), reflecting more ambition with regard to the emission reduction targets in line with the Paris Agreement.

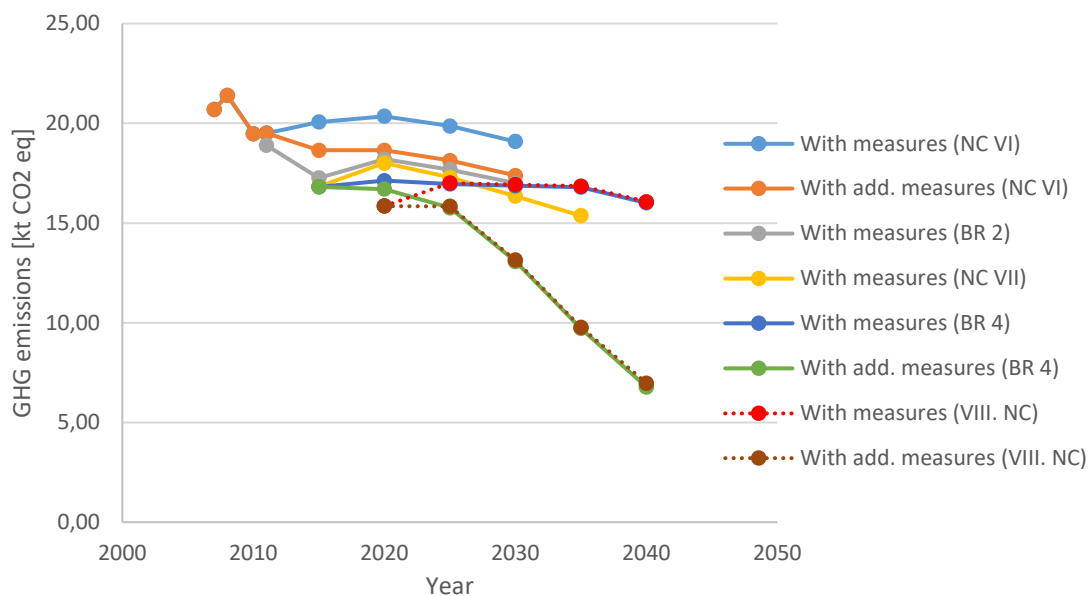


Figure 35: Comparison of projections of the Sixth National Communication (VI. NC), the second Biennial Report (BR 2), the Seventh National Communication (VII. NC) and the fourth Biennial Report (BR 4) with the projections in this report (VIII. NC)

5.9 Projections of Indirect GHG Emissions

Indirect GHG emissions decrease under both projections, especially under the projection with additional measures. As an EU Member State, Slovenia has ambitious targets for reducing emissions of air pollutants SO₂, NO_x, NMVOCs, NH₃ and PM_{2.5}, with the aim of reducing the number of premature deaths caused by air pollution. These targets are achieved through the projection with additional measures. The reduction in SO₂ emissions is mainly due to the phase-out of coal for electricity and heat generation. For NO_x, the main emission reductions are due to lower emissions from traffic as a result of the electrification of transport, as well as an increase in the share of vehicles meeting the stricter EURO standards. For NMVOCs, the emissions are the most reduced in the other sectors (buildings) sector, due to a reduction in the use of woody biomass in households as a result of improvements in the energy efficiency

of buildings, as well as the replacement of old inefficient wood boilers with heat pumps and more efficient boilers.

Table 29: Emissions projections with measures for indirect GHG emissions (source: JSI, AIS)

Pollutants		Inventory			Projection with measures		
		2005	2019	2020	2025	2030	2040
SO ₂	[kt]	39.7	4.5	4.0	3.8	3.2	2.8
NO _x	[kt]	55.3	29.4	25.3	23.7	20.7	17.0
NMVOC	[kt]	48.3	30.8	30.1	28.2	26.6	24.7

Table 30: Emissions projections with measures for indirect GHG emissions (source: JSI, AIS)

Pollutants		Inventory			Projection with measures		
		2005	2019	2020	2025	2030	2040
SO ₂	[kt]	39.7	4.5	4.0	3.6	2.6	2.8
NO _x	[kt]	55.3	29.4	25.3	22.5	17.7	12.1
NMVOC	[kt]	48.3	30.8	30.1	26.8	24.3	21.9

5.10 Uncertainty in Projections

Uncertainty in projections stems from the following: uncertainty in data applied as the basis for projections (statistical data, emission factors); models applied in projections which represent a simplified image of real-life developments; uncertainty in scenarios regarding the implementation of policies and measures as the actual effect of instruments is hard to foresee since they are subject to numerous factors that affect them; and uncertainty in the future economic, technological, and social development which includes uncertainty in energy prices; the growth in energy supply and demand; the behaviour of the main players on the market and other factors.

The source of great uncertainty is the scenario of future development of the gross domestic product, which, in particular, has a major impact on energy use and thus emissions in industry (fuel combustion and processes) and transport. The scenario used in the projections was based on a scenario prepared by the European Commission for the recent energy projections and revised so that it is more coherent with short-term trends. Since short term projections are used for the purpose of planning the budget the scenario is conservative. This is demonstrated by a comparison of the average growth in value added in the 2015–2019 period with the estimated growth in the 2015–2020 period. The actual average annual growth was 3.6%, while the projections foresaw a 2.2% growth. It may be concluded that the projection of the value added underestimates the economic growth of Slovenia, whereby indications of economic cooling were present at the end of 2019, and also, on this basis, it is hard to conclude that this also implies higher emissions since, as higher value added means more investment activities and, therefore more EEU and RES measures. The current situation due to the war in Ukraine and the impact of the epidemic measures on economic growth have not been taken into account in the projections.

The results of emission projections for the energy sector is mostly subject to the implementation of measures considered in regard to RES and EEU which will mostly depend

on the funds available. The prices of energy products and emission allowances that show a very high dynamic exert a considerable impact. Great uncertainty is also correlated with technological development, which is also related to the price of the measures. The projections foresee that natural gas will be replaced by synthetic gas, and it is envisaged that carbon capture will be installed at the coal power plant and at the cement plant, despite the fact that the development of technology is facing large delays from the initial plans. Major technological developments are also foreseen in other sectors (electricity storage devices, photovoltaics, building insulation materials, electric vehicles, etc.)

The largest uncertainty for Slovenia in the preparation of projections stems from the transport sector. High uncertainty in projections regarding transport accounts for transit transport, firstly, because modelling its volume and structure is difficult, and secondly, because the purchase of fuel for transit transport is a highly variable category which mostly depends on the ratio between the prices for motor fuels in Slovenia and in neighbouring countries. Transit transport has a significant impact on the Slovenian energy balance due to the small size of Slovenia. In 2008, when the sale of fuel to transit transport reached its peak, sales of motor fuel to foreign vehicles in Slovenia represented almost 30%. The uncertainty regarding transport is also the result of the uncertainty regarding the implementation of measures in connection with the transport policy in which little regard was given in the past for the promotion of public transport and for the development of railway transport, in spite of plans, since the main development axis was the construction of road network; additional uncertainty is also caused by the introduction of new technologies in the transport – electric vehicles, autonomous vehicles, mobility as a services, etc.

The uncertainties of the estimates of emissions in agriculture are also great. The main contribution to these are unreliable forecasts of the volume of agricultural production and breeding. The number of agricultural holdings is falling very rapidly and the existing agricultural holdings are becoming larger. In areas with favourable farming conditions with agricultural land, there will probably be no problems, but the question is whether Slovenia will succeed in preserving cultivation in areas with less-favoured farming conditions through agricultural policy measures. This refers to the land that is suitable primarily for breeding grass eating animals. The latter will therefore influence the livestock numbers.

The main uncertainties relating to the projections of emissions and sinks are, in particular, the assumptions of the actual (regular) felling, the mixture of tree species in forest stands and frequency and extent of natural disasters or natural disturbances. Climate change may have both positive and negative effects on the projections of net emissions in forests. With the increase in CO₂ concentrations in the atmosphere, better growth in forest stands is expected on the one hand (taking appropriate silvicultural measures), and, on the other hand, larger total felling crop, resulting from more frequent and more extensive natural disturbances in forests.

5.11 Sensitivity of Projections

Considering the fact that in Slovenia the development of the transport sector is most uncertain and, in addition to this, it represents the most important source of emissions from non-ETS sectors, a sensitivity analysis was performed for the transport sector in regard to the impact of

transit transport, and the scenarios regarding the implementation of transport and environmental policies in the transport sector have been compared.

Table 31: Sensitivity analysis for GHG emissions projections in the transport sector in regard to the assumptions about transit transport and the implementation of measures for transport policy

[%]	2017	2020	2025	2030	2035	2040
Projection with measures (O1)	100	78	105	108	107	102
Projection with additional measures (O2)	100	78	96	85	63	32
Reduced scope of additional measures (O3)	100	78	100	97	83	67
Projection with additional measures with a smaller share of biofuels (O4)	100	78	97	88	63	33
Projection with additional measures, additionally with the abolition of partial refund of the excise duty for commercial purposes (O5)	100	78	81	66	49	26
Projection with additional measures with a lower share of biofuels and higher share of foreign vehicles purchasing fuel in Slovenia (O6)	100	78	105	95	71	39

The projection with measures has the highest emissions according to the compared scenarios for sensitivity analysis. The sensitivity analysis focused on the range of different scenarios of projections with additional measures. In 2030, a similar reduction is achieved in scenario with reduced scope of implementing additional measures (O3) (3% lower emissions compared to 2017) and at the same level of implementing additional measures as in the basic projection with additional measures but with the same share of biofuels as in 2020 and a high share of transit transport (O6) (5%). The lower share of biofuels alone (O4) does not have a major impact (12%), while a significant reduction in the sale of fuel to foreign vehicles (O5) would significantly reduce emissions (34%). The difference gets smaller by 2040 due to the increased use of fuels, which have a smaller CO₂ footprint, with the exception of the scenario with a lower level of implementing additional measures (O3), which envisages a slower introduction of alternative fuels (electricity, synthetic gas), which is reflected in significantly higher emissions.

The sensitivity analysis of total emissions in regard to the transport scenarios presented above has shown that the emission trend in transport has a significant impact to total emissions. Emissions in 2030 in the scenario with the upper sensitivity limit (O3) are 13.9 Mt CO₂ eq, 22% lower than in 2017. However, in the scenario with the lower sensitivity limit (O5), emissions in 2030 are 12.1 Mt CO₂ eq, 32% lower than in 2017. In 2040, the emissions range is maintained at a similar level: emissions according to the scenario which represents the upper sensitivity limit amount to 9.0 Mt CO₂ eq, and emissions according to the scenario which represents the lower sensitivity limit amount to 6.6 Mt CO₂ eq

Table 32: Sensitivity analysis for total GHG emissions projections in regard to the assumptions about transit transport and the implementation of measures for sustainable transport and environmental policy

[%]	2015	2020	2025	2030	2035	2040
Projection with measures	100	89	96	96	95	91
Projection with additional measures	100	89	89	74	55	39
Reduced scope of additional measures	100	89	91	78	62	51
Projections with additional measures with a smaller share of biofuels	100	89	90	75	55	40
Projection with additional measures, additionally with the abolition of partial refund of the excise duty for commercial purposes	100	89	84	68	51	37
Projection with additional measures with a lower share of biofuels and higher share of foreign vehicles purchasing fuel in Slovenia	100	89	92	78	58	41

An even greater impact is recorded by the sensitivity analysis regarding transport emissions in case of non-ETS emissions since transport represents more than 50% of these emissions. The reduction in emissions ranges from 16% to 32% in 2030 and from 38% to 59% in 2040.

Table 33: Sensitivity analysis for GHG emissions projections of non-ETS in regard to the assumptions about transit transport and the implementation of measures for sustainable transport and environmental policy

[%]	2015	2020	2025	2030	2035	2040
Projection with measures	100	87	97	95	93	89
Projection with additional measures	100	87	90	78	63	44
Reduced scope of additional measures	100	87	92	84	73	62
Projections with additional measures with a smaller share of biofuels	100	87	90	80	63	44
Projection with additional measures, additionally with the abolition of partial refund of the excise duty for commercial purposes	100	87	82	68	56	41
Projection with additional measures with a lower share of biofuels and higher share of foreign vehicles purchasing fuel in Slovenia	100	87	94	84	67	47

5.12 Projections methodology

For the projections of emissions, a broad range of models was used which are presented in detail in Annex D. No changes have been made to the models compared to the projections presented in the 4th Biennial Report.

A detailed description of the models is available in the report: Deliverable C2.1, Documentation of Methods and Models for Climate Mitigation Mid-century Strategy Scenario Analysis - Part 1: Summary report on methods and models for scenario analysis.

The complete upgrade of models was carried out within the framework of the LIFE ClimatePath2050 project, which was co-financed by the EU LIFE programme and the Ministry of the Environment, Climate and Energy.

6 VULNERABILITY ASSESMENT, CLIMATE CHANGE IMPACTS AND ADAPTATION MEASURES

6.1 Introduction

In December 2016, the Government of the Republic of Slovenia adopted the Strategic Framework for Climate Change Adaptation, the first comprehensive strategic document in the field of climate change adaptation, which is still valid today. The first report on implementation in 2016-2020 was also prepared.

The Slovenian Environment Agency is running a project on climate change impact assessment in the 21st century. The project offers appropriate expert groundwork and first estimates of the effects of climate change in the coming period, which will then enable the preparation of an Action Plan on Climate Change Adaptation in the future.

6.2 Climate change impacts assessments

6.2.1 Starting points

In order to prepare expert groundwork for adaptation to climate change in Slovenia, the knowledge of historic changes in climate and the assessment of future climate conditions is crucial. Very important, in addition to the changed average conditions, are estimates of the frequency, character and duration of extreme weather and weather-related phenomena, which have the greatest impact on us, our environment and our activities.

In the framework of the project “Climate variability in Slovenia”, the Slovenian Environmental Agency examined in detail the past climate variability in Slovenia both in terms of average conditions and in terms of extreme phenomena. On the basis of the knowledge of past trends, within the framework of the project “Assessments of Climate Change Impacts in the 21st Century”, climate change assessments for the future and climate change impact assessments were already prepared in 2018 for some extreme events, such as heat waves, droughts, extreme precipitation phenomena, frost, high water conditions. The Agency is also publishing new data on an ongoing basis, and calculations of climate variables for the period 1950-2020 are underway.

Model calculations are used in assessing the future climate. Calculations of climate models are based on the various possible projections of the greenhouse gas concentration in the atmosphere by the end of the 21st century (the so-called Representative Concentration Pathways - RCP). Due to insufficient spatial resolution, the calculations have to be corrected (Bias Correction) for use in the climate and relief diverse regions of Slovenia. For the needs of the study of extreme events, calculations are made at least on a daily basis. The corrected model calculations represent input data for assessing the impacts of changed climatic conditions on individual natural and human systems, cultural heritage, the status of watercourses and groundwater, soil water content, agricultural and other plants, etc.

Climate change estimates in terms of temperature and precipitation, including extreme events such as heat waves, droughts, storms with strong winds, rainfall and hail, floods, etc. represent the basis for adaptation to climate change. Agriculture and forestry, water management, energy, tourism, spatial planning, building and health are among the sectors that are closely related to weather and climate and are already adapting to a certain extent to the changed climatic conditions and will need to continue to adapt, in line with scenarios and conditions. Also, the climate change assessments should be taken into account by the relevant ministries when preparing their assessments of the risk and risk management capacity for possible disasters.

The obtained estimates are the basis for:

- preparation of strategic documents for adaptation to climate change in Slovenia;
- supplementing the risk assessments of various natural and other disasters in Slovenia;
- completion of impact assessments for major projects (investments with the support of European funds).

6.3 Prepared estimates

Within the framework of the project “Assessments of Climate Change Impacts in the 21st Century”, in the period 2016-2017, for the three periods in the future (2011-2040, 2041-2070 and 2071-2100), taking into account three possible projections of the greenhouse gas concentration in the atmosphere (very optimistic RCP2.6, moderately optimistic RCP4.5 and pessimistic RCP8.5 scenario) estimates of the changes for the following climate variables were prepared:

- ✓ air temperature
- ✓ soil temperature,
- ✓ surface water temperature,
- ✓ sea temperature
- ✓ groundwater temperature,
- ✓ water content in the soil,
- ✓ amount of precipitation,
- ✓ the quantitative status of watercourses,
- ✓ water supply of aquifers,
- ✓ phenological development of selected plant species.

The climate change scenarios show that the air temperature in Slovenia will continue to rise. Compared with the period 1981-2010, it will increase on average by 1°C throughout the country in the period up to 2040, and for an additional degree C until 2070.

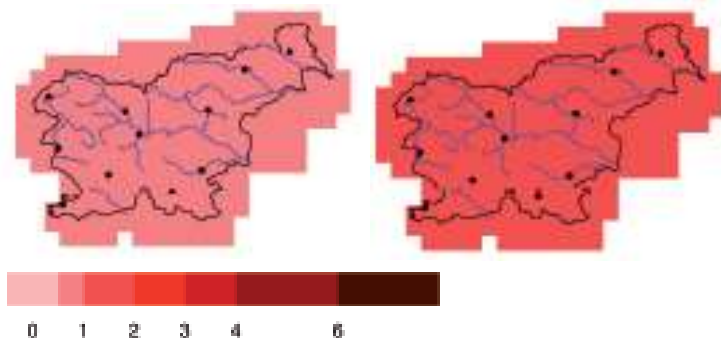


Figure 36: Change in air temperature in the period 2011-2040 (left) and 2041-2070 (right) compared to the period 1981-2010, according to the RCP4.5 greenhouse gas emissions projections

For precipitation, the climate scenarios show greater uncertainty, but signals are becoming more pronounced as we look further into the future. At an annual level, the changes are only visible in the second 30-year period (2041-2070), when the amount of precipitation will increase in the eastern half of Slovenia.

At a seasonal level, the changes are already visible in the first thirty year period.

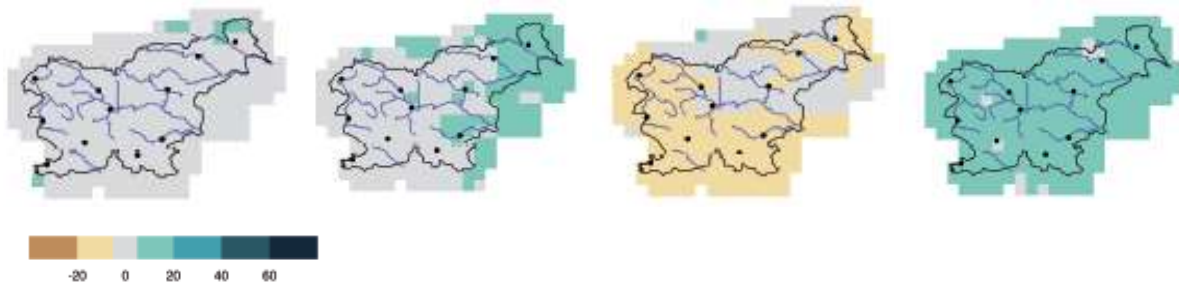


Figure 37: Predicted changes in precipitation compared to the period 1981-2010 (from left to right: annual in the period 2011-2040, annual in the period 2041-2070, summer in the period 2041-2070, winter in the period 2041-2070), according to the greenhouse gas emissions projections RCP4.5

Changes in the frequency of occurrence, duration and severity are also estimated for:

- ✓ heatwaves,
- ✓ agricultural droughts, droughts on surface waters and droughts of underground water sources,
- ✓ high water conditions,
- ✓ frost.

On the basis of the estimated changes in climate variables, climate change impact assessments were also prepared for:

- ✓ state of the soil for agriculture;
- ✓ growing conditions;

- ✓ future high water conditions on surface waters;
- ✓ future drought conditions on surface waters;
- ✓ water supply of aquifers in Slovenia.

The projection of changes in the 100-year flow rate (flow rate with a return period of 100 years - Q100) shows for the next period (2021-2050), mainly an increase in Q100 in the western part of the country and a decrease in Q100 in the eastern part of the country.

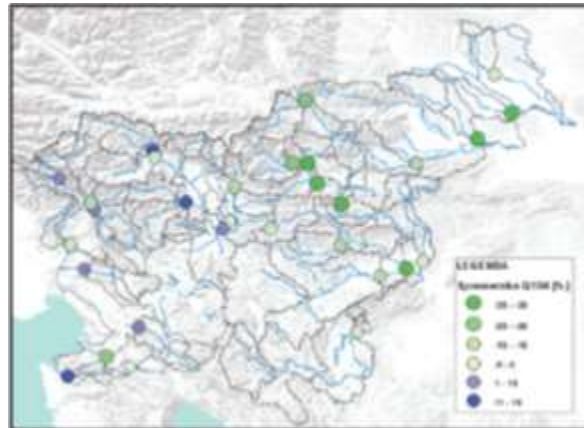


Figure 38: Change in the 100-year flow rate in the period 2021-2050 in comparison to the period 1981-2010, according to the RCP4.5 greenhouse gas emissions projections

To calculate the abovementioned impacts, extensive databases have been prepared, which will also be useful for further research into the impacts of climate change:

- ✓ databases of daily data of all key climate variables and their trends for the future in a resolution of 12 km;
- ✓ daily rainfall, minimum, maximum and average daily temperatures and daily evapotranspiration (resolution 1 km) for the period 1981-2010;
- ✓ database of homogenized water temperature series and analysis of trends in surface waters, groundwater and sea.

The prepared contents are schematically shown in the figure below.

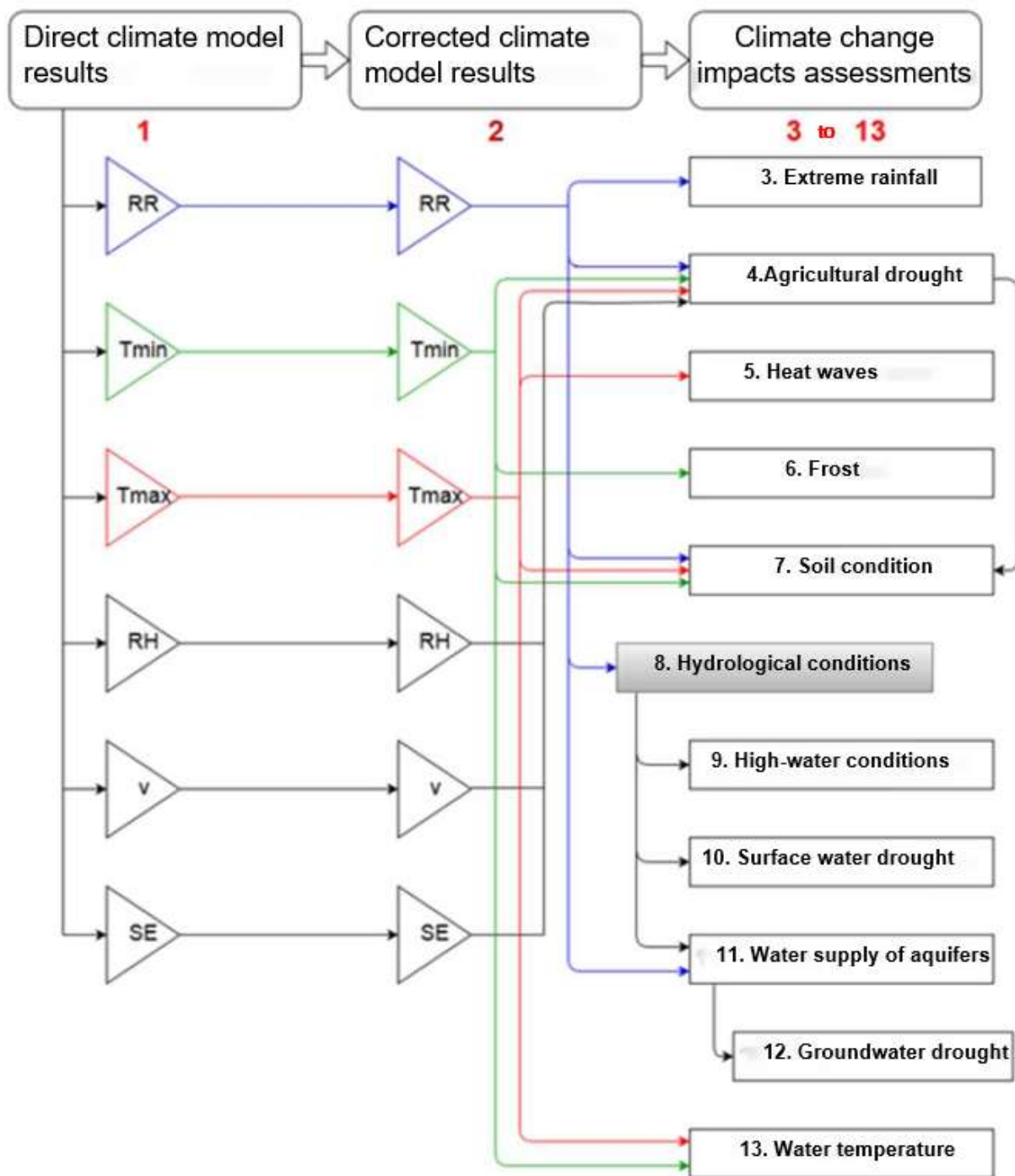


Figure 39: Schematic depiction of prepared databases of climate variables and their estimated changes as well as prepared climate change impact assessments.

6.4 Climate change vulnerability and adaptation

The Strategic Framework for Climate Change Adaptation, adopted by the Government on 7 December 2016, represents the first step towards the development of a comprehensive cross-

sectoral adaptation process. Thus, it primarily includes guidelines for greater integration of adaptation into all policies, measures and practices.

Detailed are individual horizontal orientations and steps on the path of adaptation to climate change:

- Integrating consideration of climate change impacts in all activities (through the steps of coordinating contents and planning processes, especially in development and spatial planning, and enhanced use of environmental impact assessment tools);
- Wider cooperation, through steps such as interdepartmental cooperation, involvement in European and international projects and processes (good practice case is the Centre for Drought Management in South-East Europe, DMCSEE), networking with other stakeholders in the framework of existing partnerships and the search for synergies;
- Continuous capacity building through the steps of providing climate services (climate change scenarios and their impacts), upgrading and linking databases, and establishing regular cooperation between researchers and decision makers;
- Education and training, awareness raising and communication, through the steps of analysing the situation and updating curricula, programs and other curricular documents, in particular by linking and upgrading already existing good practices, projects and initiatives, in particular further developing good practices and preparing and implementing communication campaigns and regular work with the media.

The overall goal is to reduce Slovenia's exposure, sensitivity and vulnerability to climate change impacts, and increase the climate resilience and adaptive capacity of society. In order to measure the success of achieving this goal and directing the priority preparation of local and regional adaptation strategies, the indicator for measuring the vulnerability of Slovenia is also in development. It combines a set of variables by category (exposure, sensitivity, adaptive capacity) and data sources that will be able to provide a picture of vulnerability at both municipal and state level.

The climate change vulnerability indicator represents the sum of the exposure and sensitivity as well as adaptive capacity.

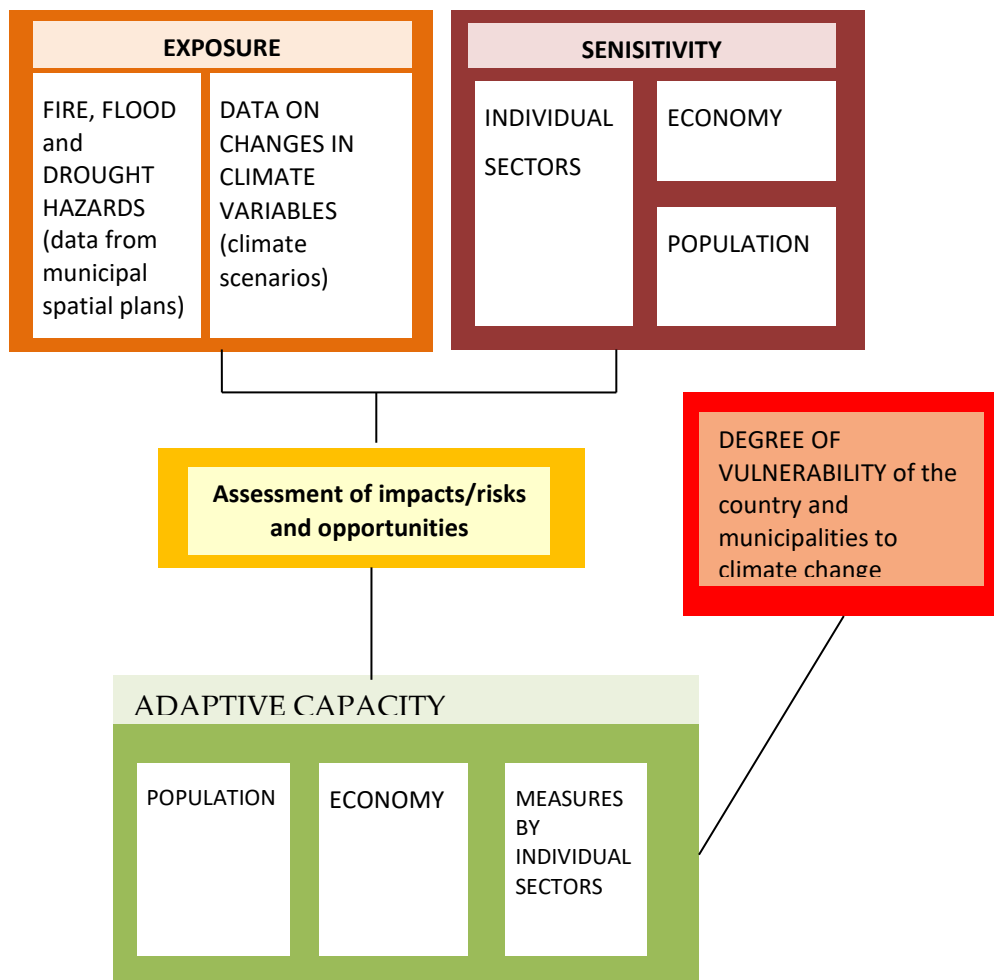


Figure 40: Schematic depiction of the structure of the vulnerability indicator of Slovenian municipalities and the state

The first report on the implementation of the Strategic Framework For Climate Change Adaptation for the period 2016-2020 has also been prepared. The main highlights of the report are:

- The Strategic Framework devotes a specific chapter to the increased use of environmental impact assessment instruments, where the objective of resilience and adaptation to climate change should be integrated into the assessment of all programmes, plans, spatial and other acts and amendments. After the adoption of the document, several activities were carried out until 2020 to strengthen the instruments for environmental impact assessment:
 - Several training courses for environmental report writers were held, and the guidelines for climate mainstreaming in major projects were translated;
 - guidance on including climate change into integrated environmental impact assessments and national spatial plans related to national infrastructure (roads, railways) were developed;
 - guidance for environmental impact report writers was prepared on how to address climate change.

- Further guidance on climate change impact assessment in administrative procedures, recommendations and other tools to strengthen the environmental impact assessment instrument, and database sharing and upgrades are under preparation. Unfortunately, a national focal point to bring together local, regional and private sector actors has not yet been established.
- Atlas of climate projections has been published (public data availability, SEA).
- For the first time, climate change adaptation measures are also included in the Climate Change Funding Programme.

A vulnerability assessment of municipalities is currently underway. A set of indicators for the exposure of municipalities to the impacts of climate change has been prepared, and an analysis of Regional Development Programmes (RDPs) has been completed. Floods are most prominent in all RDPs, while drought is not highlighted only in RDPs for Koroška and Zasavje regions, and hail is also highlighted in some RDPs. The first attempt at a country-level vulnerability assessment was carried out in 2014. It was prepared by experts from the Biotechnical Faculty.

Unfortunately, estimates of the impacts of climate change on individual sectors are behind schedule. Sectoral impacts for forest fires and health impacts are currently under preparation.

The National Environmental Action Programme with programmes of measures until 2030, adopted by Parliament in March 2020, sets out the following measures to achieve the climate change adaptation objective:

- offering climate services by providing and disseminating information on climatic conditions and expected changes in climate, tailored to the needs of users (sectors, public, researchers) and in a user-friendly format that allows easy follow-up;
- vulnerability assessment by municipality;
- municipal adaptation strategies;
- vulnerability assessment by sector;
- adaptation action plans;
- guidelines for climate change impact assessment in administrative procedures.

6.4.1 Areas of action

While a comprehensive program of measures for climate change adaptation (Action Plan) will be prepared based on the results of the climate impact assessments, the need for adaptation action was addressed in the context of related topics, especially in the following areas:

- Sustainable and integrated water resources management; The River Basin Management Plan for the Danube and Adriatic River Basins for the period 2016-2021 was adopted, which also defines measures in the area of adaptation to climate change.
- Adaptation measures have also been integrated into other sectoral policies, e.g. the Flood Risk Management Plan 2017-2021 was included in water management programme.

- Adaptation to climate change was an important topic in the development of the Common Agricultural Policy in 2014-2020 and is highlighted as one of the main areas of focus in the new agricultural policy for 2021-2027.
- In 2006, Slovenia accepted a mandate for the organization of the work of the Drought Management Centre for South-eastern Europe, DMCSEE (within the framework of the UN Convention to Combat Desertification, the UNCCD, and the World Meteorological Organization, WMO), expert groundwork was prepared for the national action plan for drought management and soil degradation; the Centre is still based at SEA.
- Information and awareness-raising; the SEA regularly informs the public of adverse climate and hydrological events; climate change adaptation was included in the “Slovenia is lowering its CO₂ emissions” project (the project ended in 2018), and events, consultations and guidelines for decision-makers have been prepared.

Short-term adaptation measures implemented by SEA include warnings of adverse climate and hydrological events, regular publication of reviews of changes in climate and monitoring of the climate situation in SEA bulletins.

A specific example of good practice in adaptation took place in the Vipava Valley. The Ajdovščina Development Agency prepared and implemented LIFE ViVaCCAdapt project that finished in 2021. The project included a climate change adaptation strategy, which was adopted by a number of municipalities in the region. Two pilot actions were also launched related to a decision support system on irrigation and to model planting of green windbreaks.

6.5 Information Provision

Currently, Slovenia has not yet established a special portal with information on adaptation to climate change, information on national activities are provided at the European portal ClimateADAPT (<http://climate-adapt.eea.europa.eu/>).

7 FINANCIAL RESOURCES AND TRANSFER OF TECHNOLOGY

In accordance with Article 9 of the Paris Agreement, the relevant decisions of the UN Convention on Climate Change, commitments and decisions at the EU level, in particular the decisions of the Economic and Financial Affairs Council (ECOFIN) and the Environment Council (ENVI), on climate finance to assist developing countries in implementing long-term climate policy measures, Slovenia is also striving towards increasing the volume of climate finance.

In 2009 at COP19, developed country Parties, including EU Member States, committed to a collective mobilisation target of USD 100 billion per year by 2020 for assistance and implementation of measures for mitigating and adapting to climate change in developing countries. The assistance includes financial resources, a transfer of technologies as well as technical assistance to developing countries. Upon the adoption of the Paris Agreement, Parties confirmed the financial target, called for a concrete plan to achieve it by 2020 and agreed to set a New Collective Quantified Goal (NCQG) before 2025, starting from a threshold of USD 100 billion per year, taking into account the needs and priorities of developing countries. According to the Climate Finance Delivery Plan Meeting the US\$100 Billion Goal¹⁴⁹ should be achieved in 2023.

Slovenia is mobilising climate finance from public and private sources. In 2021, it allocated almost EUR 5 million to climate finance or aid in developing countries, which is a 119% increase compared to 2020, thus almost returning to pre-Covid-19 levels.

The volume of Slovenia's climate finance in recent years was as follows:

2013 - EUR 1,960,525

2014 - EUR 2,266,840

2015 - EUR 2,393,155

2016 - EUR 3,001,508

2017 - EUR 3,750,807

2018 - EUR 4,336,958

2019 - EUR 5,784,355

2020 - EUR 2,256,420

2021 - EUR 4,938,452 (The main reason for the increase in funding is the resumption of payments to the Global Environment Facility (GEF) and the World Bank's International Development Association (IDA), which were postponed in 2020.)

¹⁴⁹ <https://www.canada.ca/en/services/environment/weather/climatechange/canada-international-action/climate-finance/delivery-plan.html>

Slovenia's climate finance is shown in the framework of the official development assistance (ODA) through the UN. Climate finance consists of multilateral development assistance and bilateral contributions, which now also includes the mobilisation of private finance. Multilateral resources include individual membership fees and payments to various dedicated funds.

Slovenia is also working to double the funding for climate change adaptation in line with the commitments agreed in the Glasgow Climate Pact. The latter urges developed countries to at least double their overall funding for adaptation by 2025 compared to 2019 levels, in order to achieve a balance between mitigation and adaptation funding. Slovenia has significantly increased its financial contributions to adaptation in 2021 (EUR 286,644 in 2020 and EUR 568,836 in 2021) and will continue to do so.

In 2021, regarding a total of EUR 4,938,452 of climate finance, Slovenia allocated EUR 3,380,887 for multilateral aid in the form of grants and EUR 1,557,564 in grants for bilateral assistance, especially for projects in the Western Balkan countries (mainly Albania, Bosnia and Herzegovina and Serbia) and the countries of sub-Saharan Africa. In this respect, Slovenia tried to allocate about half of the aid to projects for climate change adaptation, while the other half targeted projects regarding the reduction of the greenhouse gas emissions, including projects that concerned both areas, some of which included the transfer of knowledge, technologies or best practices from Slovenia to these countries.

Preliminary figures for 2022 show an increase in the total amount of climate finance compared to the previous year. In total, both multilateral and bilateral aid has been committed in the amount of little less than €6,350,000.

Slovenia regularly reports about its climate finance in accordance with article 16 of the Regulation on a mechanism for monitoring and reporting greenhouse gas emissions and for reporting other information at national and Union level relevant to climate change (No 525/2013/EU), also known as "MMR".

In line with the Strategy for International Development Cooperation and Humanitarian Aid of the Republic of Slovenia until 2030, Slovenia will continue its efforts to increase the share of funds earmarked for combating climate change. In the area of climate finance, Slovenia will also continue to follow the common decisions and guidelines for this purpose, both at the EU level and at the level of the UNFCCC.

8 RESEARCH AND SYSTEMATIC OBSERVATION

8.1 General information about research and systematic observation

Slovenia has a public education system with public and tuition-free universities – the University of Ljubljana, the University of Maribor and the University of Primorska. Their research and infrastructure are funded with public money. In addition to universities, a number of public research organisations and institutions in Slovenia are also funded by public money. Public funding supports basic research as well as applied and technological development.

In Slovenia, research falls under the Ministry of Higher Education, Science and Innovation. In order to bring together the needs of the State, the research community and the wider public in terms of priority topics, Slovenia has created the instrument of targeted research projects (TRP) with the main purpose of providing a research basis for the formulation, adoption and implementation of development policies of public interest, as well as for monitoring and supervising their implementation. Targeted research projects are a form of implementing the Slovenian Development Strategy and the Research Strategy. Therefore, the ministries themselves are responsible for launching calls for proposals on various topics, including environment and climate.

The Slovenian Research Agency (SRA) performs professional, developmental and executive tasks related to the implementation of the adopted Research and Innovation Strategy of Slovenia and the state budget, as well as other tasks related to the promotion of research activities.

In 2022, Slovenia adopted the Resolution on the Slovenian Research and Innovation Strategy, which is a key strategic document in the field of research, development and innovation that will serve as a basis for the formulation of policies in the field of social, economic and sustainable development related to societal challenges. It states that scientific research and innovation policies must contribute to sustainable development. Research and innovation will focus on specific areas, including the environment, sustainable management and conservation of the natural environment, resources, biodiversity, agriculture, forestry, food and sustainable and rational use of resources.

In the period 2018-2020, research and development expenditure increased, amounting to 2.15% of GDP in 2020, still below the EU average (2.32%). Slovenia is pursuing a target of 3% by 2030. The share of public spending in R&D was 0.58% of GDP in 2020. Compared to 2008, the share of environment and energy R&D expenditure in total R&D expenditure increased from 4.6% to 10.2% in 2020. The share of expenditures on environment was above the EU average. Although Slovenia improved its performance on the European Innovation Index in 2022, it is still below the EU average (93.5%). Most researchers in Slovenia work in the business sector.

The Slovenian Environment Agency (SEA) is a national environmental institution (a body under the Ministry of the Environment, Climate and Energy) that monitors the state of the environment and performs other professional tasks in the field of environment and nature.

The legal basis that defines and regulates the national meteorological, hydrological, oceanographic and seismological service is the National Meteorology, Hydrology, Oceanography and Seismic Service Act.

SEA provides high-quality meteorological, hydrological, oceanographic and air quality data. SEA plans, develops, maintains and manages the national infrastructure for environmental measurements. Currently, there are 451 automatic stations in our network with about 7800 instruments measuring 258 different parameters, which are transmitted to the central database at SEA in near real-time (10 min interval). The data flow exceeds 142 million data points per year. We also operate 332 manual observation stations.

SEA measuring network consists of the following measuring systems:

- 112 meteorological measuring stations with typical meteorological observations (air temperature, relative humidity, air pressure, precipitation, wind direction and speed, solar radiation),
- 201 hydrological monitoring stations on surface waters,
- 139 hydrological monitoring stations on groundwater,
- meteorological support at four Slovenian airports,
- 4 oceanographic stations (2 buoys and 2 land-based measuring stations),
- four water quality monitoring stations,
- two weather radars that measure precipitation distribution and intensity, shown in a radar image that is available to users every 10 minutes.
- three remote atmospheric sensing systems (radiosonde measurements, lidar and SODAR/RASS),
- 28 air quality stations,
- 2 manned observation stations,
- an underwater noise measurement system; and
- 26 seismic measurement sites.

8.2 Research

8.2.1 Environment and climate change research

In Slovenia, environment and climate change research is being carried out at public universities, institutes, private institutions, companies and NGOs. Funding comes both from the state as well as from Europe's numerous calls and programmes (e.g. Horizon2020, LIFE...). Relevant research is also carried out within institutions that are publicly owned: e.g. the Slovenian Environment Agency, the Administration for Civil Protection and Disaster Relief, the Institute for Water, the Fisheries Research Institute, the Forestry Institute, the Agricultural Institute.

In Slovenia, the Research Centre of the Slovenian Academy of Sciences and Arts is also active in this area. It also hosts the Jovan Hadži Institute of Biology and the Anton Melik Geographical Institute, which carry out a number of projects on climate and environment (for example the Impact of climate on avalanches in Slovenia, an ongoing project at the

Geographical Institute). The Anton Melik Geographical Institute has also been monitoring and studying the Triglav Glacier, Slovenia's only glacier, for many years. Another body of the Slovenian Academy of Sciences and Arts is the Environment Council (since 2015, previously under different names). It communicates its views to the public and other authorities, and organises expert consultations and round tables.

Research, innovation and competitiveness are also supported by the climate fund, which in its current programme allocates its funds to technological innovation, development and demonstration in the field of low carbon, green jobs, and the implementation of the programme of the comprehensive strategic project for decarbonising Slovenia through the transition to a circular economy. Funding is also earmarked to support LIFE projects, co-financing the targeted research project of Monitoring of vectors and vector-borne diseases in Slovenia, among others.

8.2.2 Selected research

Research and studies on the state of the climate and the assessment of climate change in Slovenia by the end of the 21st century are described in chapter 6.1. Climate scenarios and monitoring of climate change in Slovenia are prepared by the SEA (www.arso.gov.si), which also hosts the Drought Management Centre for Southeastern Europe (<http://www.dmcsee.org/sl/domov/>).

Other major climate and environment projects:

- The LIFE ClimatePath2050 project, which aimed to monitor progress and plan climate action to reduce GHG emissions, ended in 2021. The project also produced projections of GHG emissions up to 2050 (refining and updating the models).
- The comprehensive strategic project for decarbonising Slovenia through the transition to a circular economy has been launched. This is a Deep Demonstration project which will make Slovenia the first innovative environment in the EU to implement a systemic transition to a circular economy using the Deep Demonstration methodology. The method was developed within the EIT Climate-KIC, which operates within the European Institute of Innovation and Technology (https://www.gov.si/assets/ministrstva/MOP/Sporocilo-za-javnost/2022/01_Januar_2022/06_KIC/22_01_06_SJ_Krozno_brezogljicno_KIC_Deep-Demonstration-Slovenija-brosura.pdf).
- SRA project: Impact of climate change on the dynamics of beech and spruce woody biomass accumulation; the Slovenian Forestry Institute, duration: 2020-2023
- International COST project: COST CA17122: Increasing understanding of alien species through citizen science; the Slovenian Forestry Institute, duration 2018-2022
- SRA-TRP project: Climate change and sustainable development of Slovenian tourism; University of Ljubljana, Biotechnical Faculty, Department of Agronomy, duration 2021-2023
- SRA: WETADAPT – Adaptive and plastic potential of ectotherm physiology to respond to climate change, University of Ljubljana, Biotechnical Faculty, Department of Biology, duration 2020-2023

- Interreg Adrion, 11 partners from 7 countries (Slovenia, Italy, Croatia, BIH, Montenegro, Albania, Greece); Transboundary ecological connectivity of Alps and Dinaric Mountains; to strengthen international and transboundary cooperation between countries in order to ensure ecological connectivity for the long-term conservation of biodiversity, in particular the northward shifts of species due to climate change; partner the Agricultural Institute of Slovenia, duration 2020-2022
- EEA Grants: Circular Industry – Introducing circular economy into industrial processes (CIRCI); the Chamber of Commerce and Industry of Slovenia (project promoter); preparation of a database for 3 selected industrial sectors (metal processing, recyclable plastics processing and the electrical industry); Norwegian model adopted and adapted; award of at least 8 vouchers for the transition of companies to the circular economy, resulting in at least 8 pilot and demonstration projects; 5 innovative green technologies/processes/solutions foreseen to be implemented; 3 action areas addressed in the Slovenian Development Strategy 2030; duration 2022-2024
- Horizon 2020, Integrating Community Power in Energy Islands (COMPILE), University of Ljubljana, Faculty of Electrical Engineering – Laboratory of Energy Policy (project coordinator), 13 partners (partners also include Erel and the Institute for Innovation and Development of University of Ljubljana), duration 2018-2022; the main objective of the project is launching local energy systems that support the growth of RES in constrained grids and can accelerate the transition to a resilient, active grid that includes energy communities.
- Horizon 2020, New technologies and strategies for fuel cell and hydrogen technologies in the phase of recycling and dismantling, University of Ljubljana (partner), duration 2015-2020
- Horizon 2020, Smart, green and integrated transport, (Optimization of scalable realtime models and functional testing for e-drive concepts), University of Ljubljana, Faculty of Mechanical Engineering, Faculty of Electrical Engineering, Institute of Chemistry (partners), 2017-2020

8.3 Systematic observation

8.3.1 Atmospheric Climate Observing System

METEOROLOGICAL PARAMETERS

The first meteorological observations in Ljubljana began in 1824, but no records have been preserved since then. In 1850, the meteorological observatory in Ljubljana started operating again, and in the following years observation sites spread to other parts of Slovenia. The number of observation sites varied considerably, so only few carried out long-term observation. The establishment of the Hydrometeorological Service Administration in 1947 marked the beginning of the national meteorological and hydrological service in Slovenia.

The number of homogenisation stations, with data from 1961-2011, depends on the variable, as not all of them are measured at the same density:

- Air temperature (average, daily maximum and minimum): 50 stations (average and maximum), 37 (daily minimum air temperature)

- Precipitation: 266 stations
 - Total and fresh snow cover: 268 or 211 stations
 - Sunshine duration: 27 stations
 - Reference potential evapotranspiration: 63 stations
 - Air pressure: 12 stations
- We send real-time data to the international data exchange, which operates under the auspices of the World Meteorological Organisation (WMO):
 - 1-hour data from 20 synoptic stations
 - 10-min data from 94 automatic weather stations
 - Once a month, monthly aggregates are sent from two CLIMAT stations.
 - Every few years, we share data with Austria and Croatia, when we exchange daily data from 22 climatological and 146 precipitation stations.

8.3.2 Ocean climate observing system

Data from oceanographic buoys are included in the following international data exchanges:

- WMO
- MONGOOS
- EMODnet Physics

The following data is sent for international exchange:

- Koper mareographic station:
 - sea level
 - wind speed
 - wind direction
 - sea temperature
 - humidity
 - air temperature
 - precipitation
 - pressure

- Oceanographic buoys Zora and Zarja:
 - direction of the sea current (at all depths)
 - speed of the sea current (at all depths)
 - significant wave height
 - maximum measured wave height
 - wave direction
 - wave period
 - sea temperature

8.3.3 Terrestrial climate observing system

PHENOLOGICAL OBSERVATIONS

Phenological observations date back to 1950/51, when a network of special phenological observation sites began to be established. Today, 53 stations are in operation, distributed according to a regional climate key.

Data from 13 stations with a long-standing series of observations are included in the European PEP725 database.

HYDROLOGICAL OBSERVING SYSTEM – SURFACE WATERS

Surface water hydrological data are included in international data reporting and exchanges:

- GRDC (Global Runoff Database)
 - o 29 stations: flow rate
- EFAS (European Flood Awareness System)
 - o 179 stations: flow rate and water level
- Sava HIS
 - o 31: flow rate, water level and temperature
 - o 3 stations: opacity
 - o 76 meteorological stations: precipitation and air temperature
- EEA (European Environment Agency)
 - o 111 stations: flow rate
- Permanent Slovenian-Austrian Commission for Mura
 - o 2 stations: flow rate
 - o 1 station: opacity
- Permanent Slovenian-Austrian Commission for Drava
 - o 2 stations: flow rate
- Permanent Slovenian-Croatian Commission for Water Management
 - o 7 stations: flow rate
- Permanent Slovenian-Hungarian Commission for Water Management
 - o 3 stations: flow rate
- ICPDR (International Commission for the Protection of the Danube River)
 - o 2 stations: flow rate

HYDROLOGICAL OBSERVING SYSTEM – GROUNDWATER

Groundwater hydrological data are included in international reporting:

- EEA (European Environment Agency)
 - o 31 stations: groundwater level
- River Basin Management Plan (RBMP)
 - o The last reporting for the 2022–2027 status assessment (the RBMP III) included reporting on the groundwater quantitative status assessment methodology, the number of groundwater bodies, the monitoring programme, the number of monitoring sites at which water levels are measured for the quantitative status assessment (164 monitoring sites in RBMP III), the frequency of measurements and the depth of measurements. We did not report specific data on parameters for RBMP.

GLACIER OBSERVATION

Two glaciers are monitored in Slovenia; the Skuta Glacier and the Triglav Glacier. Regular annual measurements have been carried out since 1946 by the Anton Melik Geographical Institute, Research Centre of the Slovenian Academy of Sciences and Arts (ZRC-SAZU). Data is exchanged through the World Glacier Monitoring Service.

LTER NETWORK

Slovenia participates in the LTER network with observations at 16 sites, including two caves.

8.3.4 Space (satellite) observing system

Meteosat satellite measurements have been in operational use at Slovenian Environment Agency (SEA, formerly HMZ) since 1996. Since 2008, Slovenia has been a member of EUMETSAT, an international organization for exploitation of meteorological satellites. This means that Slovenia has operational access to a wide range of satellite data.

EUMETSAT satellite measurements and products are used for atmospheric monitoring, issuing warnings, ensuring air traffic safety and monitoring soil status and are integrated into climate studies.

Slovenia is an associate member of the European Space Agency (ESA), coordination activities being covered by the Slovenian Ministry of Economy, Tourism and Sport.

8.3.5 Radar observing system

To monitor precipitation systems, SEA maintains two radar systems; the Lisca radar since 1984 and the Pasja ravan radar since 2014. Radar data are sent for international data exchange at European level managed by the EUMETNET OPERA programme. This programme harmonizes radar measurements and produces a central radar composite for Europe.

9 EDUCATION, TRAINING AND PUBLIC AWARENESS

9.1 General Characteristics

According to a special [Eurobarometer opinion poll](#)¹⁵⁰ from 2021, almost eight out of ten Slovenian respondents perceive climate change as a “very serious” problem (77% compared to the EU average of 78%). Approximately one out of ten (11% compared to the EU average of 18%) consider it to be the single most serious problem. About three quarters of respondents (75%) say they have taken action themselves to combat climate change in the past six months, which is much higher than the EU average (64%). When reviewed on an activity-by-activity basis, it is clear that there is a disconnect between awareness of the problem and an active approach to addressing it. In fact, the responses show that the measures that have a greater impact on reducing emissions are implemented by a smaller proportion of respondents.

In 2020, the LIFE Care4Climate energy efficiency survey was carried out in Slovenian households. The results showed a satisfactory level of environmental awareness and financial literacy, while energy literacy is at a much lower level. The survey results suggest that people need to be better informed in order to provide an adequate basis for assessing whether energy efficiency investments are justified.

The **key players** in the implementation of Article 6 of the UNFCCC and the Kyoto Protocol in terms of raising public awareness regarding the climate change issue, its causes and consequences, and activities to combat climate change include, at government level, the Ministry of the Environment, Climate and Energy, the Ministry of Infrastructure, the Ministry of Economy, Tourism and Sport, the Ministry of Finance, and the Government Communication Office. The above-mentioned ministries are also active in the areas of education and training on climate change, whereas the lead government bodies are the ministry responsible for education (Ministry of Education and the Ministry of Higher Education, Science and Innovation) and the ministry responsible for employment policy and lifelong learning (Ministry of Labour, Family, Social Affairs and Equal Opportunities).

Educational and communication activities on climate change and related topics (e.g. best practices in the areas of waste, water, energy) have also been implemented by government agencies (e.g. the Slovenian Environment Agency – SEA) and other entities (educational and training organizations, NGOs, media, business, local communities...). Financing was provided from a variety of sources, including the national budget, EU funds and various international sources.

9.2 Education

Responsibilities relating to the development and operation of education systems are shared among the Ministry of Education, Ministry of Higher Education, Science and Innovation, local communities (municipalities), expert councils appointed by the Government of the Republic

¹⁵⁰ https://ec.europa.eu/clima/citizens/support_en

of Slovenia, and institutions established to develop and provide advice on education (National Education Institute of the Republic of Slovenia, Institute of the Republic of Slovenia for Vocational Education and Training, Slovenian Institute for Adult Education, and National Examinations Centre).

A number of topics relevant to climate change education are addressed in the context of environmental education (which has a long tradition in the Slovenian education system) and more recently introduced education for sustainable development (ESD) – for example, in the framework of energy efficiency, renewable energy, sustainable consumption and sustainable transport.

As early as 2008, the Organisation and Financing of Education Act listed among the fundamental objectives of education and training also the “educating for sustainable development and active integration into a democratic society which includes deeper understanding and a responsible attitude towards oneself, one’s own health, other people, towards one’s own and other cultures, natural and social environment, and future generations”. In 2016 and 2017, an analysis of curricula and curriculum documents was carried out in terms of the integration of key concepts and competences of sustainable development, compliance with ESD principles, and the presence of didactic approaches/methods and forms of work aimed at implementing the ESD objectives. Identified shortcomings pertain to the fundamental principles of this educational concept and indicate that sustainable development is not yet taught as a broad and comprehensive concept involving interconnected environmental, economic and social issues, whereas environmental categories are the ones with greatest prevalence. Although presented more frequently, some very relevant environmental categories are not included in curricula and curriculum documents (such as low-carbon economy, adaptation to climate change, sustainable mobility, sustainable construction, circular economy), or are only found in one or two curricula, whereas some other categories are not properly addressed. Analysis of curriculum implementation in a small sample of educational institutions that are on the active side of the spectrum showed that, despite implementing a great diversity of activities and showing a deliberate strategic approach to the introduction of ESD, school environments are nevertheless often limited to one-off environmental actions and only a small part of the activities is aimed at changing mindsets and introducing a systemic approach to sustainable development.

Similarly, the findings of the 2018 PISA survey (OECD, 2020d) highlight gaps in 15-year-olds’ knowledge of climate issues, which is closely linked to environmental issues and sustainable development, and in their knowledge of the impact that economic development has on the environment.

To improve the situation, the Climate Goals and Content in Education (2022–2023) project, funded by the Climate Change Funding Programme, is underway. The key activities of the project are the development and implementation of an integrated programme of public awareness-raising and education on climate change in the context of education for sustainable development. Detailed guidance will be provided as part of the curricula, the development of educational institutions or organizations, and the training of teachers and other staff. Moreover, public institutions will develop new teaching materials, manuals and didactic kits for programme implementation, or update the existing ones. In addition, they will set up demonstration preschool facilities, schools and other educational organizations that will

undergo a holistic transformation towards sustainable living and working, and reducing the ecological footprint. Planned activities also include an update to national guidelines for education and training for sustainable development, educational programmes, curricula and other curriculum documents and materials comprising climate objectives and content. Also included is the preparation of a draft plan for introducing the programme in preschool education, primary and secondary schools and other educational organizations in Slovenia, establishing a systemic approach to education and training and raising awareness about climate change, and developing competences for the transition to a low-carbon economy and society. A website will be established for the awareness-raising and education on climate change programme in the context of ESD, aiming at providing information and communication channels to the public. The planned activities also include the testing and evaluation of the programme in a larger sample of up to 80 schools and educational organizations. In total, up to 15 demonstration educational institutions or organizations are planned to be set-up. In addition, the measure will provide financial support for up to 40% of educational institutions or organizations to carry out shorter activities related to the climate objectives, which are already established in Slovenia and will be professionally verified by the above-mentioned public institutions, each for its own level or field of work.

In addition, activities are underway to integrate sustainable mobility into the education system under the Operational Programme for the Implementation of the European Cohesion Policy. In 2021, the Behaviour and Education Culture Strategy for Sustainable Mobility of Children and Adolescents in the Education System until 2024 was developed to guide leaders and experts in developing and strengthening knowledge and skills and awareness-raising regarding the importance of sustainable mobility and introducing children to the broader framework of sustainable mobility. National conferences on Implementation of Sustainable Mobility in Education are held annually, and manuals on sustainable mobility have been prepared for preschool, primary school and secondary school teachers.

The **Eco-school programme**¹⁵¹, coordinated by the DOVES-FEE association, is Slovenia's most established programme among the ones that follow the objectives laid out in the documents on environmental education and education for sustainable development. The programme has been implemented in 1995 and is supported by the European Commission and the UN. Its objective is to systematically promote environmental education and raise awareness among young people, especially about the importance of protecting the environment and human health. Over the years, Eco-Schools have had a tremendous impact on environmental awareness of the population, especially young people, and Slovenia is considered to be one of the most successful countries regarding the implementation of this programme. In the 2018/2019, a new category of topic, i.e. climate change, was added to the programme of Eco-Schools, which was also included in 2020/2021 school year. Schools often participate in region-wide or world-wide events, such as the European Mobility Week, the Earth Day, the World Water Day, where climate change issues are also addressed. In the 2021/22 school year, 739 institutions were enrolled in the programme, representing almost 38% of all schools and

¹⁵¹ The international "Eco-Schools" programme is one of the programmes devised by the international Foundation for Environmental Education – FEE.

preschool institutions in Slovenia. More than 130,000 Slovenian children and 8,500 educators and teachers have been involved in environmental education through environmental projects.

The Integrated National Energy and Climate Plan (NECP), adopted in February 2020, identifies education as an important element of climate policy. The NECP states that more financial resources will be allocated to the transformation of educational content.

In line with the NECP and the Slovenian Development Strategy (SDS), the Recovery and Resilience Plan (RRP) allocates a share of research, innovation and education resources to the green transition. The plan comprises a set of reform and investment measures that will create conditions for higher quality education, equipping students with key competences, including the competences for the digital and green transitions. The plan lays out actions for all levels of education. The development area Smart, Sustainable and Inclusive Growth under component 5: Strengthening Competences, in particular digital competences and those required by new professions and the green transition (C3 K5), contains the following planned reforms:

- Renovating the education system for the green and digital transitions (reformation of curricula and exam catalogues in selected areas, setting up a comprehensive support environment).
- Makeover of higher education for a green and resilient transition to Society 5.0 (creating a system that is responsive to environmental needs and produces a highly skilled workforce).
- Modernisation of secondary vocational training and vocational education including apprenticeships, and redesigning higher education study programmes for the green and digital transition.
- A strategy for greening educational and research infrastructure in Slovenia.

The National Environmental Action Programme recognizes the importance of education for nature conservation, stating that “Nature protection activities and behaviours in society that can contribute to nature conservation extend to all areas of social activities and affect all generations. An individual with a proper interdisciplinary education is therefore a key factor in achieving the goals of this programme. It is therefore important to acquire knowledge about nature and awareness of the importance of its preservation in the education system and in informal forms of education.” The programme also lays out the following two guidelines:

- Ensure an adequate scope of acquiring knowledge from basic natural sciences, especially biology and ecology, in educational programmes for all professions that in any way concern interventions in nature.
- Establish regular training for services working in biodiversity conservation and management of its components for their high-quality performance of tasks.

The Ministry of the Environment, Climate and Energy supports a number of education activities with funding from the Climate Change Funding Programme, such as the Sustainable Mobility in Practice project which provided seminars for primary school leadership and teachers. LIFE IP Care4Climate is also co-funded by the Climate Change Funding Programme. This project covers a number of activities supporting education. Among other activities, the Slovenian Platform for Sustainable Mobility is supported, with the participation of the Ministry of the Environment, Climate and Energy. The platform aims to be a central tool for

distributing sustainable mobility content to key stakeholders involved in planning, decision-making and implementation of sustainable mobility and transport policy. The portal also includes teachers' handbooks on sustainable mobility. Organisation of four summer schools and four research camps is planned as well.

In March 2022, the National Assembly of the RS adopted the Resolution on National Programme of Higher Education 2030, which also covers sustainability. The resolution states that "Higher education will be involved in all priority strategic areas of social development and will address key social and economic challenges, such as climate change, biodiversity loss, green technologies, demographic change (population ageing), health, biotechnology, environment, agri-food, artificial intelligence, digital transformation, smart specialization strategy, transition to a sustainable society, as well as migration and equality of opportunity or social equality."

For adults, there are sustainability education courses run by the Slovenian Institute of Adult Education, training courses run by folk high schools and activities in the framework of the Education for Sustainable Development Week, the European Mobility Week and the Eco Fund. Nevertheless, adults express a need for additional training. These findings are supported by Eurobarometer data showing that less than a quarter of respondents in Slovenia (similar to the EU average) think that more education and information on environmental issues (energy saving, waste management, etc.) should be made available.

9.3 Training

One of the key objectives in the field of energy efficiency in the Comprehensive National Energy and Climate Plan (NECP) is to accelerate the implementation of information, awareness-raising and training programmes for different target groups on the benefits and practical aspects of developing and applying EE and RES technologies. In addition, the NECP contains training instruments for other sectors, such as forestry (training and workshops on sustainable forest management for forest owners), agriculture (training programmes, advisory and demonstration projects, Public Advisory Service), F-gases training (training for service technicians for appliances using F-gases), etc.

The importance of training is also recognized in the Resolution on the National Environmental Action Programme 2020–2030, which includes two activities pertinent to this area: Implementation of trainings to integrate the competence of sustainable development into occupational standards and education programmes and integration of the competence of sustainable development into occupational standards.

The Act on Energy Efficiency (ZURE) establishes a systematic approach to training and certification of qualifications in several areas of energy efficiency by defining conditions for obtaining licenses for independent experts related to preparation of energy performance certificates, inspections of air-conditioning systems and inspections of heating systems. It also provides for the training of installers of RES appliances, and lays down the conditions for providers of energy consultancy services for citizens, and foresees the organization of their additional regular trainings.

Below is an overview of some of the activities that have been carried out or are ongoing in the field of training in Slovenia:

- EUREM – European Energy Manager training is aimed in particular at those responsible for energy management in public and private sector companies, building managers, plant and production managers and process engineers. In the training, participants learn how to analyse the energy situation of a company, how to technically and organisationally prepare and manage energy efficiency projects and how to present such projects to the company’s management, how to calculate estimates and ensure savings targets, and how to ensure continuous improvements within the company. Thus far, 251 energy managers have completed training in 13 courses. The training in Slovenia has been ongoing since 2008 and was replicated from Germany as part of a European project.
- Targeted training for the transition to a low-carbon society is part of the LIFE IP Care4Climate project. Four different targeted training activities are being carried out:
 - targeted training on energy performance contracting;
 - targeted training on energy renovation of buildings for energy managers in the public sector and industry, designers, maintenance and energy managers;
 - targeted training on energy management in the public sector;
 - targeted training on energy management in industry.
- The Care4Climate project includes several training activities in the following areas:
 - *Creation of a training plan for the transition to a low-carbon society and the establishment of a national qualification platform* (This activity addresses the issue of non-implementation of the planned policies and measures which is the consequence of the lack of knowledge or even will to use new technologies. The outcome of this activity will be an optimal training plan and an established qualification platform for an effective environmental and energy-efficient education.)
 - *The preparation, implementation and monitoring of targeted training courses in the field of energy efficiency, renewable energy and green energy technologies and the validation of acquired skills and knowledge* (This activity addresses the identified need to train specific target groups for a better implementation of the OP GHG measures. Thirteen training plans will be carried out, namely on green public procurement, energy performance contracting, energy renovation of buildings, energy management in public buildings and industry, preparation of local energy concepts, and on some solutions and technologies in the field of energy performance of buildings. The activity includes the implementation of such training as well. The activity will improve the implementation of energy efficiency measures and the use of renewable energy sources. It includes, inter alia, targeted training.)
 - *Community engagement for the transition to a low-carbon society* (The goal of this activity is to empower local communities, especially municipalities, to contribute to the goals of emission reduction with implementation of community projects in the field of energy, mobility, local circular economy and food supply.)

- *Capacity building for public administration for the transition to a low-carbon society and the implementation of participatory processes* (This activity addresses the lack of knowledge and competences of public employees for implementing climate change mitigation measures. Empowering, raising awareness and providing information for public employees at national and state levels in the fields of climate policies, energy efficiency, renewable energy sources, sustainable mobility, green offices, etc., can contribute to a more efficient transition to a low-carbon society. Their inclusion as stakeholders can accelerate the implementation of measures to reduce greenhouse gas emissions as defined in the OP GHG. The goal of this activity is to build public employees' capacities to implement measures for emission reduction through workshops and guidelines.
- as well as in the field of LULUCF through the activity *Building professional and governance capacities* (The objective of the activity is to improve the level of knowledge and governance capacities in the LULUCF area and to increase the accessibility and use of data relating to this area. Within the scope of this activity, an assessment of current professional and governance capacities in the LULUCF area will be made, a training course will be provided for training providers who will disseminate knowledge and train experts and decision-makers in the years to come by carrying out a programme of workshops and organising multi-day summer schools for Slovenian students and students from other EU countries.)
- In the framework of the information centre on efficient use and renewable energy sources Sustainable Energy the following training activities are held: training on the implementation of energy audits, energy management in the public sector, energy management in energy intensive companies, sustainable energy locally, green public procurement. The information centre is set up in accordance with the Act on Energy Efficiency (ZURE).
- In accordance with ZURE and other legislation, training for regular inspections of air-conditioning systems, training for energy performance certificate producers, training for ENSVET consultants, training for energy managers, training for engineers and architects in sustainable construction, energy efficiency, green public procurement, etc. is also provided.
- Within the framework of the aforementioned Slovenian Platform for Sustainable Mobility (<https://www.sptm.si/>), a number of training activities on various topics of sustainable mobility (training on the preparation of municipal integrated transport strategies, evaluation of sustainable urban mobility plans, seminar on planning a healthy city together) are carried out. The portal also offers a collection of guidelines on sustainable mobility, manuals and other materials.
- In agriculture, advice is provided under the Rural Development Programme and, in the future, it will also be provided under the Common Agricultural Policy Strategic Plan. The objective of this activity is to improve the specific knowledge of operators

wishing to participate in the measures of the Rural Development Programme and the Strategic Plan and keep them informed.

9.4 Raising awareness

The NECP provided for the preparation and implementation of a comprehensive national promotion and awareness-raising campaign on the meaning of and the way to transition to a climate neutral society. A truly comprehensive campaign (including the proposed e.g. Climate Week) has not been achieved, but many awareness-raising activities are being carried out in the framework of various projects, and more and more companies are getting involved.

Awareness-raising on climate change, including both mitigation and adaptation, is very broad. The following are just a few examples:

- The largest awareness-raising project is the LIFE IP CARE4CLIMATE project (<https://www.care4climate.si/sl>) with the following activities aimed at:
 - **Raising awareness on climate change and its implications for Slovenia and the promotion of good practices of reducing GHG emissions** (The objective of this activity is to raise awareness of key target groups and the general public about climate change and its consequences for Slovenia, and about national climate policies and measures to mitigate climate change as well as muster public support for climate policies. To this end, documents with information on the physical, political and legislative background of climate change mitigation, collections of good practices substantiated with video content and field inspections, multimedia presentations, lectures, and exhibitions for the general public will be organised.)
 - **Engaging young adults about voluntary climate change mitigation actions** (The purpose of this activity is to raise awareness among young people (from 16 to 24 years old) and young families (up to 40 years old) about voluntary actions to mitigate climate change. A change in the habits of young people has the potential to become permanent and can accomplish the desirable change to their behaviour. To this end, the digital campaign will entail a series of short animations with compelling photos to attract the attention of the target group. The key messages of the campaign will be based upon the principles of plastic-free living, sustainable mobility and the economic benefits of voluntary measures in the relevant project areas.)
 - **Hackathon series on climate change mitigation** (A hackathon is a form of a design-thinking event about a specific topic with the aim of finding new solutions for already existing problems. Within the project, a series of hackathons (3) will be organised where brainstorming sessions about climate change mitigation will be held. The aim of the first hackathon, organised in 2021, was to acquaint the participants and the general public about this topic, connect the results of integration of young people into voluntary actions and to identify possible ways of addressing the public about this issue with concrete solutions.)

- **Engaging target audiences on energy efficiency** (As a complementary activity to the C4 “Quality assurance and improvement of efficiency in construction renovation”, and C6 “Development of financial instruments and activation of other financing sources for construction renovation in the housing sector and for energy efficiency in private companies campaigns”, the aim of this campaign is to change habits of individuals and organisations in the field of energy usage. We will try to accomplish this with an online campaign aimed at households and individuals. The campaign will directly complement the measures in the field of energy efficiency in buildings, and raise the profile of activities and results.
- **Making cities walk, talk and cycle** (The target group of the activity are children, young persons and young families. The goal of the campaigns is to reduce the number of short-distance journeys made by car and, indirectly, reduce GHG emissions.)
- European Mobility Week with its Car-Free Day is a major annual EU campaign for sustainable mobility, implemented by the Ministry of the Environment, Climate and Energy . The objective of the initiative is to inform the public of the consequences of the excess use of cars and road transport in general, and to promote changes in mobility habits. The campaign draws attention to climate change and to factors creating a city “climate”: quality of life, air quality, noise pollution, traffic safety, quality of public surfaces, social integration of the population and general atmosphere in cities. Municipalities are of the key importance in this campaign, since they have a detailed knowledge of the transport-related issues in individual places and can also define traffic regimes in cities in the fastest possible manner and contribute to sustainable mobility.
- European Mobility Week has taken place every year since 2002 between September 16 and 22. The last day is devoted to the Car-Free Day. Slovenia joined the project already in the first year. The Ministry of the Environment, Climate and Energy invites local communities to participate and helps them to implement the project by preparing awareness-raising publications and different activities. The number of participating municipalities is constantly increasing. In 2022, 96 out of 212 municipalities joined the initiative.
- In accordance with ZURE, the Centre for RES/CHP publishes a wide range of information to raise public awareness on energy efficiency and renewable energy sources. Information is gathered on the Sustainable Energy portal: <http://www.trajnostnaenergija.si/>).
- In accordance with Article 211 of the Environmental Protection Act (ZVO-2), Eco Fund also carries out activities to promote various forms of public education and awareness-raising. Such activities are crucial to ensure that the different target groups are aware of and understand the environmental issues, and are willing to change their behaviour. These activities have also contributed to the promotion of Eco Fund, its visibility and the use of its services. To this end, the following was ensured in 2020:

- financing and providing free and independent energy advice for citizens within the ENSVET network, in accordance with Article 352 of the Energy Act (EZ-1) (or Article 56 of ZURE);
- co-financing of projects by non-governmental organisations (hereinafter: NGOs) operating in the public interest; in 2020, 4 interim payments were made for projects selected under the call for tenders NVO-SJI18 for co-financing projects of NGOs working in the field of climate change and 2 first advance payments were made for climate programmes of thematic networks selected under the call for tenders NVO19 for co-financing climate programmes of NGO thematic networks working in the fields of environmental protection and spatial planning; promotion of the Eco Fund in the framework of projects and events of NGOs was also carried out;
- promoting the Eco Fund in the context of projects and events organised by NGOs and other entities;
- advertising the Eco Fund's services and regular communication with the public; in accordance with Article 351 of EZ-1 (or Article 55 of ZURE), financing the implementation of the Support Centre for RES/CHP/Borzen's programme for information, awareness-raising and training in accordance with the contract concluded for the financing of the planned activities.

The specific area of energy poverty alleviation has also started to develop more intensively. Some of the measures are included in public calls for citizens and allow for 100% subsidies for socially vulnerable citizens to renovate their homes. The ZERO and ZERO500 projects, co-funded by the European cohesion policy, are also linked to the ENSVET network.

- The ENSVET network of energy advisors offers free, independent and individual energy advice to citizens, carries out educational and awareness-raising activities to promote energy efficiency measures and renewable energy sources, and works to reduce energy poverty in the local environment. ENSVET is co-financed and coordinated by the Eco Fund, which organises a network of advisory offices with interested local communities on the basis of Article 56(2) and (5) of ZURE (formerly Article 352(2) and (5) of EZ-1). ENSVET has 54 specially trained independent energy advisors working in 57 offices across Slovenia. Their main task is to offer free advice and consultations and help in selecting, planning and implementing investment measures for the efficient use of energy and the use of renewable resources in residential buildings. In 2020, with the adoption of ZURE, the network extended its activities to all legal entities and the public sector. To this end, activities are underway to train advisers in this area. ENSVET has performed 6,498 activities involving free advice on energy (written advice, e-advice, articles, TV articles, lectures, schools, other) by 31.12.2020.
- The Slovenian Environment Agency (SEA) is responsible for monitoring and analysing natural phenomena and processes in the environment, such as weather, water quality and quantity, air quality, climate change, earthquakes. It also calculates emissions of greenhouse gases and air pollutants for Slovenia, monitors emissions

from point sources and influences their reduction through systemic measures. All information is available on its website. SEA publishes a monthly bulletin that includes climate change data (<http://www.arso.gov.si/o%20agenciji/knji%c5%benica/mese%c4%8dni%20bilten/>) and regular analyses of extreme weather events. It is also present on Twitter and Facebook, and publishes podcasts on topics of interest. SEA manages the “Environmental Indicators in Slovenia” portal (<http://kazalci.arso.gov.si/en>), which is one of the four pillars of environmental reporting prepared in accordance with the Environmental Protection Act. The portal provides access to more than 180 environmental indicators, grouped into 20 categories based on numerical data indicating the state, characteristics or evolution of an individual phenomenon. The indicators make it easy to view information on trends in activities affecting the environment and its state.

9.5 Non-governmental organisations

Non-governmental organisations (NGOs) and organised civil society are the key contributors to the development and implementation of democracy and human rights. By involving a large number of individuals, they are an important component of participation in an open democratic society. Because of their knowledge and independent expertise, they can generously contribute to the decision-making processes, which has prompted the governments at all levels – local, regional or national – as well as international institutions to take into account the relevant experience and competences of NGOs when designing and implementing policies.

NGOs have an important role to play in public information and awareness, especially those that work in the field of environment protection and nature conservation. There are 54 NGOs active in the public interest in the field of environmental protection and nature conservation.

When it comes to environment issues, NGOs are important agents of cooperation, since they include individuals with common interests who are aware of their social responsibility. They enforce principles of environment and nature protection and sustainable development at all levels of political decision-making processes and activities. The most important operating area of NGOs for environmental and nature protection is undoubtedly influencing the policy and legislation planning in Slovenia and on the EU level, and raising public awareness regarding environment and sustainable development. The Ministry of the Environment, Climate and Energy has been trying to enhance the dialogue with this important part of the civil society for several years.

The National Environmental Action Programme emphasizes the important role of NGOs. The resolution states that achieving environmental protection goals in an effective way by exploiting the synergy effects of environmental stakeholders will require the strengthening of dialogue, understanding and cooperation between state and local government bodies, non-governmental organisations in environmental and nature protection, the Ombudsman, professional institutions, media and the general public and that the implementation of measures shall be organised in a way enabling the effective use of the capabilities of stakeholders. The resolution underlines the importance of supporting NGOs in the implementation of the National Environmental Action Programme, facilitating NGOs’

activities and ensuring systematic, open and substantively rich dialogue or cooperation. The resolution also recognises that the key condition for utilising the capacity of NGOs is that they are funded in a way and to an extent that allows for the continuous and systematic implementation of support activities for environmental protection.

Co-financing of NGOs is carried out through public calls for tenders by the Eco Fund, which allocates the funds under the Climate Change Funding Programme. In 2021, all 6 projects selected under the call for tenders NVO-SJI18 for the co-financing of NGO projects were completed, namely: Awareness raising, education and introduction of CO₂ footprint measurement in eco-schools as a contribution to climate change mitigation and adaptation (Ozaveščanje, izobraževanje in uvajanje merjenja odtisa CO₂ v ekošole kot prispevek k blaženju in prilagajanju podnebnim spremembam) (DOVES-FEE Slovenia, Association for Environmental Education in Europe Slovenia), Sizing e-drives for vocational schools-wheelchairs (Dimenzioniranje e-pogonov za poklicne šole-invalidski vozički) (Alpe Adria Green), Green roof as a tool for improving the quality of life in urban centres (Prostorož), Changing travel habits as part of the solution in the fight against climate change and air pollution (Spremembe potovalnih navad kot del rešitve v boju proti podnebnim spremembam in onesnaženju zraka) (PIC – Environmental defenders – for climate, Maribor Cycling Network), Training of contractors for better quality of building energy envelopes, reducing complaints and improving the impact of energy savings for heating, reducing pollution and more efficient use of subsidies (Izobraževanje izvajalcev za kakovostnejšo izvedbo energijskih ovojev stavb, zmanjšanje reklamacij in izboljšanje učinka prihranka energije za ogrevanje, zmanjšanje onesnaževanja ter učinkovitejšo porabo subvencij) (Slovenian Association for Sustainable Construction – Green Building Council Slovenia). At the end of 2019, the Eco Fund launched a new open call NVO19 to co-finance climate programmes of thematic networks. EUR 800,000 from the Climate Change Funding Programme has been announced for the four-year operation of two thematic networks in the fields of environmental protection and spatial planning. The call for proposals received 2 applications which were selected: “Plan B for Slovenia – Network of sustainable development NGOs¹⁵²” for the field of environmental protection by the applicant Umanotera Foundation – Slovenian Foundation for Sustainable Development, and “Network for Spatial Development¹⁵³” for the field of spatial planning by the applicant Institute for Spatial Policies. In addition, NGOs apply for other projects funded by the ministries (e.g. Care4Climate) and also European projects (bilateral or EU projects).

The following NGOs are most active in the field of climate change: Focus – Association for Sustainable Development (<https://focus.si/>); Umanotera – Slovenian Foundation for Sustainable Development (<https://www.umanotera.org/>); Institute for Spatial Policies (<https://ipop.si/>), CIPRA Slovenia, Society for the Protection of the Alps (<https://www.cipra.org/sl/>).

Plan B for Slovenia – Network of sustainable development NGOs brings together NGOs that understand sustainable development as development that meets the needs of the present generation without compromising the needs of future generations. The network currently brings together 38 NGOs, 26 of which have acquired the status of entities operating in the

¹⁵² <https://www.planbz slovenija.si/>

¹⁵³ <https://www.mrezaprostor.si/>

public interest. The network has been operational since 2007. The purpose of the network is to represent the voice of its member NGOs. It focuses on influencing policies and on the implementation and evaluation of agreed policies, striving for efficiency by combining knowledge with representativeness, active participation of its members and coalition building. Plan B for Slovenia is a partnership of NGOs to jointly formulate and represent positions; strengthen the voice of NGOs and speak out jointly on specific issues; establish and maintain a systemic dialogue with authorities and other bodies at local, regional, national and EU level; contribute to addressing key environmental problems; cooperate with other networks in the national and international arena; and collect and disseminate information on relevant issues.

9.6 Involvement of the public

Eighth National Communication has been presented to the public at the event on the 16th of December 2022, where the content of the report was presented. About 50 listeners attended the presentation, followed by a discussion.

In addition, the report will be published on the ministry's website, making it freely accessible to everyone.

Annex A – Glossary

AECP	Agri-Environment-Climate Payment
AGEN-RS	The Energy Agency of the Republic of Slovenia
AIS	Agricultural Institute of Slovenia
AN URE 2020	Energy Efficiency Action Plan
AR4	Forth Assessment Report IPCC
BAT	Best Available Techniques
BR3	3rd Biennial Report to UNFCCC
BR4	4th Biennial Report to UNFCCC
CAP	Common Agricultural Policy
CAP SP	Common Agricultural Policy Strategic Plan 2023-2027
CCF	Climate Change Funding Programme
CCU	Carbon Capture and Utilisation
CEC	Citizen Energy Community
Climate Fund	Climate Change Fund (see also CCF)
CHP	Cogeneration of heat and power
CLRTAP	Convention on Long-Range Transboundary Air Pollution
CNG	Compressed Natural Gas
COPERT	Software program which is developed as a European tool for the calculation of emissions from the road transport sector.
CTS	Comprehensive Transport Strategies
DH	District Heating
DHS	District Heating Systems
DSEPS 2050	Long-Term Building Energy Renovation Strategy for 2050
EAFRD	European Agricultural Fund for Rural Development
ECOFIN	Economic and Financial Affairs Council
ECP (2021-2027)	European Cohesion Policy Programme 2021-2027
EEA	European Environment Agency
EED	Energy Efficiency Directive
EEU	Efficient Energy Use
EF	Emission factor

EMEP	Programme for monitoring and evaluation of the long-range transmission of air pollutants in Europe (European Monitoring and Evaluation Programme)
ENSVET	Energy advisory network for citizens
ENVI	Environment Council
EPC	Energy Performance Contracting
EPREL	European Product Database for Energy Labelling
ERDF	European Regional Development Fund
ESA	European Space Agency
ESD	Emissions covered by Effort sharing decision (see also Non-ETS)
ESR	Emissions covered by Effort sharing regulation (see also Non-ETS)
EU	European Union
EU ETS	EU Emissions Trading System
EUMETSAT	European operational satellite agency for monitoring weather, climate and the environment from space.
EUREM	European Energy Manager training
EUROPOP2019	EU population projections
EUSAIR	Adriatic-Ionian macro-region
EZ-1	Energy Act
FIS	Forestry Institute of Slovenia
GDP	Gross Domestic Product
GHG	Greenhouse gases
GODECP	Government Office for Development and European Cohesion Policy
GPP	Green Public Procurement
H2	Hydrogen
HPP	Hydro Power Plants
IMAD	Institute for Macroeconomic Analysis and Development
IPPU	Industrial processes and product use
ITS	Integrated Transport Strategy
JSI	Jozef Stefan Institute
JTF	Just Transition Fund
KC	Key category
LCS	Low carbon society
LEA	Local Energy Agencies

LEC	Local Energy Concepts
LECom	Local Energy Community
LIFE	EU's financial instrument supporting environmental, nature conservation and climate action projects throughout the EU
LNG	Liquified Natural Gas
LTSERB (2050)	Long-Term Strategy for Energy Renovation of Buildings for 2050
LULUCF	Land use, land use change and forestry
MAFF	Ministry of Agriculture, Forestry and Food
MAC	Mobile air conditioning
MC	Ministry of Culture
METS	Ministry of Economy, Tourism and Sport
MECE	Ministry of Environment, Climate and Energy
MF	Ministry of Finance
MI	Ministry of Infrastructure
ME	Ministry of Education
MHESI	Ministry of Higher Education, Science and Innovation
MPA	Ministry of Public Administration
MVT	Motor Vehicle Tax
NECD	National Emission reduction Commitments Directive (2016/2284/EU)
NECP	(Integrated) National Energy and Climate Plan
NC(7)	(7th) National Communication to the UNFCCC
NEEAP	National energy efficiency action plan
Non-ETS	Emissions from sources not included in the (EU-)ETS. These emissions are referred also as ESR or ESD
NGOs	Nongovernmental organisations
NREAP	National Renewable Energy Action Plan
NSP	National Spatial Plan
ODA	Official development assistance
ODS	Ozone depleting substances
OECD	The Organisation for Economic Co-operation and Development
OP GHG-2020	The Operational Programme for Reducing GHG Emissions until 2020
OP ROPI	Operational Programme of Environmental and Transport Infrastructure Development 2007-2013
P+R	Park and ride

PC	Public Call
PISA	OECD's Programme for International Student Assessment
PP-EPS	Project Office for Energy Renovation of Buildings
PPT	Public Passenger Transport
PrPSSPS	Climate Change Funding Programme
QMC	Quality Mark in Construction
R&D	Research and Development
RDP	Rural Development Programme
REC	Renewable Energy Community
ReDPS50	Resolution on the Slovenian climate long-term strategy 2050
REEUB	Rules on efficient use of energy in buildings
ReNGP	Resolution on the National Forestry Programme
ReNPRP	Resolution on the National Programme for the Development of Transport in the Republic of Slovenia until 2030
ReNPVO20-30	Resolution on National Environmental Action Programme 2030
ReNSRP	Resolution on the National Programme for the Development of Transport in the Republic of Slovenia until 2030
RES	Renewable energy sources
RRES	The RES ratio is the ratio between the use of renewable and primary energy in a building. Energy can be generated on site or nearby or fed from remote systems
RRF	Recovery and Resilience Fund
RRP	Recovery and Resilience Plan
SDS	Sustainable Development Strategy
SEA	Slovenian Environment Agency
SECAP	Sustainable Energy and Climate Action Plans
SFS	Slovenia Forest Service
SRA	Slovenian Research Agency
SRIP	Strategic Research and Innovation Partnership
SRS	Slovenian Development Strategy 2030
TDS	Transport Development Strategy of the Republic of Slovenia 2030
TEN-E	The Trans-European Energy Network
TEN-T	The Trans-European Transport Network
TET	Trbovlje Thermal Power Plant

TE-TOL	Ljubljana Heat and Power Plant
TEŠ	Šoštanj Thermal Power Plant
TRP	Targeted Research Projects
UN	United Nations
UNFCCC	Framework Convention On Climate Change
VITR	Education for sustainable development
ZDMHS	National Meteorology, Hydrology, Oceanography and Seismic Service Act
ZOEE	Electricity Supply Act
ZRC SAZU	Research Centre of the Slovenian Academy of Sciences and Arts
ZSROVE	Act on the Promotion of the Use of Renewable Energy Sources
ZTro	Excise Duty Act
ZURE	Act on Energy Efficiency
ZVO	Environmental Protection Act
WAM	With additional measures
WEM	With existing measures (also WM)
WH	Waste heat
WOM	Without measures

Annex B – Summary tables on emission trends

Table 34: GHG emissions and removals in Slovenia in kt CO₂ eq by sectors and sub-sectors 1986-2020

	1986	1990	1995	2000	2005	2010	2015	2019	2020	Change LY to BY	Change LY to PY
1. Energy	16,472	14,647	15,184	14,831	16,552	16,407	13,435	13,692	12,538	-23.9	-8.4
A. Fuel Combustion	15,879	14,135	14,697	14,359	16,026	15,885	13,065	13,313	12,158	-23.4	-8.7
1. Energy Industries	6,842	6,377	5,727	5,595	6,452	6,349	4,568	4,582	4,517	-34.0	-1.4
2. Man. Industries and Construction	4,349	3,097	2,632	2,296	2,463	1,934	1,614	1,757	1,715	-60.6	-2.4
3. Transport	2,052	2,738	3,996	3,684	4,406	5,303	5,359	5,632	4,581	123.2	-18.7
4. Other Sectors	2,594	1,891	2,341	2,781	2,701	2,295	1,520	1,339	1,342	-48.3	0.2
5. Other	41	32	1	3	3	3	4	4	3	-92.3	-20.8
B. Fugitive Emissions from Fuels	593	512	487	472	526	522	370	378	381	-35.8	0.6
1. Solid Fuels	551	461	442	424	474	474	335	339	341	-38.0	0.7
2. Oil and Natural Gas and other...	42	50	45	48	53	48	36	39	39	-7.4	-0.1
2. Industrial Processes	1,408	1,393	1,073	1,162	1,427	1,015	1,146	1,228	1,175	-16.6	-4.3
A. Mineral Industry	743	694	543	598	636	479	453	566	561	-24.5	-0.9
B. Chemical Industry	98	88	88	113	137	89	60	60	62	-36.6	2.8
C. Metal Industry	471	551	374	334	425	127	208	190	144	-69.4	-24.4
D. Non-energy products	8	8	7	14	25	15	26	33	31	280.9	-5.4
E. Electronics industry	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
F. Product uses as ODS substitutes	NO	NO	33	46	145	258	343	297	295	100.0	-0.6
G. Other product manufacture and use	89	52	29	56	60	47	55	82	82	-7.3	0.1
H. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
3. Agriculture	1,936	1,860	1,774	1,810	1,717	1,678	1,717	1,720	1,724	-11.0	0.2
A. Enteric Fermentation	981	935	904	949	916	903	936	940	942	-3.9	0.3
B. Manure Management	421	416	360	343	329	316	317	315	311	-26.1	-1.3
C. Rice Cultivation	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
D. Agricultural Soils	477	453	465	484	443	431	439	437	440	-7.7	0.8
E. Prescribed Burning of Savannahs	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
F. Field Burning of Agricultural Residues	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
G. Liming	44	44	29	17	14	13	11	13	14	-67.1	11.5
H. Urea applications	9	9	12	12	12	11	9	10	12	29.8	13.5
I. Other carbon-containing fertilizers	4	4	4	4	4	4	5	5	4	11.0	-9.5

	1986	1990	1995	2000	2005	2010	2015	2019	2020	Change LY to BY	Change LY to PY
4. Land Use, Land-Use Change and Forestry	-4,765	-4,364	-5,121	-6,186	-7,209	-7,158	713	-3,452	-3,280	-31.2	-5.0
A. Forest Land	-4,776	-4,796	-5,397	-6,037	-7,258	-7,142	880	-3154	-3092	-35.3	-2.0
B. Cropland	270	272	140	138	162	153	188	190	193	-28.4	1.4
C. Grassland	-302	-276	-420	-743	-564	-521	-486	-419	-403	33.6	-3.7
D. Wetlands	2	2	1	0	6	26	3	2	2	18.1	-3.9
E. Settlements	470	471	490	518	601	424	244	169	151	-67.9	-10.9
F. Other Land	14	15	22	9	16	20	4	4	4	-71.2	0.3
G. Harvested wood products	-457	-67	28	-85	-185	-129	-129	-253	-142	-68.9	-43.8
H. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.0	NO
6. Waste	633	699	652	778	766	544	496	435	415	-34.5	-4.7
A. Solid Waste Disposal	292	373	353	475	487	299	256	225	206	-29.6	-8.6
B. Biological treatment of solid waste	NO	NO	NO	NO	3	5	12	19	19	100.0	3.7
C. Incineration and open burning of waste	2	2	1	3	3	7	27	21	20	879.0	-4.7
D. Waste water treatment and discharge	339	324	298	300	273	233	201	171	170	-49.9	-0.5
E. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
6. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO

Memo Items.

International Bunkers	59	49	58	69	130	133	283	697	380	548.7	-45.5
Aviation	59	49	58	69	61	73	75	78	78	33.0	-23.8
Navigation	NO,NA	NO,NA	NO,NA	NO,NA	69	60	209	619	354	100.0	-42.9
Multilateral Operations	NO	NO	NO	1	0	0	1	1	0	100.0	28.6
CO ₂ Emissions from Biomass	2,763	2,581	2,565	2,581	3,319	3,308	3,207	2,916	2,857	3.4	-2.0
Long term storage of C in waste disposal sites	771	1,084	1,459	2,037	2,587	3,063	3,247	3,249	3,249	321.2	0.0
Total CO ₂ Eq. Emissions without LULUCF	20,449	18,599	18,683	18,582	20,462	19,644	16,794	17,074	15,851	-22.5	-7.2
Total CO ₂ Eq. Emissions with LULUCF	15,684	14,235	13,562	12,395	13,254	12,485	17,506	13,622	12,571	-19.8	-7.7

Annex C – Tables on emission projections

Table 35: Projection with measures (source: EARS, JSI, AIS, FIS)

GHG emissions projections	Unit	Inventory								Projection			
		1986	1990	1995	2000	2005	2010	2015	2020	2025	2030	2035	2040
Sector													
Energy	kt CO ₂ eq	10,070	8,812	8,556	8,851	9,683	9,170	6,462	6,243	5,867	5,763	5,800	5,273
Transport	kt CO ₂ eq	2,052	2,738	3,996	3,684	4,406	5,303	5,359	4,581	6,140	6,356	6,267	5,995
Industry/industrial processes	kt CO ₂ eq	5,757	4,490	3,705	3,458	3,890	2,949	2,759	2,889	2,872	2,749	2,753	2,785
Agriculture	kt CO ₂ eq	1,936	1,860	1,774	1,810	1,717	1,678	1,717	1,724	1,776	1,801	1,816	1,831
Forestry/LULUCF	kt CO ₂ eq	-4,765	-4,364	-5,121	-6,186	-7,209	-7,158	713	-3,280	-3,345	-4,780	-2,511	-1,311
Waste management/waste	kt CO ₂ eq	633	699	652	778	766	544	496	415	355	262	220	189
Other Sectors													
Gases													
CO ₂ emissions including net CO ₂ from LULUCF	kt CO ₂ eq	11,935	10,651	10,157	8,794	9,654	9,241	14,319	8,095	10,694	9,377	11,679	12,208
CO ₂ emissions excluding net CO ₂ from LULUCF	kt CO ₂ eq	16,779	15,095	15,354	15,054	16,932	16,460	13,653	12,866	14,057	14,171	14,203	13,531
CH ₄ emissions including CH ₄ from LULUCF	kt CO ₂ eq	2,601	2,533	2,365	2,492	2,459	2,170	2,015	1,894	1,903	1,788	1,744	1,667
CH ₄ emissions excluding CH ₄ from LULUCF	kt CO ₂ eq	2,599	2,530	2,365	2,491	2,458	2,170	2,015	1,894	1,902	1,787	1,743	1,666
N ₂ O emissions including N ₂ O from LULUCF	kt CO ₂ eq	904	834	867	918	835	789	796	806	793	805	814	822
N ₂ O emissions excluding N ₂ O from LULUCF	kt CO ₂ eq	827	756	791	846	767	729	749	771	777	792	803	811
HFCs	kt CO ₂ eq	0	0	33	46	145	258	343	295	244	149	77	35
PFCs	kt CO ₂ eq	233	208	128	130	142	10	16	10	16	16	16	16
SF ₆	kt CO ₂ eq	10	10	12	15	18	18	17	16	15	16	16	17
NF ₃	kt CO ₂ eq	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Other gases													
Total with LULUCF ^f	kt CO ₂ eq	15,684	14,235	13,562	12,395	13,254	12,485	17,506	12,571	13,666	12,151	14,346	14,764
Total without LULUCF	kt CO ₂ eq	20,449	18,599	18,683	18,582	20,462	19,644	16,794	15,851	17,011	16,931	16,857	16,074

Table 36: Projection with additional measures (source: EARS, JSI, AIS, FIS)

GHG emissions projections	Unit	Inventory								Projection			
		1986	1990	1995	2000	2005	2010	2015	2020	2025	2030	2035	2040
Sector													
Energy	kt CO ₂ eq	10,070	8,812	8,556	8,851	9,683	9,170	6,462	6,243	5,482	3,880	2,081	1,757
Transport	kt CO ₂ eq	2,052	2,738	3,996	3,684	4,406	5,303	5,359	4,581	5,623	4,964	3,678	1,899
Industry/industrial processes	kt CO ₂ eq	5,757	4,490	3,705	3,458	3,890	2,949	2,759	2,889	2,664	2,343	2,176	1,555
Agriculture	kt CO ₂ eq	1,936	1,860	1,774	1,810	1,717	1,678	1,717	1,724	1,716	1,700	1,618	1,572
Forestry/LULUCF	kt CO ₂ eq	-4,765	-4,364	-5,121	-6,186	-7,209	-7,158	713	-3,280	-2,239	-2,217	-1,810	-1,908
Waste management/waste	kt CO ₂ eq	633	699	652	778	766	544	496	415	355	262	220	189
Other Sectors													
Gases													
CO ₂ emissions including net CO ₂ from LULUCF	kt CO ₂ eq	11,935	10,651	10,157	8,794	9,654	9,241	14,319	8,095	10,725	8,350	5,583	2,828
CO ₂ emissions excluding net CO ₂ from LULUCF	kt CO ₂ eq	16,779	15,095	15,354	15,054	16,932	16,460	13,653	12,866	12,981	10,581	7,405	4,747
CH ₄ emissions including CH ₄ from LULUCF	kt CO ₂ eq	2,601	2,533	2,365	2,492	2,459	2,170	2,015	1,894	1,832	1,639	1,526	1,438
CH ₄ emissions excluding CH ₄ from LULUCF	kt CO ₂ eq	2,599	2,530	2,365	2,491	2,458	2,170	2,015	1,894	1,831	1,638	1,524	1,437
N ₂ O emissions including N ₂ O from LULUCF	kt CO ₂ eq	904	834	867	918	835	789	796	806	771	760	747	732
N ₂ O emissions excluding N ₂ O from LULUCF	kt CO ₂ eq	827	756	791	846	767	729	749	771	755	748	736	721
HFCs	kt CO ₂ eq	0	0	33	46	145	258	343	295	244	149	77	35
PFCs	kt CO ₂ eq	233	208	128	130	142	10	16	10	16	16	16	16
SF ₆	kt CO ₂ eq	10	10	12	15	18	18	17	16	15	16	16	17
NF ₃	kt CO ₂ eq	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Other gases													
Total with LULUCF ^f	kt CO ₂ eq	15,684	14,235	13,562	12,395	13,254	12,485	17,506	12,571	13,602	10,931	7,965	5,064
Total without LULUCF	kt CO ₂ eq	20,449	18,599	18,683	18,582	20,462	19,644	16,794	15,851	15,841	13,148	9,774	6,972

Table 37: Projection without measures (source: EARS, JSI, AIS, FIS)

GHG emissions projections	Unit	Inventory								Projection			
		1986	1990	1995	2000	2005	2010	2015	2020	2025	2030	2035	2040
Sector													
Energy	kt CO ₂ eq	10,070	8,812	8,556	8,851	9,683	9,170	6,462	6,243	8,092	8,019	7,946	7,910
Transport	kt CO ₂ eq	2,052	2,738	3,996	3,684	4,406	5,303	5,359	4,581	6,687	7,218	7,734	8,560
Industry/industrial processes	kt CO ₂ eq	5,757	4,490	3,705	3,458	3,890	2,949	2,759	2,889	3,757	3,908	4,022	4,139
Agriculture	kt CO ₂ eq	1,936	1,860	1,774	1,810	1,717	1,678	1,717	1,724	1,845	1,871	1,886	1,902
Forestry/LULUCF	kt CO ₂ eq	-4,765	-4,364	-5,121	-6,186	-7,209	-7,158	713	-3,280	NA	NA	NA	NA
Waste management/waste	kt CO ₂ eq	633	699	652	778	766	544	496	415	1,121	1,181	1,219	1,243
Other Sectors													
Gases													
CO ₂ emissions including net CO ₂ from LULUCF	kt CO ₂ eq	11,935	10,651	10,157	8,794	9,654	9,241	14,319	8,095	NA	NA	NA	NA
CO ₂ emissions excluding net CO ₂ from LULUCF	kt CO ₂ eq	16,779	15,095	15,354	15,054	16,932	16,460	13,653	12,866	17,234	17,799	18,353	19,240
CH ₄ emissions including CH ₄ from LULUCF	kt CO ₂ eq	2,601	2,533	2,365	2,492	2,459	2,170	2,015	1,894	NA	NA	NA	NA
CH ₄ emissions excluding CH ₄ from LULUCF	kt CO ₂ eq	2,599	2,530	2,365	2,491	2,458	2,170	2,015	1,894	2,775	2,844	2,877	2,898
N ₂ O emissions including N ₂ O from LULUCF	kt CO ₂ eq	904	834	867	918	835	789	796	806	NA	NA	NA	NA
N ₂ O emissions excluding N ₂ O from LULUCF	kt CO ₂ eq	827	756	791	846	767	729	749	771	834	860	881	905
HFCs	kt CO ₂ eq	0	0	33	46	145	258	343	295	629	662	665	679
PFCs	kt CO ₂ eq	233	208	128	130	142	10	16	10	16	16	16	16
SF ₆	kt CO ₂ eq	10	10	12	15	18	18	17	16	15	16	16	17
NF ₃	kt CO ₂ eq	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Other gases													
Total with LULUCF ^f	kt CO ₂ eq	15,684	14,235	13,562	12,395	13,254	12,485	17,506	12,571	NA	NA	NA	NA
Total without LULUCF	kt CO ₂ eq	20,449	18,599	18,683	18,582	20,462	19,644	16,794	15,851	21,502	22,198	22,807	23,755

Annex D – Information on models used for projections

Model 1	
Model name (abbreviation)	MESAP REES-SLO
Full model name	Reference Energy Ecological Model for Slovenia
Model version and status	3.0
Latest date of revision	2020
URL to model description	http://www.energetika-portal.si/dokumenti/strateski-razvojni-dokumenti/dolgorocno-nactovanje-energetske-politike/
Model type	Technology oriented bottom-up simulation model
Summary	<p>REES-SLO2 model was developed in MESAP environment and consists of several submodels covering different sectors (transport, households, services, industry, electricity and heat production) and also PET submodel that assesses penetration of different energy efficient and renewable technology. The technology-orientated "Reference Energy Ecological Model for Slovenia (REES-SLO2)" was developed in the MESAP and Excel environment in the form of a linear network model for processes and connections (a reference energy system), which enables consistent modelling of energy use based on the needs of energy services and energy supply according to the Integrated Resource Planning method.</p> <p>REES-SLO2 (implemented in MESAP and Excel environment) calculates the envisaged final energy use balances and assesses the local production of electricity based on the proportions of different technologies in the final use structure and connections with influential parameters (the levels of economic activity by sector, the number of households, etc.). The final use of electricity divided by sector, purpose, and production in local supply systems (in industrial, distribution, and private units) is transferred for processing by the program in order to analyse the load shape.</p> <p>Into REES-SLO2 model results of all submodels are fed and energy and different emission balances are calculated. The model is highly customizable. and is strong in comparing different scenarios.</p>
Intended field of application	Modelling energy use and emissions on national or local level
Description of main input data categories and data sources	Historic energy use and emissions (CRF & NFR) data, results of projections of submodels
Validation and evaluation	The tools, models and methodology were verified in a series of preliminary studies and have been used as a basis for many strategic documents for the development of the energy sector and the reduction of greenhouse gas emissions and air pollutants.
Output quantities	<ul style="list-style-type: none"> • Primary and final energy consumption • GHG projection data in a structure orientated on CRF categories (energy sectors) • AIr pollutants emissions in NFR categories (only energy sectors)
GHG covered	All GHGs relevant for energy consumption (CO ₂ , CH ₄ and N ₂ O)
Sectoral coverage	All energy consumption sectors (1. CRF sectors)
Geographical coverage	Slovenia
Temporal coverage (e.g. time steps, time span)	covering period until 2050 in 5 year time steps.
Other models which interact with this model, and type of interaction (e.g. data input to this model, use of data output from this model)	
Input from other models	energy use of household appliances, penetration of energy efficient technologies in transport, potential for district heating, transport activity, GDP and industrial activity, population, needed energy for heating in buildings
References to the assessment and the technical reports that underpin the projections and the models used	https://www.podnebnapot2050.si/wp-content/uploads/2021/03/LIFE-ClimatePath2050_Deliverable-C3_2_AnalizaScenarijevPovzetek_V_2.pdf

Model 2	
Model name (abbreviation)	MESAP buildings model
Full model name	
Model version and status	3.0
Latest date of revision	2019
URL to model description	http://www.energetika-portal.si/dokumenti/strateski-razvojni-dokumenti/dolgorocno-nactovanje-energetske-politike/
Model type	Technology oriented bottom-up simulation model
Summary	Model calculates needed energy for heating based on the simulation of evolution of the building stock - renovation, demolition and construction. Model also simulates structure of different technologies used for production of heat for heating and hot water. Simulation is based on a stock model, where changes in structure are possible only through purchase of new technology and with altering lifetime of products. Electricity consumption in household appliances, for lighting, cooking etc is modelled separately in set of submodels representing each appliance or need using electricity.
Intended field of application	Energy consumption in buildings
Description of main input data categories and data sources	Surface area, number of population, number of households
Validation and evaluation	Calibration to historic statistical data (period 2009-2017)
Output quantities	Energy consumption in buildings per fuel and purpose
GHG covered	-
Sectoral coverage	Households, Services
Geographical coverage	Slovenia
Temporal coverage (e.g. time steps, time span)	Until 2050 in yearly steps for households and in 5 year steps for services
Other models which interact with this model, and type of interaction (e.g. data input to this model, use of data output from this model)	Output from this model is fed to MESAP REES_SLO2
Input from other models	-
References to the assessment and the technical reports that underpin the projections and the models used	

Model 3	
Model name (abbreviation)	MESAP transport model
Full model name	
Model version and status	4.0
Latest date of revision	2019
URL to model description	http://www.energetika-portal.si/dokumenti/strateski-razvojni-dokumenti/dolgorocno-nactovanje-energetske-politike/
Model type	Technology oriented bottom-up simulation model
Summary	Two models were used for transport emissions. For the assessment of the fuel consumption balances, an energy model for transport was prepared. The basis for the calculation of energy use in transport was an estimation of the development of the extent of transport volume that has been calculated with PRIMOS model. Another model calculates the vehicle fleet structure on the basis of assumptions regarding vehicle life-cycle and the structure of newly-purchased vehicles. Special attention was given to alternative technologies.
Intended field of application	Energy consumption in transport
Description of main input data categories and data sources	Transport volume, energy intensities
Validation and evaluation	Calibration to historic statistical data (period 2005-2017)
Output quantities	Energy consumption in transport per fuel or vehicle type
GHG covered	-
Sectoral coverage	Transport
Geographical coverage	Slovenia
Temporal coverage (e.g. time steps, time span)	Until 2050 in 5 year steps
Other models which interact with this model, and type of interaction (e.g. data input to this model, use of data output from this model)	Data from PRIMOS model are used as input, while output from this model is fed to MESAP REES-SLO2
Input from other models	PRIMOS - transport activity
References to the assessment and the technical reports that underpin the projections and the models used	

Model 4	
Model name (abbreviation)	PRIMOS
Full model name	Integralni prometni model Slovenije
Model version and status	2.0
Latest date of revision	2019
URL to model description	http://www.mzi.gov.si/fileadmin/mzi.gov.si/pageuploads/DMZ/Strategija_objava_EN_1012014.pdf
Model type	Dissaggregated 4-step traffic model
Summary	<p>The transport model is comprised of the internal and external transport models, and models of impacts on the environment and traffic safety. All models are combined into a whole and are strategic. The internal transport model is developed for the Central European area extending from the Atlantic Ocean to the Black Sea, and from the Baltic to the Mediterranean. The internal transport model consists of two sub-models: the national sub-model of the Republic of Slovenia based on the previously developed PRIMOS model, and the sub-model of the remaining area of the internal model. The national sub-model is more detailed and includes all intrazonal and interzonal trips, and intrazonal and interzonal transport, while the model of the remaining area of the internal model includes only interzonal trips and interstate transport. This transport model, which encompasses the wider discussed area, is called CETRA (Central European TRANsport model). External transport, i.e. transport originating from and/or going to outside the area of the internal model is summarised from the second generation TRANS-TOOLS pan-European transport model. This model comprises transport from the area of Europe which is not included in the internal model and the rest of the world.</p> <p>The model is developed using the software tool VISUM 13</p>
Intended field of application	Forecast of transport volume
Description of main input data categories and data sources	
Validation and evaluation	The model for the base year is calibrated and validated according to international criteria.
Output quantities	Transport volume
GHG covered	CO2
Sectoral coverage	Freight and passenger transport
Geographical coverage	Slovenia + Central Europe
Temporal coverage (e.g. time steps, time span)	2011 is base year and 2020, 2030 and 2050 are forecast years
Other models which interact with this model, and type of interaction (e.g. data input to this model, use of data output from this model)	
Input from other models	
References to the assessment and the technical reports that underpin the projections and the models used	

Model 5	
Model name (abbreviation)	BILANCA TGP NH3 NOX
Full model name	/
Model version and status	DEC 16
Latest date of revision	43647
URL to model description	/
Model type	Relational model
Summary	The methodology for estimation of GHG emissions is the same as for national reporting. It is based on IPCC 2006 guidelines and described in National inventory report (http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/9492.php). Activity data were projected by the means of expertise performed by Agricultural Institute of Slovenia and harmonized with the Ministry of Agriculture, Forestry and Food. Specific natural conditions (high proportion of grasslands, less favoured areas, climate, ...) and strategic documents on development of agriculture were taken into account.
Intended field of application	GHG and other pollutant emissions
Description of main input data categories and data sources	SORS, Central database CATTLE, Slovenian Environment Agency
Validation and evaluation	Review by experts
Output quantities	Emissions of methane, nitrous oxide, carbon dioxide, ammonia, nitric oxide, N budget
GHG covered	Methane, nitrous oxide, carbon dioxide
Sectoral coverage	Agriculture
Geographical coverage	Slovenia
Temporal coverage (e.g. time steps, time span)	1990 to 2050 (annual basis)
Other models which interact with this model, and type of interaction (e.g. data input to this model, use of data output from this model)	Model integrates emissions of GHG, ammonia, NOX, NMVOC and N budget
Input from other models	
References to the assessment and the technical reports that underpin the projections and the models used	

Model 6	
Model name (abbreviation)	CBM-CFS3
Full model name	Operational-Scale Carbon Budget Model of the Canadian Forest Sector
Model version and status	v1.2.7271.303
Latest date of revision	December, 2019
URL to model description	https://www.nrcan.gc.ca/climate-change/impacts-adaptations/climate-change-impacts-forests/carbon-accounting/carbon-budget-model/13107
Model type	Aspatial, empirical (yield data driven) stand- and landscape-level modelling framework
Summary	This model of carbon-dynamics implements a Tier 3 approach of the Intergovernmental Panel on Climate Change (IPCC) Good Practice Guidance for reporting on carbon stocks and carbon stock changes resulting from Land Use, Land-use Change and Forestry (LULUCF). The CBM-CFS3 is a generic modelling framework that can be applied at the stand, landscape and national levels. The model provides a spatially referenced, hierarchical system for integrating datasets originating from different forest inventory and monitoring programs and includes a structure that allows for tracking of land areas by different land-use and land use change classes. Ecosystem pools in CBM-CFS3 can be easily mapped to IPCC-defined pools and validated against field measurements. The model uses sophisticated algorithms for converting volume to biomass and explicitly simulates individual annual disturbance events.
Intended field of application	Modelling forest growth, dynamics of forest carbon pools, carbon accounting, operational use for forest planning
Description of main input data categories and data sources	The main input data are: forest inventory, tree species, growth and yield curves, natural and human-induced disturbance information, forest harvest schedule and land-use change information. Typical data sources are national forest inventory and forest inventory of the forest management planning
Validation and evaluation	The model has been applied and validated at regional and national scales in Canada, EU and many other countries (e.g. Russian Federation, South Korea)
Output quantities	Carbon stocks and carbon stock changes in living biomass, dead organic matter and soil; annual net primary production; net ecosystem production etc. (in Mg C, Mg C yr ⁻¹)
GHG covered	CO ₂ , CH ₄ , N ₂ O
Sectoral coverage	LULUCF
Geographical coverage	Slovenia
Temporal coverage (e.g. time steps, time span)	Until 2050 in 1 year time steps
Other models which interact with this model, and type of interaction (e.g. data input to this model, use of data output from this model)	
Input from other models	
References to the assessment and the technical reports that underpin the projections and the models used	

Annex E – Projection parameters

Table 38: Projection Parameters

Projection parameters used		HISTORICAL VALUES					PROJECTION WITH MEASURES (WM)					PROJECTION WITH ADDITIONAL MEASURES (WAM)			
		2000	2005	2010	2015	2020	2025	2030	2035	2040	2025	2030	2035	2040	
GDP	MEUR[05]/a	27,182	32,388	35,534	36,275	40,566	43,619	46,759	50,125	53,469	43,619	46,759	50,125	53,469	
GDP growth	[%]		3.6	1.9	0.4	2.3	1.5	1.4	1.4	1.3	1.5	1.4	1.4	1.3	
POPULATION	[1000 inhabitants]	1,988	1,998	2,047	2,063	2,096	2,086	2,089	2,084	2,071	2,086	2,089	2,084	2,071	
INTERNATIONAL PRICES															
COAL	EUR/GJ	1.69	2.56	3.51	1.97	1.44	2.84	2.96	2.99	3.03	2.84	2.96	2.99	3.03	
PETROLEUM OIL	EUR/GJ	5.91	10.05	13.34	8.04	6.11	15.73	17.33	18.08	19.14	15.73	17.33	18.08	19.14	
NATURAL GAS	EUR/GJ	4.00	5.41	6.92	6.60	3.04	6.64	7.23	7.65	8.07	6.64	7.23	7.65	8.07	
PRICE OF CO ₂ PERMITS	EUR/EUA	NA	0.0	11.5	7.5	25.0	29.00	34.70	43.50	51.70	29.00	34.70	43.50	51.70	
GROSS INLAND CONSUMPTION	[PJ]	268.97	311.72	303.52	274.67	267.45	284.77	289.11	290.23	288.40	271.10	255.76	249.72	234.82	
TOTAL PETROLEUM PRODUCTS	[PJ]	92.63	102.72	102.93	92.50	79.50	93.33	93.92	91.30	86.84	85.07	71.94	50.42	23.45	
SOLID FUELS	[PJ]	56.88	64.16	60.93	44.73	42.70	38.94	32.65	33.80	23.11	36.24	23.78	24.42	23.46	
NATURAL GAS	[PJ]	34.55	38.90	36.10	27.81	30.79	38.68	51.65	53.21	67.13	35.87	33.68	43.35	39.81	
NUCLEAR ENERGY	[PJ]	51.94	64.19	61.71	61.62	69.30	60.71	60.73	60.71	60.74	61.38	61.40	61.42	61.40	
RENEWABLES	[PJ]	37.72	42.39	48.51	46.38	49.89	49.47	49.33	47.16	48.00	53.71	60.17	65.09	74.04	
WASTE	[PJ]	0.01	0.54	0.97	1.80	2.48	2.74	2.81	3.07	3.08	2.27	2.01	2.05	1.87	
OTHER	[PJ]	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.34	0.72	0.00	4.14	9.38	18.86	
NET IMPORT OF ELECTRICITY	[PJ]	-4.76	-1.17	-7.63	-0.17	-7.21	0.90	-2.09	0.63	-1.23	-3.44	-1.37	-6.41	-8.07	
GROSS ELECTRICITY PRODUCTION	[GWh]	NA	15,117	16,433	15,100	17,191	16,574	18,177	18,501	19,954	17,195	17,570	22,064	25,082	
OIL	[GWh]	NA	37	9	17	11	1	0	0	0	1	0	0	0	
NATURAL GAS	[GWh]	NA	340	548	404	580	1,088	2,896	2,978	5,200	1,139	1,108	2,682	2,284	
COAL	[GWh]	NA	5,275	5,289	4,385	4,363	4,408	3,929	4,058	2,991	4,144	3,051	2,793	2,691	
RENEWABLES	[GWh]	NA	3,575	4,925	4,639	5,873	5,505	5,779	5,894	6,187	6,278	7,653	10,460	13,643	
NUCLEAR ENERGY	[GWh]	NA	5,884	5,657	5,648	6,353	5,565	5,567	5,565	5,568	5,626	5,628	5,630	5,628	
OTHER	[GWh]	NA	6	5	8	11	7	7	7	7	7	130	499	836	
FINAL ENERGY CONSUMPTION	[PJ]	190.09	213.89	210.78	198.50	186.48	212.1	214.9	214.8	213.9	199.8	191.2	176.8	160.9	
INDUSTRY	[PJ]	58.43	68.96	53.20	51.39	52.70	56.70	58.74	60.24	61.95	53.87	53.71	54.69	54.97	
OIL	[PJ]	11.77	9.30	5.23	3.92	4.05	2.94	2.58	2.16	2.01	2.32	1.48	1.11	0.98	
NATURAL GAS	[PJ]	20.58	22.64	20.22	16.84	18.77	20.16	22.40	24.33	25.49	18.13	16.99	15.47	13.41	
COAL	[PJ]	3.18	3.35	1.96	1.65	1.18	1.25	0.22	0.00	0.00	1.08	0.13	0.00	0.00	
RENEWABLES	[PJ]	3.13	4.16	3.56	4.31	4.78	3.10	3.16	2.23	2.26	4.40	5.34	6.10	6.36	

Projection parameters used		HISTORICAL VALUES					PROJECTION WITH MEASURES (WM)					PROJECTION WITH ADDITIONAL MEASURES (WAM)			
		2000	2005	2010	2015	2020	2025	2030	2035	2040	2025	2030	2035	2040	
ELECTRICITY	[PJ]	19.76	25.82	19.75	22.31	21.50	24.34	25.22	26.16	26.91	23.98	24.46	25.85	26.55	
HEAT	[PJ]	0.00	2.59	2.25	2.06	2.13	2.38	2.55	2.49	2.41	1.90	1.62	1.51	1.28	
OTHER	[PJ]	0.00	1.09	0.22	0.30	0.29	2.53	2.60	2.87	2.87	2.06	3.69	4.64	6.39	
TRANSPORT	[PJ]	51.54	61.50	75.03	75.33	66.69	91.26	95.45	95.76	94.05	85.33	81.32	68.37	53.11	
OIL	[PJ]	50.59	60.79	72.49	73.44	61.88	83.35	85.89	84.73	81.15	76.42	66.13	46.39	20.59	
NATURAL GAS	[PJ]	0.00	0.00	0.00	0.09	0.15	0.99	1.71	1.96	2.10	0.92	2.93	6.30	8.86	
COAL	[PJ]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
RENEWABLES	[PJ]	0.00	0.00	1.91	1.25	3.91	5.62	5.82	5.73	5.47	6.45	7.64	5.50	4.15	
ELECTRICITY	[PJ]	0.95	0.71	0.62	0.55	0.76	1.30	1.94	2.99	4.60	1.54	3.90	7.91	12.43	
HEAT	[PJ]	NO	NO	NO	NO	NO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
OTHER	[PJ]	NO	NO	NO	NO	NO	0.00	0.10	0.34	0.72	0.00	0.73	2.28	7.08	
RESIDENTIAL	[PJ]	51.82	59.63	57.13	48.83	45.63	38.46	34.89	32.39	30.63	37.08	32.62	29.39	27.45	
OIL	[PJ]	16.12	16.77	12.91	6.44	5.56	3.04	2.08	1.43	1.03	2.78	1.65	0.75	0.39	
NATURAL GAS	[PJ]	2.45	4.13	4.76	4.33	4.42	4.46	3.88	3.26	2.75	3.96	2.57	1.73	0.91	
COAL	[PJ]	0.19	0.00	0.05	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
RENEWABLES	[PJ]	19.75	23.56	23.57	23.29	19.43	15.67	13.33	11.84	10.99	15.57	13.41	12.05	11.37	
ELECTRICITY	[PJ]	9.36	10.62	11.59	11.54	13.08	12.48	12.95	13.35	13.48	11.99	12.13	12.14	12.06	
HEAT	[PJ]	3.95	4.55	4.25	3.21	3.14	2.82	2.66	2.51	2.38	2.78	2.58	2.43	2.42	
OTHER	[PJ]	NO	NO	NO	NO	NO	0.00	0.00	0.00	0.00	0.00	0.29	0.30	0.30	
SERVICES	[PJ]	25.05	20.68	22.51	19.88	18.45	22.31	22.42	23.11	24.06	20.28	20.44	21.38	22.66	
OIL	[PJ]	12.17	9.73	8.21	3.92	3.91	0.92	0.38	0.13	0.05	0.74	0.27	0.09	0.04	
NATURAL GAS	[PJ]	0.78	1.08	0.99	2.10	0.90	1.78	1.06	0.79	0.75	1.77	1.35	0.91	0.49	
COAL	[PJ]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
RENEWABLES	[PJ]	0.07	0.10	0.74	0.41	0.45	4.16	4.85	4.88	4.87	3.20	3.42	3.32	3.51	
ELECTRICITY	[PJ]	7.80	8.72	11.04	11.63	11.22	13.69	14.47	15.70	16.77	12.40	13.05	14.19	15.29	
HEAT	[PJ]	4.23	1.05	1.54	1.82	1.97	1.76	1.66	1.60	1.62	2.18	2.21	2.30	2.44	
OTHER	[PJ]	NO	NO	NO	NO	NO	0.00	0.00	0.00	0.00	0.00	0.15	0.57	0.89	
AGRICULTURE	[PJ]	3.24	3.11	2.91	3.08	3.01	3.40	3.43	3.35	3.24	3.23	3.10	2.95	2.74	
HEATING DEGREE DAYS	[°C day]	2,661	3,278	3,171	2,841	2,779	2,793	2,749	2,698	2,662	2,793	2,749	2,698	2,662	
COOLING DEGREE DAYS	[°C day]	115	75	119	190	89	192	208	229	286	192	208	229	286	
VALUE ADDED IN INDUSTRY	MEUR[05]/a	20,743	24,844	27,435	28,232	32,116	NA	NA	NA	NA	NA	NA	NA	NA	
PASSENGER TRANSPORT ACTIVITY	[mio pkm]	NA	25,573	29,220	29,583	24,875	33,968	36,204	38,108	40,116	33,466	35,497	36,057	36,721	
FREIGHT TRANSPORT ACTIVITY	[mio tkm]	NA	22,273	27,462	30,669	40,534	47,111	55,332	61,092	67,450	46,248	54,037	56,793	59,690	

Projection parameters used		HISTORICAL VALUES					PROJECTION WITH MEASURES (WM)					PROJECTION WITH ADDITIONAL MEASURES (WAM)			
		2000	2005	2010	2015	2020	2025	2030	2035	2040	2025	2030	2035	2040	
RESIDENTIAL FLOOR AREA	[1000 m2]	53,880	57,693	62,185	63,130	64,648	65,822	66,971	67,219	67,467	65,822	66,971	67,219	67,467	
NUMBER OF HOUSEHOLDS	[]	672	722	783	800	803	820,052	833,964	846,906	860,141	820,052	833,964	846,906	860,141	
SERVICE SECTOR FLOOR AREA	[1000 m2]	NA	NA	NA	NA	25,054	26,157	27,625	29,006	30,336	26,157	27,625	29,006	30,336	
NUMBER OF ANIMALS															
DAIRY CATTLE	[1000 head]	140	120	109	113	99	109	109	109	109	101	97	92	88	
OTHER CATTLE	[1000 head]	353	332	361	371	386	374	375	376	377	365	359	353	348	
SWINE	[1000 head]	604	547	396	271	229	384	449	449	449	384	449	449	449	
POULTRY	[1000 head]	5,106	3,177	4,618	5,754	6,340	6,435	6,435	6,435	6,435	6,435	6,435	6,435	6,435	
SHEEP AND GOAT	[1000 head]	96	129	130	109	114	115	115	115	115	115	115	115	115	
FERTILISER AND MANURE CONSUMPTION	[kt of nitrogen]	61.6	54.5	52.7	53.1	52.0	59	61	63	65	54	56	58	61	
SOLID MUNICIPAL WASTE GENERATED	[kt]	785	845	802	929	1,024	981	930	927	924	981	930	927	924	
LANDFILLED MUNICIPAL WASTE	[kt]	707	753	623	261	199	132	125	125	124	132	125	125	124	

Annex – Slovenia's Fifth Biennial report

1 Summary

The summary contains additional information that is presented in the 5th biennial report. Most of the information required in the biennial report is already contained in the 8th national communication, which is referred to in individual chapters of the biennial report.

The EU and its Member States have committed to achieving a joint quantified economy-wide greenhouse gas (GHG) emissions reduction target of 20% below the 1990 level by 2020, not including emissions/removals from Land Use, Land Use Change and Forestry (LULUCF). It is therefore a joint pledge with no separate targets for Member States under the Convention. This target is implemented internally through EU legislation in the 2020 EU Climate and Energy Package. In this package, the EU introduced an approach to achieve the 20% reduction in total GHG emissions below 1990 levels by dividing the effort between the sectors covered by the EU Emissions Trading System (EU ETS) and the sectors covered by the Effort Sharing Decision (ESD). Under the ESD, binding national targets were set for Member States.

Slovenian companies that are included in the EU ETS must fulfil their obligations within the EU ETS scheme, while the reduction of ESD emissions is shared among the Member States through individual national targets. According to the ESD target for Slovenia, it may not increase its emissions by more than 4% by 2020 compared to 2005. In accordance with EU decisions, this means that in 2013 annual emissions should not exceed 12.3 Mt CO₂ eq. The same value applies to 2020, because of the correction of the annual trajectory due to changes in emissions inventory, which was adopted for the period 2017-2020.

The EU has substantially overachieved its reduction target under the Convention, which means that its Member States and the United Kingdom have also fulfilled their emission reduction obligations. As stated in the 2022 EU GHG inventory submission to the UNFCCC, the total GHG emissions, excluding LULUCF and including international aviation, decreased by 34% in the EU-27 + UK compared to the base year 1990 or 1.94 billion tons of CO₂ eq.

In the period 2013-2020, Slovenia achieved lower emissions in each year than the annual target emissions determined on the basis of EU decisions. The total actual emissions for the entire period amounted to 87.1 Mt CO₂ eq., while the target emissions were 98.5 Mt CO₂ eq. Actual emissions were therefore lower by 11.4 Mt CO₂ eq.

2 Information on GHG emissions and trends, GHG Inventory including information on National inventory system

For the relevant information, we refer to chapter 3 of the Eighth Slovenian National Communication under the UNFCCC.

3 Quantified economy-wide emission reduction target

3.1 The EU target under the Convention

Under the United Nations Framework Convention on Climate Change (UNFCCC), the EU and its Member States have committed to achieving a joint quantified economy-wide greenhouse gas (GHG) emissions reduction target of 20% below the 1990 level by 2020 (the Cancun pledge). It is therefore a joint pledge with no separate targets for Member States under the Convention. The UK remains part of the joint EU 2020 target together with the 27 EU Member States.

The EU has jointly committed to its UNFCCC target and implemented it internally through EU legislation in the 2020 EU Climate and Energy Package. In this package, the EU introduced a clear approach to achieving the 20% reduction in total GHG emissions below 1990 levels by dividing the effort between the sectors covered by the EU Emissions Trading System (EU ETS) and the sectors covered by the Effort Sharing Decision (ESD). Under the ESD, binding national targets were set for Member States. The achievement of EU internal compliance under the 2020 Climate and Energy Package, including the national targets under the ESD, is not subject to the UNFCCC assessment of the EU's joint commitment under the Convention.

The definition of the Convention target for 2020 is documented in the revised note provided by the UNFCCC Secretariat on the 'Compilation of economy-wide emission reduction targets to be implemented by Parties included in Annex I to the Convention' (FCCC/SB/2011/INF.1/Rev.1 of 7 June 2011). The EU provided additional information relating to its quantified economy-wide emissions reduction target in a submission as part of the process of clarifying the developed country parties' targets in 2012 (FCCC/AWGLCA/2012/MISC.1).

The EU's accounting rules for the target under the UNFCCC are more ambitious than the rules under the Kyoto Protocol, for example because they include outgoing flights and add an annual compliance cycle for emissions under the ESD (non-ETS) or higher Clean Development Mechanism (CDM) quality standards under the EU ETS (FCCC/TP/2013/7). Accordingly, the following assumptions and conditions apply to the EU's -20% commitment under the UNFCCC:

- The EU Convention pledge does not include emissions/removals from Land Use, Land Use Change and Forestry (LULUCF). However, this sector is estimated to be a net sink over the relevant period. EU GHG inventories include information on emissions and removals from LULUCF in accordance with relevant reporting

commitments under the UNFCCC. Accounting for LULUCF activities only takes place under the Kyoto Protocol¹⁵⁴.

- The target covers the gases CO₂, CH₄, N₂O, hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and SF₆.
- The target refers to 1990 as a single base year for all covered gases and all Member States. Emissions from outgoing flights are included in the target.
- A limited number of Certified Emission Reductions (CERs), Emission Reduction Units (ERUs) and units from new market-based mechanisms may be used to achieve the target. In the EU ETS, the use of international credits was allowed up to specific levels set in the EU ETS Directive, amounting to over 1,500 million CER and ERU entitlements in the period up to 2020. Quality standards also apply to the use of international credits in the EU ETS, including a ban on the use of credits from LULUCF projects and certain industrial gas projects. International credits will no longer be used for EU ETS compliance in the system's fourth trading period (2021–2030). In the ESD sectors, the annual use of international credits is currently limited to up to 3% of each Member State's ESD emissions in 2005, with a limited number of Member States being permitted to use an additional 1% from projects in Least Developed Countries (LDCs) or Small Island Developing States (SIDS), subject to conditions. From 2021 onwards, as with the EU ETS, international credits will no longer be used for compliance under the ESD.
- The Global Warming Potentials (GWPs) used to aggregate GHG emissions in the 2013-2020 period will be from the IPCC's fourth assessment report (AR4) consistently with the UNFCCC reporting guidelines for GHG inventories.

The above information is summarised in Table 3.1.

¹⁵⁴ The LULUCF Decision (Decision No 529/2013/EU) requires Member States to prepare and maintain annual LULUCF accounts according to the rules set out in the Kyoto Protocol. However, these accounts do not contribute to the achievement of the EU Convention pledge.

Table 39: Key facts of the Convention target for EU 27 and UK

Parameters	Target
Base year	1990
Target year	2020
Emission reduction target	-20% in 2020 compared to 1990
Gases covered	CO ₂ , CH ₄ , N ₂ O, HFCs, PFCs, SF ₆
GWP	AR4
Sectors covered	All IPCC sources and sectors with the exception of LULUCF, as measured by the full inventory including international aviation (outgoing flights)
LULUCF	Accounted under Kyoto protocol, reported in EU inventories under the Convention. Assumed to produce no debits.
Use of international credits (Joint Implementation and CDM)	Possible, subject to quantitative and qualitative limits

3.2 The EU target compliance architecture

3.2.1 The 2020 Climate and Energy Package

In 2009, the EU established internal rules under its 2020 Climate and Energy Package¹⁵⁵ that underpin the EU implementation of the target under the Convention. The package introduced a clear approach to achieving the 20% reduction of total GHG emissions below 1990 levels, equivalent to a 14% reduction compared to 2005 levels. This 14% reduction objective is divided between the EU ETS and ESD sectors. The two sub-targets are:

- a 21% reduction target compared to 2005 for emissions covered by the EU ETS (including domestic and international aviation);
- a 10% reduction target compared to 2005 for ESD sectors, shared between the 28 Member States through individual national GHG targets.

Under the EU ETS Directive as revised for the system's current trading period from 2013 to 2020 (Directive 2009/29/EC), a single EU ETS cap covers the EU Member States and three participating non-EU countries (Norway, Iceland and Liechtenstein). There are no further individual caps by country. Allowances allocated in the EU ETS from 2013 to 2020 decrease by 1.74% annually, starting from the average level of allowances emitted by Member States for the second trading period (2008–2012).

The vast majority of emissions within the EU which fall outside the scope of the EU ETS are addressed under the ESD (Decision No 406/2009/EC). The ESD covers emissions from all sources outside the EU ETS, except for de minimis aviation emissions, international maritime emissions, and emissions and removals from LULUCF. It thus covers a diverse range of small-

¹⁵⁵ http://ec.europa.eu/clima/policies/package/index_en.htm

scale emitters in a wide range of sectors: transportation, households, services, small industrial installations, fugitive emissions from the energy sector, emissions of fluorinated gases from appliances and other sources, agriculture and waste. Such sources accounted for 55% of total GHG emissions in the EU in 2013¹⁵⁶.

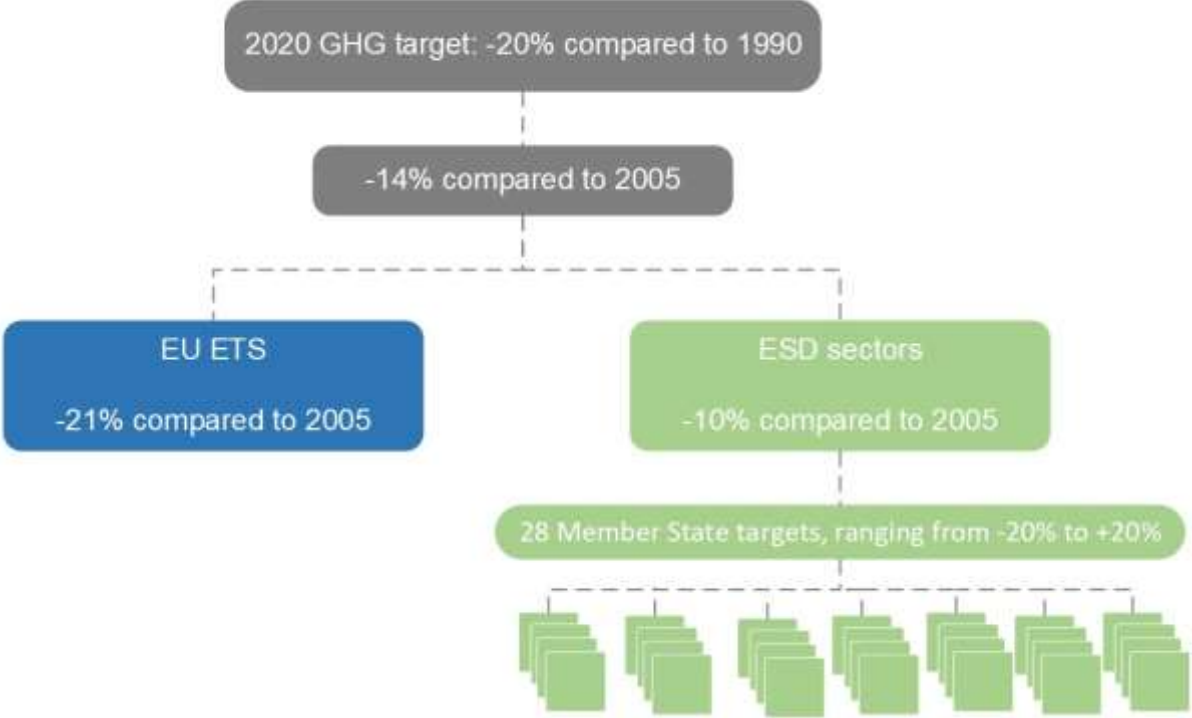


Figure 41: GHG targets under the 2020 Climate and Energy Package

While the EU ETS target is to be achieved by the EU as a whole, the ESD target is divided into national targets to be achieved individually by each Member State (see Figure 41). Under the ESD, national emission targets for 2020 are set, expressed as percentage changes from the 2005 levels. These changes have been transferred into binding quantified annual reduction targets for the period from 2013 to 2020 (Commission Decisions 2013/162/EU, 2013/634/EU and

¹⁵⁶ European Commission (2016). Commission Staff Working Document – accompanying the Report from the Commission to the European Parliament and the Council on evaluating the implementation of Decision No 406/2009/EC pursuant to Article 14 (SWD (2016) 251 final): <https://ec.europa.eu/transparency/regdoc/rep/10102/2016/EN/10102-2016-251-EN-F1-1-ANNEX-1.PDF>

2017/1471/EU), denominated in Annual Emission Allocations (AEAs)^{157, 158 159}. At the Member State level, 2020 targets under the ESD range from -20% to +20% compared to the 2005 levels.

The target levels have been set on the basis of Member States' relative Gross Domestic Product per capita. Up to certain limitations, the ESD allows Member States to make use of flexibility provisions for meeting their annual targets: carry-over of over-achievements to subsequent years within each Member State, transfers of AEAs between Member States and the use of international credits (credits from the Joint Implementation and CDM).

3.2.2 Monitoring progress towards the 2020 ESD targets

Monitoring, reporting and verification of the ESD targets mainly takes place through the submission of national GHG inventories by Member States. Chapter III of Commission Implementing Regulation 749/2014 sets out strict criteria on the basis of which the national GHG inventories and GHG emissions of Member States are reviewed annually at the EU level. Based on this review, the European Commission issues an implementing decision on Member States' ESD emissions in the given year, which might lead to Member States facing penalties or other consequences.

The ESD and the Monitoring Mechanism Regulation (MMR) have introduced an annual compliance cycle, requiring a review of Member States' GHG inventories to ensure compliance with their obligations under the ESD in the period 2013–2020. These reviews are carried out within a shorter time frame than the current UNFCCC inventory review so as to enable using flexibility provisions and taking corrective action, where necessary, at the end of each relevant year. The following progress has been made on the reviews:

- A comprehensive review was completed in 2016 to establish the GHG emission levels for the compliance years 2013 and 2014 in the ESD.
- A further review was completed in 2017 to establish the emission levels for the compliance year 2015.
- As of 2018, the annual review cycles continue.
- In 2022, the final review was conducted to establish the emission levels for the last compliance year 2020.

¹⁵⁷ Commission Decision of 26 March 2013 on determining Member States' annual emission allocations for the period from 2013 to 2020 pursuant to Decision No 406/2009/EC of the European Parliament and of the Council (2013/162/EU).

¹⁵⁸ Commission Implementing Decision of 31 October 2013 on the adjustments to Member States' annual emission allocations for the period from 2013 to 2020 pursuant to Decision No 406/2009/EC of the European Parliament and of the Council (2013/634/EU).

¹⁵⁹ Commission Decision (EU) 2017/1471 of 10 August 2017 amending Decision 2013/162/EU to revise Member States' annual emission allocations for the period from 2017 to 2020 (notified under document C/2017/5556).

3.3 Slovenian reduction targets

3.3.1 Slovenian reduction target under the EU ETS

Under the revised EU ETS Directive (Directive 2009/29/EC), a single EU ETS cap covers the EU Member States and three participating non-EU countries (Norway, Iceland and Liechtenstein). There are no further individual caps by country. There is therefore no specific Slovenian reduction target under the EU ETS.

For more information on the EU ETS target, we refer to the EU's Fifth or previous Biennial Reports.

3.3.2 Slovenian reduction target under the ESD (non-ETS)

Slovenia is committed to jointly meeting the EU economy-wide emissions reduction target under the Convention. As part of this target, Slovenia is committed to not increase its emissions in sectors covered by the ESD (non-ETS) by more than 4% compared to 2005. The quantified annual reduction targets for Slovenia, as set by EU Decisions¹⁶⁰ and expressed as AEAs in tonnes CO₂ equivalent, are 12.3 million in 2013, increasing to 12.4 million in 2016, in 2017 AEAs decreased to 12.2 million and increasing to 12.3 million in 2020 (according to AR4 GWPs).

In accordance with Article 27 of Regulation (EU) No 525/2013 and on the basis of the GHG inventory data as reviewed under Article 19 of that Regulation, the Commission examined the impact of the use of the 2006 IPCC Guidelines – and of the changes to the UNFCCC methodologies used – on Member States' GHG inventories. The difference in the total GHG emissions relevant to Article 3 of Decision No 406/2009/EC exceeded 1% for most Member States. In light of this outcome, all Member States' AEAs for the years 2017 to 2020 as contained in Annex II to Decision 2013/162/EU have been revised in order to take into account the updated inventory data reported and reviewed pursuant to Article 19 of Regulation (EU) No 525/2013 in 2016. This is why there is a decrease of AEAs in 2017 compared to 2016 for Slovenia.

Table 40: AEAs assigned to Slovenia using GWPs according to AR4 for the period 2013-2020

Year	AEAs (tonnes CO ₂ eq)	Year	AEAs (tonnes CO ₂ eq)
2013	12,323,918	2017	12,203,089
2014	12,353,720	2018	12,237,808
2015	12,383,521	2019	12,272,525
2016	12,413,322	2020	12,307,243

¹⁶⁰ Decision 2013/162/EU <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32013D0162&rid=1> and 2013/634/EU <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32013D0634&rid=1> and Commission Decision (EU) 2017/1471 of 10 August 2017 <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=OJ:L:2017:209:TOC>.

4 Progress in the achievement of quantified economy-wide emission reduction targets and relevant information

4.1 Introduction

This chapter describes the progress in and the achievement of the quantified economy-wide emission reduction targets in Slovenia for the period of 2013 to 2020. While concentrating on the reduction of greenhouse gas emissions of sectors not included under the EU Emission Trading System (non-ETS or ESD emissions), this chapter also provides information on the reduction of emissions by companies in Slovenia participating in the EU ETS.

For a description of policies and measures that have had and will have a significant impact on greenhouse gas (GHG) emissions in Slovenia, we refer to the information provided in chapter 4 of the Eighth National Communication. Summary information about policies and measures is also presented in CTF Table 3 within the CTF application.

The EU has substantially overachieved its reduction target under the Convention, which in turn means that its Member States and the United Kingdom have also fulfilled their emission reduction obligations. As stated in the 2022 EU GHG inventory submission to the UNFCCC, total GHG emissions, excluding LULUCF and including international aviation, decreased by 34%, or 1.94 billion tons of CO₂-eq, in the EU-27 + UK in 2020 compared to the base year 1990.

4.2 Progress in and the achievement of the quantified economy-wide emission reduction targets in the non-ETS (or ESD) sectors

As elaborated in chapter 3 of this Biennial report, more specifically section 3.3, the quantified annual reduction targets for Slovenia up to 2020 are set by EU Decisions. These amounted to 12.3 Mt CO₂-eq in 2013 for the non-ETS sectors and the same value in 2020. This target results in a cumulative amount of 98.5 Mt for the 2013–2020 period. Actual non-ETS (ESD) emissions in the period 2013–2020 were 87.1 Mt CO₂-eq, which is 11.4 Mt CO₂ eq or 11.5 % lower.

Actual emissions in the non-ETS sectors were below the annual allocated emissions every year in the period 2013–2020 (see Table 4.1 and Figure 4.1).

Different factors are behind lower emissions. Measures included in the OP GHG contributed to much lower emissions compared to EU targets for Slovenia, as was shown by the projections. Additionally economic growth was lower due to longer recession and fuel prices in Slovenia compared to neighbouring countries were not so favourable to induce purchase of fuel in Slovenia. In 2020 COVID had an important impact on transport emissions, which

resulted in considerably lower emissions compared to 2019. Agriculture emissions remained on the similar level throughout the period, while emissions from buildings decreased.

Table 41: Comparison of actual and target yearly emissions (source: EARS, EC)

	Actual nonETS emissions [kt CO ₂ ekv]	Annual emission allocations (AEAs) [kt CO ₂ ekv]
2013	11,010	12,324
2014	10,634	12,354
2015	10,825	12,384
2016	11,324	12,413
2017	11,300	12,203
2018	11,197	12,238
2019	10,949	12,273
2020	9,882	12,307
TOTAL	87,121	98,495

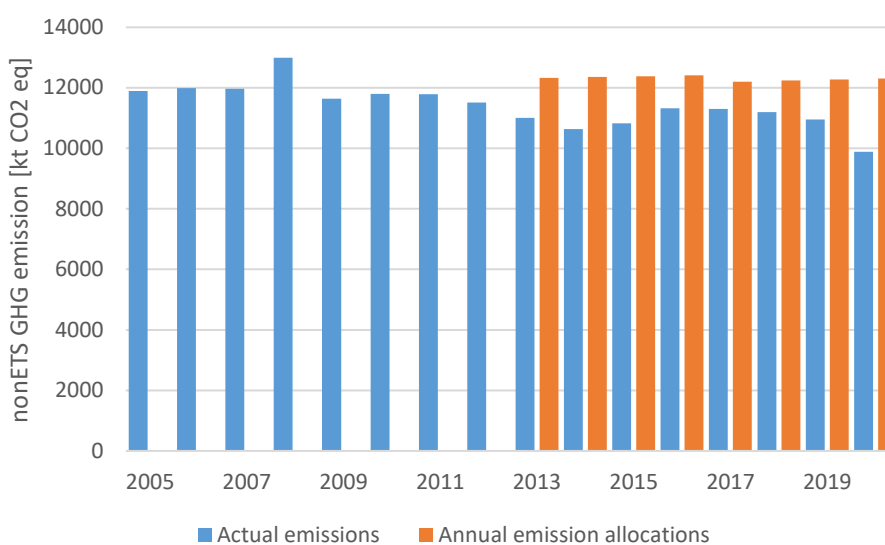


Figure 42: Comparison of actual and target yearly emissions (source: EARS, EC)

4.3 Emissions by Slovenian companies participating in European Emissions Trading System (ETS)

As elaborated above, the EU ETS target is to be achieved by the EU as a whole. Nevertheless, national policies and measures also impact the emissions of companies that participate in the European Emissions Trading System (EU ETS). In 2013, EU ETS GHG emissions from Slovenian companies amounted to 7.4 Mt CO₂ eq in 2013. By 2020 they decreased to 6.1 Mt CO₂ eq. Reduction has been achieved in production of electricity and heat. New thermal unit has been commissioned in 2014, resulting in closing of old coal units. Increase in electricity

productions from RES also contributed to that. Emissions from fuel combustion and processes in industrial companies remained more or less on the same level, despite increase in production and value added.

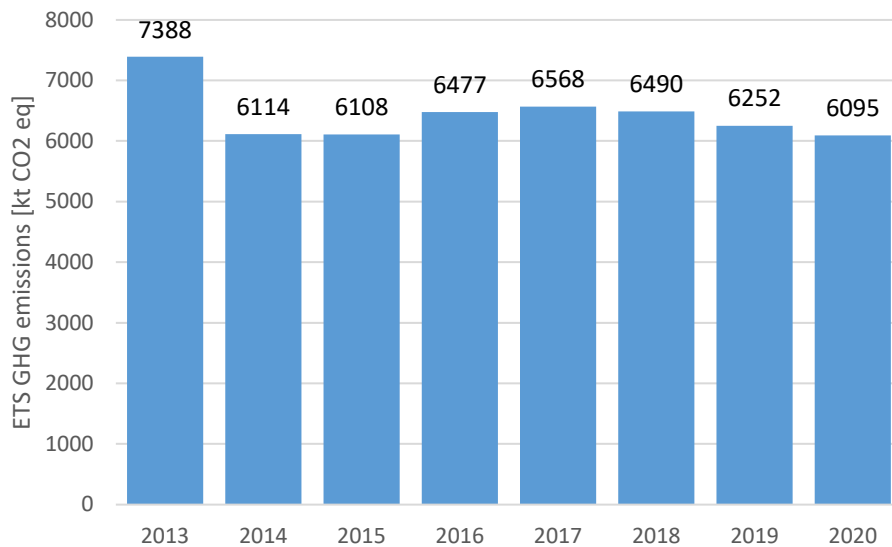


Figure 43: GHG emissions from Slovenian companies included in the EU ETS between 2013-2020 (source: EARS)

4.4 Policies and measures

Relevant information on policies and measures are reported in chapter four of the Eighth National Communication. Information on mitigation actions and their effects is included in the CTF Table 3.

5 Projections

For the relevant information, see chapter 5 of the Eighth Slovenian National Communication under the UNFCCC.

6 Provision of public financial support, technological and capacity building support to developing country Parties

For the relevant information, we refer to chapter 7 of the Eighth Slovenian National Communication under the UNFCCC.