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Report on the technical review of the third biennial report of Liechtenstein

Developed country Parties were requested by decision 2/CP.17 to submit their third biennial report to the secretariat by 1 January 2018. This report presents the results of the technical review of the third biennial report of Liechtenstein, conducted by an expert review team in accordance with the "Guidelines for the technical review of information reported under the Convention related to greenhouse gas inventories, biennial reports and national communications by Parties included in Annex I to the Convention".

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Contents

Abbreviations and acronyms

Annex II Party	Party included in Annex II to the Convention
AR4	Fourth Assessment Report of the Intergovernmental Panel on Climate Change
BR	biennial report
CER	certified emission reduction
CH_4	methane
CHF	Swiss franc
CO_2	carbon dioxide
CO_2 eq	carbon dioxide equivalent
CTF	common tabular format
ERT	expert review team
EU	European Union
GDP	gross domestic product
GHG	greenhouse gas
HFC	hydrofluorocarbon
IPCC	Intergovernmental Panel on Climate Change
IPPU	industrial processes and product use
LULUCF	land use, land-use change and forestry
NA	not applicable
NC	national communication
NF_3	nitrogen trifluoride
NIR	national inventory report
NO	not occurring
N_2O	nitrous oxide
PaMs	policies and measures
PFC	perfluorocarbon
SF_6	sulfur hexafluoride
UNFCCC reporting guidelines on BRs	"UNFCCC biennial reporting guidelines for developed country Parties"
UNFCCC reporting guidelines on NCs	"Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part II: UNFCCC reporting guidelines on national communications"
WAM	'with additional measures'
WEM	'with measures'
WOM	'without measures'

I. Introduction and summary

A. Introduction

1. This is a report on the centralized technical review of the BR3[1] of Liechtenstein. The review was organized by the secretariat in accordance with the "Guidelines for the technical review of information reported under the Convention related to greenhouse gas inventories, biennial reports and national communications by Parties included in Annex I to the Convention", particularly "Part IV: UNFCCC guidelines for the technical review of biennial reports from Parties included in Annex I to the Convention" (annex to decision 13/CP.20).

2. In accordance with the same decision, a draft version of this report was transmitted to the Government of Liechtenstein, which provided no comments to be considered or incorporated into this final version of the report.

3. The review was conducted from 12 to 17 March 2018 in Bonn, Germany, by the following team of nominated experts from the UNFCCC roster of experts: Ms. Asia Adlan (Sudan), Mr. Menouer Boughedaoui (Algeria), Mr. Christo Christov (Bulgaria), Ms. Nancy Liliana Gamba Cabezas (Colombia), Mr. Domenico Gaudioso (Italy), Mr. Liviu Gheorghe (Romania), Mr. Dirk Günther (Germany), Ms. Fui Pin Koh (Malaysia), Ms. Sangchan Limjirakan (Thailand), Mr. Juan Luis Martin Ortega (Spain), Mr. Engin Mert (Turkey), Ms. Gherghita Nicodim (Romania), Mr. Koki Okawa (Japan), Ms. Marcela Itzel Olguin-Alvarez (Mexico), Mr. Brian Quirke (Ireland), Ms. Kristina Saarinen (Finland), Ms. Marina Shvangiradze (Georgia) and Ms. Caroline Tagwireyi (Zimbabwe). Mr. Gaudioso, Ms. Saarinen and Ms. Shvangiradze were the lead reviewers. The review was coordinated by Ms. Veronica Colerio, Ms. Suvi Monni and Ms. Sevdalina Todorova (UNFCCC secretariat).

B. Summary

4. The ERT conducted a technical review of the information reported in the BR3 of Liechtenstein in accordance with the UNFCCC reporting guidelines on BRs (annex I to decision 2/CP.17).

1. Timeliness

5. The BR3 was submitted on 20 December 2017, before the deadline of 1 January 2018 mandated by decision 2/CP.17. The CTF tables were submitted on 20 December 2017.

2. Completeness, transparency of reporting and adherence to the reporting guidelines

6. Issues and gaps identified by the ERT related to the reported information are presented in table 1. The information reported by Liechtenstein in its BR3 mostly adheres to the UNFCCC reporting guidelines on BRs.

Table 1

Summary of completeness and transparency of mandatory information reported by Liechtenstein in its third biennial report

Section of BR	*Completeness*	*Transparency*	*Reference to description of recommendations*
GHG emissions and trends	Complete	Transparent	
Assumptions, conditions and methodologies related to the attainment of the quantified economy-wide emission reduction target	Complete	Transparent	
Progress in achievement of targets	Complete	Mostly transparent	Issue 1 in table

[1] The BR submission comprises the text of the report and the CTF tables, which are both subject to the technical review.

				4; issues 1–3 in table 6; issue 6 in table 10
Provision of support to developing country Parties[a]	NA	NA	NA	

Note: A list of recommendations pertaining to the completeness and transparency issues identified in this table is included in chapter III below.

[a] Liechtenstein is not an Annex II Party and is therefore not obliged to adopt measures and fulfil obligations defined in Article 4, paragraphs 3, 4 and 5, of the Convention.

II. Technical review of the information reported in the third biennial report

A. Information on greenhouse gas emissions and removals related to the quantified economy-wide emission reduction target

1. Technical assessment of the reported information

7. Total GHG emissions[2] excluding emissions and removals from LULUCF decreased by 13.0 per cent between 1990 and 2015, whereas total GHG emissions including net emissions or removals from LULUCF decreased by 10.7 per cent over the same period. Table 2 illustrates the emission trends by sector and by gas for Liechtenstein.

Table 2
Greenhouse gas emissions by sector and by gas for Liechtenstein for the period 1990–2015

	GHG emissions (kt CO_2 eq)					*Change (%)*		*Share (%)*	
	1990	*2000*	*2010*	*2014*	*2015*	*1990–2015*	*2014–2015*	*1990*	*2015*
Sector									
1. Energy	201.07	219.83	193.77	164.05	162.32	–19.3	–1.1	87.7	81.4
A1. Energy industries	0.18	2.77	3.26	2.51	2.05	1 062.9	–18.6	0.1	1.0
A2. Manufacturing industries and construction	36.32	36.46	26.11	27.15	27.44	–24.5	1.1	15.8	13.8
A3. Transport	76.75	91.31	77.84	74.16	61.87	–19.4	–16.6	33.5	31.0
A4. and A5. Other	87.45	88.45	85.42	59.10	69.81	–20.2	18.1	38.2	35.0
B. Fugitive emissions from fuels	0.37	0.83	1.14	1.13	1.16	215.2	2.5	0.2	0.6
C. CO_2 transport and storage	NO	NO	NO	NO	NO	NA	NA	NA	NA
2. IPPU	0.45	4.46	9.99	10.99	10.70	2 264.5	–2.7	0.2	5.4
3. Agriculture	25.51	21.48	24.18	24.39	24.09	–5.6	–1.2	11.1	12.1
4. LULUCF	3.51	22.01	21.08	13.76	8.32	137.2	–39.5	NA	NA
5. Waste	2.18	2.36	2.41	2.39	2.28	4.6	–4.6	1.0	1.1
6. Other	NO	NO	NO	NO	NO	NA	NA	NA	NA
Gas[a]									
CO_2	198.78	216.72	190.81	161.33	159.55	–19.7	–1.1	86.7	80.0
CH_4	19.53	17.36	19.85	19.83	19.50	–0.2	–1.7	8.5	9.8
N_2O	10.90	9.85	9.90	9.87	9.85	–9.7	–0.2	4.8	4.9
HFCs	0.00	4.11	9.69	10.64	10.42	9 974 953.5	–2.0	0.0	5.2
PFCs	NO	0.01	0.07	0.04	0.04	NA	–8.8	NA	0.0

[2] In this report, the term "total GHG emissions" refers to the aggregated national GHG emissions expressed in terms of CO_2 eq excluding LULUCF, unless otherwise specified. Values in this paragraph are calculated based on the 2017 annual submission, version v6.

	GHG emissions (kt CO_2 eq)					*Change (%)*		*Share (%)*	
	1990	*2000*	*2010*	*2014*	*2015*	*1990–2015*	*2014–2015*	*1990*	*2015*
SF_6	NO	0.09	0.02	0.12	0.04	NA	–67.8	NA	0.0
NF_3	NO	NO	NO	NO	NO	NA	NA	NA	NA
Total GHG emissions without LULUCF	**229.21**	**248.14**	**230.35**	**201.82**	**199.39**	**–13.0**	**–1.2**	**100.0**	**100.0**
Total GHG emissions with LULUCF	**232.72**	**270.15**	**251.42**	**215.58**	**207.71**	**–10.7**	**–3.7**	**NA**	**NA**

Source: GHG emission data: Liechtenstein's 2017 annual submission, version v6.
[a] Emissions by gas without LULUCF and without indirect CO_2.

8. The decrease in total emissions was driven mainly by factors such as fuel prices and intensified efforts to reduce fuel combustion activities in the energy sector, particularly in transport and other sectors.

9. In brief, Liechtenstein's national inventory arrangements were established in accordance with the Emissions Trading Act. By this legal Act, the Office of Environment is in charge of establishing emission inventories and is therefore also responsible for all aspects concerning the establishment of the National Inventory System under the Kyoto Protocol. The responsibility of the Office of Environment for establishing the National Inventory System is also described in the report of the Government to the Parliament for ratifying the Kyoto Protocol. Legislative arrangements, guidelines and further information on Liechtenstein's climate policy are available on the Office of Environment's website. There have been no changes since the last submission.

2. Assessment of adherence to the reporting guidelines

10. The ERT assessed the information reported in the BR3 of Liechtenstein and recognized that the reporting is complete, transparent and adhering to the UNFCCC reporting guidelines on BRs. No issues relating to the topics discussed in this chapter of the review report were raised during the review.

B. Assumptions, conditions and methodologies related to attainment of quantified economy-wide emission reduction target

1. Technical assessment of the reported information

11. For Liechtenstein, the Convention entered into force on 20 September 1994. Under the Convention, Liechtenstein committed to reducing its GHG emissions by 20 per cent below the 1990 level by 2020. The target includes all GHGs included in the "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual greenhouse gas inventories", namely CO_2, CH_4, N_2O, HFCs, PFCs and SF_6. It also includes all IPCC sources and sectors included in the annual GHG inventory. The global warming potential values used are from the AR4. Emissions and removals from the LULUCF sector are included in the target and accounted using a land-based approach. Liechtenstein reported that it plans to make use of market-based mechanisms to achieve its target. In absolute terms this means that, under the Convention, Liechtenstein has to reduce its emissions from 232.72 kt CO_2 eq in the base year[3] to 186.18 kt CO_2 eq by 2020.

2. Assessment of adherence to the reporting guidelines

12. The ERT assessed the information reported in the BR3 of Liechtenstein and recognized that the reporting is complete, transparent and adhering to the UNFCCC reporting guidelines on BRs. No issues relating to the topics discussed in this chapter of the review report were raised during the review.

[3] The emission level in the base year is from Liechtenstein's 2017 annual submission, version v6.

C. Progress made towards the achievement of the quantified economy-wide emission reduction target

1. Mitigation actions and their effects

(a) Technical assessment of the reported information

13. Liechtenstein provided information on its package of PaMs implemented, adopted and planned, by sector and by gas, in order to fulfil its commitments under the Convention. Liechtenstein reported on its policy context and legal and institutional arrangements put in place to implement its commitments and monitor and evaluate the effectiveness of its PaMs.

14. Liechtenstein provided information on a set of PaMs similar to those previously reported. However, the information was more comprehensive in most sectors, and included updated information, for example in relation to the planned revision of the CO_2 Act. There are no changes made since the previous submission to Liechtenstein's institutional, legal, administrative and procedural arrangements used for domestic compliance, monitoring, reporting, archiving of information and evaluation of the progress made towards its target.

15. Liechtenstein did not report on its self-assessment of compliance with the emission reduction target and national rules for taking action against non-compliance.

16. The key overarching cross-sectoral policy reported by Liechtenstein is the National Climate Protection Strategy of 2007, which was revised in 2015. In addition, the Energy Strategy 2020, the mitigation effect of which is assessed as the most significant, provides the framework for future climate policy and for Liechtenstein meeting its emission reduction target for 2020. Other policies that have delivered significant emission reductions are the Emissions Trading Act and the CO_2 Act. The Emissions Trading Act sets up the general framework for the fulfilment of Liechtenstein's reduction obligations originating from the ratification of the Kyoto Protocol. The CO_2 Act introduces a levy on the consumption of fossil fuel (oil and natural gas), an obligation to compensate for CO_2 emissions from the use of motor fuels (gasoline and diesel) and emissions regulation for passenger cars.

17. Liechtenstein highlighted the mitigation actions that are under development, such as the revision of the emissions regulation for passenger cars in 2018 to include light-duty vehicles, and the expected revision of the CO_2 Act in 2018 or 2019. Among the mitigation actions that provide a foundation for significant additional actions, the CO_2 Act is the most significant. Table 3 provides a summary of the reported information on the PaMs of Liechtenstein.

1. Table 3

Summary of information on policies and measures reported by Liechtenstein

Sector	*Key PaMs*	*Estimate of mitigation impact by 2020 (kt CO_2 eq)*	*Estimate of mitigation impact by 2030 (kt CO_2 eq)*
Policy framework and cross-sectoral measures	Climate Protection Strategy	NA	NA
	Environmental Protection Act	NA	NA
	Emissions Trading Act	NA	NA
Energy	Energy Ordinance 2008	NA	NA
	Energy Strategy 2020	6.89	1.92
	CO_2 Act	NA	NA
Transport	Mobiles Liechtenstein 2015 (national transport policy)	NA	NA
	Heavy Vehicle Fee	NA	NA
	Promotion of public transport	NA	NA

Sector	*Key PaMs*	*Estimate of mitigation impact by 2020 (kt CO_2 eq)*	*Estimate of mitigation impact by 2030 (kt CO_2 eq)*
Renewable energy	Green electricity label	NA	NA
	Promotion of photovoltaic systems of private owners	NA	NA
	Hydropower (a plant transformed into pumped-storage plant in 2018)	NA	NA
Energy efficiency	Energy Efficiency Act	2.89	–0.09
IPPU	No PaMs reported for IPPU		
Agriculture	Agriculture Law (promotion of environment and animal-friendly agriculture as well as permanent pastures on swampy and mixed soils)	NA	NA
	Ecological equalization payments in agriculture	NA	NA
	Preservation of soil for agriculture use	NA	NA
LULUCF	Cultivation regulations in the Forestry Act aiming at sustainable cultivation of forests	NA	NA
	Ordinance on forest reserves and protected areas	NA	NA
Waste	Steam pipeline	2.2	NA

Note: The estimates of mitigation impact are estimates of emissions of CO_2 or CO_2 eq avoided in a given year as a result of the implementation of mitigation actions.

(b) Policies and measures in the energy sector

18. **Energy supply**. Liechtenstein has no fossil fuel resources of its own. Liechtenstein's own supply of energy is limited to firewood, ambient heat and electricity (hydroelectric power plants, photovoltaic systems, biogas and natural gas plants). In 2016, 22 per cent of consumed electricity was produced in Liechtenstein. Natural gas (21 per cent) and electricity (33 per cent) constitute the greatest share of the total energy consumption. The most important policy on energy supply is the CO_2 Act, which sets a levy for oil and natural gas.

19. **Renewable energy sources**. The increased use of renewable energy sources is of central importance for the reduction in GHG emissions and accordingly for a long-term climate policy in Liechtenstein. The Energy Strategy 2020 provides future oriented impulses for the national energy policy focusing on areas such as the promotion of efficient energy use, the use of renewable energy and energy conservation. These goals correspond to the aims of the EU 2020 climate and energy package from 2008. The Energy Strategy includes a target to increase the share of renewable energy in total energy use from 8 per cent to 20 per cent by 2020. The act and the ordinance on the Liberalization of the Electricity Market provide mechanisms to support the conveyance of renewable energies. The Liechtenstein Power Authority also offers a “Green Electricity” label and certification for domestic hydropower plants and photovoltaic systems. The State subsidizes solar collectors with a contribution of CHF 250 per square metre, whereas photovoltaic systems generating electricity are subsidized with a contribution of CHF 400 per installed output (kW) within the maximum subsidy per system of CHF 400,000.

20. **Energy efficiency**. The Energy Strategy 2020 sets the target to stabilize energy consumption to 2008 levels by 2020. The Energy Efficiency Act and the Energy Ordinance of Construction Act constitute the legal framework for the implementation of energy efficiency measures relating to buildings. The Government promotes the measures for implementing the objectives laid down in the Energy Strategy 2020 with financial resources and advice. Almost all Liechtenstein municipalities provide additional funds to projects subsidized at the national level pursuant to the Energy Efficiency Act.

21. **Residential and commercial sectors**. Liechtenstein has implemented measures that focus on the efforts to promote energy conservation. For instance, government subsidies of up to CHF 200,000 are granted for the renovation of old buildings to improve insulation. In addition, the Minergie standard is promoted and employed in all new buildings of public administration. The standard requires buildings to offer a high level of comfort, economic efficiency and low-energy consumption. Liechtenstein also provides subsidies for the use of solar energy for the production of hot water.

22. **Transport sector**. In 2008, Liechtenstein approved a national transport policy which includes a strategy for developing the transport sector in the medium and long term. As part of the national transport policy, the Government has implemented or prepared a wide range of projects to promote public transportation and to reduce emissions arising from transport. Examples include the expansion of the Liechtenstein Bus Authority, "Liechtenstein Takt" regional train schedule, preferential treatment of buses at traffic lights, subsidies of electric scooters and electric bicycles, tax exemptions for solar, hybrid, electric and natural gas vehicles, security measures along routes to schools and in the area of pedestrian crossings, mobility campaigns and medium-term expansion of the railway network. In 2016, the report on the transport policy and mobility strategy "Mobiles Liechtenstein 2015" was updated.

23. **Industrial sector**. Liechtenstein's economy has a significant emphasis on industrial production. In 2015, the production sector provided 38.4 per cent of employment, which is high in comparison with other European countries. The most important industrial branches are mechanical engineering, electrical machinery, vehicle components, dental technology, food products and construction work. Owing to Liechtenstein's limited domestic market, the larger enterprises in particular are heavily export oriented. Liechtenstein reported in its NC7 that two large industrial installations participate in the EU Emissions Trading System. During the review, the Party explained that the main policy having an impact on the emissions from industry is the CO_2 Act.

(c) Policies and measures in other sectors

24. **Industrial processes**. Between 1990 and 2015, GHG emissions from the industrial processes sector increased from 0.45 kt CO_2 eq. to 10.70 kt CO_2 eq, mainly owing to an increase in the utilization of HFCs. Liechtenstein did not report any specific PaMs addressing the reduction of GHG emissions from the industrial processes sector. During the review, Liechtenstein provided further information that the CO_2 ordinance also addresses emissions from HFCs, PFCs, SF_6 and NF_3 but no target on the reduction is defined. F-gases are also regulated by the Customs Treaty with Switzerland and the Swiss Ordinance on Chemical Risk Reduction.

25. **Agriculture**. Liechtenstein adopted its main agricultural PaM, the new Agricultural Law, in 2008 to promote the trend towards more ecological agriculture. The ecological equalization payments in agriculture promote ecological cultivation methods. The law on preservation of soil for agricultural use aims to permanently protect soil for agricultural use from misuse. The Water Protection Act specifies the thresholds for animal husbandry per area unit. In parallel to Switzerland, the Ecological Performance Certificate was introduced for environmentally friendly cultivation and welfare-oriented animal husbandry. All registered farms operate according to these principles. Direct payments are paid only if the practice corresponds to the provisions of the animal protection legislation and the environmental protection provisions. The use of fertilizers is strictly regulated. Since 2002, the promotion of farm animals consuming roughage is included in the direct payment system.

26. **LULUCF**. For the LULUCF sector, Liechtenstein reported only forestry PaMs. It provided information that sustainability in forestry has been of great importance since the introduction of the Forestry Regulations in 1865. The current Forestry Act (1991) includes the qualitative and quantitative (prohibition of clearing) preservation of the forest stocks and the promotion of nature-friendly forest management. In addition, international agreements such as the 1993 Helsinki Ministerial Conference on the Protection of Forests in Europe provide the basis for forest management. The National Forest Programme of Liechtenstein contributes to sustainable forest management.

27. **Waste management**. The Office of Environment and the Ministry of Environment are responsible for developing legislation and policies to ensure the recovery and environmentally sound disposal of waste, coordinating the planning of waste disposal facilities and implementation of the policy framework in close collaboration with the 11 communes. The basis for waste legislation in Liechtenstein is the Environmental Protection Act (2008). Under the Customs Treaty with Switzerland, the Swiss Federal Office for the Environment monitors the import, export and transit of wastes and hazardous wastes for Liechtenstein. The ordinance on prevention and disposal of waste from 2016 bans landfilling of combustible waste. Waste is exported to Switzerland for combustion, and steam produced by the incineration plant is used by the manufacturing industry in Liechtenstein.

(d) Response measures

28. Liechtenstein did not report on the assessment of the economic and social consequences of response measures in BR3, except stating that the measures in its Energy Strategy 2020 have been checked against their compatibility with economic as well as social requirements. The ERT takes note that Liechtenstein reported in its NC7 that it is unable to provide further information on the economic and social requirements with which its PaMs need to be compatible and how these requirements contribute to minimizing climate change effects and adverse effects of PaMs on international trade and social, environmental and economic impacts as no data are available. During the review, Liechtenstein explained that there are no plans to further improve the information provided.

(e) Assessment of adherence to the reporting guidelines

29. The ERT assessed the information reported in the BR3 of Liechtenstein and identified issues relating to completeness, transparency and adherence to the UNFCCC reporting guidelines on BRs. The findings are described in table 4.

2. Table 4

3. Findings on the mitigation actions and their effects from the review of the third biennial report of Liechtenstein

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation or encouragement*
1	Reporting requirement specified in paragraph 6 Issue type: transparency	In CTF table 3, Liechtenstein provided information on its mitigation actions, but included only two implemented PaMs reducing CO_2 emissions in the energy sector. CTF table 3 did not include PaMs in other sectors or targeting other gases. The ERT noted from the NC7 that Liechtenstein has also quantified the effects of a measure in the waste sector and has reported a series of other measures for the other sectors. Furthermore, CTF table 3 did not provide a brief description of PaMs reported.
	Assessment: recommendation	During the review, Liechtenstein clarified that the energy sector is the main sector with the highest emissions and most mitigation actions target this sector. As the energy sector is the only one with quantitative mitigation impacts, only the energy sector PaMs were included in the CTF tables. The ERT recommends that Liechtenstein improve the transparency of its reporting by including mitigation actions covering sectors other than energy and gases other than CO_2, and that it include a brief description of the reported PaMs, in CTF table 3.
2	Reporting requirement specified in paragraph 24 Issue type: completeness	The BR3 of Liechtenstein did not include information on the domestic arrangements established for the process of the self-assessment of compliance with emission reductions in comparison with emission reduction commitments or the level of emission reduction that is required by science. It also did not include information on the progress made in the establishment of national rules for taking local action against domestic non-compliance with emission reduction targets.
	Assessment: encouragement	The ERT reiterates the encouragement made in the previous review report that Liechtenstein include, in its next BR, information on the domestic arrangements established for the process of the self-assessment of compliance with emission reductions in comparison with emission reduction commitments or the level of emission reduction that is required by science, as well as on the progress made in the

establishment of national rules for taking local action against domestic non-compliance with emission reduction targets, to the extent possible.

2. *Note*: Paragraph number listed under reporting requirement refers to the relevant paragraph of the UNFCCC reporting guidelines on BRs. The reporting on the requirements not included in this table is considered to be complete, transparent and adhering to the UNFCCC reporting guidelines on BRs.

2. Estimates of emission reductions and removals and the use of units from market-based mechanisms and land use, land-use change and forestry

(a) Technical assessment of the reported information

30. For 2014, Liechtenstein reported in CTF table 4 annual total GHG emissions excluding LULUCF of 215.97 kt CO_2 eq, which is 6.7 per cent below the 1990 base-year level reported in CTF table 4. The ERT noted that this value is different from the total GHG emissions excluding LULUCF reported in CTF table 1 for 2014, 201.82 kt CO_2 eq (11.9 per cent below the base-year level).

31. For 2015 Liechtenstein reported in CTF table 4 annual total GHG emissions excluding LULUCF of 207.70 kt CO_2 eq, which is 10.3 per cent below the 1990 base-year level reported in CTF table 4. The value reported in CTF table 1 is 199.39 kt CO_2 eq (13.0 per cent below the base-year level).

32. Liechtenstein did not report in CTF table 4 on the contribution from LULUCF. During the review, Liechtenstein explained that LULUCF contributions were not reported as those emissions are of minor importance to reaching the 2020 target and there were no overall net emission reductions in the whole sector. Liechtenstein reported that it intends to use units from market-based mechanisms under the Convention. It reported in CTF tables 4 and 4(b) that it used units from market-based mechanisms in 2015 and 2016 towards the achievement of its 2020 target in the amount of 51.71 and 54.00 kt CO_2 eq, respectively. Table 5 illustrates Liechtenstein's total GHG emissions, the contribution of LULUCF and the use of units from market-based mechanisms to achieve its target.

4. Table 5

Summary of information on the use of units from market-based mechanisms and land use, land-use change and forestry by Liechtenstein to achieve its target

Year	*Emissions excluding LULUCF (kt CO_2 eq)*[a]	*Contribution of LULUCF (kt CO_2 eq)*[b]	*Emissions including contribution of LULUCF (kt CO_2 eq)*[b]	*Use of units from market-based mechanisms (kt CO_2 eq)*[c]
1990	229.21	3.51	232.72	0
2010	230.35	21.08	251.42	0
2011	217.44	21.44	238.88	0
2012	226.77	21.71	248.48	0
2013	233.27	13.86	247.12	0
2014	201.82	13.76	215.58	0
2015	199.39	8.32	207.71	51.71
2016				54.00

Sources: Liechtenstein's BR3 and CTF tables 1, 4, 4(a)I, 4(a)II and 4(b).

[a] Information is from CTF table 1. The Party explained during the review that the values reported in CTF table 4 are incorrect.

[b] The Party did not include this information in CTF table 4. Information is from CTF table 1.

[c] The Party explained that the units reported for 2015 and 2016 are assigned amount units and CERs. The Party did not report any use of units for 1990, 2010–2014 (see table 6).

33. In assessing the progress towards the achievement of the 2020 target, the ERT noted that Liechtenstein's emission reduction target under the Convention is 20 per cent below the 1990 base-year level (see para. 11 above). As discussed above, in 2015 Liechtenstein's annual total GHG emissions excluding LULUCF were 13.0 per cent (29.82 kt CO_2 eq)

below the base-year level. The ERT noted that in 2015 the contribution of LULUCF was not reported by Liechtenstein in CTF table 4 but that net emissions from LULUCF accounted for 8.32 kt CO_2 eq. The use of market-based mechanisms accounted for 51.71 kt CO_2 eq.

34. The ERT noted that Liechtenstein is making progress towards its emission reduction target by implementing mitigation actions that are delivering some emission reductions and by using units from the market-based mechanisms under the Convention. On the basis of the results of the projections (see para. 46 below), the ERT noted that the Party may face challenges in meeting its 2020 target under the Convention with domestic action only. However, the ERT notes that Liechtenstein plans to use market-based mechanisms to meet its target.

(b) Assessment of adherence to the reporting guidelines

35. ERT assessed the information reported in the BR3 of Liechtenstein and identified issues relating to transparency and adherence to the UNFCCC reporting guidelines on BRs. The findings are described in table 6.

5. Table 6

6. Findings on estimates of emission reductions and removals and the use of units from the market-based mechanisms and land use, land-use change and forestry from the review of the third biennial report of Liechtenstein

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation*
1	Reporting requirement specified in paragraphs 9 and 10 Issue type: transparency Assessment: recommendation	The total emissions excluding LULUCF reported in CTF table 4 for the base year (1990) and for 2010–2015 are not consistent with the emissions reported in CTF table 1. During the review, Liechtenstein explained that the values reported in CTF table 1 are correct. The ERT recommends that Liechtenstein report correct values for total emissions excluding LULUCF in CTF table 4, consistent with the information in CTF table 1.
2	Reporting requirement specified in paragraphs 9 and 10 Issue type: transparency Assessment: recommendation	Liechtenstein did not report the contribution from LULUCF in CTF table 4. During the review, Liechtenstein explained that LULUCF contributions were not reported as those emissions are of minor importance to reach the 2020 target and there were no overall net emission reductions in the whole sector. The Party further stated that it did not consider that such additional emissions are relevant for reporting on the target. The ERT recommends that Liechtenstein report the contribution from LULUCF in CTF table 4, even if the LULUCF sector constitutes net emissions, because LULUCF is included in its target.
3	Reporting requirement specified in paragraph 10 Issue type: transparency Assessment: recommendation	In CTF table 4, Liechtenstein reported information on market-based mechanisms only for 2015 and 2016. During the review, the Party explained that of the years of the second commitment period under the Kyoto Protocol, CERs were purchased only in 2015 and 2016, and that it considered that purchases in the first commitment period are not relevant for the current reporting. The ERT recommends that Liechtenstein report the quantity of market-based mechanisms for all relevant years in CTF table 4.

Note: Paragraph number listed under reporting requirement refers to the relevant paragraph of the UNFCCC reporting guidelines on BRs. The reporting on the requirements not included in this table is considered to be complete, transparent and adhering to the UNFCCC reporting guidelines on BRs.

3. Projections overview, methodology and results

(a) Technical assessment of the reported information

36. Liechtenstein reported updated projections for 2020 and 2030 relative to actual inventory data for 2015 under the WEM scenario. The WEM scenario reported by Liechtenstein includes implemented and adopted PaMs.

37. In addition to the WEM scenario, Liechtenstein referred to its NC7 where WAM and WOM scenarios are reported. The WAM scenario includes planned PaMs, while the WOM scenario excludes all PaMs implemented, adopted or planned after 2015. Liechtenstein provided a definition of its scenarios, explaining that in its WEM scenario, the majority of CO_2 reduction is attributed to policies such as renovation of buildings and increased use of heat pumps, while emission reductions are also predicted for the transport and energy industries. The WAM scenario includes additional measures from the Energy Efficiency Act and from the Energy Strategy 2020, such as efficiency standards for road vehicles and increased replacement of oil and gas heating with heat pumps. The definitions indicate that the scenarios were prepared according to the UNFCCC reporting guidelines on NCs.

38. The projections are presented on a sectoral basis, using the same sectoral categories as those used in the reporting on mitigation actions, and on a gas-by-gas basis for CO_2, CH_4, N_2O, HFCs, PFCs and SF_6 (treating HFCs and PFCs collectively in each case) for 2015–2030. The projections are also provided in an aggregated format for each sector as well as for a Party total using global warming potential values from the AR4.

39. Liechtenstein did not report emission projections for indirect GHGs such as carbon monoxide, nitrogen oxides, non-methane volatile organic compounds or sulfur oxides.

40. Emission projections related to fuel sold to ships and aircraft engaged in international transport were reported separately and were not included in the totals. Liechtenstein reported on factors and activities affecting emissions for each sector.

(b) Methodology, assumptions and changes since the previous submission

41. During the review, Liechtenstein explained that the methodology used for the preparation of the projections is different from that used for the preparation of the emission projections for the BR2. The general methodologies used for the WEM and WAM projections are described in chapter 5.3 of the NC7. The modelling of the energy sector (fuel combustion) scenarios is the most detailed. The projections are based on Liechtenstein's Energy Strategy 2020 and on the interim report concerning the Energy Strategy, published in 2017. The basis for the projections is Scenario 2 of the Energy Strategy, which is characterized by a stabilization of energy consumption, an enhancement of renewable energy sources and a reduction in CO_2 emissions. Scenario 2 defines a package of measures, implemented stepwise until 2020, in order to reach the GHG emission target. The projections for fugitive emissions from fuels, IPPU and agriculture are based on projections for Switzerland, while for the LULUCF sector the emissions are assumed to stay at the average level of 2011–2015. Waste sector projections are based on the Party's Waste Plan. During the review, the Party explained that where Swiss projections were applied to Liechtenstein, the sectoral experts of Liechtenstein confirmed that the circumstances in Switzerland and Liechtenstein are comparable and that the chosen method in Switzerland's NC7 is feasible also in Liechtenstein.

42. To prepare its projections, Liechtenstein relied on the key underlying assumptions and objectives of the Energy Strategy 2020 (see paras. 19 and 20 above). During the review, the Party explained that it did not use variables such as population, GDP or employment in its projections. Only the population numbers were reported in CTF table 5.

43. Liechtenstein did not provide information on sensitivity analyses in its BR3. During the review, the Party explained that sensitivity analyses were not conducted for any of the assumptions owing to resource constraints.

(c) Results of projections

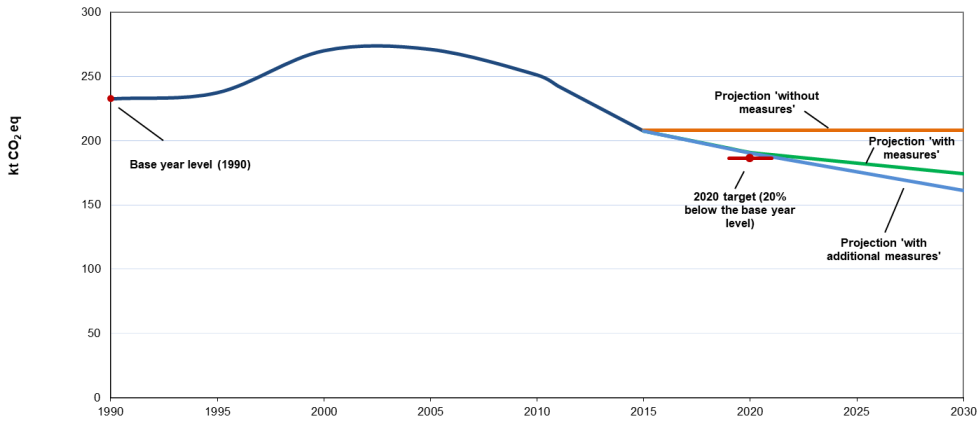
44. The projected emission levels under different scenarios and information on the quantified economy-wide emission reduction target are presented in table 7 and the figure below.

Table 7
Summary of greenhouse gas emission projections for Liechtenstein

	GHG emissions (kt CO_2 eq per year)	*Changes in relation to base-year level (%)*	*Changes in relation to 1990 level (%)*
Quantified economy-wide emission reduction target under the Convention	186.18	–20.0	–20.0
Inventory data 1990[a]	232.72	NA	NA
Inventory data 2015[a]	207.71	–10.7	–10.7
WOM projections for 2020[b]	207.71	–10.7	–10.7
WEM projections for 2020[b]	190.92	–18.0	–18.0
WAM projections for 2020[b]	190.55	–18.1	–18.1
WOM projections for 2030[b]	207.71	–10.7	–10.7
WEM projections for 2030[b]	174.36	–25.1	–25.1
WAM projections for 2030[b]	161.41	–30.6	–30.6

[a] From Liechtenstein's BR CTF table 1; the emissions are with LULUCF.
[b] From Liechtenstein's NC7 and/or BR3.

Greenhouse gas emission projections reported by Liechtenstein



Sources: (1) data for the years 1990–2015: Liechtenstein's 2017 annual inventory submission, version v6; total GHG emissions including LULUCF; (2) data for the years 2016–2030: Liechtenstein's NC7 and BR3; total GHG emissions including LULUCF.

45. Liechtenstein's total GHG emissions excluding LULUCF are projected to be 175.10 and 158.54 kt CO_2 eq in 2020 and 2030, respectively, under the WEM scenario, which is a decrease of 23.6 and 30.8 per cent, respectively, below the 1990 level. Under the WAM scenario, emissions in 2020 and 2030, amounting to 174.73 and 145.59 kt CO_2 eq, respectively, are projected to be lower than those in 1990 by 23.8 and 36.5 per cent, respectively.

46. Liechtenstein's total GHG emissions including LULUCF are projected to be 190.92 and 174.36 kt CO_2 eq in 2020 and 2030, respectively, under the WEM scenario, which is a decrease of 18.0 and 25.1 per cent, respectively, below the 1990 level. Under the WAM scenario, emissions in 2020 and 2030, amounting to 190.55 and 161.41 kt CO_2 eq with LULUCF, respectively, are projected to be lower than those in 1990 by 18.1 and 30.6 per cent, respectively.

47. The 2020 projections suggest that Liechtenstein may face challenges in meeting its 2020 target under the Convention, which includes LULUCF (see para. 11 above). However, the ERT notes that Liechtenstein plans to use market-based mechanisms to meet its target.

48. Liechtenstein presented the WEM and WAM scenarios by sector for 2020 and 2030, as summarized in table 8.

Table 8
Summary of greenhouse gas emission projections for Liechtenstein presented by sector

	GHG emissions and removals (kt CO_2 eq)					*Change (%)*			
	1990	*2020*		*2030*		*1990–2020*		*1990–2030*	
Sector		*WEM*	*WAM*	*WEM*	*WAM*	*WEM*	*WAM*	*WEM*	*WAM*
Energy (not including transport)	124.32	77.87	77.87	69.01	62.64	–37.4	–37.4	–44.5	–49.6
Transport	76.75	61.05	61.05	55.35	50.75	–20.5	–20.5	–27.9	–33.9
Industry/industrial processes	0.45	10.00	9.64	7.77	7.32	2 110.5	2 030.9	1 617.6	1 518.1
Agriculture	25.51	23.61	23.61	23.37	21.84	–7.4	–7.4	–8.4	–14.4
LULUCF	3.51	15.82	15.82	15.82	15.82	350.8	350.8	350.8	350.8
Waste	2.18	2.56	2.56	3.03	3.03	17.5	17.5	39.0	39.0
Other (specify)	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total GHG emissions without LULUCF	**229.21**	**175.10**	**174.73**	**158.54**	**145.59**	**–23.6**	**–23.8**	**–30.8**	**–36.5**

Source: Liechtenstein's 2017 annual submission, version v6, and NC7/BR3. The ERT calculated the values for energy (not including transport) because the value reported by Liechtenstein included transport under energy.

49. According to the projections reported for 2020 under the WEM scenario, the most significant emission reductions are expected to occur in the energy and transport sectors, amounting to projected reductions of 46.43 kt CO_2 eq (37.4 per cent) and 15.75 kt CO_2 eq (20.5 per cent) between 1990 and 2020, respectively (see para. 53 below for drivers). The pattern of projected emissions reported for 2030 under the same scenario remains the same.

50. If additional measures are considered (i.e. under the WAM scenario), the patterns of emission reductions by 2020 presented by sector and by gas remain the same.

51. Liechtenstein presented the WEM and WAM scenarios by gas for 2020 and 2030, as summarized in table 9.

Table 9
Summary of greenhouse gas emission projections for Liechtenstein presented by gas

	GHG emissions and removals (kt CO_2 eq)					*Change (%)*			
	1990	*2020*		*2030*		*1990–2020*		*1990–2030*	
Gas		*WEM*	*WAM*	*WEM*	*WAM*	*WEM*	*WAM*	*WEM*	*WAM*
CO_2	198.78	136.42	136.42	122.03	111.19	–31.4	–31.4	–38.6	–44.1
CH_4	19.53	19.19	19.19	19.24	18.15	–1.7	–1.7	–1.5	–7.1
N_2O	10.90	9.68	9.67	9.64	9.06	–11.2	–11.3	–11.6	–16.9
HFCs	0.00	9.74	9.39	7.57	7.13	NA	NA	NA	NA
PFCs	NO	0.04	0.03	0.03	0.03	NA	NA	NA	NA
SF_6	NO	0.03	0.03	0.03	0.03	NA	NA	NA	NA
NF_3	NO	NO	NO	NO	NO	NA	NA	NA	NA
Total GHG emissions without	**229.21**	**175.10**	**174.73**	**158.54**	**145.49**	**–23.6**	**–23.8**	**–30.8**	**–36.5**

LULUCF

Source: Liechtenstein's NC7 and BR3. The value for HFCs in 1990 presented in NC7/BR3 is a value rounded to zero and therefore a change could not be calculated.

52. For 2020 the most significant reductions are projected for CO_2, and N_2O emissions: 62.36 kt CO_2 eq (31.4 per cent) and 1.22 kt CO_2 eq (11.2 per cent) between 1990 and 2020, respectively, in the WEM scenario.

53. The reduction in CO_2 emissions (excluding LULUCF) under the WEM scenario in the period 1990–2030 is assumed to amount to 38.6 per cent in total. A major share of these projected reductions is attributed to other sectors (1.A.4) and to the measures from the Energy Strategy 2020: renovation of buildings and increased use of heat pumps. Less pronounced reductions are predicted for the transport sector. The CH_4 emission reduction (excluding LULUCF) under the WEM scenario in the period 1990–2030 is assumed to amount to 1.5 per cent. Most of the reduction is expected to occur in 2015–2030, as the reduction in 1990–2015 was only 0.2 per cent. N_2O emissions follow a similar trend to CH_4 emissions in 2015–2030: although the overall reduction from 1990 to 2030 is projected to be 11.6 per cent, the emissions have already decreased from 1990 to 2015 by 9.7 per cent.

54. If additional measures are considered (i.e. in the WAM scenario), the patterns of emission reductions by 2030 presented by sector and by gas slightly change owing to the reduction in CO_2 emissions (excluding LULUCF) under the WAM scenario in the period 1990–2030 (44.1 per cent). The main reasons for this reduction are the additional measures in the energy sector under the WAM scenario (see para. 37 above). The reduction in CH_4 emissions (excluding LULUCF) in the period 1990–2030 is also relevant and is assumed to amount to 7.1 per cent. The main reason for this reduction in the WAM scenario compared with the WEM scenario is the more pronounced reductions expected in Switzerland's WAM scenario for the agriculture sector.

(d) Assessment of adherence to the reporting guidelines

55. The ERT assessed the information reported in the BR3 of Liechtenstein and identified issues relating to completeness, transparency and adherence to the UNFCCC reporting guidelines on BRs. The findings are described in table 10.

7. Table 10

8. Findings on greenhouse gas emission projections reported in the third biennial report of Liechtenstein

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation or encouragement*
1	Reporting requirement[a] specified in paragraph 30 Issue type: completeness Assessment: encouragement	In its BR3, Liechtenstein did not provide a sensitivity analysis or a justification for not reporting it. During the review, the Party indicated that owing to restricted resources (and given that for many sectors the estimates are adapted from Switzerland's projections) it does not plan to include a sensitivity analysis in the next BR. The ERT reiterates the encouragement made in previous review report that Liechtenstein provide a sensitivity analysis of the projections on the key assumptions or at least provide the relevant explanations as to why it may not be feasible to provide a sensitivity analysis.
2	Reporting requirement[a] specified in paragraph 35 Issue type: completeness Assessment: encouragement	Liechtenstein did not report emission projections for indirect GHGs such as carbon monoxide, nitrogen oxides, non-methane volatile organic compounds or sulfur oxides. The ERT encourages Liechtenstein to include these projections to enhance completeness in its next BR.
3	Reporting requirement[a] specified in	Parties using models to project GHG emissions and removals and estimating the total effect of PaMs should provide sufficient information to allow a reader to obtain

	paragraph 42 Issue type: transparency Assessment: encouragement	a basic understanding of such models. Because of the small size of the country, Liechtenstein does not have a comprehensive emission projection model developed specifically for that nation. Projections of Switzerland are used as a basis for the IPPU and agriculture sectors as well as for fugitive emissions from fuels in the energy sector. The BR3 provides a brief description on projections and refers to the NC7 for further information. However, the NC7 lacks transparency regarding how the Swiss projections are used to derive the projections for Liechtenstein. During the review, Liechtenstein explained that because of strong social and economic similarities with Switzerland, Liechtenstein's projections are calculated by applying the relative year-to-year changes in Switzerland's projections to GHG emissions from the IPPU and agriculture sectors as well as from fugitive emissions from fuels in the energy sector. This approach is applied for both the WEM and the WAM scenario and it is reviewed by Liechtenstein sectoral experts. To increase transparency, the ERT encourages Liechtenstein to add further information on the models used in the next BR. The ERT notes that in particular, information on the methods and key variables used in the Swiss approach and on how they have been adapted to compile the projections on GHG emissions for Liechtenstein would increase the transparency of the reporting.
4	Reporting requirement[a] specified in paragraph 43 Issue type: transparency Assessment: encouragement	The BR3 provides a brief description on projections and refers to the NC7 for further information. Liechtenstein's NC7 did not include, for each model or approach used for projections, information such as: the gases/sectors considered, the type of model used (key characteristics, original purpose); the model's strengths/weaknesses; and how it accounts for any overlap or synergies that may exist between different PaMs. In the NC7, the Party referred to the NC7 of Switzerland for sectors where Swiss models were used. During the review, the Party provided some additional information on the models and approaches used, in particular for fuel combustion. To increase transparency, the ERT encourages Liechtenstein to include in the next BR for each model and approach used for projections the following information: the gases/sectors considered; the type of model used (key characteristics, original purpose); its strengths/weaknesses; and how it accounts for any overlap or synergies that may exist between different PaMs. The ERT notes that this information is particularly relevant for the sectors for which national methods are used.
5	Reporting requirement[b] specified in paragraph 12 Issue type: completeness Assessment: encouragement	Liechtenstein did not report the main differences in the assumptions, methods employed and results between projections in the current BR and those in the previous NC. During the review, the Party explained that changes were made to the methodology used in the NC6 and BR2. The ERT encourages Liechtenstein to report in its next BR on the main differences in the assumptions, methods employed and results between projections in the current BR and those in earlier NC.
6	Reporting requirement[b] specified in CTF table 6 Issue type: transparency Assessment: recommendation	In CTF table 6(a), the values reported by Liechtenstein under "Energy" also include emissions for "Transport". During the review, the Party explained that transport is included under energy to follow the categories of the GHG inventory. The ERT recommends that Liechtenstein improve the transparency of its reporting in CTF table 6 by presenting the emissions for energy excluding transport.
7	Reporting requirement[b] specified in CTF table 6 Issue type: completeness Assessment: encouragement	Liechtenstein reported the WOM and WAM projections in the text of the NC7 but did not provide these projections in CTF table 6. During the review, Liechtenstein explained that it plans to report the WAM scenario in CTF table 6 of the next submission. To increase the transparency of Liechtenstein's reporting, the ERT reiterates the encouragement that it include the WAM scenario in CTF table 6(c). The ERT also encourages Liechtenstein to report the WOM scenario in CTF table 6(b).

Note: The reporting on the requirements not included in this table is considered to be complete, transparent and adhering to the UNFCCC reporting guidelines on NCs and on BRs.

[a] Paragraph number listed under reporting requirement refers to the relevant paragraph of the UNFCCC reporting guidelines on NCs.

[b] Paragraph number listed under reporting requirement refers to the relevant paragraph of the UNFCCC reporting guidelines on BRs.

D. Provision of financial, technological and capacity-building support to developing country Parties

56. Liechtenstein is not an Annex II Party and is therefore not obliged to adopt measures and fulfil obligations defined in Article 4, paragraphs 3, 4 and 5, of the Convention. However, Liechtenstein provided information in the BR3 on its provision of financial, technology transfer and capacity-building support to developing country Parties and referred to the NC7 for more information. The ERT commends Liechtenstein for reporting this information and suggests that it continue to do so in future BRs.

57. Liechtenstein has reported information on the assistance it has provided to developing country Parties that are particularly vulnerable to the adverse effects of climate change to help them to meet the costs of adaptation to these adverse effects. Furthermore, Liechtenstein has provided information on other financial resources related to the implementation of the Convention provided through bilateral, regional and other multilateral channels.

58. Liechtenstein reported that all activities and projects related to capacity-building or the transfer of technology take place within the framework of International Humanitarian Cooperation and Development, which is based on the Law on International Humanitarian Cooperation and Development from 2007 (LGBl. 2007 Nr. 149). The law provides for four categories of development cooperation: bilateral development cooperation; multilateral development cooperation; emergency and reconstruction assistance; refugee and migration assistance. The law does not particularly mention technology transfer and capacity-building, but almost all the projects that target mitigation or adaptation have both components.

59. Liechtenstein has provided information on its financial contribution to the Adaptation Fund for 2016, established in accordance with decision 10/CP.7.

III. Conclusions and recommendations

60. The ERT conducted a technical review of the information reported in the BR3 and CTF tables of Liechtenstein in accordance with the UNFCCC reporting guidelines on BRs. The ERT concludes that the reported information mostly adheres to the UNFCCC reporting guidelines on BRs and provides an overview of emissions and removals related to Liechtenstein's quantified economy-wide emission reduction target; assumptions, conditions and methodologies related to the attainment of the target; progress made by Liechtenstein in achieving its target; and the Party's provision of support to developing country Parties.

61. Liechtenstein's total GHG emissions excluding LULUCF were estimated to be 13.0 per cent below its 1990 level, whereas total GHG emissions covered by its quantified economy-wide emission reduction target (i.e. including LULUCF) were 10.7 per cent below its 1990 level in 2015. The decrease in total emissions was driven mainly by factors such as fuel prices and intensified efforts to reduce fuel combustion activities in the energy sector, particularly in the transport and other sectors. Between 2014 and 2015 emissions from the transport sector decreased mainly due to a shift in the fuel prices, which decreased in Austria and increased in Liechtenstein between 2013 and 2015, leading to less fuel purchased in Liechtenstein and thus a decrease in emissions accounted for in the Party's inventory.

62. Under the Convention, Liechtenstein committed itself to achieving a quantified economy-wide emission reduction target of 20 per cent below the 1990 level by 2020. The target covers CO_2, CH_4, N_2O, HFCs, PFCs and SF_6, expressed using global warming

potential values from the AR4 and covers all sources and sectors included in the annual GHG inventory. Emissions and removals from the LULUCF sector are included in the target. Liechtenstein reported that it plans to make use of market-based mechanisms to achieve its target. In absolute terms, this means that under the Convention Liechtenstein has to reduce its emissions from 232.72 kt CO_2 eq (in the base year) to 186.18 kt CO_2 eq by 2020.

63. The key overarching cross-sectoral policy reported by Liechtenstein is the National Climate Protection Strategy from 2007, which was revised in 2015. In addition, the Energy Strategy 2020 provides the framework for future climate policy and for Liechtenstein meeting its emission reduction target for 2020. Key legislations supporting Liechtenstein's climate change goals include the Emissions Trading Act and the CO_2 Act. The mitigation actions with the most significant mitigation impact are the Energy Efficiency Act and Energy Strategy 2020.

64. For 2015 Liechtenstein reported in CTF table 4 annual total GHG emissions excluding LULUCF of 207.70 kt CO_2 eq, which is 10.3 per cent below the 1990 base-year level reported in CTF table 4. The value reported in CTF table 1, confirmed by the Party to be correct, is 199.39 kt CO_2 eq (13.0 per cent below base-year level). Liechtenstein reported on its use of units from the market-based mechanisms, but did not report on the contribution of LULUCF towards achieving its target. It reported in CTF tables 4 and 4(b) that it used units from market-based mechanisms in 2015 and 2016 towards the achievement of its 2020 target in the amount of 51.71 and 54.00 kt CO_2 eq, respectively. The ERT noted that Liechtenstein is making progress towards its emission reduction target by implementing mitigation actions that are delivering some emission reductions and by using units from the market-based mechanisms under the Convention.

65. The GHG emission projections provided by Liechtenstein include those under the WOM, WEM and WAM scenarios. In the three scenarios, emissions including LULUCF are projected to be 10.7, 18.0 and 18.1 per cent, respectively, below the 1990 level in 2020. On the basis of the reported information, the ERT concludes that Liechtenstein may face challenges in achieving its 2020 target under the WEM and WAM scenarios with domestic measures. However, the ERT notes the Party's plan to use market-based mechanisms to reach its target.

66. Liechtenstein is not an Annex II Party and is therefore not obliged to adopt measures and fulfil obligations defined in Article 4, paragraphs 3, 4 and 5, of the Convention. However, Liechtenstein provided information in the BR3 on its provision of support to developing country Parties.

67. In the course of the review, the ERT formulated the following recommendations for Liechtenstein to improve its adherence to the UNFCCC reporting guidelines on BRs in its next BR:[4] The key recommendations are that Liechtenstein improve the transparency of its reporting by:

(a) Including in CTF table 3 mitigation actions covering sectors other than energy and gases other than CO2, and including a brief description of the reported PaMs in CTF table 3 (see issue 1 in table 4);

(b) Reporting correct values for total emissions excluding LULUCF in CTF table 4, consistent with information in CTF table 1 (see issue 1 in table 6);

(c) Reporting the contribution from LULUCF in CTF table 4, even if the LULUCF sector constitutes net emissions, because LULUCF is included in the target (see issue 2 in table 6);

(d) Reporting quantity of market-based mechanisms for all relevant years in the CTF table 4 (see issue 3 in table 6);

(e) Presenting the emissions for energy excluding transport in CTF table 6 (see issue 6 in table 10).

[4] The recommendations are given in full in the relevant chapters of this report.

Annex

Documents and information used during the review

A. Reference documents

2017 GHG inventory submission of Liechtenstein. Available at http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/10116.php.

BR3 of Liechtenstein. Available at http://unfccc.int/national_reports/biennial_reports_and_iar/biennial_reports_data_interface/items/10132.php.

BR3 CTF tables of Liechtenstein. Available at http://unfccc.int/national_reports/biennial_reports_and_iar/biennial_reports_data_interface/items/10132.php.

"Compilation of economy-wide emission reduction targets to be implemented by Parties included in Annex I to the Convention". FCCC/SBSTA/2014/INF.6. Available at http://unfccc.int/resource/docs/2014/sbsta/eng/inf06.pdf.

"Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual greenhouse gas inventories". Annex to decision 24/CP.19. Available at http://unfccc.int/resource/docs/2013/cop19/eng/10a03.pdf.

"Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part II: UNFCCC reporting guidelines on national communications". FCCC/CP/1999/7. Available at http://unfccc.int/resource/docs/cop5/07.pdf.

"Guidelines for the technical review of information reported under the Convention related to greenhouse gas inventories, biennial reports and national communications by Parties included in Annex I to the Convention". Annex to decision 13/CP.20. Available at http://unfccc.int/resource/docs/2014/cop20/eng/10a03.pdf.

NC7 of Liechtenstein. Available at http://unfccc.int/national_reports/annex_i_natcom/submitted_natcom/items/10138.php.

Report of the technical review of the second biennial report of Liechtenstein. FCCC/TRR.2/LIE. Available at http://unfccc.int/resource/docs/2016/trr/lie.pdf.

Report of the technical review of the sixth national communication of Liechtenstein. FCCC/IDR.6/LIE. Available at http://unfccc.int/resource/docs/2015/idr/lie06.pdf.

"UNFCCC biennial reporting guidelines for developed country Parties". Annex I to decision 2/CP.17. Available at http://unfccc.int/resource/docs/2011/cop17/eng/09a01.pdf.

B. Additional information provided by the Party

Responses to questions during the review were received from Ms. Heike Summer (Office of Environment), including additional material.