ENERGY SECTOR

Green Growth National Action Plan 2021-2025

وزارة الطاقة والثروة المعدنية

Ministry of Environment

GGGI

This report should be referenced as follows:

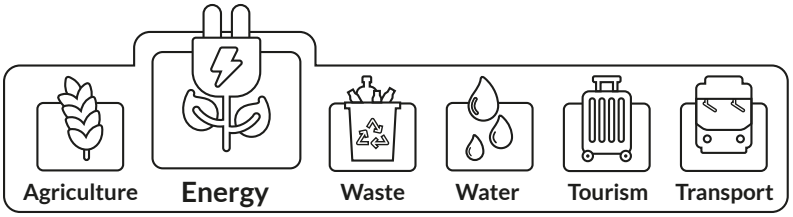
MoEnv. "Energy Sector Green Growth National Action Plan 2021-2025," 2020. Amman, The Hashemite Kingdom of Jordan.

His Majesty King Abdullah II Ibn Al Hussein

Economic leadership is by definition forward-looking. And forward-looking engagement will send a powerful message, a message of hope for my people and for yours.

ENERGY SECTOR

Green Growth National Action Plan 2021-2025



وزارة الطاقة والثروة المعدنية

Ministry of Environment

GGGI

Foreword by the Minister of Environment

The Ministry of Environment has been taking solid action to support Jordan's green growth transformation. In 2017, the Cabinet approved the National Green Growth Plan, which established green growth as a top national priority. Jordan's green growth vision – economic growth which is environmentally sustainable and socially inclusive – puts a strong emphasis on the importance of building resilience. This is needed for our economy to be able to absorb external shocks such as the negative consequences of COVID-19, and the ability to restore itself and continue growing.

In this context, I am proud to present the next step in implementing this vision, the Green Growth National Action Plan 2021-2025. The development of this plan lies at the heart of our continuous efforts and ambitions to support environmental and climate action in Jordan, while also achieving our sustainable economic growth objectives.

During the process of developing this plan, the Ministry of Environment has taken impressive efforts to strengthen its partnerships with the government institutions responsible for governing the six green economy sectors identified in the Jordan Vision 2025. These include: Agriculture, Energy, Waste, Water Tourism and Transport. Through a deeply collaborative approach, we were able to identify 86 priority enabling policy actions and projects that can trigger green growth. Many of these actions are ready for the support of donors, partners, and private sector investors.

Our world is facing the most challenging economic circumstances in a century as we work to contain the COVID-19 pandemic and adapt to a new normal way of life. As for our Kingdom, I am proud to say that the government acted decisively to stop the spread of the virus, implementing measures that saved potentially thousands of lives. However, response has come at a cost, with our economy and the economic security of our citizens once again at risk.

While infrastructure investments and donor support will be critical to stabilize this risk, private sector investment in the green growth vision is equally important. In many ways, the world is already moving toward a greener future. The spread of renewable energy, electric transportation, technology that saves water and energy resources, and innovations that promote the circular economy are taking off globally. The task for Jordan is harnessing these green developments into growth and employment-creation opportunities.

I would like to express my gratitude to the Global Green Growth Institute for their partnership and technical support in the process of developing Jordan's green growth agenda. The Ministry of Environment is committed to supporting green growth implementation in the 2021-2025 period, and beyond.

Dr. Saleh Al-Kharabsheh
Minister of Environment

Acknowledgements

The Green Growth National Action Plan 2021-2025 (GG-NAP) was developed by the Ministry of Environment with the support of the Global Green Growth Institute (GGGI), under the leadership of H.E Dr. Saleh Al Kharabsheh, Minister of Environment, and benefited significantly from the effective directions of H.E. Eng. Ahmad Al Qatarneh, the Secretary General of the Ministry of Environment. Tremendous support was provided by the Technical Advisor to the Minister and Director of the Green Economy Unit, Dr. Jihad Alsawair.

Special acknowledgment goes to the sector focal points at the six key line ministries for their extensive input and coordination support throughout the development process. Appreciation also goes to the GGGI for their technical assistance throughout the project and their continued commitment to support Jordan's transition to a green economy.

The GG-NAP required a vast amount of expertise, research, consultation, and effort to complete. The finalization of the document would not have been possible without the dedication of all the individuals and organizations who worked together throughout the development process. We would like to express our deepest appreciation to those who have worked on shaping and guiding this action plan over the past two years.

Appreciation also goes to all the entities that were integral to the success of this report, as they generously provided the project team with their knowledge and expertise. These include: Prime Ministry, Ministry of Planning and International Cooperation, Ministry of Agriculture, Ministry of Energy and Mineral Resources, Ministry of Water and Irrigation, Ministry of Local Administration, Ministry of Transport, Ministry of Tourism and Antiquities, Ministry of Public Works and Housing, Ministry of Industry and Trade, Ministry of Finance, Jordan Renewable Energy and Energy Efficiency Fund, Cities and Villages Development Bank, Greater Amman Municipality, Aqaba Special Economic Zone Authority, Jordan Enterprise Development Corporation, the Jordan Chamber of Industry, Jordan Chamber of Commerce, Association of Banks in Jordan, Higher Council for Science and Technology, Royal Scientific Society, Department of Statistics, National Agriculture Research Center, Water Authority, the Jordan Valley Authority, GIZ, UNDP, NDC Partnership, EBRD, EU, AFD, FAO and World Bank.

Lastly, special thanks to the hundreds of individuals who participated in meetings, workshops, reviews, etc. for providing valuable information and feedback during the drafting process. This contribution in the interest of supporting the Government of Jordan and its green growth ambitions is sincerely appreciated.

Project Team

Ministry of Environment, Green Economy Unit

- Dr. Jihad Alsawair (Project Lead) / ***Technical Advisor to the Minister of Environment and Director of Green Economy Unit***
- Afrah Al Hajjaj / ***Green Economy Unit***
- Hanin Abuhamra / ***Green Economy Unit***
- Shan Bader / ***Green Economy Unit***

Global Green Growth Institute

- Ahmed Al Amra / ***Country Representative, GGGI-Jordan***
- Marshall Brown (Project Manager) / ***Senior Program Officer, GGGI-Jordan***

Sector Line Ministries, Green Growth Focal Points

- Mohammed El Shebli / ***Ministry of Agriculture***
- Shorouq AbdelGhani / ***Ministry of Energy and Mineral Resources***
- Nadia Al-Qudah / ***Ministry of Tourism and Antiquities***
- Raja' Bayer/ ***Ministry of Transport***
- Thaer Al-Momani/ ***Ministry of Water and Irrigation***
- Rushdi Sheikh/ ***Ministry of Local Administration***

GGGI's Team of National and International Green Growth Experts

- Dr. Maha Al-Zu'bi
- Majdi Salameh
- Rishi Basak
- Ingvild Solvang
- Jan Stelter
- Dr. James Seong-cheol Kang
- Diana Alejandra Quezada Avila
- Dr. Hussam Khasawneh
- Donovan Storey
- Christina Cheong
- Laila Kasuri
- Theresa Sayavong
- Mark Gibson
- Mahfuzur Rahman

Technical Support

Ministry of Environment

- Belal Shaqarin / ***Director, Climate Change Directorate***
- Belal Qtaishat / ***Director, Natural Resource Projection Directorate***
- Dr. Mohammad Khashashneh / ***Director, Hazardous Substances and Waste Management Directorate***
- Heba Zabalawi / ***Hazardous Substances and Waste Management Directorate***

Other National Institutions

- Sudki Hamdan / ***Department of Statistics***
- Dr. Nizar Haddad / ***National Agriculture Research Center***
- Nisreen Al Araj / ***Greater Amman Municipality***
- Wafa' Shehadeh / ***Ministry of Water and Irrigation***
- Naimeh Ibseileh / ***Water Authority of Jordan***
- Abeer Nassar / ***Jordan Valley Authority***
- Dr. Wael Ababneh / ***Ministry of Energy and Mineral Resources***
- Lina Mobaideen / ***Jordan Renewable Energy and Energy Efficiency Fund***
- Dr. Ayman Soleiman / ***Aqaba Special Economic Zone Authority***
- Hotaf Yassien / ***Aqaba Special Economic Zone Authority***
- Waed Al-Jaafreh / ***Ministry of Planning and International Cooperation***

Contents

List of Abbreviations

ASEZA	Aqaba Special Economic Zone Authority
CO_2	Carbon dioxide
CSP	Concentrated solar power
DAE	Direct Access Entity
DOS	Department of Statistics
EBRD	European Bank for Reconstruction and Development
EE	Energy efficiency
EMRC	Energy and Minerals Regulatory Commission
ESCO	Energy service company
EV	Electric Vehicle
EU	European Union
GAM	Greater Amman Municipality
GCF	Green Climate Fund
GDP	Gross Domestic Product
GEF	Global Environment Facility
GG-NAP	Green Growth National Action Plan
GGGI	Global Green Growth Institute
GHG	Greenhouse gas
GNI	Gross National Income
GoJ	Government of Jordan
JCI	Jordan Chamber of Industry
JEA	Jordan Engineers Association
JGBC	Jordan Green Building Council
JSMO	Jordan Standards and Metrology Organization
IEA	International Energy Agency
IFC	International Finance Cooperation
JREEEF	Jordan Renewable Energy and Energy Efficiency Fund
MEMR	Ministry of Energy and Mineral Resources
$MtCO_2e$	Million metric tons of CO_2e emissions
MoEnv	Ministry of Environment
MoF	Ministry of Finance
MOLA	Ministry of Local Administration
MOPIC	Ministry of Planning and International Co-operation
MoT	Ministry of Transport
MPWH	Ministry of Public Works and Housing
MRV	Monitoring, Reporting and Verification
NEPCO	National Electric Power Company
NDC	Nationally Determined Contributions
NGO	Non-Governmental Organization
NEEAP	National Energy Efficiency Action Plan
NERC	National Energy Research Center
NREAP	National Renewable Energy Action Plan
PPP	Public-private partnerships
R&D	Research and development
RE	Renewable energy
ROI	Return on investment
RSS	Royal Scientific Society
SDG	Sustainable Development Goal
TBD	To be determined
UN	United Nations
UNFCCC	United Nations Framework Convention on Climate Change
UNIDO	United Nations Industrial Development Organization
USAID	United States Agency for International Development

About the Green Growth National Action Plan 2021-2025

Jordan's primary national development strategy Jordan Vision 2025 has set high ambitions for the country's socioeconomic development in the 2015-2025 period. With this strategy, Jordan hopes to achieve an economic growth rate of 7.5% in 2025, while striving to bring the poverty and unemployment rates as low as 8% and 9.17%[1], respectively. To achieve this vision, the government has defined a set of priorities and actions based on strong private sector development and resilience to external economic shocks. While the environment and climate change are not central features in the Jordan Vision 2025, several environmental priorities are addressed, including climate change adaptation, water and energy efficiency, waste management and natural resource protection. Importantly, the document calls for the development of the green economy in six targeted sectors: Energy, Transport, Water, Waste, Agriculture and Tourism.[2]

Throughout 2018 and 2019, Jordan's economy experienced a steady but low growth, with real GDP at just under 2.0%. Substantial efforts have been taken to address the central government's debt, which reached 99.1% in 2019, including through introducing fiscal reforms such as the passage of the 2019 Income Tax Law.[3] However, in early 2020, Jordan, like the rest of the world, was shaken by the global COVID19 pandemic. The implementation of public health measures to limit the spread of the virus brought the economy to a standstill, leaving many Jordanians worse-off.[4] This new economic situation poses a significant risk to Jordan in the short term. With an unemployment rate of 19%[5] at the end of 2019 and a slowdown of business-as-usual economic activity, families and small business will struggle to make ends meet.[6] High public debt and a likely reduction in foreign investment and tourism sector revenues will further test the long-term resilience of the economy. The economy is now estimated to shrink by about 3.5%, unemployment is expected to exceed 20%, and pressures on natural resources (particularly water) and vulnerable communities to intensify.[7]

This unprecedented set of circumstances is a serious challenge in the short term, but it presents an opportunity for the Government of Jordan to refocus its efforts on designing an economic growth approach that will foster long-term resilience. Green growth is one strategic approach that can support this effort. The Ministry of Environment began developing the Green Growth National Action Plan 2021-2025 in late 2018 as a next step toward implementation of the recommendations in the National Green Growth Plan, under the request of the Cabinet of Ministers. The GG-NAP outlines sector-level green growth frameworks and actions for the Agriculture, Energy, Tourism, Transport, Waste and Water sectors to support implementation of Jordan's green growth vision and strengthen future ability to recovery and contain shocks from catastrophic events such as COVID 19.

The Green Growth National Action Plan 2021-2025 lays out pathways for sustainable development that will increase resilience, strengthening Jordan's capacity to contain shocks and recover from catastrophic events such as COVID-19.

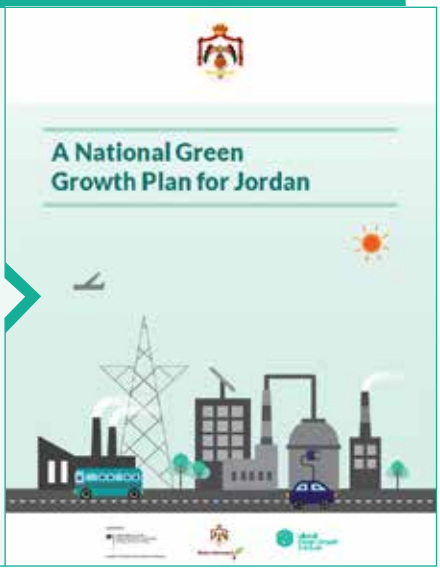
[1] GoJ. "Jordan 2025: A National Vision and Strategy," 2015.
[2] GoJ. "Jordan 2025: A National Vision and Strategy," 2015.
[3] The World Bank. "Jordan's Economic Update — April 2020," 2020.
[4] Reuters. "Many Jordanians struggling as country emerges from COVID-19 lockdown, U.N. agency says," 2020.
[5] Department of Statistics, 2019.
[6] UNDP. "Impact of COVID-19 on Households in Jordan",2020.
[7] The World Bank. "Jordan's Economic Update — April 2020," 2020.

Green growth, defined as **"Economic Growth that is environmentally sustainable and socially inclusive"**,[8] is a multi-sector development approach that is aligned with both the 2030 Sustainable Development Agenda and Jordan's Nationally Determined Contributions (NDC) under the Paris climate change agreement of 2015. In 2017, as a first step towards achieving green growth in Jordan, the Cabinet of Ministers approved the report "A National Green Growth Plan for Jordan" (NGGP). Having received a special mention by the League of Arab States for being a best practice example to be replicated in the region, the NGGP assesses Jordan's green growth potential and creates a roadmap to achieve a green economy transition in Jordan through strategic direction and recommendations (Box 1).

BOX 1
About the National Green Growth Plan for Jordan

The NGGP charts out a plan for Jordan to achieve an expanding yet sustainable and resilient economy that ensures the creation of green jobs for its citizens and increased investment in green projects. The NGGP uses a cost-benefit analysis approach to identify the challenges and opportunities for project implementation and focuses on tackling these barriers in the six green growth sectors: Agriculture, Energy, Tourism, Transport, Waste and Water. **Four driving principles of green growth are identified and mainstreamed across the actions in the Green Growth National Action Plan 2021-2025:**

- Transparent governance processes and enforcement of legislation
- Mechanisms to incentivize green growth
- Integrated planning processes that value societal impacts
- Behavior shifts and capacity building



To achieve the strategic vision laid out in the NGGP, the Ministry of Environment (MoEnv) worked in partnership with key national stakeholders to develop the **Green Growth National Action Plan 2021–2025** (GG-NAP). The GG-NAP is presented through a series of six national action plans that serve as sector-level green growth agendas. Each GG-NAP provides implementable actions to achieve the five national green growth objectives and embody the four driving principles of green growth implementation (see Box 2). Detailed descriptions of priority policy and investment actions are included in the sector action plans, which will serve as the core of Jordan's green growth, climate change and sustainable development agendas in the 2021 to 2025 period. Some of these are already under consideration by donors and investors. Many are included in Jordan's NDC Action Plan and are climate finance opportunities.

[8] Global Green Growth Institute. "GGGI's Strategy 2030," 2019.

BOX 2
Why the Green Growth National Action Plan 2021-2025?

The next step towards implementing the recommendations of the National Green Growth Plan for Jordan, the Action Plan for Agriculture, Energy, Tourism, Transport, Water, and Waste sectors:

1. **Elaborates and mainstreams green growth, climate change and sustainable development objectives into sectoral strategic frameworks.** This will encourage formulation of greener projects, and the implementation of policies that will strengthen the enabling environment for greener investment and private sector development. These priorities are aligned with the SDGs and the NDC Action Plan[9] as well as national sector-level priorities, which will further prepare the government to mainstream sustainable development into the post-*Jordan Vision 2025* national development plan.

2. **Strengthens cross-sector collaboration.** Multi-stakeholder coordination and collaboration is central to designing and implementing green growth actions, as it can maximize co-benefits. The overall development process and the actions in each sectoral plan were intentionally designed to enhance such collaboration. Such activities lead to increased awareness and behavior change among decision makers, which can further strengthen the enabling environment for future investment in green growth.

3. **Emphasizes the importance of improving the enabling environment for green growth.** During the initial phase of green growth implementation in Jordan, substantial focus on the enabling environment is needed. Each action description identifies the enabling actions (such as supporting technical assistance programs) required for the responsible institution to be more successful in securing investment for implementation – either from public budget, private sector investors or donors.

The development of the action plan was undertaken through a highly collaborative approach between the Ministry of Environment and the line ministries responsible for guiding each sector. Sector-level green growth focal points were established and ministerial leadership was engaged through the Higher Steering Committee for Green Economy to secure endorsement. This experience demonstrated the important and growing role the Ministry of Environment plays in facilitating action across different issue areas. The network of green growth and climate action advocates developed in recent years is a powerful tool for implementing green growth in Jordan.

The GG-NAPs were developed with technical support from the Global Green Growth Institute (GGGI), who worked with the Ministry of Environment to conduct wide-ranging stakeholder consultations in 2018 and 2019. The strategic objectives, sector sub-objectives and actions were identified and formulated through an iterative process linked as closely as possible to existing sectoral priorities. Non-government stakeholders and experts were also consulted to ensure alignment with broader sectoral priorities, and to bridge local context and international best practice.

[9] Clima-Med EU. "Jordan approves NDC Action Plan to achieve the implementation of its commitments to the Paris Agreement," 2019.

Figure 1 shows a summary of the green growth planning and implementation in Jordan.

FIGURE 1
Green Growth Planning and Implementation in Jordan

Executive Summary

The ***Energy Sector Green Growth Action National Action Plan 2021-2025 (GG-NAP)*** outlines a green growth framework and actions for the sector aligned with the National Green Growth Plan (NGGP), Jordan Vision 2025, and Nationally Determined Contributions (NDCs) under the Paris agreement.

At the heart of the green growth approach lies the leveraging of the sector's resilience through economic growth that is environmentally sustainable and socially inclusive. The GG-NAP outlines five national green growth objectives on which the *Energy Sector GG-NAP* was developed:

1. Enhance Natural Capital
2. Sustainable Economic Growth
3. Social Development and Poverty Reduction
4. Resource Efficiency
5. Climate Change Adaptation and Mitigation

From these five national objectives, the *Energy Sector GG-NAP* identifies 16 sector sub-objectives that serve to mainstream the overarching green growth objectives into energy sector policies and investments.

Jordan is currently at a critical juncture of its green growth transition, with the energy sector as a driving force for change. Jordan has achieved significant success in the field of renewable energy implementation, attracting over USD 5 billion in investment in the sector, and exceeding its own expectations in terms of renewables contribution to the energy mix. However, its first-mover status and commitment to providing affordable access to sustainable energy has come with some unintended economic consequences. The level of subsidization and various technical and managerial capacity challenges at the national energy utility are key contributors to the rise in Jordan's sovereign debt, increasing from 55% of GDP in 2009 to 99.1% at the start of 2020.[10] This debt is hindering the public sector's ability to respond to the COVID-19 pandemic, and to stimulate investment in key economic sectors.

In the last decade, the electricity sector has witnessed significant growth with the installed capacity of combined cycle increasing around 70%, and the share of renewable energy installed capacity having risen to around 10%. Until 2015, the electricity sector in Jordan was dominated by conventional energy sources, but with the implementation of several utility-scale PV and wind projects, the current share of renewable energy in the electricity mix is above 10%. The country expects its share of renewable energy for electricity generation to reach 35% of the total installed capacity by 2023.[11] Energy efficiency (EE) is the next frontier for Jordan, as it can help reduce the overall energy intensity of the economy and offer new market development and job opportunities. Energy efficient transport, buildings, and appliances, as well as behavior change and awareness campaigns, can support the government's goal of increasing energy efficiency.

Energy is a critical infrastructure and service sector required for other economic sectors to function. Investing in sustainable energy is, therefore, a critical green growth enabler. The *Energy Sector Green Growth National Action Plan 2021-2025* has been developed with this aim in mind, and would lead to the following transformational impacts:

- Supporting Jordan's objectives to achieve a cleaner energy mix through renewable energy as well as a reduction in national Green House Gas (GHG) emissions of 14%.[12]
- Promoting the revitalization of the energy services market and the pursuit of energy sector innovation as a driver of future economic growth and employment.
- Increasing the readiness of key national institutions to attract climate finance.
- Emphasizing the importance of achieving energy efficiency through green building and construction, electric transport, and appliances.

The Ministry of Environment (MoEnv) and the Ministry of Energy and Mineral Resources (MEMR) worked in partnership with the support of national stakeholders and the Global Green Growth Institute to identify 12 priority actions to achieve green growth through the energy sector as shown in Table 1. The implementation of these actions is estimated to cost USD 85,300,000, which will require a mix of public, private sector and donor support for its implementation. The actions include:

[10] The World Bank. "Jordan's Economic Update — April 2020," 2020.
[11] NEPCO. "Annual Report 2018," 2018; and MEMR. "National Renewable Energy Action Plan 2018-2023," n,d.
[12] 1.5% unconditional, 12.5% conditional reductions according to the NDC.

- **4 investment preparation and demonstration actions.** These projects are at various levels of readiness: some require feasibility analysis, while others are investment-ready. Many are suitable candidates for public-private partnerships or direct private sector investment, and others are opportunities to leverage climate finance.
- **8 enabling policy and institutional reform actions.** Given the current gaps in available fiscal resources, these actions intend to attract investment by addressing policy barriers and capacity gaps that lead to higher costs, risk levels or uncertainty in decision making. These include programs to support innovation, institutional reform and coordination.

11 out of 12 of these actions contribute to the objective of Climate Change Adaptation and Mitigation, which are considered to be "Climate Action Priorities". In addition, some of them can be found in Jordan's NDC Action Plan and forthcoming Green Climate Fund Country Programme.

TABLE 1
Summary of Jordan's Energy Sector Green Growth Action Plan 2021-2025

#	Action Title	Total Estimated Implementation Cost (USD)	Relevant Green Growth Objectives				
			Enhanced Natural Capital	Sustainable Economic Growth	Social Development and Poverty Reduction	Resource Efficiency	Climate change Mitigation and Adaptation
EN01	Improve Energy Demand Management through Development of a Smart Electricity Grid	3,5000,000		x		x	x
EN02	Develop Industrial Renewable Roadmap and Investment Plan	1,000,000		x			x
EN03	Improve the market for green building and construction services	1,000,000		x	x	x	x
EN04	Develop and Implement a National Green Building Strategy and Action Plan	3,000,000		x		x	x
EN05	Conduct Energy Efficiency Retrofits for Public Buildings	1,500,000		x		x	x
EN06	Implement Electric Vehicle Charging Stations and Services Provision in Greater Amman Municipality through a Public-Private Partnership	16,300,000	x	x			x
EN07	Develop a Behavior Change Campaign and Financial Mechanism to Increase Use of Energy Efficient Appliances in Jordan	9,000,000			x	x	x
EN08	Develop and Implement a National Energy Storage Action Plan and Investment Pipeline	10,000,000		x		x	x
EN09	Increase Public Investment in Energy Sector Research and Development	15,000,000		x	x		
EN10	Achieve GCF Accreditation for the Jordan Renewable Energy and Energy Efficiency Fund (JREEEF)	1,000,000		x	x	x	x
EN11	Improve the Enabling Environment and Capacity Development Support for the Growth of the Energy Services (ESCO) Market	1,000,000		x	x	x	x
EN12	Implement the Energy Sector Monitoring, Reporting and Verification (MRV) System	3,000,000		x			x

1. A Green Growth Framework for the Energy Sector

Green growth is a new strategic approach for the Government of Jordan (GoJ) that integrates principles of inclusive, sustainable economic growth into the existing national context and priorities. Implementing this green growth approach will allow Jordan to achieve its socioeconomic development targets while simultaneously addressing environmental risks and climate change – all of which are critical to achieving the Sustainable Development Goals (SDGs), as shown in Figure 2 below. At the outset of the green growth planning process, visioning exercises and consultations were held with national stakeholders through which **five national green growth objectives** were established.[13]

These objectives reflect Jordan's unique institutional setup, political and economic realities, and long-term growth ambitions. National-level plans and strategies were reviewed and used as inputs to guide and shape the objectives, developed into sector-level sub-objectives (see Chapter 3). The *Energy Sector Green Growth National Action Plan (GG-NAP) 2021-2025* was developed as a partnership between the MoEnv and the MEMR, with green growth focal points established within the latter and the Greater Amman Municipality (GAM), in order to ensure consistent feedback from the technical and management levels. Figure 3 shows the process for developing the energy sector GG-NAP.

FIGURE 2
Relationship between the Five National Green Growth Objectives and the Sustainable Development Goals

[13] This process reflected and built on the 5 green growth outcomes proposed in the National Green Growth Plan.

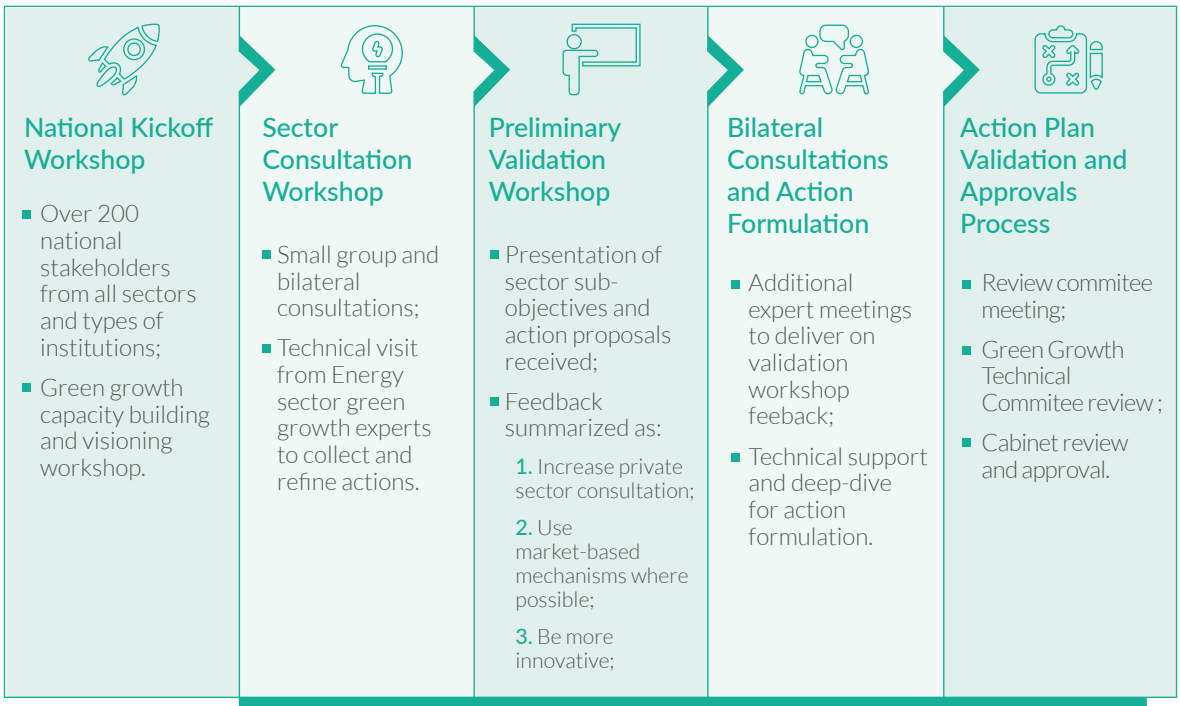


FIGURE 3
Process for Developing the *Energy Sector GG-NAP*

The Energy sector in Jordan is responsible for managing the production and distribution of energy for all purposes in the Kingdom. The sector is composed of government actors, responsible for strategic planning; the energy regulation authority, and the utilities that manage the distribution of power for the industrial, commercial, and residential sectors, among other uses. The energy sector is the central player in the global discussion on how to address climate change, as well as being a key national player in the country's economic growth and development. The following sections describe the relationship between each of Jordan's national green growth objectives and the energy sector. Chapter 2 carries out an assessment of Jordan's performance against these objectives in Jordan's energy sector.

1.1 Enhanced Natural Capital

Jordan's first national green growth objective is to enhance the country's natural capital. For that purpose, it aims to improve the quality and quantity of natural resources used to generate economic growth and provide ecosystem services that support economic activities.

Energy is a vital component of natural capital, as natural resources are the basic elements from which energy is produced. Primary fuels such as coal, oil, natural gas, and uranium are considered non-renewable natural resources, while. on the other hand, primary energy flows like solar, wind, and hydro are considered renewable resources. Unlike primary flows, primary fuels are located in deposits within the Earth, that, in order to be used, must be discovered and extracted. Sustainable extraction and management of these resources is critical to avoid their drastic depletion or the degradation of the natural environments in which they are located. Enhancing the share of renewable energy (RE) is regarded as the most prudent way forward to strengthen a country's natural capital.

Many forms of energy production require ample and reliable water supply, a resource that is in short supply in many parts of the world, as is the case in Jordan. Water is used at various stages of the power generation cycle, including fuel extraction and processing (mining and refining, liquefaction and gasification of oil, gas, coal, uranium, as well as in the production of biomass/biofuels through agriculture) and generation (coal, gas, oil, nuclear, and biomass plants). The power sector is one of the biggest water users in the world. On the water supply side, energy needed for treatment and distribution accounts for as much as 80% of water supply cost, so an insufficient supply of affordable energy will have negative impacts on the price and availability of water, especially in regions where water is in short supply.[14]

[14] OECD & IEA. "OECD Green Growth Studies." 2012.

Dependence on liquid hydrocarbons for vehicle, aviation, and marine transport is not only costly for importing countries but it is also a source of tension in geopolitical relations and a major source of air pollution in urban areas. When burned, coal is considered the "dirtiest" of all fossil fuels, with the byproducts of its combustion being hazardous to human health and the environment. Poor combustion of coal can severely deteriorate local air quality.[15]

Sustainable Development Goals: 7 (Affordable and Clean Energy), 11 (Sustainable Cities and Communities), 15 (Life on Land)

1.2 Sustainable Economic Growth

Jordan's second national green growth objective is to ensure sustainable economic growth. In particular, the aim is to improve the enabling environment for the creation of long-term, inclusive socioeconomic development, as detailed in the Jordan Vision 2025.

Energy is a key element for achieving SDGs related to poverty, hunger, education, gender equality, health, communicable diseases, and environmental sustainability. That is mainly because almost all production and consumption activities require energy as a basic input. Therefore, energy is recognized as the fundamental need for economic development. Economic productivity is driven by energy and is considered to be the contributor of at least half the industrial growth in a modern economy.[16] Historically, power crises have been linked to economic growth challenges, and vice versa.

Given the importance of the energy sector in economic growth, sustainable management is crucial in order to ensure sustainable economic growth. Sustainable economic and social development are dependent on sustainable energy utilization. Many developing countries have achieved significant economic development with rapid urbanization and industrialization. The relation of rapid economic growth, industrialization, and energy production is directly causing environmental degradation, which poses a threat to industrialization and civilization. Finding out a way to achieve mutual benefits between energy production and environmental protection should be considered one of the essential factors of economic growth.

RE and EE have been acknowledged as being key elements in the fight against environmental degradation, as well as in satisfying energy demand in a cleaner and more sustainable way. While RE can reduce environmental degradation by supplying clean energy, EE measures are expected to be the main factor in reducing energy intensity besides being an indicator of successful decoupling.

Sustainable Development Goals: 8 (Good Jobs and Economic Growth), 9 (Industry, Innovation and Infrastructure), 16 (Peace, Justice and Strong Institutions)

1.3 Social Development and Poverty Reduction

Jordan's third national green growth objective is to achieve social development and poverty reduction. To this end, it aims to increase the equity with which the benefits of economic development and access to services are distributed across society.

Social development and poverty reduction are central concepts to Jordan's long-term development agenda and are a core component of inclusive green growth. Achieving this objective requires special attention to reducing inequalities in society, unlocking access to opportunity and extending the benefits of growth to all members of society. Gender equality and women's empowerment are policy agendas that help support social development and poverty reduction, and they are a critical part of the overall economic growth. A 2015 McKinsey study found that women generate only 37% of the global Gross Domestic Product (GDP), but that closing this gap could add between USD 12 and 28 trillion to the global economy.[17] In the MENA region, women generate only 18% of GDP, suggesting greater inclusion is a major economic growth opportunity. Furthermore, access for marginalized groups and those excluded from markets, services and spaces are required for sustainable growth. Accordingly, green growth recognizes women and men

[15] OECD & IEA. "OECD Green Growth Studies," 2012.
[16] Foran, Barney, and Franzi Poldy. *Future Dilemmas: Options to 2050 for Australia's Population, Technology, Resources and Environment*, 2002.
[17] McKinsey Global Institute. "How advancing women's equality can add $12 trillion to global growth," 2015.

with a sense of equity, and the poor and marginalized as not simply vulnerable, but as active agents of change for more sustainable growth.

'Just Transition' is embedded in the Paris Climate Agreement in ensuring the rights of workers and communities directly impacted by the transition towards RE solutions. This means supporting the work force in oil and gas industries in adjusting to new labor market demands and opportunities. The energy sector has been historically important to job creation, as large numbers of workers are needed to explore and extract fuel sources. Studies show that in the future, significant opportunities for job creation also exists in the RE and EE sectors. Globally, 11 million people were employed in the sector worldwide in 2019, compared with 10.3 million in 2017.[18] Opportunities for job creation vary by technology, Solar PVC tops the list followed by bioenergy, hydro, and wind power industries.[19] EE measures, such as building retrofits and energy management services, are often labor intensive as well.

Closing the gender gap in the energy sector can significantly contribute to a greater participation of women in the labor market. Globally, 32% of workers in the sector are women, and the gap is wider in Science, Technology, Engineering and Math (STEM) related roles and leadership.[20] Comparatively, 22% of workers in oil and gas are women, indicating that women are more attracted to the opportunities in the sustainable energy sector.[21] A multifaceted approach is needed to bring more women into the sector, including supporting women in STEM related educations and removing existing barriers to entering the workforce and advancing their careers. Successful approaches will broaden the talent base in the sector, and contribute to the overall socio-economic co-benefits associated with women's empowerment and gender equality.[22]

The issue of access to affordable and reliable energy services is essential to human development and economic growth. This has implications for sector-level policies, including fiscal policies that can include subsidies or introduction of taxes, which in turn, can free public spending to offset negative impacts on low income households. Public support for such initiatives is essential to accomplish a successful implementation.

Sustainable Development Goals: 1 (No Poverty), 4 (Quality Education) 5 (Gender Equality), 10 (Reduced Inequalities)

1.4 Resource Efficiency

Jordan's fourth national green growth objective is to achieve resource efficiency. This can be defined as improving the efficiency – reducing the wastefulness – of the economy by achieving a higher efficiency in the production and consumption of economic outputs.

Traditionally, economic growth has been characterized by an initially high rate of natural resource consumption per capita, followed by a period of declining natural resource consumption past a certain rate of economic growth. However, with extreme population growth and the looming threat of global climate change, the global community has recognized the need to shift the economic growth trend towards more sustainable consumption and production – greater shared prosperity with less waste. To achieve resource efficiency and natural resource decoupling, substantial shifts in technology, policies, and behaviors are necessary. Reshaping traditional processes of natural resource consumption and realigning incentives is critical.

Energy resources, as they are found in nature, are labelled as primary energy, i.e. natural gas; crude oil; biomass; solar radiation; energy from wind or water flow. Each country has its own natural energy resources, which can be limited, and sometimes not sufficient to meet its energy demand. Fossil fuels take years to be replenished and have adverse environmental impacts. Therefore, strong long-term strategic planning is crucial, in which resource efficiency and management are critical elements. Once the energy resource is tapped, the primary energy is converted to secondary energy then to final energy and finally to useful energy. Through this process, energy resources undergo conversion, transmission, distribution and sometimes misuse, which leads to loss of energy. This loss can be managed by Energy Conservation (changing the consumption pattern and behavior demand for useful energy) and EE (reducing losses throughout the energy system value chain, i.e., losses linked to processing, production, transportation and use of energy). While the idea of

[18] IRENA. "Renewable Energy and Jobs Annual Review," 2019.
[19] IRENA. "Renewable Energy and Jobs Annual Review," 2019.
[20] 20 IRENA. "Renewable Energy: A Gender Perspective," 2019.
[21] IRENA. "Renewable Energy: A Gender Perspective," 2019.
[22] McKinsey Global Institute. "The Power of Parity: How Advancing Womens' Equality Can Add $12 Trillion to Global Growth," 2015.

energy conservation is to reduce demand for energy services, EE is achieved through reduction of the amount of energy required to provide an equivalent level of service. Energy conservation is regarded as the priority and the low-hanging fruit in achieving resource efficiency in the energy sector, since such savings can be achieved in virtually no time and cost.

New technologies may be required to achieve EE at the source of demand (for example, through developing more energy efficient building materials and approaches, appliances, smart management tools, and more). Investing in these technologies come with short-term cost implications, but often have straightforward and quick payback models through the reduced consumption. Therefore, establishing a market of energy efficient products and services can be an economic and employment creation opportunity under the right investment environment. At the macro-level, even small investments in EE can have a cumulatively large impact on national economic growth, job creation and GHG emissions reduction.

Sustainable Development Goals: 7 (Affordable and Clean Energy), 9 (Industry, Innovation and Infrastructure), 12 (Sustainable Consumption and Production)

1.5 Climate Change Adaptation and Mitigation

Jordan's fifth national objective is to achieve climate change adaptation and mitigation, which is expressed as improving Jordan's resilience to the effects of climate change and decreasing the country's total greenhouse gas (GHG) emissions. This objective is consistent with the Paris climate change targets, which is the global community's plan to respond to the global climate crisis. Actions taken to address climate change adaptation and mitigation can also be found in Jordan's National Determined Contribution (NDC) to the Paris Agreement.

Climate change-related weather events and natural disasters threaten to destabilize traditional access to natural resources, which also being a jeopardy to the livelihoods of the most vulnerable members of society and entire economies. The world has recognized the impact of global climate change as a major global challenge requiring collective effort. The effects of climate change are already evident in the form of rising sea levels, more extreme weather, flooding, droughts, and storms. Climate change is actually the consequence of large amounts of GHG emissions into the atmosphere, caused by human activities such as burning fossil fuels for electricity generation, heating, industrial uses, and power for transport. Global energy consumption is by far the largest source of GHG emissions generated by human activities, accounting for about two thirds of global emissions.[23]

Despite global efforts to curtail GHG emissions from the energy sector and massive investments in "clean" renewable sources, energy production and consumption continues to be the leading contributor to climate change. Energy-related carbon dioxide (CO_2) emissions have risen by 1% per year over the last 10 years.[24] Many countries have already introduced policies, regulations, and infrastructure investment plans to combat climate change, which are outlined in each country's Nationally Determined Contribution (NDC) to the Paris Climate Agreement. Most NDCs include some level of ambition to transition towards a lower-carbon energy system, by increasing the adoption of RE and reducing fossil fuel consumption, in addition to enhancing EE.

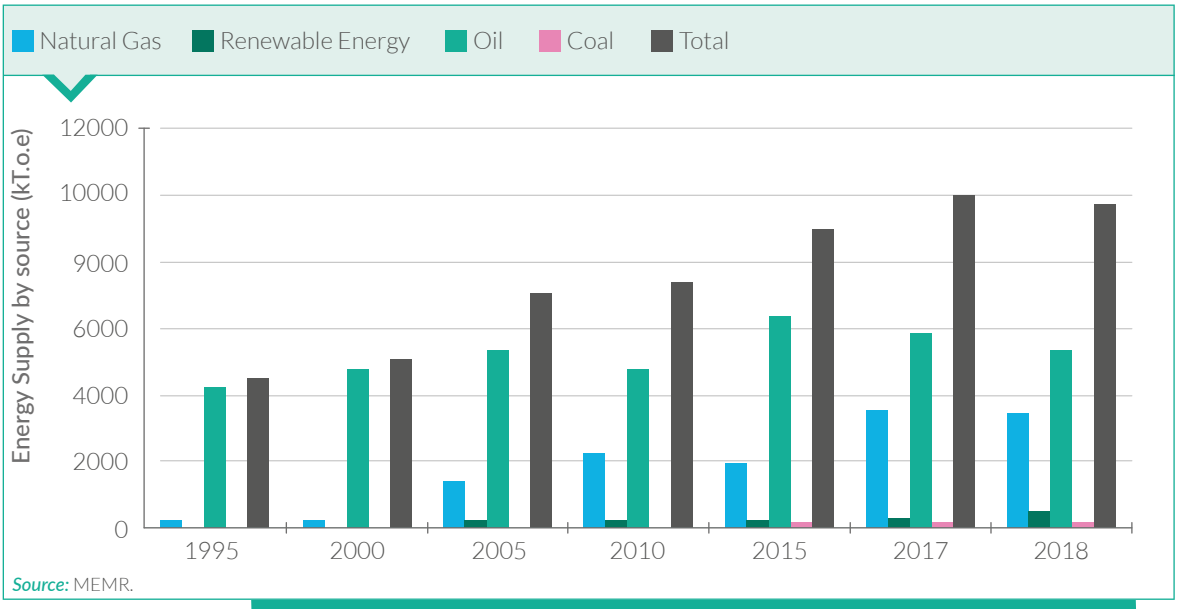
Sustainable Development Goals: 7 (Affordable and Clean Energy), 11 (Sustainable Cities and Communities), 13 (Climate Action)

[23] The European Union. "Energy and Climate Change," 2017.
[24] IRENA. "Global Renewables Outlook: Energy transformation 2050", 2020.

2. Assessing Green Growth in Jordan's Energy Sector

2.1 Energy Sector Green Growth Situation Analysis

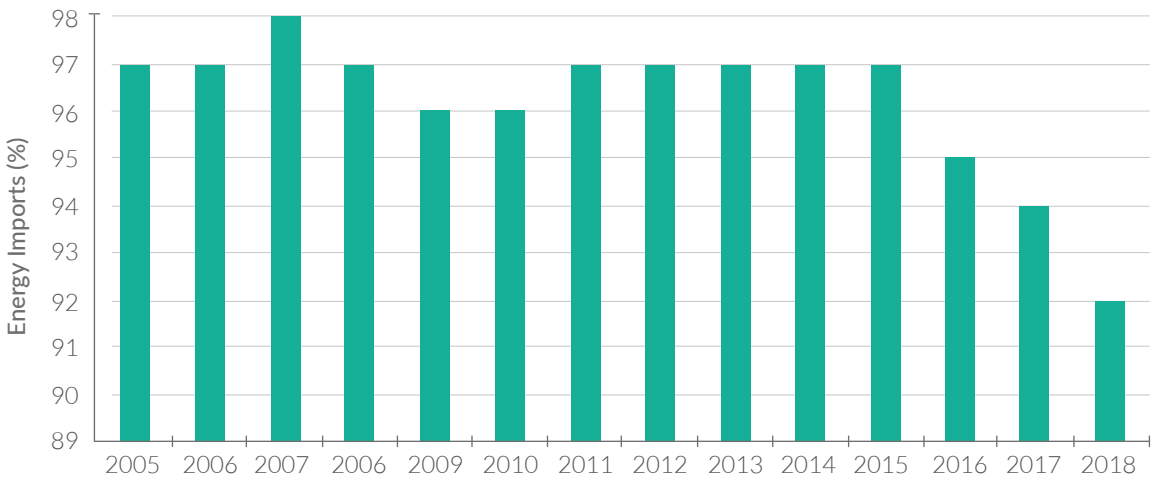
Natural Capital. Jordan is one of the most resource-scarce countries in the world, with few natural energy resources and a high dependence on imported fossil-fuels for energy. Figure 4 shows the historical consumption of natural resources by energy sector, while Figure 5 illustrates the historical trend of energy importation, which has only marginally decreased to 92% as of 2018. In recent years, Jordan's implementation of RE projects, such as solar PV and wind, has diversified its energy mix, with renewable sources powering 10.7% of total electricity production in 2018.[25] The National Electric Power Company (NEPCO) expects the total energy mix to be up to 30% renewable by 2022 at the current rate of investment.



Source: MEMR.

FIGURE 4
Total primary energy supply by source, Jordan 1995-2018,

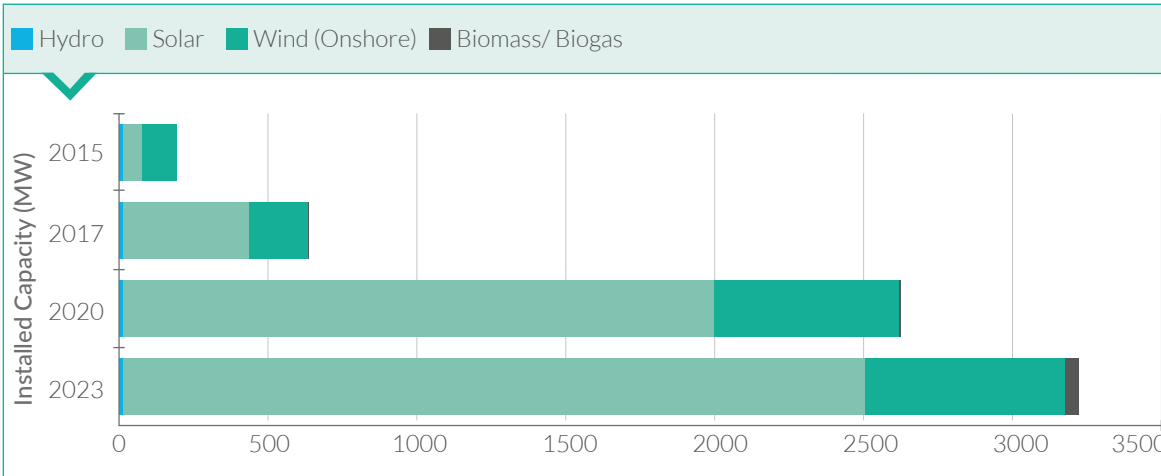
[25] National Electric Power Company. "Annual Report 2018," 2018.



Source: MEMR.

FIGURE 5
Historical net energy import

The Government of Jordan (GoJ) has identified two natural resources which might be explored and utilized in energy sector: oil shale and uranium. Geological evidence indicates that Jordan has available an oil shale reserve of more than 30 billion tons, located under more than 60% of the country's land[26]. The majority of these reserves have been reported to exist in the western part of the country, situated close to the surface, where infrastructure has been developed. The government has taken some initiatives to explore the reserve in order to enhance the domestic share of natural resources in the energy mix, signing four concession agreements with potential producers by 2019 [27].Strategic environmental impact assessments will determine the extent to which oil shale exploitation projects will impact the natural environment and what mitigation efforts will be required. Regarding uranium, the country also has natural mineral reserves that could play a role in diminishing dependency on the energy industry's foreign market. The exact environmental impact of exploring these natural resources has not been fully assessed, but the government is currently in discussions with several regional partners and investors to better understand the potential utility of these uranium reserves.



Source: MEMR. National Renewable Energy Action Plan 2018-2023

FIGURE 6
Renewable Energy Share in Jordan's energy mix

[26] MEMR. "Jordanian Oil Shale 2019," 2019. (link).
[27] MEMR. "Jordanian Oil Shale 2019," 2019. (link).

Jordan is growing its RE resources with projects in the solar, wind, geothermal, and biomass sub-sectors. Figure 6 shows the RE share in Jordan's energy mix. Jordan is located in the "solar belt," the geographic areas between latitudes 25 N and 25 S, which indicates that sunny days could reach 316 days per annum and for an average of 8 hours per day. In addition, numerous regions in Jordan are characterized by wind speeds ranging from 7-8.5 meters per second, which is a suitable speed for building wind energy plants. Due to these conditions, Jordan's RE resources have grown, providing a maximum contribution to the total energy mix of roughly 6% in 2017.[28] Using these energy resources may significantly decrease the energy reliance on imported oil from the Arab oil neighboring countries and improve Jordan's energy security.

Geothermal wells are distributed across the country and the utilization of these for heating and cooling can reduce the cost of conventional energy. Regarding biomass resources, the conversion of agricultural waste into biodiesel can also reduce diesel imports and serve as a circular-economy solution to waste treatment. The conversion of animal waste into biogas has the potential to offset imported liquified petroleum gas (LPG), although more investment in research and development (R&D) is needed to bring this to fruition. Jordan can also enhance its strength in the cross-border energy market by anchoring the role of a hub by linking different countries for transmission of natural energy resources.

Sustainable Economic Growth. Green growth in the energy sector has a direct impact on Jordan's sustained economic growth because of the high dependency on imported GHG-intensive fossil fuel sources (94% in 2017). Energy consumption in Jordan accounted for 26% of total imports and 17% of GDP in 2017. That year, the financial cost of imported energy reached almost USD 3.5 billion. According to Jordan Vision 2025, Jordan's economic growth is set to reach a target of 7.5% in 2025. Under one detailed vision to achieve this rate of growth, the electricity and water sectors should combinedly grow by 128 million USD, representing 13% of that growth[29]. To achieve this level of growth, the government is focusing on increasing investments in RE and EE programs, attracting nearly USD 5 billion in investment in the renewables sector to the country as of 2019[30]. This expansion and diversification of resources needs further investment into the transmission grid and smart electricity usage, which are part of the forthcoming Master Energy Strategy.

In 2014, electricity prices for the end consumer ranged from JD 0.033 per kWh for small residential consumers with a demand of less than 150 kWh per month, to JD 0.292 per kWh for the banking sector. In 2012, the generation and distribution costs were JD 0.146 per kWh, whereas the average selling price was JD 0.0636 per kWh. The difference in price had to be covered by the state-owned NEPCO, thereby creating a substantial deficit of JD 2.3 billion by the end of 2012. This deficit, financed by structural loans from the World Bank, continues to create restriction on fiscal resources that could be used to create incentives that would stimulate private sector-led economic growth. In order to reduce the losses, a National Strategic Plan with structural benchmarks has been developed, which foresees the adjustment of electricity tariffs and other measures to enhance the efficiency of the electricity system. Even if electricity continues to be subsidized for many purposes, such as for consumers with low electricity consumption, the government is still studying the best way to balance subsidization and the need to service NEPCO's debt, given its drag on public resources.

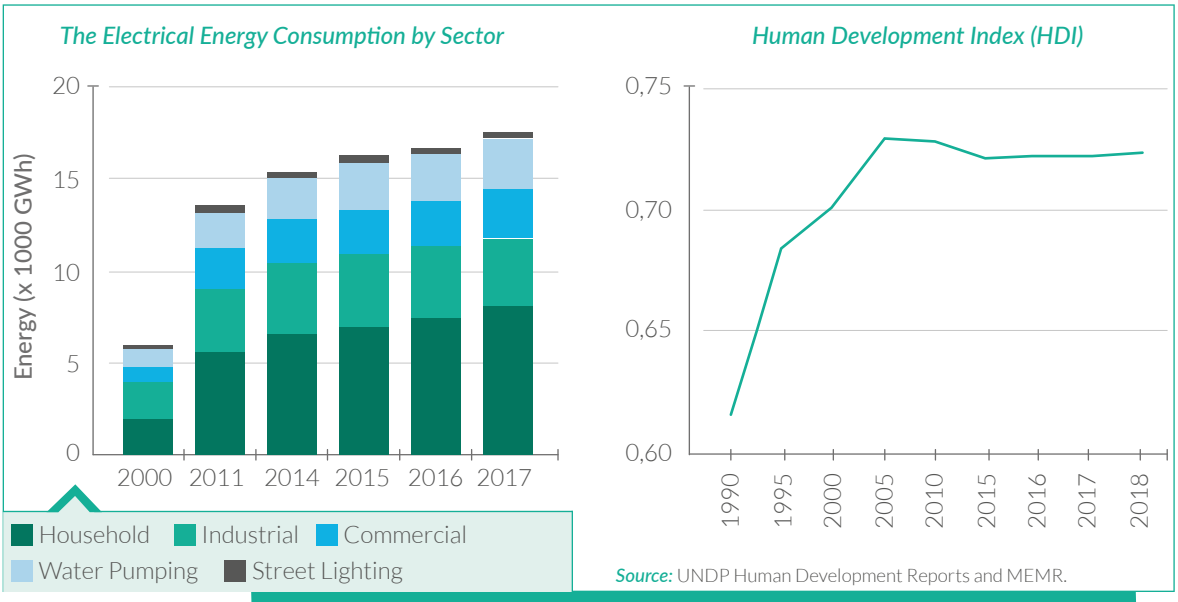
The energy sector in Jordan has a solid roadmap, promising short-term and long-term strategies, as well as comprehensive action plans; i.e. the National Energy Efficiency Action Plan (NEEAP) and the National Renewable Energy Action Plan (NREAP). By connecting the existing action plans in the energy sector with the green growth action plan, and by linking the ongoing efforts to fostering RE and EE with the endeavors to reduce GHG emissions and comply with the conditions of green economy, it will be easier to face and address the barriers and challenges in the sector, as well as get financial incentives to more RE and EE projects.

Most Southern and Eastern Mediterranean countries (SEMCs), including Jordan, have experienced solid economic growth over the last couple of decades, with Jordan's GDP rising from USD 4.16 billion in 1990 to USD 43.74 billion in 2019[31]. This growth enabled improvements in living standards, such as in health and primary education services and reduction in illiteracy, as well as strengthening of income opportunities. With this explosion of economic growth, electricity consumption has also increased, which positively contributed to the development of the economy. As Jordan continues to increase its mix of renewable energy for electricity generation, it is also is increasing its energy security. Taken together with exploration of indigenous sources, MEMR suggests that up to 48.5% of energy for electricity generation could come from local sources by 2030, compared to the current 15%.[32]

[28] MEMR. "Annual Report 2017," 2017.
[29] GoJ. "Jordan Economic Growth Plan 2018-2022,"2018.
[30] The Arab Weekly. "Jordan making strides in renewable energy production," 2020.
[31] World Bank. "Country Data - Jordan," 2020.
[32] Reuters. "Jordan energy plan seeks major reduction in foreign fuel imports, minister says," 2020.

Social Development and Poverty Reduction. Access to energy is at the heart of Social Development and Poverty Reduction, contributing to a decrease in poverty through the provision of clean water, sanitation, and healthcare. One quantitative measure of life quality is the Human Development Index (HDI), which is a composite statistic of life expectancy, literacy, education, and GDP per capita for different countries[33]. Jordan has an high HDI, ranked 102 of 189 countries.[34] Studies revealed that there is a correlation between energy consumption per person and the HDI, implying that a small amount of change in energy availability would dramatically shift the scale of HDI. Figure 8 shows the existing strong interactions between energy consumption and social conditions.

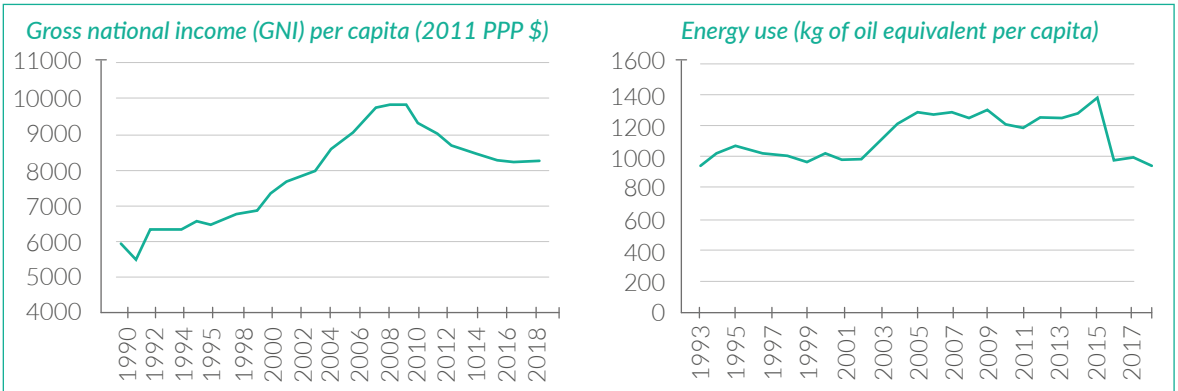
Gross National Income (GNI) is another key indicator which designates a country's progress in social development and in addressing poverty. Figure 9 illustrates Jordan's historical energy consumption per capita along with its GNI. Energy sector employment can be one way to create social development and poverty reduction opportunities. A study conducted by The King Abdullah Petroleum Studies and Research Center (KAPSARC) estimates that 1% of the workforce in Jordan, Egypt, and Morocco are in the RE sector, while the International Energy Agency (IEA) estimates that 40 million people will work in RE by 2050 globally[35]. The IEA also projects job creation in these RE markets, that are still in their growth stage. Of the total "clean technology" jobs (in the RE and EE sectors) in Jordan in 2016, 71% were in the electricity, gas, steam, and air conditioning supply sub-sector (excluding utilities), representing roughly 12,913 jobs.[36] As investment in the sector continues, new employment opportunities are expected to thrive.



Source: UNDP Human Development Reports and MEMR.

FIGURE 7
Historical electricity consumption and change in HDI

[33] FES. "A Guide to Renewable Energy in Egypt and Jordan," 2016.
[34] IRENA. "Renewable Energy: A Gender Perspective," 2019.
[35] KAPSARC "Renewable Energy and Employment: The Experience of Egypt, Jordan and Morocco," 2019.
[36] EDAMA. "Jordan Clean Technology Sector Report," 2016.



Source: The World Bank and MEMR.

FIGURE 8
The historical energy consumption per capita of Jordan along with its GNI

Jordan is ranked 138 (of 153 countries) in the World Economic Forum Gender Gap Report 2020, having a particularly high gap in the areas of 'Economic Participation and Opportunity' and 'Political Empowerment'. Overall, women's labor force participation is low, with a 0.22 female to male ratio. Only 15.1% of women are working, and only 15.4% of seats in parliament are held by women.[37] Women in Jordan are excelling in Science, Technology, Engineering and Math (STEM) education; however, they do not end up in STEM Related careers.[38] For example, of the clean technology jobs in 2016 referenced above, only 18% are held by women[39]. Removing the barriers to women's entry and career development in the sector could create an opportunity to close the gender gap in the labor force and, most importantly, also leverage the talent of STEM educated women in Jordan.

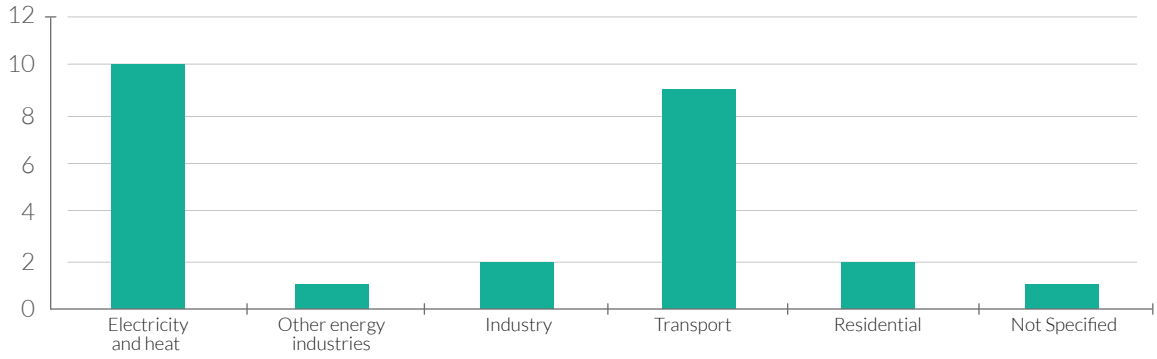
Resource Efficiency. In Jordan, electricity consumption per capita increased from 1,712 KWh in 2016 to 1,741 KWh in 2017. Meanwhile, the share of primary energy per capita was 981 kg oil equivalent in 2016, compared with 991 in 2017[40]. Jordan's overall energy intensity, indicating the amount of energy consumed per unit of GDP, has decreased in the last two decades, and the country is considered to have an average energy intensity, when compared to its peers in the Upper Middle Income group.[41] In terms of electricity losses within the energy system infrastructure, in 2017 the rate was 13.10%, compared to 14.89% in 2015, which was primarily driven by illegal use[42]. Grid management improvements, including capacity building at the utilities and the use of smart grid technology can improve the system's overall performance in the future.

Jordan has set a national target to achieve cumulative electricity savings of 20% by 2020 through the implementation of energy efficiency measures.[43] Major sectors include residential, tertiary, industrial, water pumping, street lighting, and transport. The 2nd National Energy Efficiency Action Plan 2017-2020 (NEEAP) proposes 35 measures covering all energy-consuming sectors. The implementation of the NEEAP will allow an accumulated final energy savings of about 1,570 ktoe between 2016 and 2020 and 13,500 ktoe to 2030. Electricity savings are expected to be around 9,120 GWh up to 2020, and 40,960 GWh up to 2030, having final energy savings of around 18,400 ktoe between 2016 and 2030.

Cumulatively, the total investment cost of the new NEEAP is estimated to be around 696 million JD and will generate annual savings for the user of about 230 million JD per year by 2020. In this case the average payback period of the NEEAP from the point of view of the users will be around 2.5 years, representing a good profitability. The average cost of the saved kWh can be estimated to be around 0.088 JD/kWh (0.126 $/kWh), keeping in mind that many measures, especially for the water sector, include additional upgrades not related to EE.

[37] World Economic Forum. "Global Gender Gap Report 2020: Insight Report," 2019.
[38] USAID. "Women in Energy in Jordan. Challenges, Opportunities and the Way Forward," 2015.
[39] EDAMA. "Jordan Clean Technology Sector Report," 2016. (link).
[40] NEPCO. "Annual Report 2017," 2017.
[41] GGGI. Green Growth Index 2019.
[42] NEPCO. "Annual Report 2015," 2015.
[43] MEMR. "The Second National Energy Efficiency Action Plan for Jordan 2018-2020," 2018.

Climate Change Adaptation and Mitigation. The energy sector plays a major role in climate change adaptation, especially since energy is the primary contributor to the total emissions causing climate change effects. Jordan's energy mix is dominated by imported fossil fuel, in particular, natural gas and oil. In 2017, natural gas supplied approximately 90% of the energy demand, while 10% was supplied by other sources[44]. Therefore, both fuel sources had major impact in CO_2 emissions in 2017, and, as expected, oil contributed about 65% of total emissions while natural gas had a share of 31%. Figure 10 shows 2017's emissions by sector in MT CO_2.



Source: IEA[45].

FIGURE 9
GHG Emission by sector (MT CO_2) in 2017

Oil consumption is the largest contributor to GHG emissions, demonstrating the importance of transitioning towards cleaner energy production and consumption. According to the IEA database, emission mix for Jordan is led by electricity and heat producers along with the transportation sector, followed by residential sectors. Therefore, those sectors need a special attention while planning for mitigation measures for combating climate change. In parallel to the adoption of RE, the country should adopt a long-term policy and action plan to enhance the share of cleaner fossil fuel, i.e. natural gas. Though natural gas is a fossil fuel, the global warming emissions from its combustion are much lower than those from coal or oil. Jordan also needs to investigate the emissions contribution by different sectors, since this would help in addressing climate change by focusing on emission intensive sectors.

In Jordan, energy contributed 73% of total emissions in 2006, with an estimated GHG of 21,000 Gg CO_2eq. This contribution is expected to increase to 83% by the year 2040. Therefore, it is crucial to focus on mitigation efforts on the energy sector within the green growth plans. Electricity generation and transportation are the leading subsectors in generating more emissions, reaching a share of 39% and 43%, respectively, of the energy sector's total emissions[46]. The future of RE in Jordan is bright and it is possible to achieve more than the targets mentioned earlier; and that is because Jordan enjoys top-quality solar and wind energy, in which solar radiation is so high it can reach 5–7 kWh/m^2 per day with more than 300 sunny days per year, and wind speeds that reach 9 m/s in some places in Jordan. These and other factors resulted in the outstanding score in Climatescope 2017[47] (the clean energy country competitive index), in which Jordan was ranked third globally, just behind Brazil and China, climbing eight places from Climatescope 2016[48]. The reduction in GHG emissions will improve the quality of local air, water, and soil which contribute directly to the biodiversity and ecosystems services. Another added value of green growth in the energy sector is the reassurance that the energy strategy and action plans are compatible with Jordan's efforts towards green growth, which will reinforce and support the direction that Jordan is taking in the energy sector.

[44] The Jordan Times. "Almost 90% of generated electricity comes from natural gas — NEPCO," 2018.
[45] IEA. "Data and statistics," 2017.
[46] MoEnv. "Jordan's Third National Communication on Climate Change," 2014.
[47] Bloomberg Finance. "Climatescope 2017," 2017.
[48] Bloomberg Finance. "Climatescope 2016," 2016.

RE is a fundamental element of achieving Jordan's GHG emissions targets. In 2017, the total RE installed capacity was 627 MW, compared to 3800 MW of conventional electricity generation (fundamentally based on diesel and natural gas), meaning RE's contribution to electricity generation is of 6%.

According to Jordan's latest approved energy strategy (2007-2020), RE targets were set to reach 11% of Jordan's energy mix by 2020, with an updated target set to reach 21% of generated electricity from renewable resources by 2025.

2.2 Current Energy Sector Strategic Priorities

Jordan Vision 2025. This document is the country's primary economic and social development strategy, addressing the economic, social and governance challenges affecting Jordan's ability to transform into a more developed economy. Energy security, as a tool to achieve economic sustainability, is at the center of the Jordan Vision 2025's energy approach. For this reason, there are several intended outcomes from the energy scenario. Key objectives of the **targeted scenario by 2025** include:

- Improving the performance of petroleum products' sector and opening the market to competition;
- Diversifying sources of natural gas imports;
- Enhancing the safety of the electrical system while raising the availability and reliability of the system;
- Encouraging investment in RE;
- Increasing the carrying capacity of the electrical grid;
- Encouraging the use of solar energy for water heating;
- Requiring the implementation of green building codes;
- Encouraging the use of devices that are compatible with "Green" standards;
- Raising awareness about the long-term financial benefits of EE;
- Intensifying oil drilling and exploration;
- Increasing the exploitation of oil shale;
- Developing the skills and techniques necessary to support the growth of the energy sector;
- Attracting private sector investment to the energy sector.

Energy Strategies. GoJ has dedicated itself to a sustainable and vibrant energy policy path by means of encouraging EE and developing RE systems. The GoJ has updated its published Energy Strategy (2007-2020) and set up the Master Strategy for Energy Sector 2015-2025 with the ambitious targets for RE. The ***Master Strategy*** has three main objectives:

1. Identify reliable sources of energy at the lowest possible cost;
2. Increase the utilization of indigenous resources and renewables to increase supply security;
3. Improve EE in order to reduce oil imports, reduce the need for investment in production facilities, and diminish environmental impact (including GHG emissions).

GoJ is implementing a ***National Renewable Energy Action Plan (NREAP)***[49] for the period 2018-2023. The official target adopted in the NREAP is for renewable resources to reach more than 37.14% of the total installed electricity capacity by the year 2023. This, translated into electrical capacity, means between reaching 2.2 GW and 3.2 GW, reflecting the potential development pathways of both large-scale and decentralized projects against their 2018 baseline, in which there are more than 1 GW of installed capacity from renewable sources of energy, namely 7 GW solar PV, 3 GW wind, 12 MW hydro, and 3.5 MW biogas.

[49] MEMR. "National Renewable Energy Action Plan 2018-2023," n,d.
[50] MEMR. "The First National Energy Efficiency Action Plan for Jordan 2012-2014,"2013.
[51] MEMR. "The Second National Energy Efficiency Action Plan for Jordan 2018-2020," 2018.

In 2011, the GoJ issued the First ***National Energy Efficiency Action Plan (NEEAP)***[50] for 2012-2014. The baseline that was adopted was the average electricity consumption between 2006 and 2010, which is equal to 11,291 GWh per year. The first Jordan NEEAP included 11 main measures, targeted to achieve a 7.6% reduction in energy consumption by the year 2014, equaling about 806 GWh. The rate of completion for the first NEEAP was estimated to be 40%. Therefore, the GoJ issued the ***Second NEEAP*** for the years 2017-2020[51], with the goal of saving almost 2000 GWh in electricity by 2020. The second NEEAP includes 35 measures (26 measures + 9 cross-cutting projects) covering the residential, tertiary, industrial, water pumping, street lighting, and transport sectors.

Jordan's existing national plans, strategies, and policy documents add a further level of specificity to its priorities, many of which are linked to green growth (see Table 2 below).

TABLE 2
Green Growth Priorities found in Existing National Documents

Relevant plans and strategies for Energy Sector	Green Growth Objectives				
	Enhanced Natural Capital	Sustainable Economic Growth	Social Development & Poverty Reduction	Resource Efficiency	Climate Change Adaptation & Mitigation
Jordan Vision 2025	x	x	x		
Jordan Economic Growth Plan 2018 - 2022		x	x	x	
Energy Master Strategy 2015-2025	x	x	x	x	x
National Renewable Energy Action Plan (NREAP) 2018-2023 (tbc)		x			x
National Energy Efficiency Action Plan (NEEAP) 2017-2020				x	x
National Strategy and Action Plan for Sustainable Consumption and Production in Jordan (2016-2025)				x	x
Jordan Sustainable Energy & Climate Action Plans (SECAPs) (one each for Irbid Municipality, Karak Municipality, and the Aqaba Special Economic Zone Authority)				x	x
Nationally Determined Contribution (NDC, Paris COP21)					x
The National Climate Change Policy of the Hashemite Kingdom of Jordan 2013-2020					x

2.3 Energy Sector Stakeholders

MEMR is the leading government institution responsible for strategic planning and for guiding the development of Jordan's energy sector. The mandate of this ministry is to set the appropriate policies and legislation to achieve a secure and sustainable supply of energy, as well as ensure an optimum utilization of energy and mineral resources in line with international best practices. MEMR works in close partnership with the Energy and Minerals Regulatory Commission (EMRC) to ensure alignment of incentives, enforcement of laws and policies related to energy production and consumption in Jordan. It also works closely with energy producers, distributors, and other key institutions to ensure access to energy for all in Jordan. Other key partners who support the energy sector include:

Key stakeholders:

- EDAMA (local Non-Governmental Organization (NGO) and business association)
- Electricity Distribution Company (EDCO)
- Energy and Minerals Regulatory Commission (EMRC)
- Irbid District Electricity Company (IDECO)
- Jordan Chamber of Commerce (JCC)
- Jordan Chamber of Industry (JCI)
- Jordan Electric Power Company (JEPCO)
- Jordan Engineers Association (JEA)
- Jordan Green Building Council (JGBC)
- Jordan Renewable Energy and Energy Efficiency Fund (JREEEF)
- Jordan Standards and Metrology Organization (JSMO)
- Ministry of Environment (MoEnv)
- Ministry of Industry, Trade and Supply (MITS)
- Ministry of Local Administration (MOLA)
- Ministry of Public Works and Housing (MPWH)
- Ministry of Transport (MoT)
- Ministry of Water and Irrigation (MWI)
- National Electric Power Company (NEPCO)
- National Energy Research Center (NERC)

Key Sector Donors and Development Partners:

- Bank aus Verantwortung (KfW)
- European Bank for Reconstruction and Development (EBRD)
- European Investment Bank (EIB)
- European Union (EU)
- International Finance Cooperation (IFC)
- Jordan Green Building Council
- United Nations Development Programme (UNDP)
- United States Agency for International Development (USAID)
- World Bank (WB)

3. Energy Sector Sub-Objectives and Action Selection

3.1 Energy Sector Green Growth Sub-Objectives

Jordan's green growth transformation is largely dependent on the country's ability to successfully service its energy sector debt, and leverage clean RE investments into growth and employment opportunities. This vision is well-documented in various national plans and strategies, including the Jordan Vision 2025, the Jordan Economic Growth Plan 2018-2022, and the forthcoming Energy Sector Master Strategy.

Further operationalizing the five national green growth objectives described in Chapter 1 and assessed in Chapter 2, energy sector sub-objectives for each national objective were determined. These sub-objectives serve as a green growth agenda for the energy sector agenda, which can be continually developed by national stakeholders.

Close coordination and collaborations with MEMR and MoEnv ensured alignment with sector priorities as laid out in the NREAP, NEEAP, and the forthcoming sector strategy, as well as in other major national plans. Special emphasis was also given to establishing linkages with the country's cross-cutting environment and socio-economic strategies and plans. Where specific green growth concepts were not prominently mainstreamed into policies and strategies, global green growth best practices were incorporated into the objective and action levels.

The five national green growth objectives are translated into 16 sector sub-objectives for Jordan's energy sector, as detailed in Table 3.

TABLE 3
Energy Sector Green Growth Sub-Objectives

National Green Growth Objective	Energy Sector Green Growth Sub-Objectives
Enhanced Natural Capital	a. Limit air pollution from fossil fuel use; b. Reduce impact on natural resources from energy and minerals exploration and production, including water.
Sustainable Economic Growth	a. Reduce the country's reliance on fossil fuel imports; b. Increase the affordability of energy for industrial and commercial consumers; c. Support the reduction of energy sector-based public debt; d. Increase competition and strengthen regulation of the electricity market; e. Enhance innovation and technical capacities in the energy sector.
Social Development and Poverty Reduction	a. Improve the affordability of clean energy for low-income communities; b. Maintain access to reliable, affordable and sustainable energy for all; c. Increase opportunity for employment in the energy sector, especially for women and youth; d. Enable refugees and host communities to access adequate, affordable and secure energy supply.
Resource Efficiency	a. Increase use of waste to energy approaches to produce energy (biofuels and electricity generation); b. Reduce energy network losses and improve energy management in utilities; c. Increase the efficiency of energy use (including electricity and fuels).
Climate Change Adaptation and Mitigation	a. Decrease total consumption of energy from fossil fuel resources; b. Decrease total GHG emissions from energy sector activities.

Climate Action Priority. Climate action – policies and investments which lead to climate change adaptation and mitigation – are key priorities for the Government of Jordan. Actions which are noted to contribute to the strategic objective of Climate Change Adaptation and Mitigation represent sectoral priorities that can also be found in the NDC Action Plan and/or the ***National Adaptation Plan***[52]. These documents, along with the GG-NAP, guide the MoEnv in planning and implementing its international climate change commitments, for which it aims to achieve 14% overall GHG emissions reductions by 2030, including 1.5% unconditional reduction against the baseline, with a 12.5% additional reduction target being conditional upon receiving financial and technical support from international donors and development partners.


بسم الله الرحمن الرحيم

Hashemite Kingdom of Jordan
Intended Nationally Determined Contribution (INDC)[1]

Jordan's INDC Summary

Jordan nationally determines to reduce its greenhouse gas emissions by a bulk of 14 % until 2030. This contribution of GHGs reduction will be unconditionally fulfilled at, maximally, 1.5 % by the Country's own means compared to a business as usual scenario level.

However, Jordan, conditionally and subject to availability of international financial aid and support to means of implementation, commits to reduce its GHGs emissions by additional, at least, 12.5 % by 2030.

The outcome targets above are accompanied by a diverse combination of numerous GHGs cut-oriented actions in all involved sectors of emissions in addition to the adaptation actions in targeted sectors. These actions (policies, strategies, legislations, measures, etc) are articulated in this document. The methodological approaches underlying Jordan's INDC are included in this communication as well.

Jordan's Nationally Determined Contribution

14% | GHG emissions reduction by 2030

1.5% unconditional 12.5% conditional

[52] These priorities have been developed for MoEnv with the support of NDC Partnership and GIZ programs in Jordan.

3.2 Translating Green Growth Priorities into Actions

Taking into account the priorities of stakeholders, the gap analysis performed, and the strategic planning exercises conducted, the MoEnv, MEMR and the Global Green Growth Institute (GGGI) identified and validated a prioritized list of investments and enabling actions. Ideas were solicited through an open call for ideas with key government and non-government stakeholders. Action proposals were received and reviewed using a multi-level screening tool from which priority interventions (policies, programs, and investments) were selected and presented at a national preliminary validation workshop in December 2018. The findings of this workshop revealed the preference by stakeholders to prioritize those with:

- Strong links to national green growth objectives;
- High levels of innovation or novelty in concept;
- Likelihood to attract private sector investment or develop the private market.

Bilateral and small-group consultations were conducted through 2019 to prioritize and formulate the actions proposed by sector stakeholders. This process included the assessment of feasibility, risks and alignment with government priorities as per the feedback received in 2018, which improved the depth of analysis, input from private sector actors and local technical experts. The zero draft of the action plan was reviewed by an ad-hoc Energy Sector Green Growth Review Committee, hosted by the MEMR. Endorsement was received by sector leadership in the MEMR, and approval was received by the Cabinet of Ministers in early 2020.

For the purpose of this action plan, actions are presented in three ways: as enabling actions, as an investment, and as a combination of the two.

- ***Enabling Actions.*** These are considered to be any actions that will enable stakeholders (government and/or others) to be more prepared for future green growth policy or investment implementation. They are policy, strategy, research, and capacity building-oriented in nature. They can be implemented through a mixture of donor and government support. Donors would typically support implementation on a grant basis through technical assistance funds. Each action description contains the detailed rationale and strategic orientation which will allow Action Leads to develop funding proposals for these actions as priority green growth programs.

- ***Investment Actions.*** These are priority investment projects that support the achievement of national green growth objectives. Investments must be proven feasible from a technical, financial, and environmental standpoint. As such, they require proof of concept, a business model showing that an attractive return on investment (ROI) is possible.

For enabling actions that do not lead to an investment, the estimated budget and status of financing are noted in the action description in Chapter 5 of the action plan. In these cases, the "No" box is checked under the "Action Leads to Investment" section of the action description. It is important to note that some technical assistance actions may lead to investment. However, for the purposes of this action plan, all actions that do not include feasibility analysis for a specific project or investment are assumed to not lead to an investment.

Estimated Budget for this Action	
Financing Secured	☐ Yes ☐ No
Potential Source of Funding	
Action Leads to Investment	☐ Yes ☐ No ☐ This action is an Investment opportunity
Estimated Investment Size	

For many green growth investments, limited feasibility analysis is available. In these cases, the action includes the development of the required analysis (feasibility studies, technical assistance, etc.) directly related to a potential or known investment opportunity. The "Estimated Budget for this Action" is noted in the action description, and the "Yes" box is checked in the "Action Leads to Investment." In the case of investment opportunities that have feasibility analysis completed and are considered ready for investment, the box "This action is an investment opportunity" is checked. In both cases an estimated budget for the implementation of the project/investment is given, based on the available information (such as a feasibility study, consultation with project designers, or best estimation). Table 4 shows the types of actions found in the GG-NAP 2021-2025.

TABLE 4
Types of actions found in the GG-NAP 2021-2025

Action Type	Description of Activities to be Implemented
Enabling Action	**Any action that will enable stakeholders** (government and/or others) to be more prepared for future green growth policy or investment implementation. Activities, outputs, and milestones might include: ▪ Policy analysis, recommendations, and reform ▪ Capacity building programs, public campaigns that increase awareness among a set of key stakeholders ▪ Knowledge exchange and learning ▪ Reforms to processes, procedures, and institutional setup ▪ Technical studies and analysis
Investments	**Any action that will lead to investment in a specific project** that will support the achievement of one or more of the sector green growth sub-objectives. **For demonstration or pilot projects**, activities, outputs, and milestones might include: ▪ Investment analysis and preparation activities ▪ Clarify the proof of concept (technical and financial aspects) of implementation of green growth projects ▪ Reform of specific policies or regulations required to attract investment ▪ Develop service models and business plans ▪ Inform replication or scale up **Investment-ready projects** are considered ready for implementation between 2021 and 2025 based on available feasibility analysis.

Action Priority Level. Actions that were considered low priority for green growth were not included in the action plan, and action descriptions were not developed. From the numerous ideas received, a limited number of detailed action descriptions were prepared and assessed according to the criteria below. Sector review committees and green growth focal points at the relevant line ministries were asked to evaluate and validate the level of priority, and this is noted in each action form. Table 5 shows the prioritization criteria for GG-NAP 2021-2025.

TABLE 5
Prioritization criteria for GG-NAP 2021-2025

Priority Level	Description
Low	Low-priority actions are those which do not meet the adjusted criteria after the Preliminary Validation Workshop, meaning they: ▪ Lack clear and substantial links to national green growth objectives ▪ Lack innovation and do not demonstrate added value to existing sector objectives, as outlined in national/sectoral policy documents ▪ Cannot be reasonably implemented given the available resources or capacity at the sector level in the 2021-2025 period ***Low-priority actions have not been included in this action plan.***
Medium	Action which: ▪ Positively contributes to at least one of the national green growth objectives and sector sub-objectives ▪ Adds value to existing sector objectives (as outlined in national/sectoral policy documents)
High	Action which meets all the "Medium" criteria, plus: ▪ Encourages changes to the prevailing 'business as usual', triggering long-term, sustainable green growth transformation ▪ Impacts a large geographical area or segment of the population
Very High	Action which meets all the "High" criteria, plus: ▪ Considered a key milestone for future implementation of green growth actions, i.e., enabling actions that lead to improved and quantifiable green growth policies and investments ▪ Has strong private sector orientation, interest and/or ownership ▪ Resources have been identified for implementation (public, private, donor)

4. Implementation Arrangements

4.1 Action Implementation

Green Growth Implementation Principles. Successful implementation of this plan will require sector-level policy and institutional reform measures. The goal of these measures is to achieve:

- Greater strategic alignment and coherence among existing plans and strategies;
- Improved coordination between government institutions and stakeholders;
- More meaningful and frequent engagement of private sector, NGOs and other non-government actors;
- Stronger investment and strategic planning systems and processes, leading to stronger return on investments made in national development and economic growth;
- Technical capacity development within government institutions.

Roles and Responsibilities. Green growth is a unique development approach that will require a high level of collaboration between national stakeholders, which has been called out as both a key challenge and opportunity in the NGGP. MEMR is the leading institution responsible for overseeing the implementation of all policies and strategies for the energy sector, but many of the actions in this action plan require joint preparation and implementation across institutions, stakeholders, and sectors. The private sector, civil society actors, and government agencies – such as the GAM, MPWH, municipal authorities, and many more – are included as action implementation leads and support. Donors, development agencies, and local NGOs are needed to provide financial support, technical expertise, and knowledge of local needs and context.

Table 6 shows the roles and responsibilities of various stakeholders for green growth implementation in Jordan.

TABLE 6
Roles and Responsibilities of Various Stakeholders for Green Growth Implementation in Jordan

Stakeholder	Roles and Responsibilities
Action Lead	▪ Ensuring the action is successfully implemented within the planned time frame. This may include additional preparatory actions such as further consultations, resource mobilization (identifying potential donors, writing funding proposals, preparing project documents), coordinating stakeholders, and facilitating implementation (disbursing funding, etc.). ▪ Provide progress status reports as needed to the relevant focal ministry for monitoring and evaluation (M&E) purposes. ▪ For investments, the Action Lead is the project owner.
Action Support	▪ Support the Action Lead by providing technical feedback, in-kind or financial support, drafting and ideation support, and other collaborations during all phases of action planning and implementation.
Sector Green Growth Focal Points at the MEMR	Action Implementation ▪ Serve as focal point for communications and reporting on sector action plan implementation progress ▪ Support action implementation by supporting Action Leads with resource mobilization, coordination, data collection, etc. ▪ Ensure the policy/regulatory environment supports action implementation (with donor support if required). Mainstreaming ▪ Support mainstreaming activities and approaches that support green growth implementation into sector-level policies and investments. ▪ Serve as technical advisor to line ministry leadership on an ad-hoc basis (especially Secretary General sitting on the Higher Steering Committee for Green Growth). ▪ Facilitate partnerships with private sector and civil society institutions to support green growth planning and implementation. Monitoring/Reporting ▪ Provide quarterly status updates on the implementation of the action plan to MoEnv, Green Economy Unit (noting any challenges and requesting any needed support).
Ministry of Environment (MoEnv)	Green Economy Unit ▪ Work closely with Action Leads to provide policy analysis (undertaking policy review, cost-benefit analysis, supporting pre-feasibility analysis, conducting consultations to change policies or regulation) as needed to support implementation. ▪ Guide Jordan's green growth planning and implementation activities and facilitating collaboration amongst all stakeholders. ▪ Support line ministries with cross-sector coordination to support project design and implementation. Technical Units ▪ Multiple directorates working on cross-cutting green growth agendas (climate change, biodiversity and natural resources, and waste regulation) support line ministries with cross-sector coordination to support project design and implementation. Policies Unit ▪ Support with resource mobilization and partnerships. Higher Steering Committee for Green Economy (composed of Secretaries-General of each of the key line ministries) ▪ Responsible for reviewing and approving a results report on a bi-annual basis, and for submitting this to the Prime Ministry. Green Growth Technical Committee (composed of technical level focal points) ▪ Responsible for supporting action plan preparation and for reviewing and addressing implementation gaps and challenges on an ad hoc basis.

Stakeholder	Roles and Responsibilities
Ministry of Planning and International Cooperation (MOPIC)	**Evaluation and Institutional Development Unit** ▪ Reporting against the Jordan Vision 2025 and annual Executive Development Programs, economic growth and investment planning, and sustainable development planning. ▪ Ensure mainstreaming of green growth into the next national development plan (post-2025) and other cross-cutting national plans (Jordan Response Plan, Jordan Economic Growth Plan, etc.). **Directorate for International Cooperation** ▪ Coordinate with donors to link national priorities (projects and programs) with development assistance (grants, loans, public-private partnerships, etc.). **Department of Statistics (DOS)** ▪ Collect data to report against KPIs. **Higher National Committee for Sustainable Development** ▪ Provide guidance and follows up on all decisions, priorities and recommendations related to the 2030 Agenda.
Prime Ministry	**Public-Private Partnerships Unit** ▪ Determine which actions (or which components) are suitable and priority for developing public-private partnerships. Special emphasis is given to those investments that require strong government oversight, or where ability to generate revenues is weak in the initial payback period. ▪ Review and approve of implementation progress reports. **Progress Unit** ▪ Review and approve of progress reports against the Executive Development Plan and other national and sector-level plans, strategies, and projects.
Ministry of Finance (MoF)	▪ Determine what level of contribution the government can make to action implementation at the sector level.
Jordan Investment Commission	▪ Coordinate with the line ministries to develop relevant actions into investment proposals and promote the projects to potential foreign investors. ▪ Facilitate foreign direct investment to achieve green growth implementation.
NGOs	▪ Support future action formulation by providing local context and technical expertise as needed. ▪ May be responsible for implementing actions in coordination with government or private sector.
Private sector	**Private sector associations** ▪ Support the development of market assessments/analysis to formulate better business models or revenue models for investment actions. ▪ Participate in regular public-private dialogue to identify gaps in regulatory environment or other barriers to investment and suggest solutions. **Investors** ▪ Provide feedback on project proposals and potentially invest in actions by providing grants, loans, or equity finance.

Coordination. Weak coordination between stakeholders is a green growth implementation barrier affecting all sectors and threatening the sustainability of green growth interventions. This fact has been well-documented in the Jordan Vision 2025, the Jordan Economic Growth Plan 2018-2022, the National Green Growth Plan, and through the consultation process for the development of this plan. To encourage greater future coordination and collaboration between sectors and institutions (public and private) all stakeholders must commit to developing a culture of knowledge exchange, innovation, sharing and collaboration. The government can play a leading role on the establishment of this culture through:

- Consolidating governance bodies where overlap exists, removing duplicate committees or governance units for the same issues;
- Upholding the highest standards of transparency and knowledge exchange, committing to sharing information as needed and following standard procedure for policy and project development;
- Hosting regular, inclusive sector-level donor and development partner consultations, and more frequent public-private-civil society dialogues on key policies and investments;
- Conducting more public outreach and awareness of government successes and lessons learned.

Financing Implementation. An estimated budget for implementation of each action is included in each action description in Chapter 5. This estimate is considered a starting point for detailed action planning. In some cases, implementation can be achieved at a lower cost, while others can be bundled with other programs/initiatives. The specific components of these programs and projects will likely differ during implementation. Line ministries implementing sectoral action plans are responsible for identifying the financial resources required for green growth action implementation, including using public budget where available and with sector donors. As implementation facilitators, MoEnv and MOPIC will support identification of off-budget resources for implementation to support SDG achievement and NDC implementation.

Official development assistance and climate finance are two sources of international finance that can be applied to green growth implementation. While technical assistance programs and demonstration/ pilot projects may be easily financed by donors on a grant basis, investment in projects is a more resource intensive process. Infrastructure projects typically require substantial up-front costs, which tend to be financed with debt under long payback periods. Consequently, most of these investments will be owned either by the government or large institutional investors or a mixture of ownership through PPP. These will require cost-benefit-analysis and investment planning in advance of implementation. Project implementers will work directly with MoF to ensure that the necessary investment conditions can be reached.

Capacity building and Institutional Development. The mainstreaming of green growth planning and implementation at the sector level will require continuous learning through capacity building and institutional development. The green growth analysis, objectives, implementation actions and results framework can be strategically mainstreamed at the sector level during sectoral planning exercises. Continuous development of the concept and its ramifications on sectoral development is needed for technical- and management-level government staff. MoEnv will aim to play an increasing role in supporting capacity building and institutional development with its partner ministries in the area of green growth and climate change.

Monitoring and Evaluation. Several donor-funded actions are included in the action plan, each with specific logic models and corresponding performance indicators as part of standard donor requirements. These will refer to and align with the overall results framework for the GG-NAP. Whenever possible, common indicators will be used to increase alignment and reporting schedules will be synchronized with the GoJ's fiscal year. Ongoing monitoring of the performance of individual sector actions will be the responsibility of the line ministry for the sector, as below, in coordination with the identified action "owner". Sector leads and the appropriate Action Leads will communicate any issues uncovered as part of their ongoing performance monitoring with MoEnv's Green Economy Unit.

Implementation Tracking. Implementation will be tracked jointly by the Green Economy Unit at the MoEnv, the relevant monitoring focal point at the sector ministerial level, and the Evaluation and Institutional Development Unit at MOPIC. Key roles and responsibilities of all stakeholders responsible for pushing implementation are outlined below. Efforts will be taken within the first year to ensure sector-level commitment to implementation. MOPIC and MoEnv will work with action leads to ensure sufficient access to financial and technical assistance for implementation.

Communications. MoEnv will work to ensure effective communication across government institutions about the status of implementation of the GG-NAP. Projects that contribute to green growth will be entered into the Green Growth Tracking System developed by MoEnv,, and the Ministry commits to ensuring regular updates on implementation.

4.2 Future Planning and the next phase (post-2025)

Sectoral Planning. Sector decision makers at the relevant line ministry and the MoEnv will seek to continuously support green growth mainstreaming at the sector level. This means using the objectives outlined in the action plan to guide implementation of sectoral policies and investments. Further, MoEnv will work with MOPIC to continuously seek to find and feature green growth actions under implementation in Jordan. Many existing or future actions that do not appear in the GG-NAP can still be considered green growth actions, and their impacts will be accounted for in green growth reporting. Lessons learned from these projects and programs will be compiled and reflected into the design of future projects and programs.

Phase II Green Growth Action Planning. Action planning in the next phase will be less complex, given the experience of developing this first action plan. The preparations for this shall begin in the fourth quarter of 2024, with ample time for consultation and review of lessons learned in Phase I. The implementation period for Phase II is expected to be 2026-2030, and, as such, will be closely aligned with the Sustainable Development (2030) Agenda and the NDC. Green growth action planning for Phase II can also be aligned with the next long-term national development plan developed by MOPIC, the follow-up to the Jordan Vision 2025. For this process, MoEnv and MOPIC will work together to undertake consultations at the sector level, provide capacity building and strategic visioning workshops, and support green growth action ideation and formulation. Advance consultation with donors to the extent possible, and identification of public budget for green growth implementation, is needed.

5. Energy Sector Green Growth Actions 2021-2025

The following 12 priority actions have been identified for implementation in the 2021-2025 period. These interventions are estimated to cost USD 85,300,000, and include:

- **4 investment preparation and demonstration actions.** These projects are at various levels of readiness: some require feasibility analysis, while others are investment-ready. Many are suitable candidates for PPP or direct private sector investment, and others are opportunities to leverage climate finance.

- **8 enabling policy and institutional reform actions.** Given current gaps in available fiscal resources, these actions intend to attract investment by addressing policy barriers and capacity gaps that lead to higher costs, risk levels or uncertainty in decision making. These include programs to support innovation, institutional reform and coordination.

Implementation of these actions will contribute to the Energy Sector Green Growth Sub-Objective as well as in:

- Supporting Jordan's objectives to achieve a cleaner energy mix through RE and a reduction in national GHG emissions of 14%[53].
- Promoting the revitalization of the energy services market and the pursuit of energy sector innovation as a driver of future economic growth and employment.
- Increasing the readiness of key national institutions to attract climate finance.
- Emphasizing the importance of achieving EE through green building and construction, electric transport, and appliances.

Table 7 shows the energy sector green growth actions and can be used by action owners to begin project proposal formulation for the purpose of mobilizing public budget or external grants, loans or other financial support for implementation. It is understood that detailed implementation approach, outputs, timeline, budget, and stakeholders may change depending on the source of finance during the process of implementation.

[53] 1.5% unconditional, 12.5% conditional reductions according to the NDC.

TABLE 7
Energy Sector Green Growth Actions 2021-2025

#	Action Title	Page #	Total Estimated Implementation Cost (USD)	Relevant Green Growth Objectives				
				Enhanced Natural Capital	Sustainable Economic Growth	Social Development and Poverty Reduction	Resource Efficiency	Climate change Mitigation and Adaptation
EN01	improve Energy Demand Management through Development of a Smart Electricity Grid	27	3,500,000		x		x	x
EN02	Develop Industrial Renewable Energy Roadmap and Investment Plan	29	1,000,000		x			x
EN03	Improve the market for green building and cosnstruction services	31	1,000,000		x	x	x	x
EN04	Develop and implement a National Green Strategy and Action Plan	33	3,000,000		x		x	x
EN05	Conduct Energy Retrofits for Public Buildings	35	1,500,000		x		x	x
EN06	Implement Electric Vehicle Charging Stations and Service Provision in Greater Amman Municipality through a pUBLIC-private Partnership	37	16,300,000	x	x			x
EN07	Develop a Behavior Change Campaign and Financial Mechanism to Increase Use of Energy Efficient Appliances in Jordan	39	9,000,000			x	x	x
EN08	Develop and implement a National Energy Storage Action Plan and Investment Pipeline	41	10,000,000		x		x	x
EN09	Increase a Public Investment Energey Sector Research and Development	43	15,000,000		x	x		
EN10	Achieve GCF Accreditation for the Jordan Renewable Energy and Energy Efficiency Fund (JREEEF)	45	1,000,000		x	x	x	x
EN11	Improve the Enabling Environment and Capacity Development Support for the Growth of the Energy Services (ESCO) Market	47	1,000,000		x	x	x	x
EN12	Implement the Energy Sector Monitoring, Reporting and Verafication (MRV) System	49	3,000,000		x			x

EN01 | Improve Energy Demand Management through Development of a Smart Electricity Grid

Description
Implementation of RE projects of 1MW or higher has been temporarily halted until the financial situation of the National Electric Power Company has improved, and until the physical electricity grid is ready to absorb the additional production that large-scale renewables expansion will bring. As this situation develops, NEPCO and the EMRC are working closely with the EBRD on studying the potential scenarios and technologies to upgrade the grid to make smarter energy supply and management decisions. This will include the installation of various smart metering technologies and other physical infrastructure upgrades. **The purpose of this action is to prepare the necessary technical assistance (planning, capacity building, and training) to national energy and electricity sector stakeholders, in order to effectively implement smart upgrades to Jordan's electricity grid.** This action would complement the planned infrastructure investments and debt restructuring interventions already underway with the EBRD and World Bank, in collaboration with NEPCO and the EMRC. In particular, this action would prepare NEPCO and EMRC to jointly lead a national transition towards smart grid development, and to engage with electricity consumers at all levels (residential, industrial, and commercial sectors) on the future of energy management in Jordan and the implications on their energy use. This action will result in both electricity consumers' and NEPCO's improved understanding of smart energy technologies and applications, allowing them to adapt their energy management approaches in support of Jordan's energy objectives. This action constitutes the undertaking of three assessment studies, development and delivery of training, development and implementation of a stakeholder communication and outreach plan over a period of three years, as well as an evaluation of the efficiency and effectiveness of the outreach and communication plan's implementation.

Action Objectives	▪ To enhance the capacity of national energy and electricity sector stakeholders to effectively implement smart upgrades to Jordan's electricity grid. ▪ To improve the capacity of NEPCO and EMRC to jointly lead a national transition towards smart grid development, and to engage with electricity consumers at all levels on the future of energy management in Jordan and the implications on their energy use. ▪ To enhance stakeholders' understanding and appreciation of the value for sector transition into smart electricity grid, service market development opportunities, policy changes needed, and the economic, environmental, and social impacts from the transition.
Implementation Milestones	▪ **One training and awareness raising needs assessment study** conducted following participatory approaches. ▪ **One training and capacity** development plan for NEPCO and EMRC on the topic of smart grid development and energy management approaches. ▪ **One assessment report on the economic, environmental, and social impacts** of the transition towards a smarter electricity grid and management system, identifying the technical challenges and opportunities for distribution companies, government (especially in terms of fiscal impacts), energy service companies (ESCOs) and end-users for this transition. ▪ **One assessment report on the energy services market development opportunities**, detailing the policy changes needed to incentivize the creation of local businesses that can support smarter energy management in Jordan. ▪ **Stakeholder communication and outreach plan** for large and small-scale users (industrial, residential, commercial, public/government, etc.) and across key sectors (e.g. transport, water, etc.), aimed at increasing awareness about energy savings and efficiency opportunities under the planned smart grid and automation upgrades in the coming years. ▪ **Evaluation report on the implementation of the stakeholder communication and outreach plan.** ▪ **Action Plan for the smart meters' substitution.**

Relevant Green Growth Objectives	▪ **Sustainable Economic Growth:** Enhance innovation and technical capacities in the energy sector; Support the reduction of energy sector-based public debt. ▪ **Resource Efficiency:** Reduce energy network losses and improve energy management in utilities; Increase the efficiency of energy use (including electricity and fuels). ▪ **Climate Change Adaptation and Mitigation:** Decrease total GHG emissions from energy sector activities.

Estimated Implementation Period	
Start Year – 2021	*End Year* – 2023

Location(s)	National	**Other key partners**	EBRD, World Bank, EU
Implementing Stakeholders	*Lead* EMRC *Support* MEMR, NEPCO, Electricity distribution companies	**Estimated Budget for this Action**	USD 3,500,000

Financing Secured	☐ Yes ■ No	**Potential Source of Funding**	To be determined (TBD) in the validation phase
Action leads to investment	☐ Yes ■ No ☐ This action is an Investment opportunity	**Estimated Investment Size**	-

Level of Priority			Readiness for Implementation				
Very High	High	Medium	1	2	3	4	5

▪ Technical assistance and investment preparation activities are ongoing as part of the EBRD loan for NEPCO restructuring.

Implementation Risk Mitigation Measures	▪ Strong and effective communication and collaboration is needed. Therefore, this action includes the development and implementation of a communication and outreach plan. ▪ The action is advised to establish partnerships with national mass media and active social media players to implement the outreach program. Collaboration also needs to be established and maintained with related sector leading organizations, including the Ministry of Trade and Industry, Ministry of Tourism and Antiquities, municipalities, Chambers of Commerce and Industry, etc. This will enhance the overall reach of the awareness messages to a wider spectrum of the Jordanian community.

EN02 | Develop Industrial Renewable Energy Roadmap and Investment Plan

Description
Consuming 17% of total energy and 24% of electricity, Jordan's industrial sector is a critical component of the country's economic growth and will play an important role in the development of the green economy.[54] In 2015, the Jordan Chamber of Industry (JCI) established an Energy and Environmental Sustainability Unit to help ensure that industrial actors are able to effectively support Jordan's energy transition. The unit advocates for energy sector interventions that can reduce the price and increase the sustainability of energy supply for industrial application. Electricity costs can represent a substantial portion of overall operating costs for some industrial sub-sectors. As of 2019, the Ministry of Energy and Mineral Resources and JREEEF has worked with over 60 factories to develop energy rationalization plans, aimed at improving EE. However, currently 66% of energy costs for industry are related to the production of heat, for which RE can be a viable power supply option. Concentrated solar power (CSP) is one technology that has continued to drop in price[55] as R&D has globally improved and could be a viable option for Jordan's industrial sector. **The purpose of this action is to identify a pipeline of industrial sector RE projects that can help deliver on both industrial energy rationalization plans and Jordan's overall RE generation targets for 2025 and beyond.** This action will support the identification of priority projects, timelines, and targets, as well as the undertaking of necessary pre-feasibility and feasibility analysis for a small number of priority projects to promote the industrial use of RE. In addition, the program will address the necessary policy, and R&D-related activities will be elaborated, including a program to explore the potential for CSP solutions for industrial applications. This action will be implemented in partnership with the private sector, government, and research/civil society institutions.

Action Objectives	▪ Improve the readiness of industrial actors to implement RE projects. ▪ Support planning and prioritization of RE projects for government. ▪ Enhance innovation in the area of thermal energy generation for industrial application in Jordan. ▪ Increase evidence-based decision making by public and private electricity sector stakeholders to support the adoption of CSP. ▪ Stimulate industrial sector investments in RE projects that can help deliver on both industrial energy rationalization plans and Jordan's overall RE generation targets for 2025 and beyond. ▪ Stimulate industrial sector contribution to achieving Jordan's overall renewable energy generation targets for 2025 and beyond.
Implementation Milestones	▪ **One stakeholder's analysis study** conducted and reported on. This study should identify and prioritize stakeholders to be partnered with, and should suggest the communication and outreach requirements and frameworks for each. ▪ **Partnerships established** between industrial actors, local R&D institutions, and government to jointly develop the action plan. ▪ **Necessary assessment studies to identify the renewable energy deployment potential** in the industry sector, explore usages for RE in addition to electricity generation, such as producing heat for industries. ▪ **A pipeline of renewable energy investment projects (mainly CSP)** with full concept note and pre-feasibility assessment for at least 20 new projects, and full-feasibility assessment for at least 5 high priority projects selected based on the outcomes from the pre-feasibility stage. ▪ **A research and development (R&D) agenda** to explore the opportunities and challenges associated with industrial energy use, including but not limited to CSP, for generating thermal energy for industrial application. This agenda will also identify policy aspects related to the exploration and implementation of the potential for CSP solutions for industrial applications. ▪ **Industrial Renewable Energy Roadmap and Investment Plan.** This road map should clearly discuss the arrangements for the implementation of the identified/prioritized investment projects, and for the implementation of the R&D agenda.

[54] JCI. "Overview of the Potential for Renewable Energy in the Industrial Sector in Jordan," 2018.
[55] IRENA. "Renewable Power Generation Costs in 2018," 2018.

Relevant Green Growth Objectives	▪ **Sustainable Economic Growth:** Reduce the country's reliance on fossil fuel imports; Increase the affordability of energy for industrial and commercial consumers. ▪ **Climate Change Adaptation and Mitigation:** Decrease total consumption of energy from fossil fuel resources; Decrease total GHG emissions from energy sector activities.

Estimated Implementation Period	
Start Year — 2021	*End Year* — 2022

Location(s)	-	**Other key partners**	Ministry of Industry and Trade, GAM, Aqaba Special Economic Zone Authority (ASEZA), concerned development and donor agencies
Implementing Stakeholders	*Lead* Ministry of Energy and Mineral Resources (MEMR) *Support* JCI, NEPCO, NERC	**Estimated Budget for this Action**	USD 1,000,000

Financing Secured	☐ Yes ■ No	**Potential Source of Funding**	To be determined (TBD)
Action leads to investment	■ Yes ☐ No ☐ This action is an Investment opportunity	**Estimated Investment Size**	TBD during action implementation, in light of the findings from the assessment pre-feasibility analysis studies

Level of Priority			**Readiness for Implementation**				
Very High	High	Medium	1	2	3	4	5

▪ The World Bank has begun working on a feasibility analysis for CSP in the Jordan context.

EN03 | Improve the market for green building and construction services

Description
This action aims to provide technical assistance to municipal governments in the project's location, with the support of MPWH, the Jordan Engineer's Association, and private sector construction and engineering companies, to better understand and further develop the green construction services market in Jordan. A feasibility analysis will be undertaken to identify locations for greener buildings, and construction of new green buildings. Additionally, retrofitting activities will be carried out according to Jordan's green building code and the recommendations from the JGBC for improving EE in the residential sector. The result will be an increase in the total number of green buildings in Jordan, and a detailed post-implementation analysis as well as recommendations on how to further replicate and scale up green residential buildings across Jordan.

Action Objectives	▪ Increase the awareness of key related stakeholders about the environmental and economic values of green construction, and the need to further develop the green construction services market in Jordan. ▪ Enhance and streamline the capacity of related stakeholders to plan for and develop green affordable housing across Jordan. ▪ Improve the understanding about the feasibility, investment needed and impacts from the implementation of projects to increase the total number of green affordable housing in Jordan. ▪ Stimulate residential investments, in particular affordable housing investments, by adopting and implementing green building codes and measures needed to rationalize the consumption of resources and to promote more effective energy and water conservation. ▪ Reduce energy consumption by the residential sector through the adoption of green building codes, and through the mitigation of the sector's contribution to climate change.

Implementation Milestones	▪ **One stakeholders' training needs study** conducted and reported on. This study should identify and prioritize stakeholders to be partnered with, as well as the needed framework for capacity building and technical assistance.
	▪ **Stakeholders' understanding of the value of green buildings, and their capacity to further develop the green construction services market in Jordan** through:
	  ▪ The implementation of training events, and publishing educational materials and modules on a dedicated website, to enhance stakeholders' capacity. This includes training on Jordan's green building code and the recommendations from the JGBC for improving EE in the residential sector.
	  ▪ The provision of technical assistance delivered through on-job mentoring and technical advice services for a period of two years.
	  ▪ The provision of technical assistance for participatory development of the road map and agenda mentioned below.
	▪ **One feasibility analysis study and Strategic Environmental Assessment** for the construction of new green buildings, and for renovating all unsold affordable housing buildings to meet green housing codes. This should include sites' selection, planning and prioritization for the scale-up of green affordable housing, and construction of new green buildings or retrofitting activities.
	▪ **One road map and agenda to:**
	  ▪ Provide detailed post-implementation analysis and recommendations for how to further replicate and scale up green residential buildings across Jordan.
	  ▪ Mainstream Jordan's green building code and the recommendations from the JGBC for improving EE in the residential sector.

Relevant Green Growth Objectives	▪ **Sustainable Economic Growth:** Enhance innovation and technical capacities in the energy sector. ▪ **Social Development and Poverty Reduction:** Maintain access to reliable, affordable, and sustainable energy for all. ▪ **Resource Efficiency:** Increase the efficiency of energy use (including electricity and fuels). ▪ **Climate Change Adaptation and Mitigation:** Decrease total GHG emissions from energy sector activities.

Estimated Implementation Period	
Start Year — 2021	*End Year* — 2022

Location(s)	Nationwide	**Other key partners**	International development organizations, donors, commercial banks, United Nations (UN) Habitat
Implementing Stakeholders	*Lead* MEMR, MPWH, Royal Scientific Society (RSS) *Support* JEA, ASEZA, GAM, MOLA	**Estimated Budget for this Action**	USD 1,000,000

Financing Secured	☐ Yes ■ No	**Potential Source of Funding**	To be determined (TBD) in the validation phase
Action leads to investment	☐ Yes ■ No ☐ This action is an Investment opportunity	**Estimated Investment Size**	-

Level of Priority			**Readiness for Implementation**				
Very High	High	Medium	1	2	3	4	5

▪ Two pilot projects have been implemented and lessons learned can be gathered from implementers (JGBC and UN Habitat) for ease of replication.

EN04 | Develop and Implement a National Green Building Strategy and Action Plan

Description
The purpose of this action is to improve the existing policy, regulatory and strategic framework for green buildings in Jordan by establishing a National Green Building Strategy and Action Plan. Through this action, stakeholders at MPWH (host of the National Building Council), the MEMR, municipal governments such as GAM and the MoEnv, will work with the construction and engineering private sector stakeholders to map out a pathway to achieve a step-increase in the implementation of green buildings. The result of this action would be a well-coordinated and clearly articulated national green building strategy with timelines, targets, clarified roles, and responsibilities and projects for implementation up to 2030. The strategy and action plan would build on NEEAP, covering projects and policies to be implemented in order to increase the scale up of green building construction in the public, residential, commercial, and industrial buildings sectors. Public-private dialogue and the establishment of a national multi-stakeholder coordination mechanism will support successful implementation, and ensure the achievement of economic co-benefits (such as employment and SME development).

Action Objectives	▪ Improve the enabling environment for green growth and EE in the building/ construction sector. ▪ Increase the awareness of key related stakeholders about the environmental and economic values of green construction and green buildings, and the need to further develop the green construction services market in Jordan. ▪ Enhance and streamline the capacity of related stakeholders to plan for and develop green buildings across Jordan.

Implementation Milestones	▪ **Identify and assess policy, regulatory and strategic improvement measures** to integrate NEEAP with the proposed strategy.
	▪ **National-level coordination committee established to:**
	  ▪ Facilitate and improve coordination and collaboration across all organizations concerned with green buildings.
	  ▪ Map out a pathway to achieve a step-increase in the implementation of green buildings.
	  ▪ Lead the development of the National Green Building Strategy and Action Plan, and facilitate all-inclusive stakeholders' participation in strategy formulation.
	▪ **National Green Building Strategy and Action Plan.** Building on national lessons learned and regional and global best practice, MPWH will lead the development of a national strategy and action plan aimed at reducing the energy consumption and GHG emissions profile of the buildings sector in Jordan. This will be closely linked to energy-sector targets, as laid out in the Amman Climate Action Plan, as well as various national Sustainable Energy, Climate Action Plans, and the Energy Master Strategy. The strategy will identify policy changes and investments required for successful implementation, which will be developed in partnership with local materials production facilities, construction companies, and engineering associations through multi-stakeholder consultation processes. This should include a number of incentives to be established in order to promote the development of a green building and green construction materials market. Employment and SME development opportunities should also be considered in the action plan.
	▪ **Pipeline of projects and policies to be implemented to increase the scale of green building construction** in the public, residential, commercial, and industrial buildings sectors. These include a set of incentives to motivate investments in green buildings, such as the implementation of at least the policy projects during the Action implementation duration.

Relevant Green Growth Objectives	▪ **Sustainable Economic Growth:** Enhance innovation and technical capacities in the energy sector. ▪ **Resource Efficiency:** Increase the efficiency of energy use (including electricity and fuels). ▪ **Climate Change Adaptation and Mitigation:** Decrease total GHG emissions from energy sector activities.

Estimated Implementation Period	
Start Year — 2021	***End Year*** — 2022

Location(s)	National, TBD	**Other key partners**	EU, USAID, DfID, private sector construction companies
Implementing Stakeholders	***Lead*** MPWH, MEMR, MoEnv, Municipalities ***Support*** JGBC, JEA	**Estimated Budget for this Action**	USD 3,000,000

Financing Secured	☐ Yes ■ No	**Potential Source of Funding**	To be determined (TBD)
Action leads to investment	☐ Yes ■ No ☐ This action is an Investment opportunity	**Estimated Investment Size**	-

Level of Priority			**Readiness for Implementation**				
Very High	High	Medium	1	2	3	4	5

▪ A basic understanding exists of the scale of interventions necessary, with several national pilots having been conducted. Additional analysis and strategic decision-making are needed.

Implementation Risk Mitigation Measures	▪ Establishment of the national coordination committee is critical to ensuring implementation, which can be facilitated by the MoEnv. ▪ Public-private dialogue, especially with the local residential and commercial buildings construction industry, will likely be necessary for success.

EN05 | Conduct Energy Efficiency Retrofits for Public Buildings

Description
The purpose of this action is to implement a number of EE upgrades in public buildings in Jordan based on the current priorities of MPWH, which is the ministry responsible for the management of public buildings across the country. The action will build on the approach and successes experienced under the MINARET project implemented by RSS/NERC, which is expected to achieve an estimated energy savings of 800 MWh per year, and an estimated JD 160,000 per year. These retrofits will include several interventions to improve the EE of the lighting, heating and cooling, insulation, and appliances used in selected public buildings. The results of this action will be a reduction of energy consumption in selected public buildings, a provision of support to the implementation of NEEAP, and a reduction of the cost of maintenance of buildings, further decreasing the cost burden on the public budget.

Action Objectives	▪ Implement a number of EE upgrades in public buildings in Jordan. ▪ Decrease the cost burden from the energy operation as well as the maintenance costs of selected public buildings on the public budget. ▪ Support the implementation of NEEAP regarding the EE and operation and maintenance costs.
Implementation Milestones	▪ **One review report on the evaluation of EE of public buildings across Jordan, validating the** current priorities identified by the MoPWH. This review should also include documentation and cost analysis. ▪ **Detailed plan for the undertaking of EE upgrades** in selected priority public buildings, including detailed budgets and estimated energy savings from such upgrades. ▪ **EE upgrades of the selected priority public buildings completed and handed over** to the respective owners. This can include, but is not limited to, thermal retrofitting, installation of energy efficient lighting and appliances, smart energy metering, and others. ▪ **Conduction of an awareness and behavior change program** for users of the retrofitted buildings, including training on improved energy consumption behavior in public buildings. ▪ **Two annual energy audits to assess project achievements.** ▪ **A roadmap and detailed budget created for scaling up the implementation of EE upgrades to all public buildings over a period of five years.** This will include a business model with a well-defined payback period and an energy/cost savings analysis that can be published for public use.
Relevant Green Growth Objectives	▪ **Sustainable Economic Growth:** Support the reduction of energy sector-based public debt. ▪ **Resource Efficiency:** Increase the efficiency of energy use (including electricity and fuels). ▪ **Climate Change Adaptation and Mitigation:** Decrease total GHG emissions from energy sector activities.

Estimated Implementation Period	
Start Year — 2021	*End Year* — 2023

Location(s)	National	**Other key partners**	KfW
Implementing Stakeholders	***Lead*** MPWH, RSS ***Support*** MEMR	**Estimated Budget for this Action**	USD 1,500,000

Financing Secured	☐ Yes ■ No	**Potential Source of Funding**	KfW, public budget
Action leads to investment	■ Yes ☐ No ☐ This action is an Investment opportunity	**Estimated Investment Size**	Up to USD 20,000,000

Level of Priority			Readiness for Implementation				
Very High	High	Medium	1	2	3	4	5

- A program is currently under implementation by KfW that has a well-defined payback period and clear results plan; this can be relatively easily scaled up through a similar size and structured intervention.

Implementation Risk Mitigation Measures	

EN06 | Implement Electric Vehicle Charging Stations and Service Provision in GAM through a Public-Private Partnership

Description
The purpose of this action is to attract investments to establish a network of slow and fast EV charging stations in the City of Amman in order to respond to the growing service demand. Through this action, MoT, the GAM, NEPCO, and the EMRC will work to determine the scale of investment required to implement sufficient charging infrastructure and service provision contracts in order to respond to the national demand. Then, GAM and EMRC will work with the NEPCO and MoF to undertake the necessary investment preparation (feasibility analysis and regulatory adjustments) to attract private sector partnership with the aim of financing the implementation of a number of charging stations to be operated by a private sector service provider. The charging infrastructure will be linked to ongoing efforts to develop a smarter electricity grid, and technical assistance will be provided to NEPCO and EMRC on how to leverage the EV charging consumption for better supply and demand management to achieve greater EE and revenue generation. The result will be an increase in the access to EV charging services in the City of Amman, improved ability to manage supply and demand of energy at peak hours of the day, and increased electricity consumption, which will contribute to improving NEPCO's financial status and Jordan's overall fiscal situation.

Action Objectives	▪ Establish a network of slow and fast EV charging stations in the City of Amman to respond to growing demand for services. ▪ Improve the enabling environment for green growth and EE in the transport sector. ▪ Increase the awareness of key related stakeholders about the environmental and economic values of EVs, and the need to further develop the green transport infrastructure in Jordan.
Implementation Milestones	▪ **A study undertaken to determine the scale of investment** required to implement sufficient charging infrastructure and service provision contracts to respond to national demand. ▪ **Develop the necessary investment preparation** (feasibility analysis and regulatory adjustments) to attract private sector partnership to finance the implementation of a number of charging stations to be operated by a private sector service provider. ▪ **Provide technical assistance to NEPCO and EMRC** on how to leverage the EV charging consumption for better supply and demand management to achieve greater EE and revenue generation. ▪ **Prepare a feasibility study for PPP investments** in the development of EV Charging Stations and Service Provision. ▪ **Prepare a marketing package and tender documents f**or PPP investments in the development of EV Charging Stations and Service Provision. ▪ **Tendering process commenced** and best bidders selected.
Relevant Green Growth Objectives	▪ **Sustainable Economic Growth:** Reduce the country's reliance on fossil fuel imports; Support the reduction of energy sector-based public debt. ▪ **Climate Change Mitigation and Adaptation:** Decrease total consumption of energy from fossil fuel resources; Decrease total GHG emissions from energy sector activities. ▪ **Enhanced Natural Capital:** Limit air pollution from fossil fuel use.

Estimated Implementation Period	
Start Year – 2021	*End Year* – 2023

Location(s)	GAM	**Other key partners**	UNIDO, GGGI
Implementing Stakeholders	*Lead* NEPCO, EMRC, GAM, MOF *Support* MEMR, MoT, MoEnv	**Estimated Budget for this Action**	USD 1,300,000

Financing Secured	☐ Yes ■ No	**Potential Source of Funding**	Global Environment Facility (GEF) (UNIDO project)
Action leads to investment	☐ Yes ☐ No ■ This action is an Investment opportunity	**Estimated Investment Size**	USD 15,000,000

Level of Priority			Readiness for Implementation				
Very High	High	Medium	1	2	3	4	5

- Some feasibility analysis for this investment has already been conducted by GGGI, USAID, and potentially others.
- UNIDO has been approved for funding through a GEF grant, to be implemented with MoT.

Implementation Risk Mitigation Measures	▪ Strong public-private dialogue is required at the project initiation phase to ensure investment is secured. ▪ Government energy and transport regulators should be fully engaged to ensure policy conditions meet the business development requirements of investors.

EN07 | Develop a Behavior Change Campaign and Financial Mechanism to Increase Use of Energy Efficient Appliances in Jordan

Description
The purpose of this action is to establish a behavior change and awareness campaign and a source of finance to increase the use of energy efficient appliances in residential and commercial settings, which represents 60% of all energy consumption in Jordan. This action will have two components. First, it will assess the effectiveness of the improved Minimum Energy Efficiency Standards (MEES) policy established in 2014, by surveying and analyzing behavior and attitudes of local manufacturers, retail importers/sales and consumer of appliances, starting at the end of the 2015 UNDP/GEF project "Energy Efficiency Standards and Labelling in Jordan". Gaps in effectiveness will be assessed against the results framework from that project, and a behavior change campaign will be developed to address these gaps. Second, a source of finance will be established based on the estimated level of demand for an appliance replacement and/or purchase incentive program. Capacity building will be conducted for local ESCOs and JREEEF technical staff in order to provide homeowners, business owners, and retail appliance sellers with the necessary information to make the energy efficient purchase decision.

Action Objectives	▪ Stimulate a behavior change through social marketing to increase the use of energy efficient appliances in residential and commercial settings. ▪ Develop and locate a source of finance and financing mechanism to increase the use of energy efficient appliances in residential and commercial settings. ▪ Achieve 25% rate of replacement of old, high energy consuming appliances, with energy efficient appliances by the end of the year 2024, and accordingly reduce energy consumption at residential and commercial establishments by 15% or more.
Implementation Milestones	▪ **Conduct a technical assessment and feasibility analysis** for the replacement of old, high energy consuming appliances, with energy efficient appliances prepared using recent statistics from DOS. ▪ **Identify and evaluate financial mechanisms and financing options** to replace high-energy consuming appliances with energy efficient ones. This evaluation should note affordability and willingness to pay by the different economic levels of the Jordanian community, and identify the necessary economic incentives (tax and customs reduction, etc.). This should also include green financing options in collaboration with credit companies, financing companies, and commercial banks. ▪ **A source of finance and financing mechanism developed and operated** to increase the use of energy efficient appliances in residential and commercial settings. ▪ **One public awareness and communication program developed and implemented,** in partnership with mass and social media, to announce and explain the developed financing mechanism. ▪ **Periodic monitoring of appliances' replacement and public awareness implemented** and used to inform the adoption of the financing mechanism and the awareness program. The monitoring should note sales of Jordanian energy efficient appliances compared to imported ones.
Relevant Green Growth Objectives	▪ **Social Development and Poverty Reduction:** Maintain access to reliable, affordable, and sustainable energy for all. ▪ **Resource Efficiency:** Increase the efficiency of energy use (including electricity and fuels). ▪ **Climate Change Adaptation and Mitigation:** Decrease total GHG emissions from energy sector activities.

Estimated Implementation Period	
Start Year – 2021	*End Year* – 2024

Location(s)	-	**Other key partners**	UNDP, UN-Environment. Green Climate Fund (GCF)
Implementing Stakeholders	*Lead* MEMR, JREEEF *Support* JSMO, RSS/NERC, Chambers of Commerce	**Estimated Budget for this Action**	USD 4,000,000

Financing Secured	☐ Yes ■ No	**Potential Source of Funding**	GCF small grants (SAP)
Action leads to investment	■ Yes ☐ No ☐ This action is an Investment opportunity	**Estimated Investment Size**	Small revolving fund, approximately USD 5,000,000 to begin

Level of Priority			Readiness for Implementation				
Very High	High	Medium	1	2	3	4	5

- A results framework for measuring the impact of the appliance S&L regime has been developed by UNDP through a GEF grant in 2015, but follow up to this program is unclear.
- Commercial sector appliances were not included, so additional scoping and analysis would be required, and engagement with additional commercial sector stakeholders needed.

Implementation Risk Mitigation Measures	▪ Fiscal incentives may be needed to encourage importing of more energy efficient appliances. ▪ A strong enforcement and inspection regime are required for effective implementation.

EN08 | Develop and Implement a National Energy Storage Action Plan and Investment Pipeline

Description
The purpose of this action is to establish a short-to-medium term strategy to address Jordan's energy storage needs, which is a critical enabling component of the country's RE transition. With the establishment of the legal and regulatory frameworks for energy storage expected by the end of 2021, Jordan is prepared to undertake a step-increase in energy storage investment. Therefore, this action aims to develop a strategy and action plan to carry forward the findings of the various ongoing feasibility studies, which are part of the EU, EBRD and World Bank support programs related to battery and hydro-pumped storage options. The strategy will lay out detailed decision-making criteria for energy storage investment, and identify the roles and responsibilities of national stakeholders in the development and implementing of storage projects, including local R&D institutions. As a result of this action, Jordan will be better prepared to make investment decisions about the types, sizes, and locations of various energy storage projects, as well as being able to build the national expertise and institutional support to become a regional leader in energy storage as part of the low-carbon energy transition. The action will also include a set of concept notes to be used as potential investment proposals for public, private, and PPP financing.

Action Objectives	▪ Establish a short-to-medium term action plan to address Jordan's energy storage needs, which is a critical enabling component of the country's RE transition. This includes:
	  ▪ Enhancing Jordan's capacity for investment decision-making in terms of the types, sizes, and locations of various energy storage projects, to thus undertake a step-increase in energy storage investment.
	  ▪ Building the national expertise and institutional support in Jordan to become a regional leader in energy storage as part of the low-carbon energy transition.

Implementation Milestones	▪ **One action plan developed to carry forward the findings** of the various ongoing feasibility studies as part of the EU, EBRD, and World Bank support programs related to battery storage and hydro-pumped storage options. The action plan will lay out the following:
	  ▪ Recommendations for policy and regulatory modifications, and institutional capacity building needed to govern energy storage aspects.
	  ▪ Detailed decision-making criteria for energy storage investment decision making.
	  ▪ Institutional framework defined, with clear roles and responsibilities of national stakeholders in development and implementing storage projects, including local R&D institutions.
	  ▪ Actions for improving national experts' knowledge and skills related to energy storage, and its environmental management, including hazardous waste management.
	  ▪ A set of recommendations for regional collaboration to stimulate Jordan's potential to become a regional leader in energy storage as part of the low-carbon energy transition.
	▪ **The Action Plan implemented will be periodically monitored and evaluated.** This will include, but not necessarily be limited to:
	  ▪ Implementation of the institutional and regulatory recommendations.
	  ▪ Implementation of the training program.
	  ▪ Implementation of experimental/pilot energy storage projects.
	▪ **A pipeline of projects and/or a set of concept notes to be used as potential investment proposals for public, private, and PPP financing.**
	▪ **A detailed feasibility analysis, preliminary design, and tender documents for PPP investments for at least 10 energy storage projects.** This includes the completion of the tendering process to select PPP investors.

Relevant Green Growth Objectives	▪ **Sustainable Economic Growth:** Support the reduction of energy sector-based public debt; Enhance innovation and technical capacities in the energy sector. ▪ **Resource Efficiency:** Reduce energy network losses and improve energy management in utilities. ▪ **Climate Change Adaptation and Mitigation:** Decrease total GHG emissions from energy sector activities.

Estimated Implementation Period	
Start Year — 2022	*End Year* — 2024

Location(s)	National	**Other key partners**	EBRD, World Bank
Implementing Stakeholders	*Lead* MEMR, NEPCO *Support* -	**Estimated Budget for this Action**	USD 10,000,000

Financing Secured	☐ Yes ■ No	**Potential Source of Funding**	EBRD, EU
Action leads to investment	■ Yes ☐ No ☐ This action is an Investment opportunity	**Estimated Investment Size**	To be determined (TBD) based on feasibility analysis

Level of Priority			**Readiness for Implementation**				
Very High	High	Medium	1	2	3	4	5

▪ Total amount of energy storage needed is currently unclear, but feasibility analysis is being undertaken as part of the EBRD and EU technical assistance programs.

EN09 | Increase Public Investment in Energy Sector Research and Development

Description
The purpose of this action is to improve the coordination and availability of resources for a dedicated national program for the energy sector's R&D and innovation. The implementation of this action will be led by MEMR, with close coordination of national education, research and innovation stakeholders, as well as private sector actors. First, MEMR will undertake an economic feasibility study to examine the potential ROI for different R&D investment scenarios in terms of private sector market development and employment creation potential. The preferred scenario will be chosen based on a cost-benefit analysis, with the objective of improving Jordan's competitive advantage in the development of energy science and technology. This will then lead to the development of policy recommendations to ensure the appropriate allocation of funds to Jordanian education and research institutions, and tp Jordanian private sector energy companies. Fund allocation use and impacts will be monitored by the MEMR and the MoF. Specific efforts will be taken to ensure strong national coordination between R&D activities and innovation, and green growth impacts.

Action Objectives	▪ Improve the coordination and availability of resources for energy sector R&D and innovation. ▪ Stimulate and maintain growth in energy sector R&D and innovation.

Implementation Milestones	▪ **National Steering Committee established** under the umbrella of MEMR to lead and coordinate the implementation of this action, and to facilitate collaboration with all related stakeholders.
	▪ **An economic feasibility study undertaken by MEMR** to examine the potential ROI for different R&D investment scenarios in terms of private sector market development and employment creation potential. The feasibility study will also:
	  ▪ Identify the preferred scenario based on cost-benefit analysis, with the objective of improving Jordan's competitive advantage in the development of energy science and technology.
	  ▪ Identify policy recommendations to ensure the appropriate allocation of funds to Jordanian education and research institutions, and to Jordanian private sector energy companies.
	▪ **A dedicated national program for energy sector R&D and innovation developed** with a clear 5-year road map, action plan, and monitoring framework.
	▪ **Jordan's energy sector R&D and innovation fund established** within MEMR. This includes the following sub-milestones:
	  ▪ Regulatory frameworks developed and ratified by the government.
	  ▪ Fund institutionalization arrangements are in place, and staff responsible for fund management are assigned.
	  ▪ Financial and administrative management frameworks, procedures, and forms are developed and approved by the respective authorities.
	  ▪ Core fund allocated by the government and other funding agencies.
	  ▪ Fund investment strategy for the first five years, which should explain the strategic direction for R&D and innovation investments for five years, priority research topics for the first five years, funding eligibility criteria, funding instruments, transparency policy and measures.
	  ▪ Develop and implement a fund raising strategy and fund sustainability plan.
	▪ **Outreach and fundraising program funded, developed, implemented and monitored** to motivate researchers and inventors to apply for grants/loans for related research, and to contribute to strengthening the fund partnership networks and fundraising efforts for the fund.
	▪ **Fund allocation use and impacts monitored by the MEMR and the MoF.** Quarterly monitoring reports and annual financial audits disclosed publicly.

Relevant Green Growth Objectives	▪ **Sustainable Economic Growth:** Enhance innovation and technical capacities in the energy sector. ▪ **Social Development and Poverty Reduction:** Increase opportunity for employment in the energy sector, especially for women and youth.

Estimated Implementation Period	
Start Year — 2021	*End Year* — 2025

Location(s)	National	**Other key partners**	UNDP, IFC, other donor and lending agencies
Implementing Stakeholders	*Lead* MEMR, RSS *Support* MoF, MoEd, MoHE, energy companies, universities and research centers	**Estimated Budget for this Action**	USD 5,000,000 (constituting USD 3,000,000 as core investment in the fund, and the other USD 2,000,000 for the preparatory studies, establishment of the fund, staff salaries, and for the implementation of the outreach and fundraising program).

Financing Secured	☐ Yes ■ No	**Potential Source of Funding**	To be determined (TBD) in the validation phase
Action leads to investment	■ Yes ☐ No ☐ This action is an Investment opportunity	**Estimated Investment Size**	USD 10,000,000 new research investments possibly funded by donor and development agencies, private sector investments or contributions through their CSR programs over a period of five years after successful implementation of this action.

Level of Priority			**Readiness for Implementation**				
Very High	**High**	Medium	1	**2**	3	4	5

▪ A national R&D strategy exists, but a specific program to advance R&D in the energy sector has not been developed.

Implementation Risk Mitigation Measures	▪ Engagement of all related stakeholders in the formulation of the investment strategy and the definition of research priorities for funding is critical to ensuring the relevance of research and innovation to Jordan's priorities for advancing EE and generation of energy from renewable resources.

EN10 | Achieve GCF Accreditation for the Jordan Renewable Energy and Energy Efficiency Fund (JREEEF)

Description
The purpose of this action is to increase Jordan's access to climate finance for the purpose of supporting its transition towards a low-carbon energy system. To implement this action, steps will be taken to improve the institutional arrangements within JREEEF, so that it can become a national Direct Access Entity (DAE) to the GCF. This might include the development or improvement of a Social and Environmental Safeguards policy, technical capacity, fiduciary policies, strategic readiness, and potentially others. Because JREEEF has already received support for accreditation readiness and work has already begun to develop the Cities and Villages Development Bank (CVDB) as a DAE for Jordan, the process and change of accreditation is expected to be simpler and quicker. The result of this action will be an increase in JREEEF's ability to directly finance or provide subsidies necessary to implement Jordan's future energy master strategy, and its NREAP and NEEAP.

Action Objectives	▪ Increase JREEEF's ability to directly finance or provide subsidies necessary to implement Jordan's future energy master strategy, and its NREAP and NEEAP.

Implementation Milestones	▪ **Policy, legal and institutional review of JREEEF undertaken** to identify policy, legal and institutional measures needed to quality as national DAE to the GCF.
	▪ **Institutional arrangements within JREEEF developed and enhanced** such that it can become a national DAE to the GCF. This includes:
	  ▪ The development or improvement of a Social and Environmental Safeguards policy.
	  ▪ Development of JREEEF technical capacity, fiduciary policies, strategic readiness, and potentially others.
	  ▪ One training program implemented for JREEEF staff to undertake the responsibilities of being national DAE to the GCF.
	  ▪ Change of JREEEF accreditation to become national DAE to the GCF.
	  ▪ A communication and outreach program developed and implemented for JREEEF as national DAE to the GCF.
	  ▪ Pipeline of Jordan priority projects prepared (as concept notes) for application to the GCF. The identification and formulation of project concepts should be fully participatory and engaging of all related stakeholders.

Relevant Green Growth Objectives	▪ **Sustainable Economic Growth:** Reduce the country's reliance on fossil fuel imports. ▪ **Social Development and Poverty Reduction:** Maintain access to reliable, affordable, and sustainable energy for all. ▪ **Resource Efficiency:** Increase the efficiency of energy use (including electricity and fuels). ▪ **Climate Change Mitigation and Adaptation:** Decrease total GHG emissions from energy sector activities.

Estimated Implementation Period	
Start Year — 2021	*End Year* — 2022

Location(s)	National	**Other key partners**	GGGI
Implementing Stakeholders	*Lead* MoEnv (Climate Change Directorate) *Support* JREEF	**Estimated Budget for this Action**	USD 1,000,000

Financing Secured	☐ Yes ■ No	**Potential Source of Funding**	GCF
Action leads to investment	☐ Yes ■ No ☐ This action is an Investment opportunity	**Estimated Investment Size**	-

Level of Priority			Readiness for Implementation				
Very High	High	Medium	1	2	3	4	5

- Basic understanding of JREEEF's readiness for accreditation exists due to ongoing support programs.

Implementation Risk Mitigation Measures	▪ JREEEF can learn from the experience of the CVDB; knowledge exchange and partnership are encouraged throughout the JREEEF accreditation process.

EN11 | Improve the Enabling Environment and Capacity Development Support for the Growth of the Energy Services (ESCO) Market

Description
The purpose of this action is to develop the necessary policies, regulations, and technical capacity within Jordan's energy services companies to support the achievement of Jordan's low-carbon energy transition. ESCOs provide services such as analysis and audits, appliance and materials retrofits, energy management, project design and implementation, maintenance and operation, and various auxiliary energy services (such as heating and lighting). This action would provide business development support to selected ESCOs, particularly those providing EE-related services, by improving their financial and management capacity, marketing and branding, and the quality of their service provision. Steps will be taken to link ESCOs to key adjacent sub-sectors, such as transport, construction and engineering, agriculture and waste, and support them to develop relevant supporting business lines. As a result of this project, the overall market for energy and environmental services will be developed, supporting a broad range of green growth objectives.

Action Objectives	▪ Develop the necessary policies, regulations and technical capacity within Jordan's energy services companies to support the achievement of Jordan's low-carbon energy transition. ▪ Stimulate the market for energy and environmental services to supporting a broad range of green growth objectives.

Implementation Milestones	▪ **One study to map ESCOs, to identify and assess their empowerment and development needs.** This includes:
	  ▪ Geo-database showing ESCOs locations, domains of services, types and locations of their implemented projects and services, etc.
	  ▪ Development of a needs assessment study that should cover respective financial and technical capacity development needs.
	  ▪ Policy and legal study.
	  ▪ Roles and responsibilities framework prepared following participatory approaches and in full coordination with related sectors to link ESCOs to key adjacent sub-sectors, and to support them in the development of relevant supporting business lines.
	  ▪ Cost-benefit analysis for identified businesses, supporting lines for development
	▪ **One road map with the detailed description of actions needed** to provide support for improving their financial and management capacity, marketing and branding, and the quality of the ESCOs service provision.
	▪ **One training course developed and implemented for ESCOs** to address identified training needs.
	▪ **One set of policy and regulatory recommendations needed** to empower and further developed the EE-related services market and service providers.

Relevant Green Growth Objectives	▪ **Sustainable Economic Growth:** Increase competition and strengthen regulation of the electricity market; Enhance innovation and technical capacities in the energy sector. ▪ **Social Development and Poverty Reduction:** Increase opportunity for employment in the energy sector, especially for women and youth. ▪ **Resource Efficiency:** Increase the efficiency of energy use (including electricity and fuels). ▪ **Climate Change Adaptation and Mitigation:** Decrease total GHG emissions from energy sector activities.

Estimated Implementation Period	
Start Year – 2021	*End Year* – 2022

Location(s)	National	**Other key partners**	USAID, MoF
Implementing Stakeholders	*Lead* EMRC, MEMR *Support* Ministry of Digital Economy and Entrepreneurship, RSS/NERC JEDCO, BDC, other business development support programs	**Estimated Budget for this Action**	USD 1,000,000

Financing Secured	☐ Yes ■ No	**Potential Source of Funding**	To be determined (TBD) in the validation phase
Action leads to investment	☐ Yes ■ No ☐ This action is an Investment opportunity	**Estimated Investment Size**	-

Level of Priority			Readiness for Implementation				
Very High	High	Medium	1	2	3	4	5

- Some work was done through the Jordan Energy Sector Capacity Building Program that could be scaled.

Implementation Risk Mitigation Measures	▪ Fiscal incentives for ESCOs may be needed; the business case and long-term economic impact (especially in terms of employment) should be thoroughly developed.

EN12 | Implement the Energy Sector Monitoring, Reporting and Verification (MRV) System.

Description
Jordan has a target to reduce its overall GHG emissions by 14% by the year 2030, most of which are expected to come as a result of the transition from fossil-fuel based energy consumption towards RE and greater EE. **The purpose of this action is to develop the necessary protocols and build institutional capacity to implement an MRV system to credibly measure and report energy sector GHG gas emission reductions.** MRV implementation will allow Jordan to fulfill the commitments made in its NDC, which will enable a continued international support for NDC implementation and for the development of a global carbon market, both of which are critical components of the global fight against climate change. Some technical arrangements have been made to prepare Jordan for participation in the global carbon market, such as the World Bank program under the "Partnership for Market Readiness", which is implemented under the MoEnv's leadership. Implementation of this action would result in the increased ability for government institutions to operationalize the systems and conduct effective energy-sector GHG monitoring, reporting, and verification.

Action Objectives	▪ Develop, implement and maintain MRV, and accordingly enable Jordan to fulfill the commitments made in its NDC and enable continued international support for NDC implementation and for the development of a global carbon market. ▪ Increased ability for government institutions to operationalize the systems and conduct effective energy-sector GHG monitoring, reporting and verification.
Implementation Milestones	▪ **MRV developed and discussed** with all national and international stakeholders. ▪ **Improve the capacity of the MoEnv** and other related stakeholders to efficiently implement and use the MRV. ▪ **MRV data management and sharing policy developed** following participatory approaches and efficiently implemented and monitored. ▪ **Baseline data collected and arranged** as a repository benchmark for future MRV analysis. ▪ **MRV operationalized and maintained.**
Relevant Green Growth Objectives	▪ **Sustainable Economic Growth:** Enhance innovation and technical capacities in the energy sector. ▪ **Climate Change Adaptation and Mitigation:** Decrease total GHG emissions from energy sector activities.

Estimated Implementation Period	
Start Year — 2021	*End Year* — 2022

Location(s)	National	**Other key partners**	World Bank, IRENA
Implementing Stakeholders	*Lead* MEMR, MoEnv *Support* MOPIC, DOS	**Estimated Budget for this Action**	USD 3,000,000

Financing Secured	☐ Yes ■ No	**Potential Source of Funding**	To be determined (TBD) in the validation phase
Action leads to investment	☐ Yes ■ No ☐ This action is an Investment opportunity	**Estimated Investment Size**	-

Level of Priority			Readiness for Implementation				
Very High	High	Medium	1	2	3	4	5

- Software and hardware systems exist for MRV implementation from the World Bank PMR program; training will be provided for national stakeholders on this system.

Implementation Risk Mitigation Measures	▪ Implementation and full functioning MRV will require continuous training and capacity building for operations of the systems. A strong coordination between institutions and an increase in the government's capacity to measure and report relevant data in a timely manner is also required.

ANNEX 1: Energy Sector Green Growth Results Framework

Indicator	Definition	Baseline	Target	Responsible	Reporting and SDG	Timeline
Sustainable Economic Growth						
# and % workers in the energy sector	Total # workers in the "Electricity, Gas, Steam, and air conditioning Supply" sector AND Total # workers in the "Electricity, Gas, Steam, and air conditioning Supply" sector, relative to total national employment	8,369 (2016) 0.72% (2016) Total employees 1,161,639 (2016)	-	DOS	-	Produced annually Latest is 2016
Data Source DOS Labour Force Survey http://www.dos.gov.jo/owa-user/owa/employment.emp_show_t1						
Sector's contribution to GDP	%GDP contribution of electricity and water sector relative to national GDP (at constant 1994 market prices)	2.3% (2015)	-	DOS	Vision 2025	Annual Latest available is 2016
Data Source DOS Jordan Statistical Yearbook 2016, issue 67, table 23.11						
Social Development & Poverty Reduction						
% female workers in the sector	Total # female workers employed in the "Electricity, Gas, Steam, and air conditioning Supply" sector, relative to total employment in the sector	6.96% (2016)	-	DOS	-	Annual Latest available online is 2016
Data Source DOS http://www.dos.gov.jo/owa-user/owa/employment.emp_show_t3						
# and % youth workers in the sector	Total # youth workers (aged 15-24) employed in the "Electricity, Gas, Steam, and air conditioning Supply" sector, relative to total employment in the sector	TBD	-	DOS	-	Available annually, through special data request Latest is 2017
Data Source DOS Labour Force Survey SPECIAL DATA REQUEST						

Indicator	Definition	Baseline	Target	Responsible	Reporting and SDG	Timeline
Resource Efficiency						
Electric power transmission and distribution losses (% of output)	Electric power transmission and distribution losses include losses in transmission between sources of supply and points of distribution and in the distribution to consumers, including pilferage	16.6% (2017)	11% by 2025 2030 target to be set after sector actions are established	World Bank	Vision 2025	World Bank had annual data, with latest being 2014
Data Source World Bank https://data.worldbank.org/indicator/EG.ELC.LOSS.ZS?locations=JO						
Energy intensity measured in terms of primary energy and GDP	Total consumption of primary energy in tons of oil equivalent, per million JD GDP at current market prices	8,944,000/ 26,637.4 = 336 (2015)	-	DOS	SDG 7.3.1 Energy intensity measured in terms of primary energy and GDP (C070301)	Latest is 2015 Produced annually
Data Source DOS Environment Statistics 2015-2014 table 2.2.2.1 AND DOS Jordan Statistical Yearbook 2016, issue 67, table 23.6						
Climate Change Adaptation and Mitigation						
Amount and % of GHG emissions from the energy sector	Million metric tons of CO_2e emissions ($MtCO_2e$) from the energy sector AND $MtCO_2e$ from the energy sector, relative to total national GHG emissions	20,938 MtCO2e in 2006 (72.3 % of Jordan's total GHG emissions) (2014)	-	DOS/MOENV	National Communication to UNFCCC	2014 Will be annual once MOENV has national inventory in place
Data Source DOS Environment Statistics 2015-2014 table 3.1.1.1						