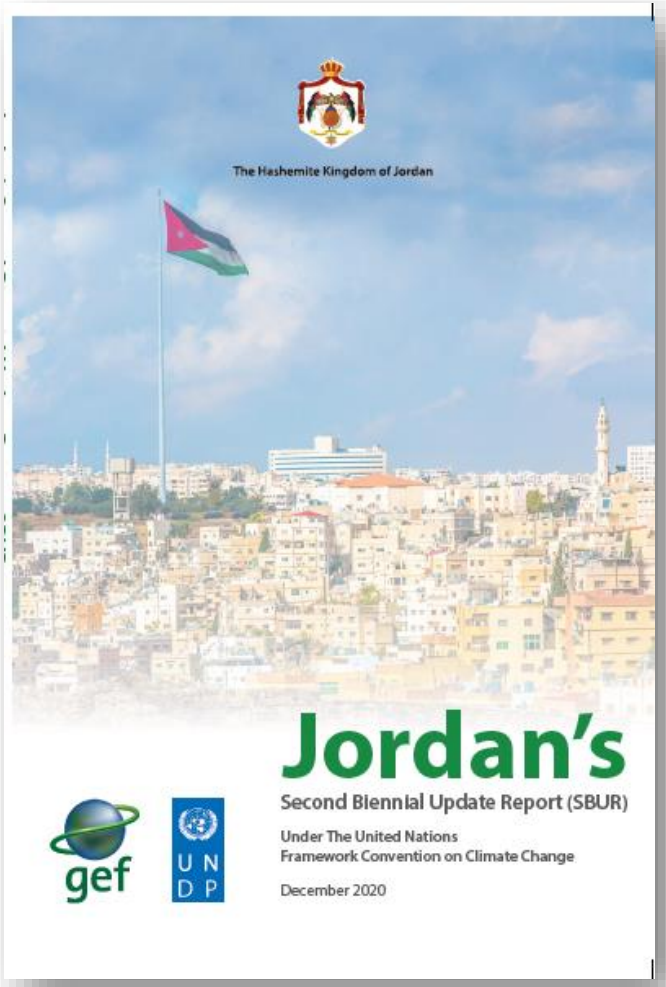


MINISTRY OF ENVIRONMENT

FACILITATIVE SHARING OF VIEWS

JORDAN

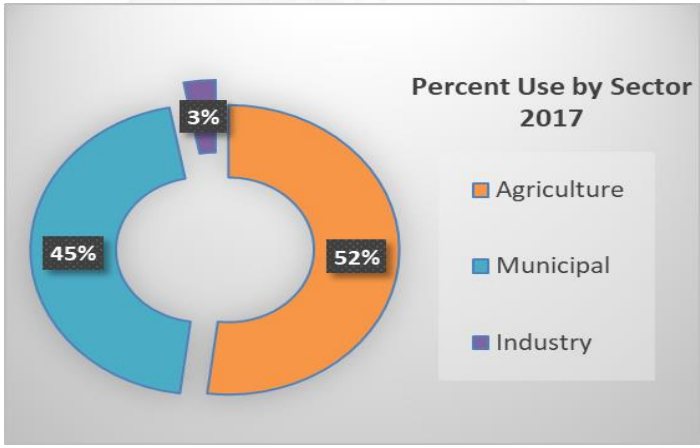
Sharm El-Sheikh, Egypt

11 November 2022

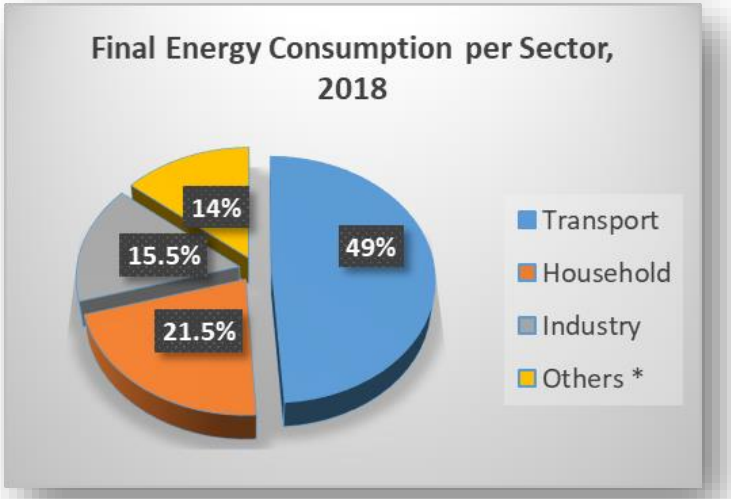
National context

- Middle Eastern Country, relatively small area of approximately 89 000 km²
- Jordan's total population reached around 10 million (2021)
- The population of has doubled more than 10 times over the past 55 years due to forced immigration.
- About 75% of the country can be described as having a desert climate with less than 200 millimeters of rain annually.

- Jordan is ranked as the second poorest country in the world in terms of water resources
- Water use in Jordan is distributed among three different sectors: agriculture, municipal supplies, and industry.
- The agriculture sector was the largest user of the country's water resources, accounting for 52% of the total water supply, while 45% was used for municipal supplies, and 3% for industrial uses.



- Jordan currently imports around 93% of its total energy, comprising almost 8% of Jordan's GDP and placing a strain on its economy.
- The largest energy consumer in 2018 was the transport sector with a 49% percent share, followed by household, industrial and other service sectors with 21.5%, 15.5% and 14% share respectively.



Currently, transportation is considered to be very energy inefficient, using almost half of the final energy consumption of Jordan. Transport accounts for 20-25% of the income of the families

Jordan experiences a relatively high growth rate in private cars of approximately 5% per year which exceeds the estimated population growth. Public transport (PT) in general is not well organized and lacks the infrastructure and interchanges required for a comfortable journey

Institutional arrangements

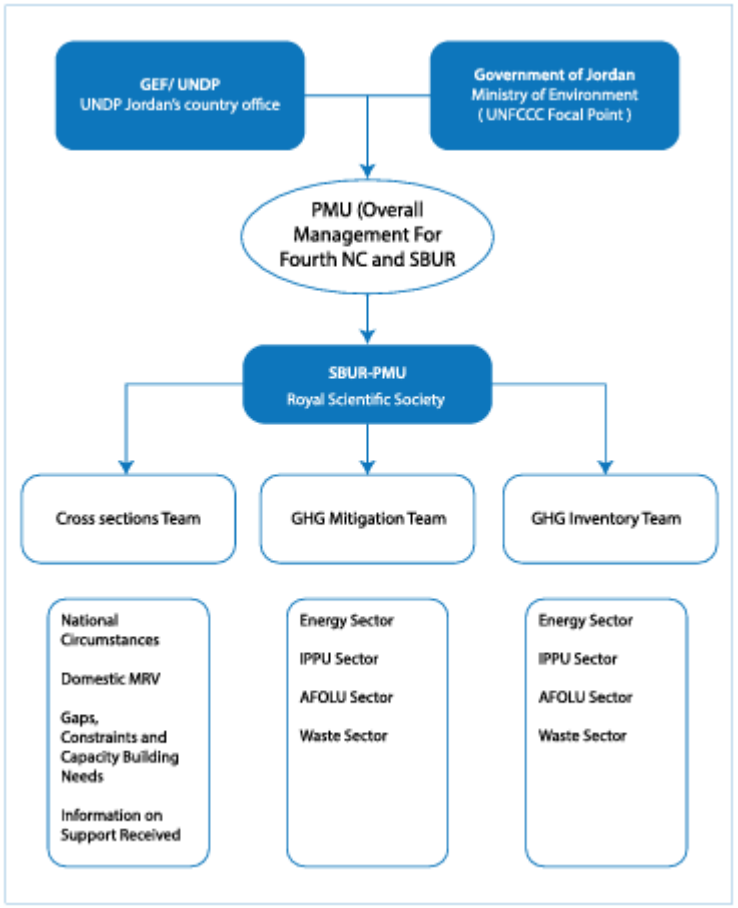
The Ministry of Environment is the focal point for issues relevant to the UNFCCC and is responsible for seeing that Jordan's commitments are met.

Report	Submission Year	Inventory Year
INC	1997	1994
SNC	2009	2000
TNC	2014	2006
BUR1	2017	2010-2012
BUR2	2020	2016
FNC	Expected 2022	2017

The preparation of Jordan's BUR was coordinated by the Ministry of Environment in partnership with UNDP.

The report preparation was lead a national non-governmental, non-for-profit research organization "the Royal Scientific Society".

A pool of 25 national experts representing different national entities participated in the preparation of the BUR



PROJECT TEAM

Project Management
Ministry of Environment- Climate Change (CC) Directorate Belal Shqarin- Climate Change Director **UNDP- Jordan Country Office** Dr. Nedal Al-Ouran - Head of Environment, Climate Change and DRR Pillar Rana S. Saleh - Environment Programme Analyst Sami Tarabieh - Projects Coordination Specialist
Coordination, Compilation and Editing of SBUR Royal Scientific Society/Water and Environment Centre Rafat Assi- Project Manager Ruba Ajjour- Project Coordinator

GHG Inventory • **Team leader:** Ruba Ajjour	GHG Mitigation • **Team leader:** Rafat Assi
• **Energy** Lina Mobaideen Ashraf Al Rawashdeh Mahmoud Al Smairat Safwan Bany Saleh	• **Energy** Mahmoud Alees Rafat Assi Abed Alghani Arab
• **IPPU** Faraj Altalib Ali Al Mashni Sayyed Saleh Maha Abu Mowais Bara' Mataiqah	• **Transport** Jane Raqqad
• **Solid Waste** Maha Abu Mowais Mahmoud Zboon	• **Industrial Processes** Jehan Haddad Bara' Mataiqah
• **Wastewater** Husam Alkilany	• **Agriculture and Forestry** Ruba Ajjour
• **AFOLU** Nancy Alziq Ruba Ajjour Mohammad Elshebli	• **Waste Management** Husam Alkilany
• **UNDP/UNEP GSP Review** Dr. Carlos Lopez	• **LEAP Experts- SEI** Charlie Heaps and Silvia Ulloa
	Domestic MRV Ruba Ajjour
	National Circumstances Rawia Abdallah
	Gaps and Constraints Maha Alma'ayta
	Information on Support Received Sara Al Haleeq

Jordan's Second Biennial Update Report was coordinated by the Ministry of Environment and prepared in partnership with the United Nations Development Programme.

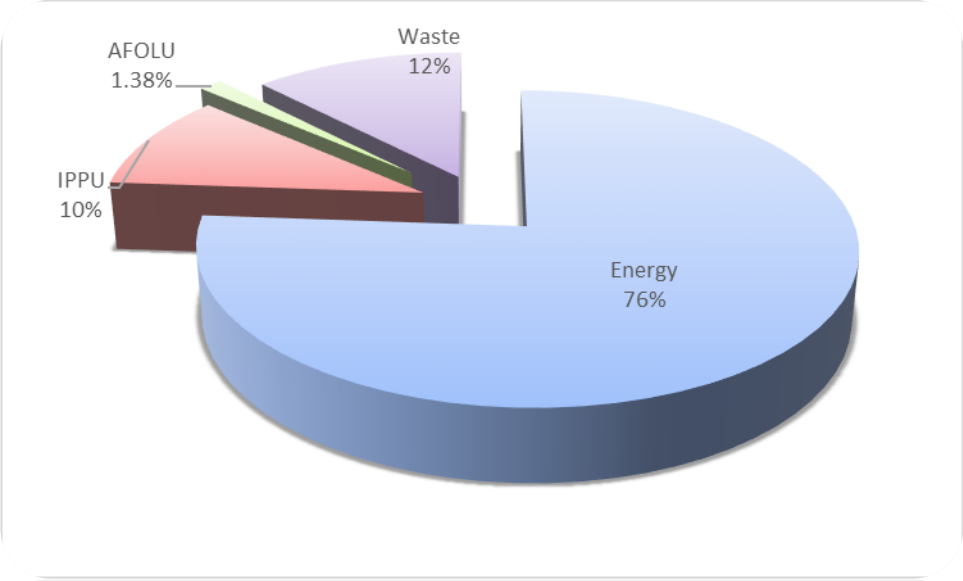
An agreement with the Royal Scientific Society was realized to execute the work. Preparation of the Second BUR was a national effort with the participation of experts from different national entities.

Preparation of National GHG Inventory for 2016

- The GHG national inventory chapter addresses emissions of carbon dioxide (CO2), nitrous oxide (N2O), methane (CH4), sulfur hexafluoride (SF6), hydrofluorocarbons (HFCs), and perfluorocarbons (PFCs).
- Those gases are supported by the software and the IPCC 2006 Guidelines and the 2019 Refinement
- Non-methane volatile organic compounds (NMVOCs) emissions resulting from the solvents sub sector were estimated using European Monitoring and Evaluation Programme (EMEP/EEA) air pollutant emission inventory guidebook 2019.
- Emissions were estimated in Gigagrams (Gg) for all direct and indirect gases, as well as in Gg of CO_2-equivalent (CO_2eq) for all direct gases. For the conversion from Gg of different GHGs to Gg of CO_2eq, the Global Warming Potential (GWP) values provided in the IPCC Second Assessment Report (SAR) temporal horizon 100 years were used.

GHG aggregate emissions in Gg CO_2eq by sector, 2016

Categories	Emissions CO_2 Equivalents (Gg)	Percentage of the overall
Total National Emissions and Removals	31,063.32	100%
Energy	23,649.47	76.13%
IPPU	3,177.42	10.23%
AFOLU	428.71	1.38%
Waste	3,807.73	12.26%



Key category analysis (level assessment), 2016

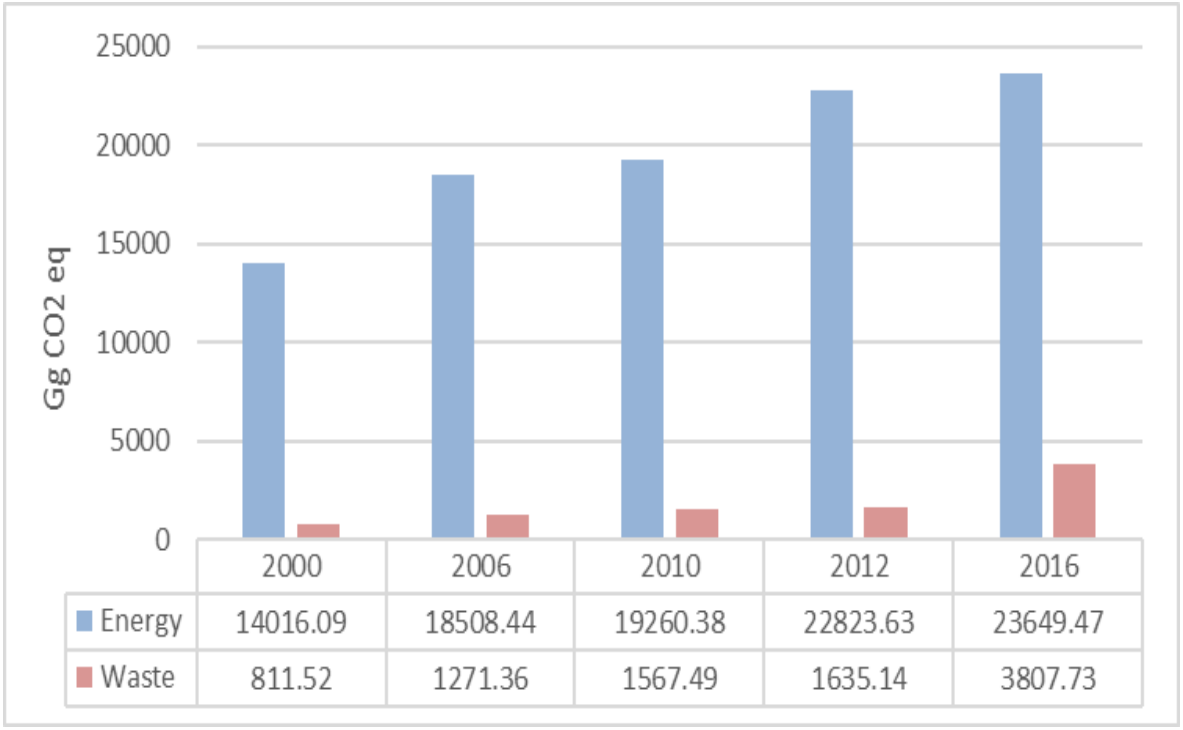
for the year 2016, the key category analysis resulted in thirteen subcategories; the top four accounting for around 65 % of all emissions, were:

- Fuel Combustion Activities subcategories: Energy Industries (Gaseous Fuels), Road Transportation, Energy Industries (Liquid Fuels), and other sectors (commercial/institutional and residential-Liquid Fuels) and;
- The solid waste management subcategory.

IPCC Category code	IPCC Category	GHG	2016 Emissions CO_2eq (Gg)	Cumulative Total % of Column F
1.A.3.b	Road Transportation	CO_2	8566.56	26.4%
1.A.1	Energy Industries - Gaseous Fuels	CO_2	6495.61	46.3%
4.A	Solid Waste Disposal	CH_4	3559.01	57.3%
1.A.1	Energy Industries - Liquid Fuels	CO_2	2460.51	64.9%

Time Series and Comparison between Current and Previous Inventories

- Chapter five, volume one of the 2006 IPCC Guidelines was consulted in terms of good practices ensuring time series consistency.
- Recalculations were carried out for the years 2010 and 2012. Also, techniques for combining or "splicing" different methods or data sets to compensate for incomplete or missing data were used for estimating years the 2000 and 2006.



	2000	2006	2010	2012	2016
Energy	14016.09	18508.44	19260.38	22823.63	23649.47
Waste	811.52	1271.36	1567.49	1635.14	3807.73

A comparison between the energy and waste sectors for the years of 2000, 2006, 2010, 2012, and 2016. There is a normal trend of increase through the various years that could be attributed to population increase and economic growth.

Categories/Years	2000	2006	2010	2012	2016
	Gg CO_2 eq				
Total National Emissions and Removals	14,827.61	19,779.8	23,170.94	28,110.71	31,063.32
1 - Energy	14,016.09	18,508.44	19,260.38	22,823.63	23,649.47
2 - Industrial Processes and Product Use	NE**	NE**	1,776.09	3,144.71	3,177.42
3 - Agriculture, Forestry, and Other Land Use	NE**	NE**	180.5	237.29	428.71
4 - Waste	811.52	1,271.36	1,567.49	1,635.14	3,807.73
Memo Items (5)					
International Bunkers	523.53	905.40	1,078.11	1,110.02	4,320.36
1.A.3.a.i - International Aviation (International Bunkers)	519.04	734.85	1,016.41	1,044.24	3,394.73
1.A.3.d.i - International water-borne navigation (International bunkers)	4.49	162.49	52.2602	56.0552	925.63

Overview of time series estimation

Future Improvement Plan (*such as)*

- The activity data used in the estimate, especially in the subcategories identified as key or significant , should be improved as much as possible, in order to use tier 2. **(short term and long term**)
- Also, actions to improve data, methods, EF and other estimation parameters (OEP) should be prioritized in key categories to use tier 2 (especially in the subcategory 2F1a, 4A Solid Waste Disposal, 3A1c Sheep and 3B Land). **(short term and long term**)
- The documentation boxes and worksheet remarks included within the software should be added. **(short term**)
- The completeness of the inventory should be improved by: **(short term to long term**)
- Prepare a QA/QC and verification plan and manual for the coming inventory **(short term)**.

The Mitigation chapter has been prepared to update the baseline scenario and the BUR-1 mitigation measures

- The BUR-1 baseline scenario was updated for all economic sectors of energy, industry, agriculture and forestry in addition to the waste sector, based on the strategies, policies and plans prevailing in the Jordanian context during the time of preparation of this SBUR (2020).
- The newly released strategies, policies, action plans and committed projects were reviewed and summarized. In addition, all projects and actions that were part of BUR-1 baseline scenario were reviewed to update their status. Based on this review, the most probable future trends in activities that will impact and shape the GHG emissions are highlighted.

Strategies, policies and action plans that were reviewed to prepare the updated baseline scenario include:

- The new Energy National Strategy for 2020-2030, issued in April 2020
- The 2020-2025 National Agricultural Development Strategy, issued in August 2020.
- The new solid waste management framework law issued in March 2020 and entered in force in September 2020
- National Renaissance Plan (2019-2020), issued in 2018
- Jordan Economic Growth Plan (2018-2021), issued in 2017.
- The Industrial Policy (2017-2021), issued in 2016.

Update of BUR-1 mitigation measures:

- All BUR-1 mitigation projects were reviewed and assessed to identify all those still valid. The valid projects were updated, after adjustments were made in their expected implementation timeline.
- The emission reduction and the unit cost of emission reduction for each mitigation project have been recalculated taking into consideration several factors such as the improvement in technologies and changes in prices.
- The updated BUR-1 mitigation projects include 23 GHG mitigation measures in the sectors and subsectors of primary energy, renewable energy, energy efficiency, industries, domestic solid waste and wastewater, and agriculture and forestry.

Appendix A: Mitigation Projects Tabular Updates

Table A.1: Primary energy projects

Table A.2: Renewable energy projects

Table A.3: Energy efficiency projects

Table A.4: IPPU Projects

Table A.5: AFOLU Projects

Table A.6: Waste Projects

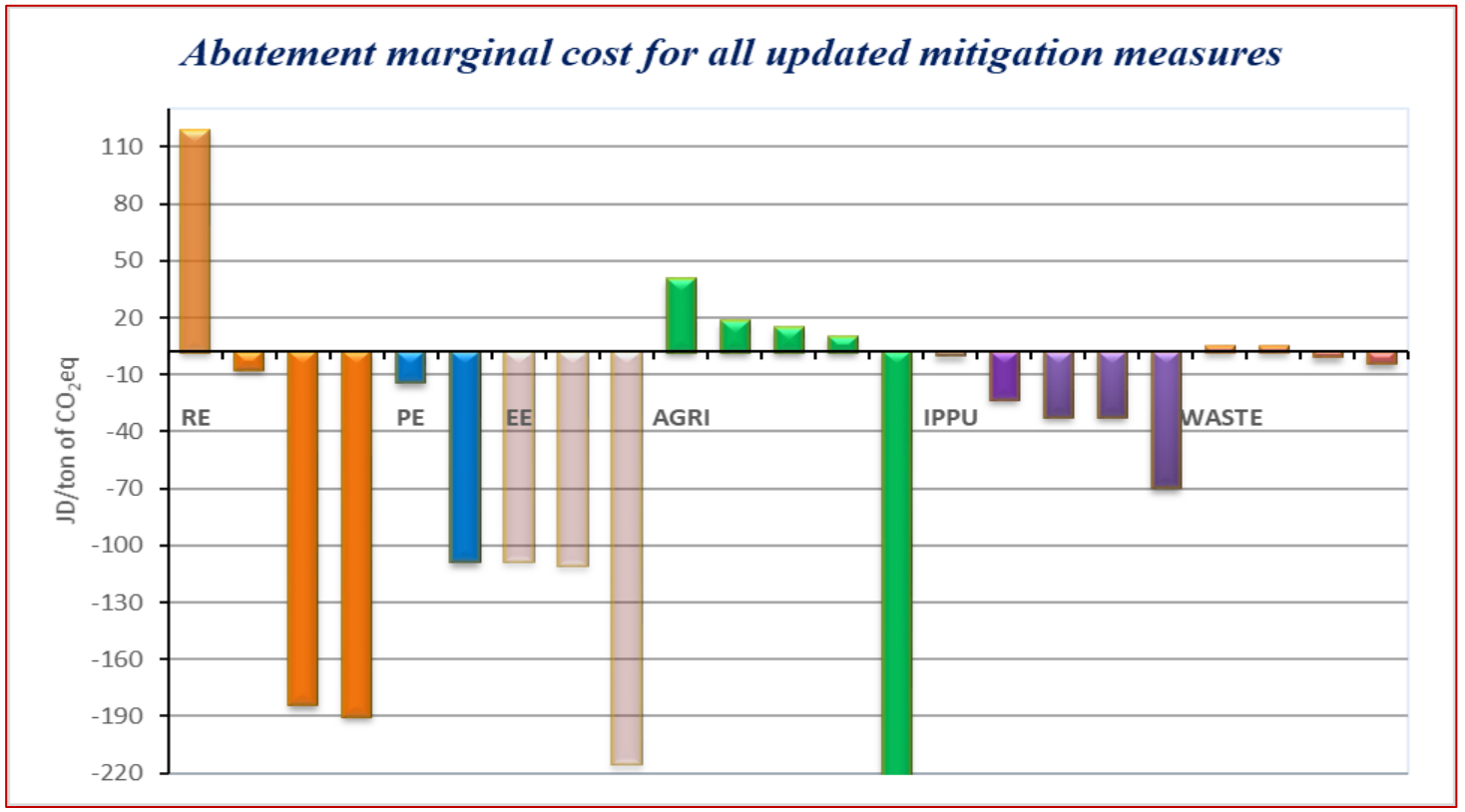
GHG emissions reduction of the updated measures

- Twenty three GHG mitigation projects out of the 39 projects that were proposed previously in the FBUR are still valid. The yearly GHG emission reductions were recalculated for each mitigation measure over its lifetime. The table below, shows the total GHG emission reductions of the 23 measures for selected years.

Year	Total GHG Emissions Reductions of the 23 updated measures ($Gg\ of\ CO_2\ eq$)
2025	1,511.45
2030	2,487.75
2035	2,591.57
2040	2,400.42
2045	3,228.82
2050	1,220.47

GHG abatement cost was recalculated for the 23 projects in addition to the yearly and reduced emission reductions. These projects belong to several sectors and subsectors including primary energy, renewable energy, energy efficiency, waste, and agriculture.

It is concluded from the abatement cost analysis for the updated FBUR valid projects that the most feasible options are the energy mitigation projects. The findings indicated that in particular the energy efficiency should receive the most attention



Support received and needed (finance, technology, capacity-building)

Current situation/Achieved improvements

- Climate change (CC) Directorate, Environment Law No. 6/2017 and CC bylaw No.79/2019.
- Establishment of Green Economy Unit
- NDC Partnership
- Mainstreaming climate change at the national level

GHG inventory and Mitigation technical capacity-building needs that were reported in the BUR-1 most of them are still valid.

The implementation of Article 6 under the PA, Jordan has recently started the work of preparing a roadmap to promote and facilitate Jordan's engagement in A6.

A working committee has been formed, aiming at raising awareness and building the capacity of the national stakeholders.

GEF supported Jordan financially in executing NCs, BURs, Mainstreaming Rio Convention into National Sectoral Polices

The key challenges in financing climate change projects

- Due to the COVID-19 pandemic and its negative effects on health, the economy and society, financial support from donors was directed to the health sector to mitigate the effects of this pandemic.
- Lack of Climate Finance Framework (policy or strategy) – Currently under process
- Banks in Jordan, in general, are interested in providing finance to RE and EE projects. Banks **prefer financing RE projects**, particularly those which are of a larger size and linked to their existing client base. **EE and smaller sized projects are less preferred**.
- To minimize risks, financiers need access to an independent, credible reference body for the accreditation of climate change projects, particularly RE and EE projects. However, technical **verifiers are unavailable, and financiers lack technical capacity.**
- Project developers lack technical capacity – CB programs ongoing

ETF transition and implementation

On-going initiatives and preparations at the national level, to implement the ETF

* Multi-level integrated Monitoring, Reporting and Verification (MRV) system for the Hashemite Kingdom of Jordan- 2018
* It was planned that Jordan's National MRV system and the registry of climate mitigation measures to be fully functional by the end of the year 2020 covering transport and waste sectors in addition to the energy sector. However, this was not done mainly because of COVID-19 pandemic.
* Staff recruited to oversee MRV

GEF support is requested - to submit the first BTR by 31 December 2024.

Written questions and answers exchanged through FSV Portal

1) Number of questions received:

10 Questions

2) List of Parties that submitted questions:

USA, UK and Northern Ireland, EU, New Zealand, Australia.

3) Topics covered by those questions:

Capacity Building needs, QC/QA and data management, 2006 IPCC Guidelines and 2019 Refinement, Progress in Mitigation measures implementation and domestic MRV system

4) Key take- away from such written exchange

It motivates parties to improve their reporting.

It highlights the key important issues in term of Climate reporting and National communication thus shedding more clarity on how to prioritize the country's needs.

How are you moving to address your list of capacity-building needs? To what extent is this action conditional on external support? Did capacity limitations impact the BUR process in any way? If so, how?

The identified capacity building (CB) needs as part of the Second BUR were labeled – short, medium and long term needs; *so Jordan has some progress but still needs much more work.*

The identified CB needs have been a reference for several development agencies country's program.

The Climate Change Directorate is receiving support from the World Bank to strengthen the directorate capacities (two specialists were recruited to support the ministry staff).

Jordan's CB needs require more support- financial and technical: The BUR was prepared during the peak of the pandemic and that has affected hosting external technical support on issues as Uncertainty estimations, Key Category Analysis and GHG mitigation analysis tools). limitation

Data Needs: Improvements of the activity data are a Multi stakeholder, multi sectoral issue that needs extensive personnel involvement and financial support to have updated and well documented data (limitation).

Reporting on inventory till now is a project based process that is expected to improve with time and with the full functioning of the MRV system.

Congratulations on moving to the use of the IPCC 2006 guidelines. What do you feel have been the major benefits, and lessons learned, from this change?

Jordan decided on moving to IPCC 2006 Guidelines, starting with our first BUR (2017).

The reason behind that back then was that Jordan aspired to improve our reporting and that the new guidelines will be followed eventually so why delay the action.

Using IPCC 2006 Guidelines has gave us the advantage of starting the learning earlier than the rest of the countries and now after using the guidelines for 4 inventories we built good practical experience that we are ready to share with peers.

Moving was not difficult in fact the software is user- friendly.

Are there any updates to the development and implementation of the domestic multi-tiered integrated MRV system since the publication of the 2nd BUR?

- As stated in the 2BUR; It was planned that Jordan's National MRV system and the registry of climate mitigation measures to be fully functional by the end of the year 2020 covering transport and waste sectors in addition to the energy sector. However, this was not done mainly because of COVID-19 pandemic.
- Efforts in 2021 and 2022 were focused on having stakeholders report using the system.
- staff high turn over within the stakeholders organizations
- stakeholders staff overloaded with work had problems in abiding to deadlines.
- The Ministry of Environment has recruited two experts to support stakeholders in using the MRV system (technical and maintenance support)

Jordan's Second BUR notes that SBI49 identified a number of capacity building needs – on in particular being to enhance technical capacity on using surrogate data and other techniques from the 2006 IPCC guidelines to fill gaps in historical data and generate a consistent time series.

Can Jordan comment on any progress to date on this item for preparation of subsequent reporting and/or highlight any priority sectors for targeting the capacity building?

Jordan did not do much since then for two reasons:

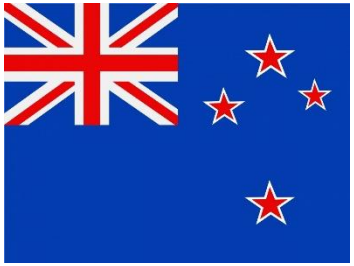
* The inventory estimation process is till now project based and the second BUR development project was during the COVID 19 peak and we were left with many delays and we achieved little from the CB list.

Thank you, Jordan, for the opportunity to comment on your second Biennial Update Report. In your Report, you mention publishing the National Agricultural Development Strategy which aimed to increase the number of farmers using digital agricultural services. Can you provide an update on how this policy is progressing?

- The ministry of Agriculture has so far progresses as follows:

- Till now the ministry of agriculture ministry have introduced 63 digital services (production, diseases, marketing)
- Developed regulations for the tracing agricultural products.
- Developed regulations to registration of the agricultural units
- A pilot version of the Agricultural Units Registry has been launched – the Registry includes full data about the units.

Aotearoa- New Zealand notes Jordan's assessment of urban development opportunities through the Amman Resilience Strategy, and asks Jordan to elaborate on how this may connect with urban densification and greater sustainable transport modes including walking, cycling and rail.



Currently, transportation is considered to be very energy inefficient, using almost half of the final energy consumption of Jordan.

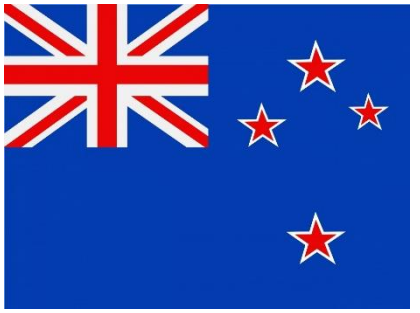
But Greater Amman Municipality (GAM) is trying hard to provide solutions- Since 2020 GAM has launched on ground several projects to improve mobility and walkability.

During COVID 19 lock down our people discover their passion for cycling and walking.

The Resilience strategy has several projects that are still open to implementation if the financial resources were made available

GAM is currently making efforts to evaluate the available plans using a participatory approach as well as involving citizens

Aotearoa - New Zealand commends Jordan in its efforts to build energy self-sufficiency through both development of local renewable energy resources and in building energy efficiency across sectors. It also notes that Jordan has recognised opportunities to allow for international investment through implementation of Article 6. What are Jordan's capacity building and development needs to support growth in this area?



Jordan's is making the most of our country's significant solar and wind resources. Jordan is a leader in the region in EE and clean energy production, with 29 % of electricity powered by renewables, and we plan to reach 50 % by 2030.

In the meantime, Jordan needs support in exploring new sources and deployment of new technologies related to Energy storage (hydro and batteries), hydrogen, CSP.

We are currently developing a regulatory framework for A6 and we will need capacity building in implementation of A6

Jordan's Second Biennial Update report provides information on several mitigation actions in the waste and wastewater sectors, which were planned to be implemented starting in 2021 or 2022. Could you provide an update on the status of one of these actions? Which steps have been completed, and which challenges remain before this action can be fully completed?

- •COVID 19 conditions affected the availably of funds and had caused delays in plans. Implementation has started in one project- new extension to all Ekedar landfill and a new call for proposal in under way for the Azraq landfill
- Also, Jordan has validated these projects while updating Jordan's NDC and all projects were found to be valid and were considered within Jordan reduction target waiting for implementation once the financial resources are available.

According to Jordan's Second Biennial Update Report, substitutes for ozone-depleting substances (hydrofluorocarbons) constitute the second most important source (expressed in CO_2 equivalents) of greenhouse gas emissions from the industrial processes and product use sector in 2016. Is Jordan considering any actions to mitigate the emissions of these gases?

Jordan started working extensively on sustainable cooling since 2021.

So far Jordan has completed baseline studies and currently developing a sustainable cooling action plan.

Our national industries are pioneers in this area and we have many achievements within the private sector.

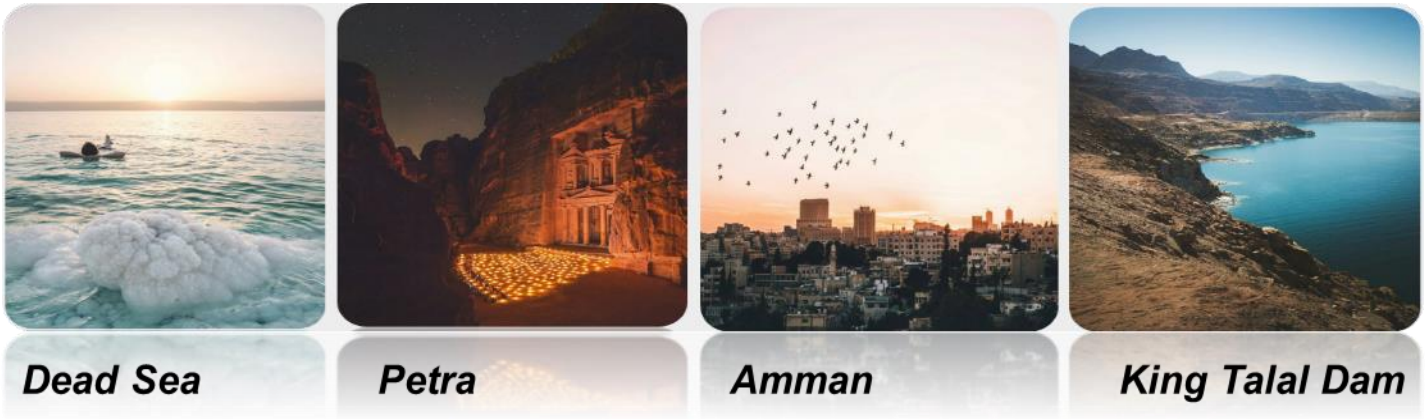
Jordan has on ground several projects related to solar cooling /NH3 and CO2 for refrigerants

In addition to the 2006 IPCC Guidelines, Jordan used the 2019 Refinement to the 2006 IPCC Guidelines in its most recent GHG inventory. Could you name an example of a source category where the 2019 Refinement was used? Were methods and/or emission factors from the Refinement used?

The main changes that were introduced were as follows:

- The fugitive emissions chapters; new a section for fuel transformation and updating emission factors.
- IPPU Sector used updated for the emission factors,
- Waste sector used updated default data.

Thank you for your attention



For further clarifications or inquiries:

Ruba Ajjour

Manager of Climate Change Studies

Royal Scientific Society

ruba.ajjour@rss.jo