



MINISTRY OF ENERGY AND MINERAL RESOURCES

Annual Report 2019





His Majesty King Abdullah II Ibn Al Hussein



His Highness Prince Al-Hussein bin Abdullah II, The Crown Prince

Minister of Energy and Mineral Resources Speech

The energy and mineral resources sector has made many strides over the past year. These accomplishments did not come out of a vacuum, but are the result of planning and implementation by outstanding cadres within the sector, who consistently sought to promote His Royal Highness King Abdullah II bin Al-Hussein's vision of energy as the backbone of the economy. Likewise, the importance of the mining sector, its role in strengthening the economy, and its contribution to GDP are clear to all of us.



Our clear vision is to achieve energy supply security and the optimal use of natural resources. We seek to achieve this through clear goals and specific performance indicators reflected in the strategy of the Ministry of Energy and Mineral Resources. This strategy includes specific programs and projects implemented in cooperation with our partners in various sectors and uses a participatory approach. These goals, programs, and projects are consistent with the vision of Jordan 2025, and they seek to accomplish the obligations of the sector provided in the Renaissance Plan, within a state of production and solidarity.

This report includes the Ministry's accomplishments in various sectors, despite the many challenges it faced. These accomplishments have put Jordan into first place in the area of delivering electricity to its population, according to the Global Competitiveness Index, as well as into first place in the Middle East and North Africa—and sixth in the world—in the area of investment in renewable energy, according to Climate scope's 2019 report. Jordan occupies first place among Arab countries in per capita share of renewable energy capacity and has secured %100 of the supply of petroleum products in the Kingdom. In addition, the mineral resources sector makes up %19.7 of Jordan's exports and %7.6 of its GDP.

In addition to the abovementioned accomplishments, we have not neglected the Ministry's institutional development. Over the recent period, we have worked on creating a plan to computerize all services, as well as on developing electronic systems to automate operational processes and evaluate deliverables according to specific metrics.

In the future, we seek to maximize these accomplishments through plans centering on energy independence, increased reliance on local resources, reduced energy costs, and sustainability, in addition to increased investment in mineral resources.

Finally, I would like to thank our human capital and partners with whom we work diligently to achieve ongoing excellence in this sector, under the motto, "Together we create excellence and achieve sustainability."

Hala Adel Al-Zawati
Minister of Energy and Mineral Resources

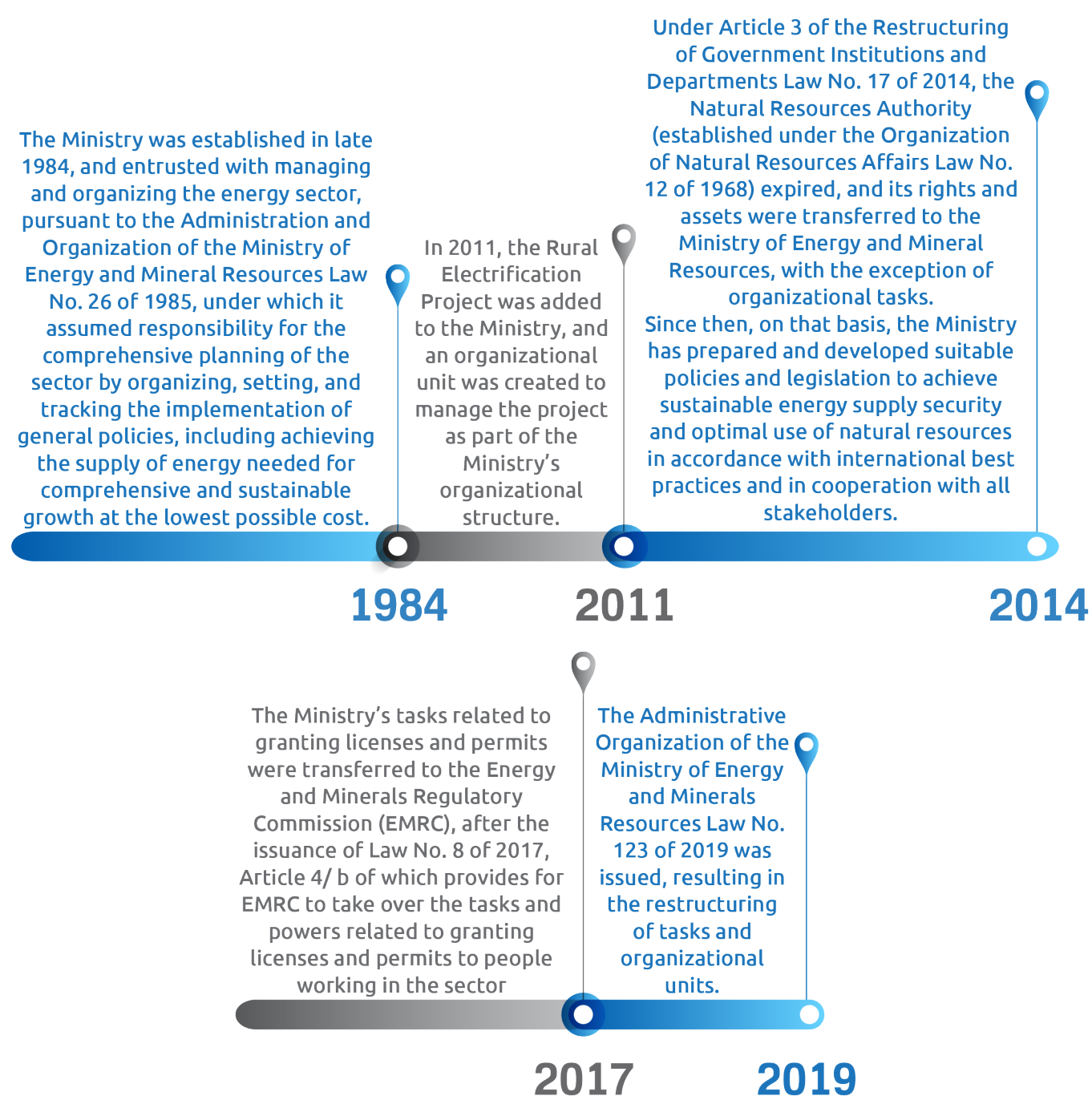
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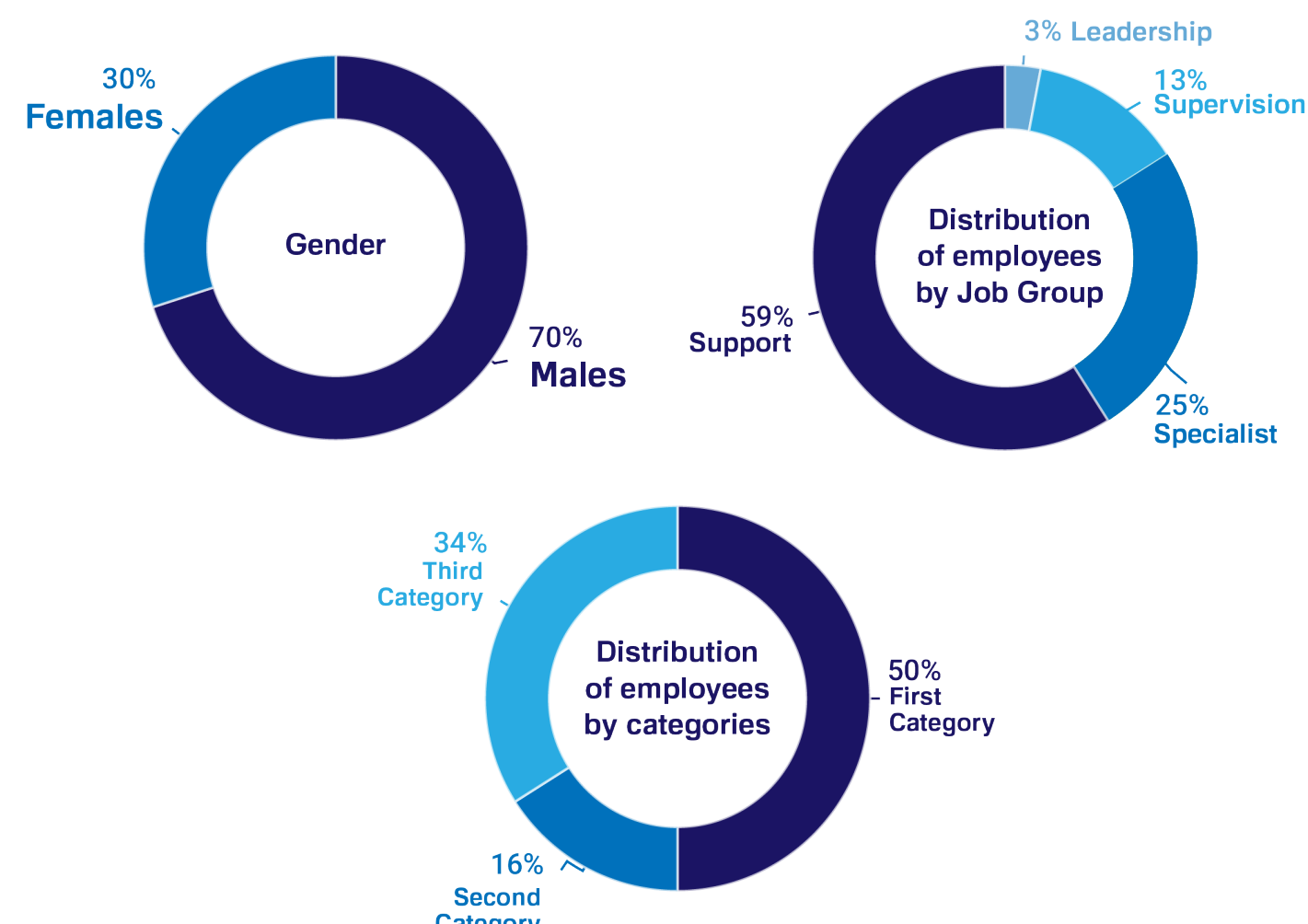
Institutional Framework

The Ministry of Energy and Mineral Resources has adopted a comprehensive planning process for the sector in terms of organizing, setting, and tracking the implementation of general policies in order to achieve its assigned tasks. The Ministry prepares and develops appropriate policies and legislation to achieve sustainable energy supply security and optimal use of natural resources in accordance with international best practices.

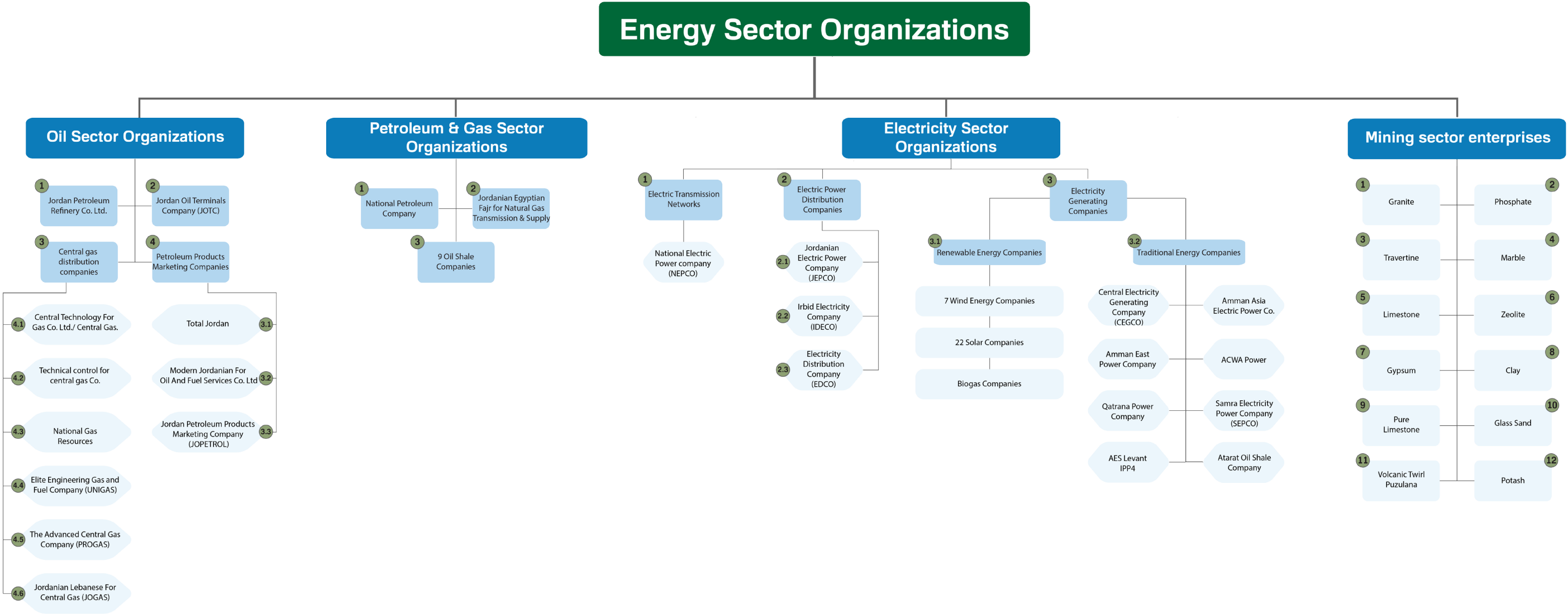
Over time, the regulatory framework of the Ministry of Energy and Mineral Resources has evolved as follows:



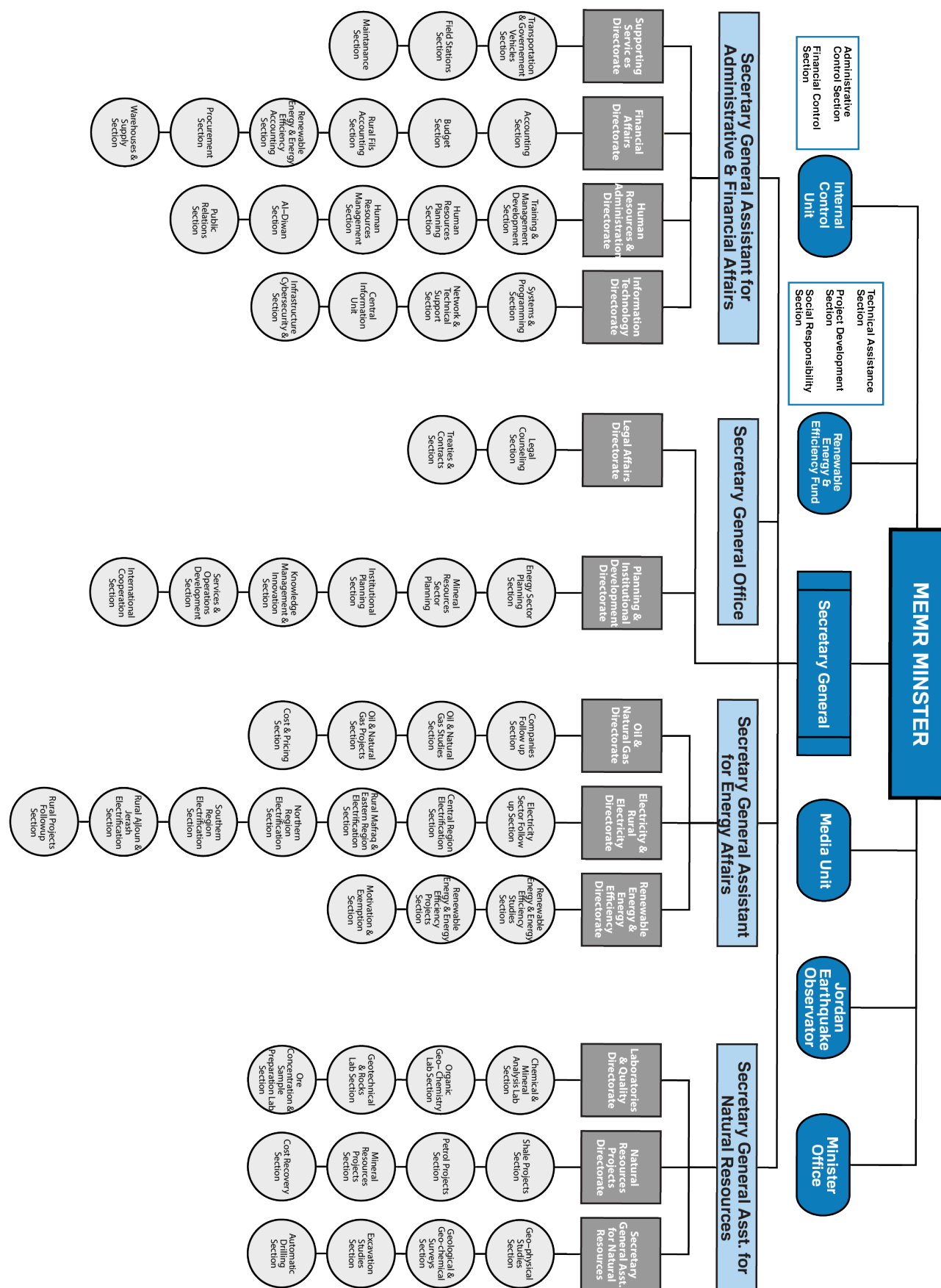
At the end of 2019, the Ministry had 444 employees (310 men and 134 women). The human resource metrics are as follows.



Organizational Structure of Energy Sector



Organizational Structure of the Ministry of Energy and Mineral Resources



Ministry of Energy and Mineral Resources

Vision

Achieving a secure sustainable supply of energy and optimal use of natural resources.

Mission

Setting and developing the appropriate policies and legislation to achieve a secure sustainable supply of energy and the optimal use of natural resources, according to international best practices.

Ministry Values

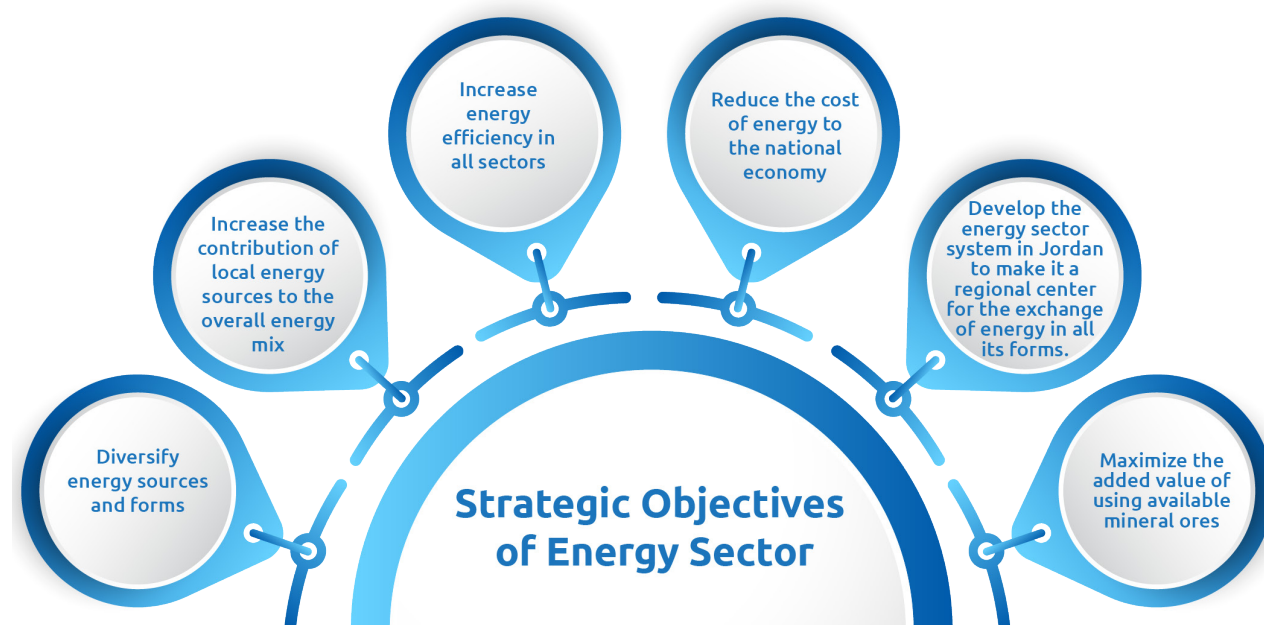


National Goals

The national goals that the Ministry helps achieve are specified based on the Jordan 2025 document. They seek to accomplish the government's work priorities (along the lines of revitalization) for 2020-2019, within the three core areas of rule of law, production, and solidarity:



Strategic Objectives of Energy Sector



Strategic Objectives of Ministry of Energy and Mineral Resources:



Programs of the Strategic Objectives of the Ministry

Strategic Goal		Strategic Goal	
Programs	Consolidate and strengthen strategic thinking and governance practices	Diversify Energy Sources	Programs
	Develop ministry strategies and decision-making mechanisms		
Programs	Develop local energy sources	Rationalize energy consumption and improve energy efficiency	Programs
	1. Expand the exploitation of renewable energy sources 2. Expand the exploitation of oil shale to produce oil and generate electricity 3. Develop areas of exploration for conventional and unconventional oil and gas		
Programs	Increase investment in the mineral resources sector	Monitor, analyze, and evaluate seismic information	Programs
	1. Increase investment in the mineral resources sector 2. Increase the accuracy and quality of laboratory tests		
Programs	Strengthen and develop international relations and cooperation	Raise the efficiency of institutional performance	Programs
	Incentivize international cooperation		
		1. Institutional development 2. Information technology and communications 3. Improve financial performance 4. Internal monitoring 5. Develop human resources and building and stimulating capabilities 6. Community responsibility 7. Public relations 8. Administrative services	

Ministry of Energy and Mineral Resources Achievements

The energy and mineral resources sector is a vitally important sector in the Hashemite Kingdom of Jordan because of its major impact on sustainable development. In terms of mineral wealth, Jordan is considered a country rich in natural resources because of its distinctive geological diversity. Data, studies, maps, and technical services related to the land's resources are considered basic standards of infrastructure for many industries that generate economic and social revenues for the country by employing the local workforce, supplying the local market's need for raw materials and intermediate and final products, and supplementing the national income in hard currencies.

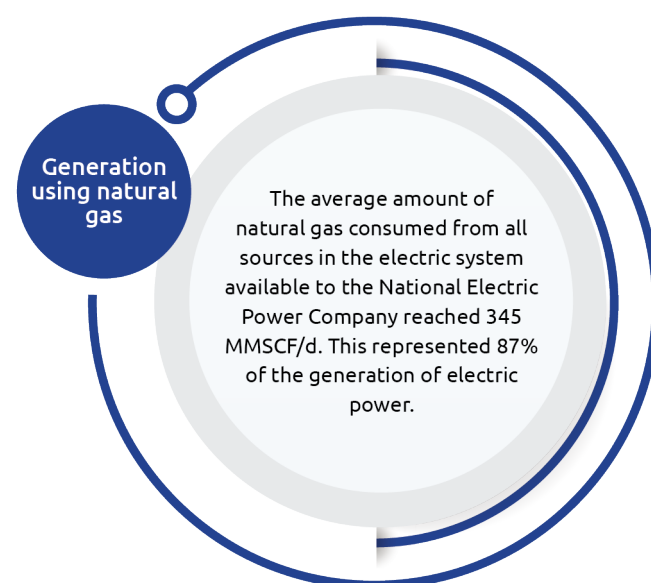
In order to achieve the objectives of this sector and meet the challenges—in line with the royal vision, the Jordan 2025 document, the Renaissance Plan, and the government's priorities for 2020-2019, and within the three core areas (rule of law, production, and solidarity)—the Ministry of Energy and Mineral Resources is working on long-term and short-term planning, using a participatory approach and in cooperation with all stakeholders, to achieve its vision of sustainable energy security and optimal use of natural resources.

Great strides have been made over the recent period in the energy and mineral resources sector, despite the major challenges the sector is facing, including the difficulty of attracting investments in mineral resources, as well as the reliance on imports, as Jordan imported approximately %91 of its energy needs in 2019, at high costs.

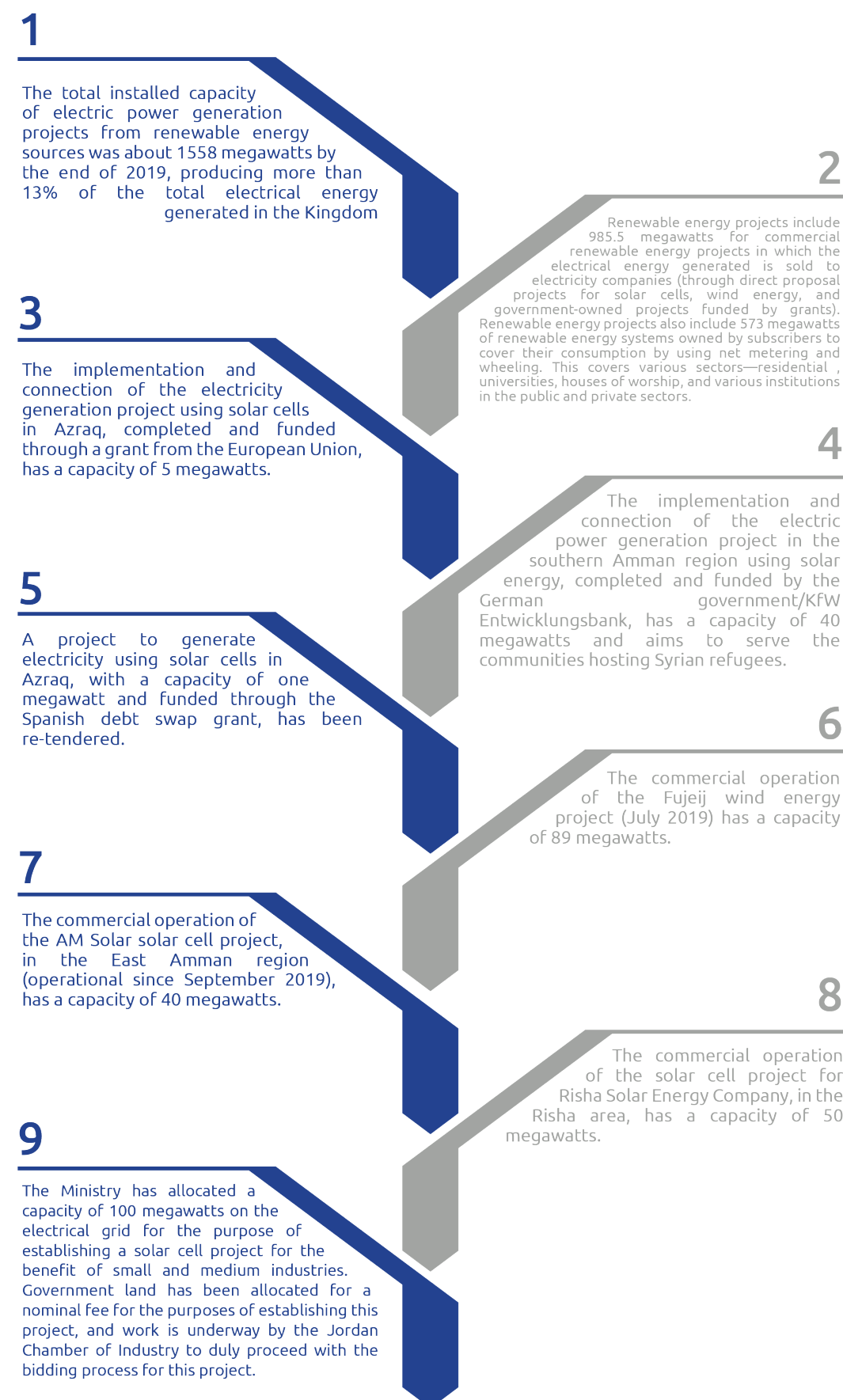
With this background, this report presents the Ministry's accomplishments during 2019.

1. Electricity Sector

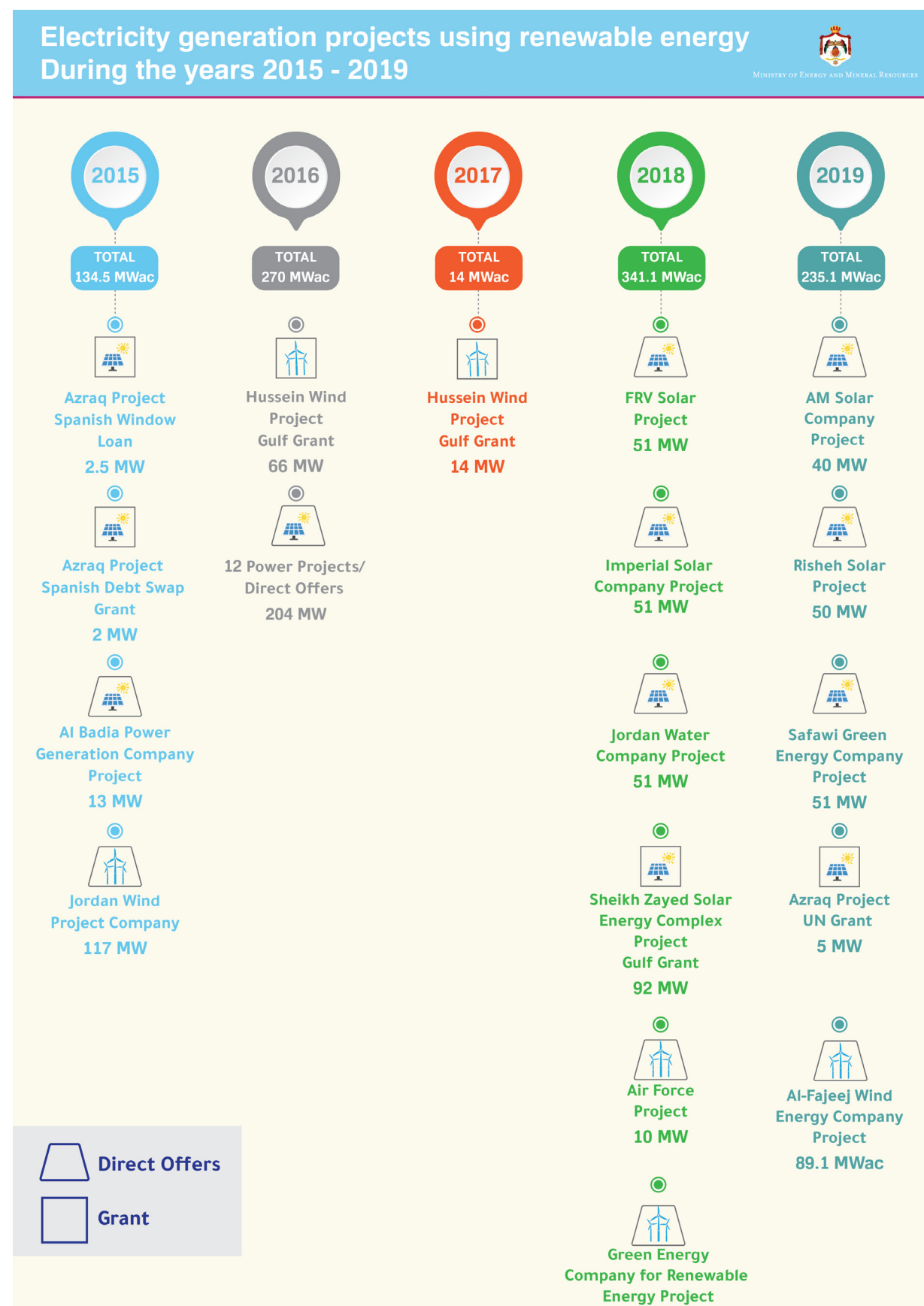
1.1 Generation using natural gas



1.2 Generation using renewable energy

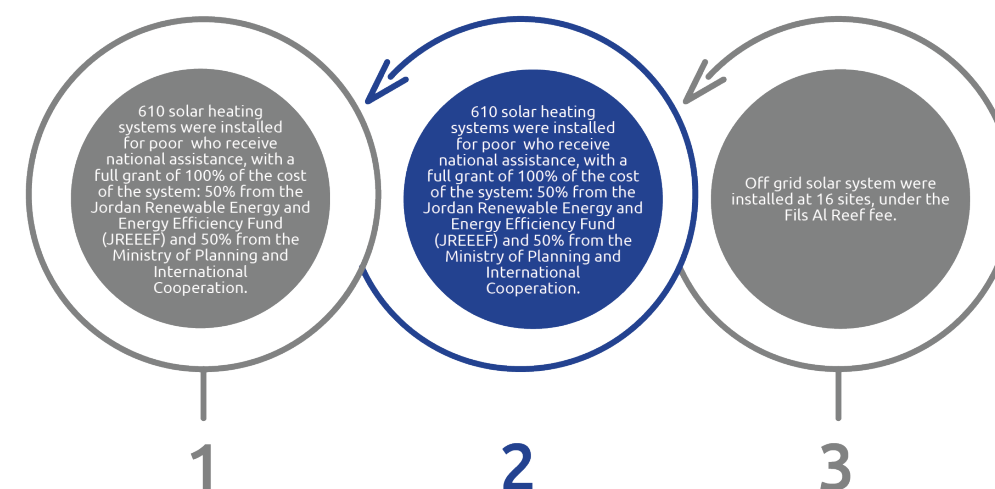


Electricity Generation Projects By Renewable Energy For The Period (2019-2015)

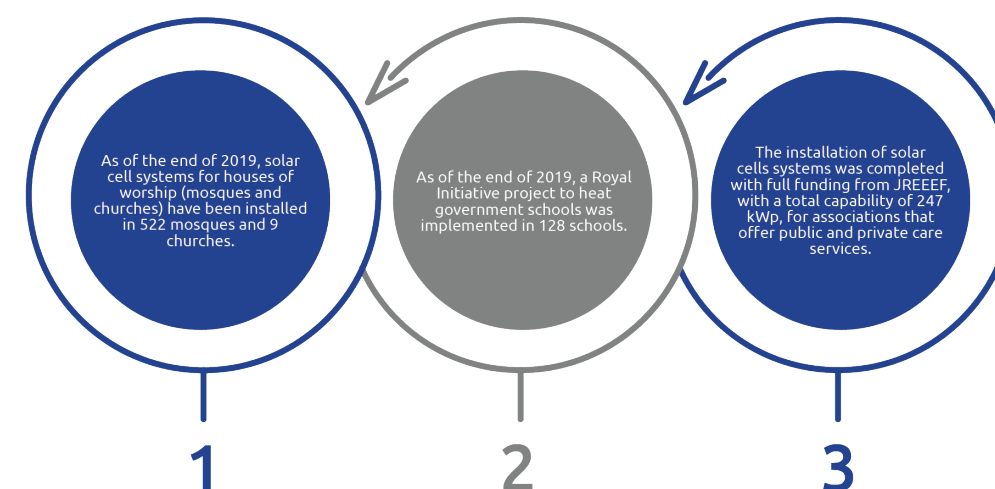


1.2.1 Small PV Systems

Residential Sector Programs



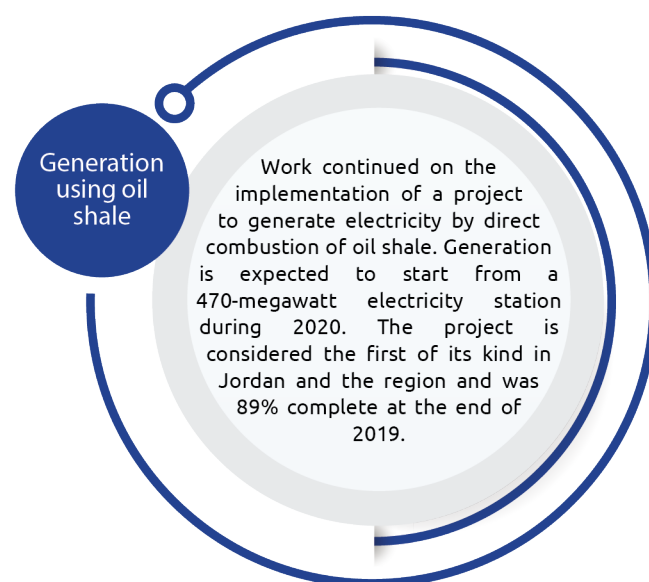
Government Buildings Programs



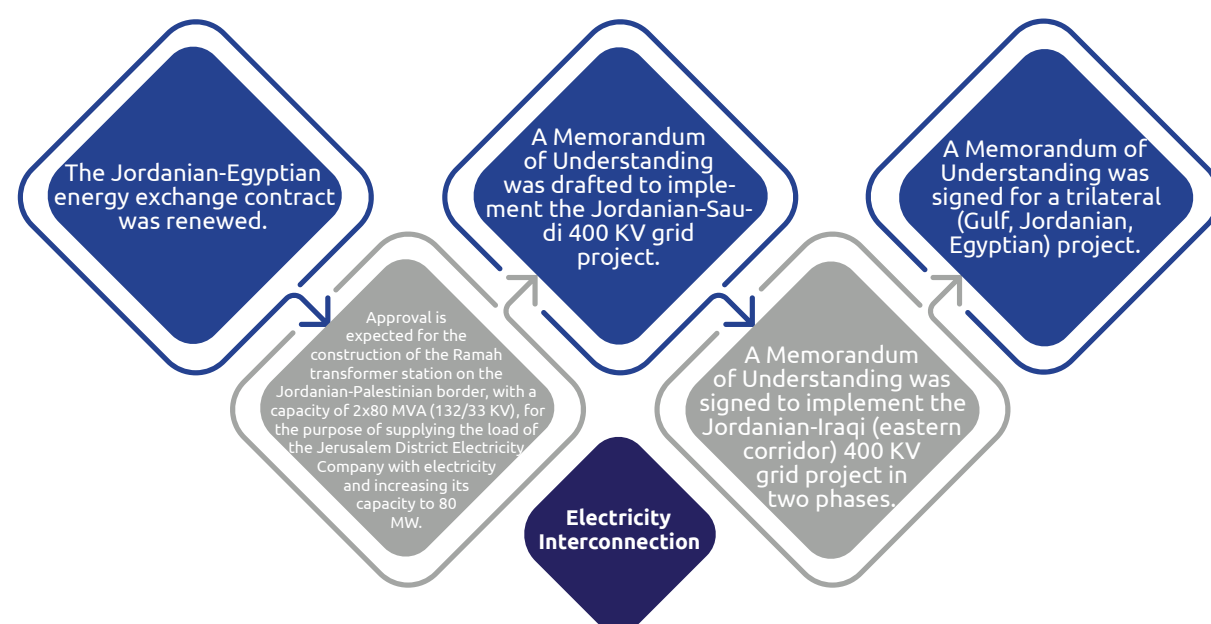
Agricultural Sector Programs



3.1 Generation using Oil Shale



4.1 Electricity Interconnection



2. Energy Saving & Energy Efficiency

The Ministry is implementing several programs to monitor energy consumption and improve efficiency, targeting various sectors and including all governorates of the Kingdom. JREEEF implements some of these programs through various financing programs and frameworks, and in partnership with international donor institutions, commercial banks, foundations, umbrella groups in the sector and local development associations as follows:

2.1 Residential Sector Programs

1

The total installed capacity of electric power generation projects from renewable energy sources was about 1558 megawatts by the end of 2019, producing more than 13% of the total electrical energy generated in the Kingdom.

2

Renewable energy projects include 985.5 megawatts for commercial renewable energy projects in which the electrical energy generated is sold to electricity companies (through direct proposal projects for solar cells, wind energy, and government-owned projects funded by grants). Renewable energy projects also include 573 megawatts of renewable energy systems owned by subscribers to cover their consumption by using net metering and wheeling. This covers various sectors—residential, universities, houses of worship, and various institutions in the public and private sectors.

3

The implementation and connection of the electricity generation project using solar cells in Azraq, completed and funded through a grant from the European Union, has a capacity of 5 megawatts.

4

The implementation and connection of the electric power generation project in the southern Amman region using solar energy, completed and funded by the German government/KfW Entwicklungsbank, has a capacity of 40 megawatts and aims to serve the communities hosting Syrian refugees.

5

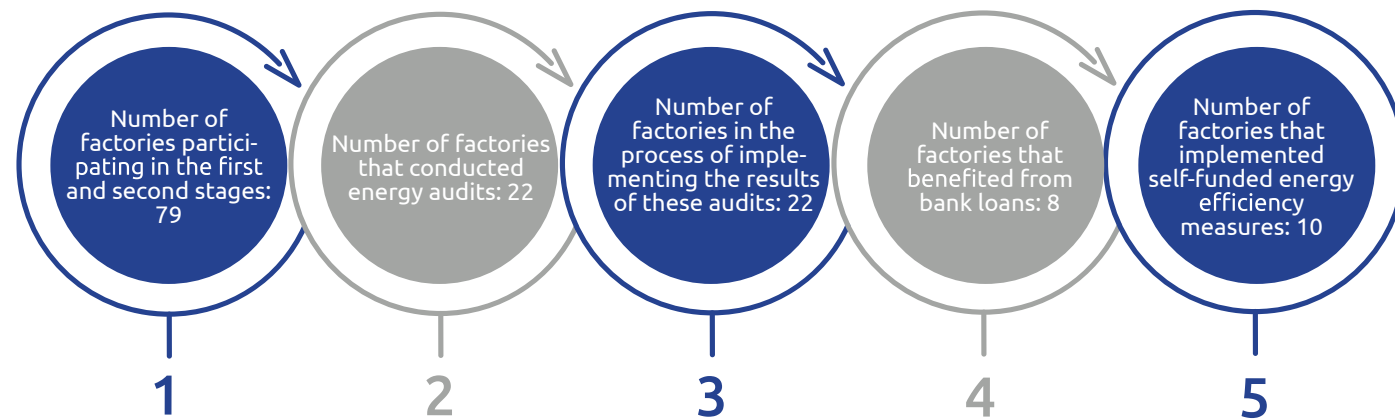
A project to generate electricity using solar cells in Azraq, with a capacity of one megawatt and funded through the Spanish debt swap grant, has been re-tendered.

6

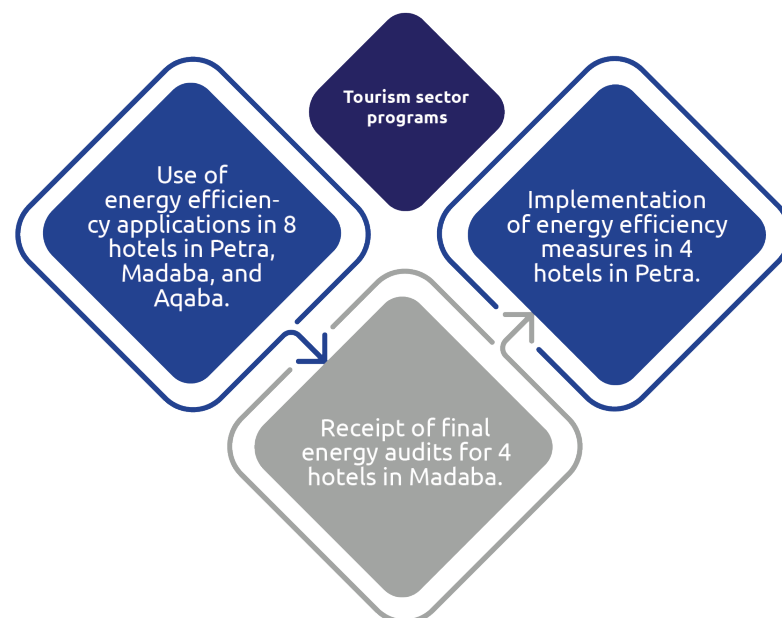
The commercial operation of the Fajeij wind energy project (July 2019) has a capacity of 89 megawatts.

2.2 Industrial Sector Programs

Implementation is ongoing of renewable energy and energy efficiency technologies in the industrial sector (small and medium industries), with the following performance metrics:



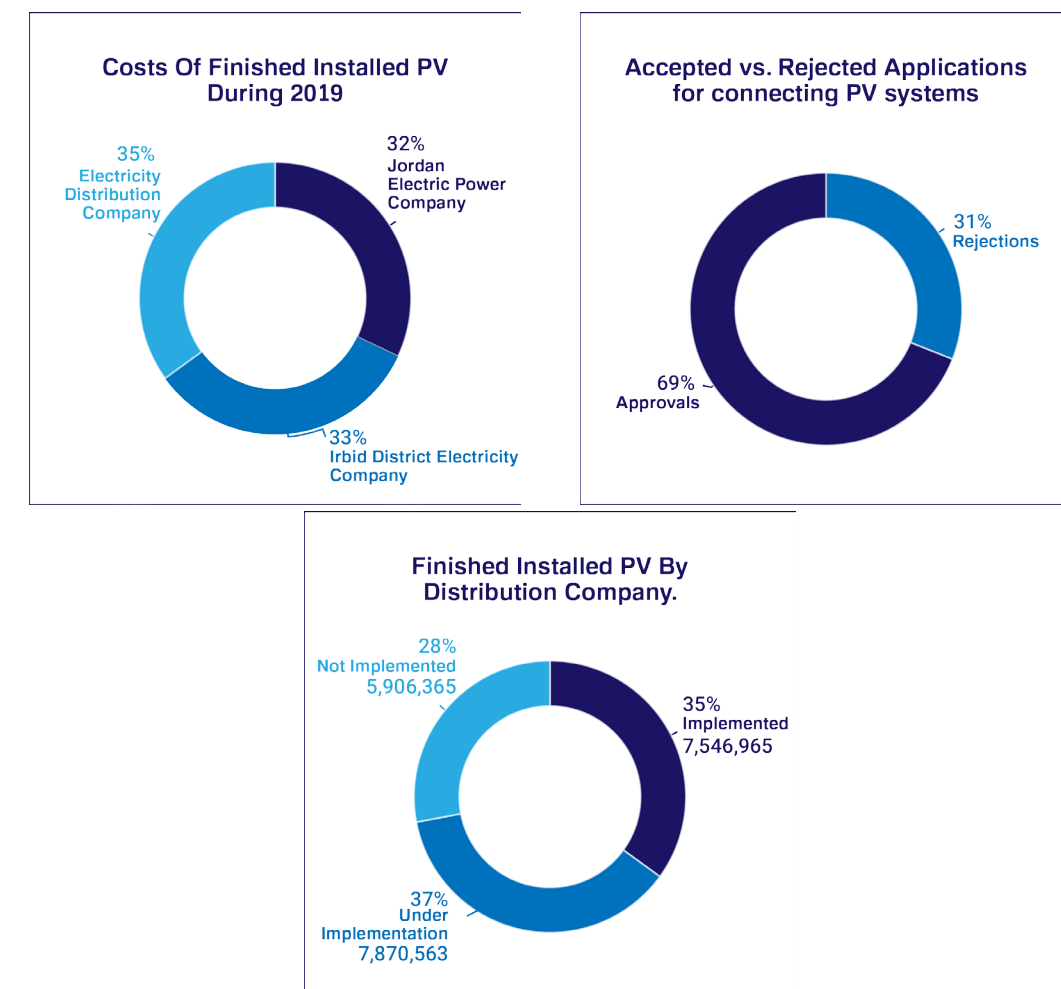
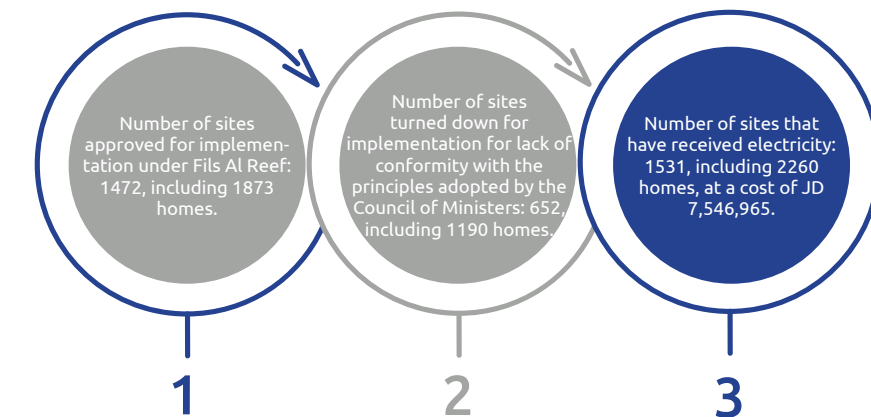
2.3 Tourism Sector Programs



3. Rural Electrification

The Ministry continues efforts to deliver electricity to remote villages, rural communities, and poor via the Fils Al Reef fee. The project contributes to the development of local communities and supports various sectors, and also encourages the use of renewable energy sources by utilizing solar cell systems not connected to the grid for communities and farms in rural areas.

There were 2124 applications for Fils Al Reef in 2019, including 3063 homes, broken down as follows:

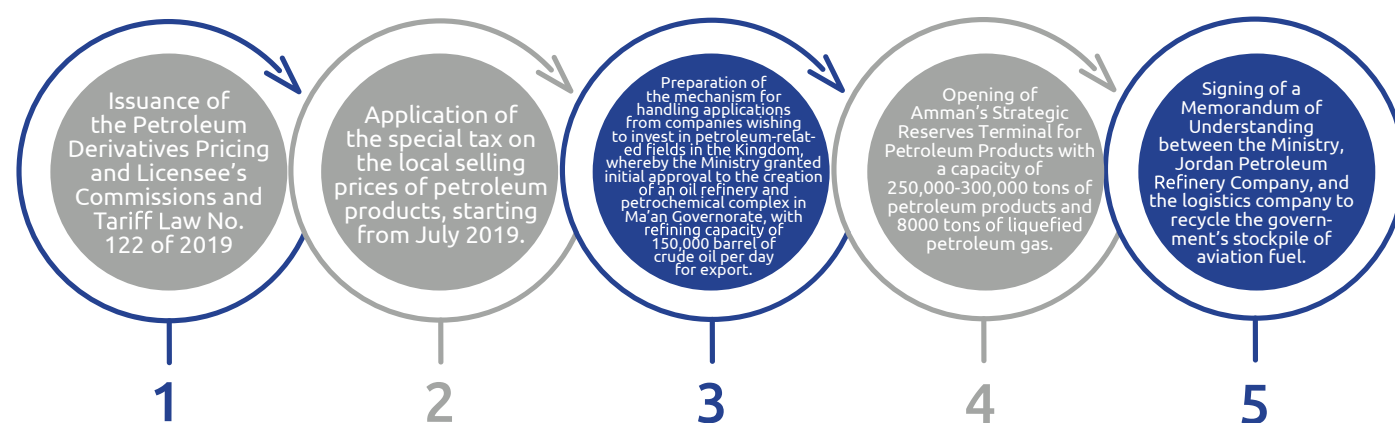


4. Oil Sector

4.1 Diversification of crude oil sources

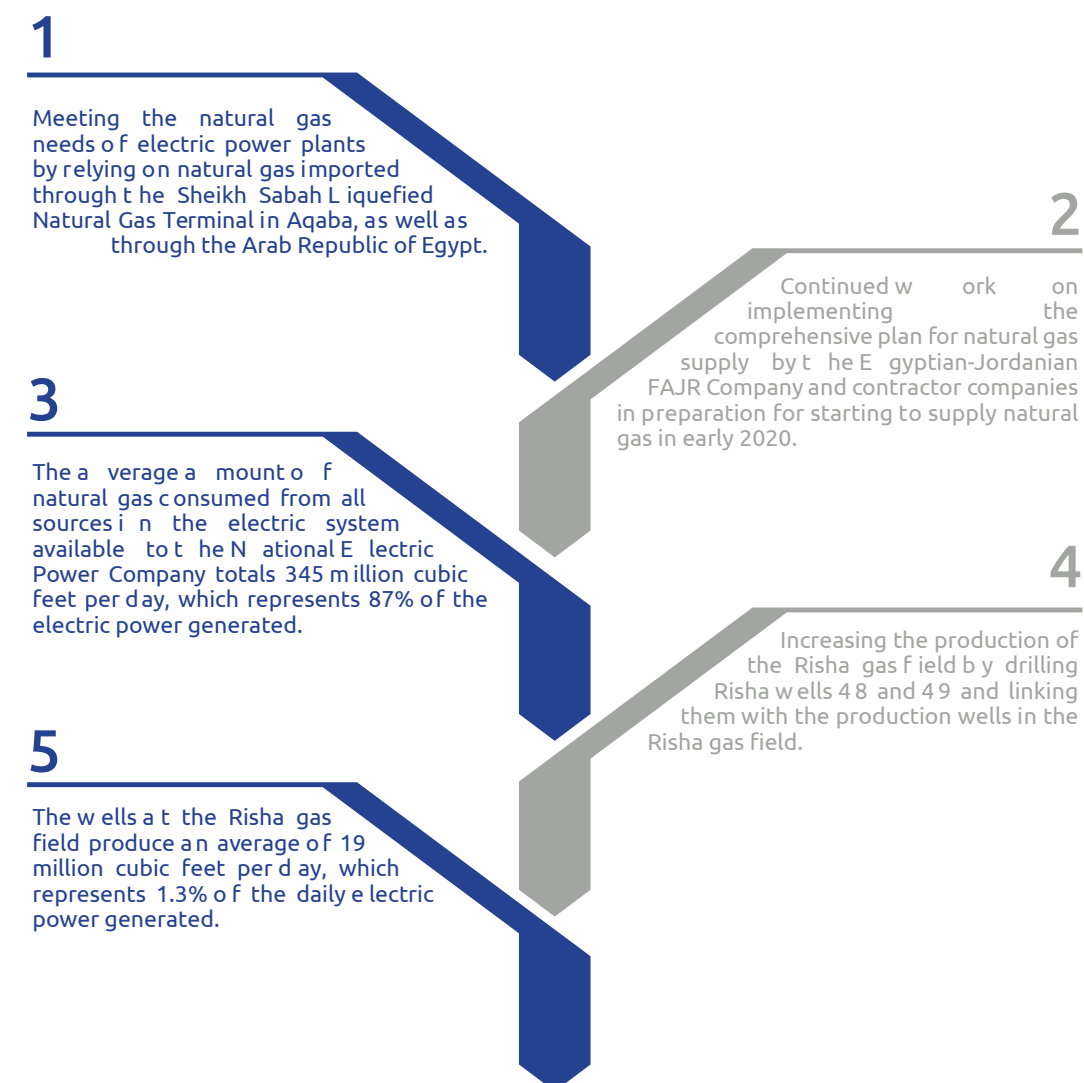


4.2 Petroleum products sector

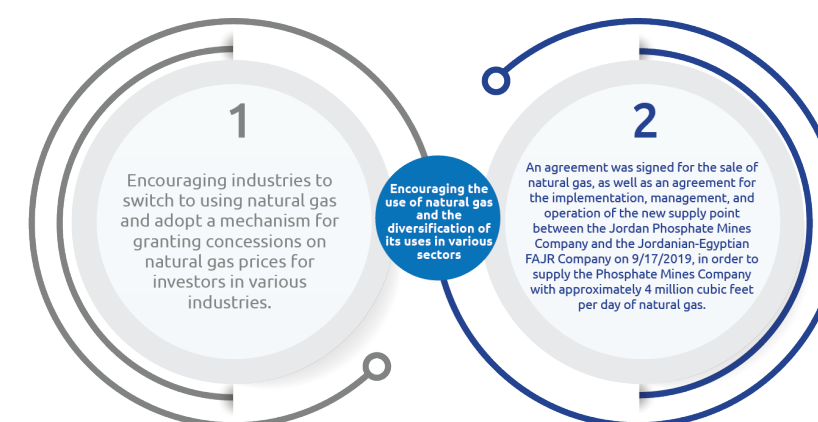


5. Natural Gas sector

5.1 Diversification of natural gas sources



5.2 Encouraging the use of natural gas and the diversification of its uses in various sectors



6. Mineral Resources sector

6.1 Petroleum and oil shale

1

Implementation of infrastructure maintenance at the Hamza oil field has begun, and an executive plan has been drawn up to complete the Hamza oil field development plan.

2

Completion of the division of areas open to oil shale (21 areas for surface distillation, and one for underground distillation) and preparation of final maps of the areas open for investment.

3

Analysis by the University of Freiburg in Germany of 600 samples of shale from the Sarhan wells in the east of the Kingdom, to build upon a previous extensive study to determine the amount of unconventional oil shale reserves.

4

Preparation of a direct review system for exploration and exploitation of petroleum, oil shale, coal, and strategic minerals, following official approval procedures.

6.2 Geology and mining

6.2.1 General geological survey project

- Preparation of two geological maps (one at a scale of 1:100,000 and the other at 1:50,000) of the following regions: Wadi Hadraj, Wadi Al-Dhbei'ani, and Mashash Hadraj.
- Preparation and publication of a geological report for the Wadi Abu al-Hamam area.

6.2.2 Geochemical survey project

- Detection of the presence of rare-earth elements and radioactive ores in the formation of stones with high concentrations.
- Initial report on anomalous area 3, a metallic rock formation for rare-earth and radioactive elements in the southwestern part of Al-Dubaydib area, preparation to conduct drilling and evaluation of the ore, and collection of 267 geochemical samples from the Al-Dubaydib formation to cover anomalous areas 3-1.

6.2.3 Geophysical prospecting studies and surveys project

- Continued work on prospecting for rare-earth, precious, and radioactive elements in cooperation with the Atomic Energy Commission, in two stages:
 - Stage One: Receipt of the results of all laboratory analyses.
 - Stage Two: Drilling of 51 wells in 24 trenches within an area of 60 km² and approximately 1561 meters deep. 800 samples were collected and sent for laboratory analysis; 142 have been received back.
- Continued work in the exploration for lithium in Dead Sea rocks. 56 samples were sent for laboratory analysis, 51 samples were received back, and the final report was prepared.
- Four calculations of Bouguer and free air anomalies, at a scale of 1:50,000 were added to the geophysical index of the gravitational survey.
- Measurement of the Earth's gravitational values at 168 stations.
- Updating of the Kingdom's general gravity survey project database.
- Geophysical survey conducted in cooperation with Germany's Federal Institute for Geosciences and Natural Resources (BGR), within the project for managing groundwater resources in Syrian refugee areas, and measurements completed at 26 stations via the magneto telluric method (MT) to determine the level of groundwater in basalt wells.
- Geophysical studies services implemented via various geophysical methods, such as geo electric, seismic survey, ground radar, geomagnetism, electromagnetic method, and gamma spectroscopy imaging.

6.2.4 Exploration projects and marketing of mineral resources

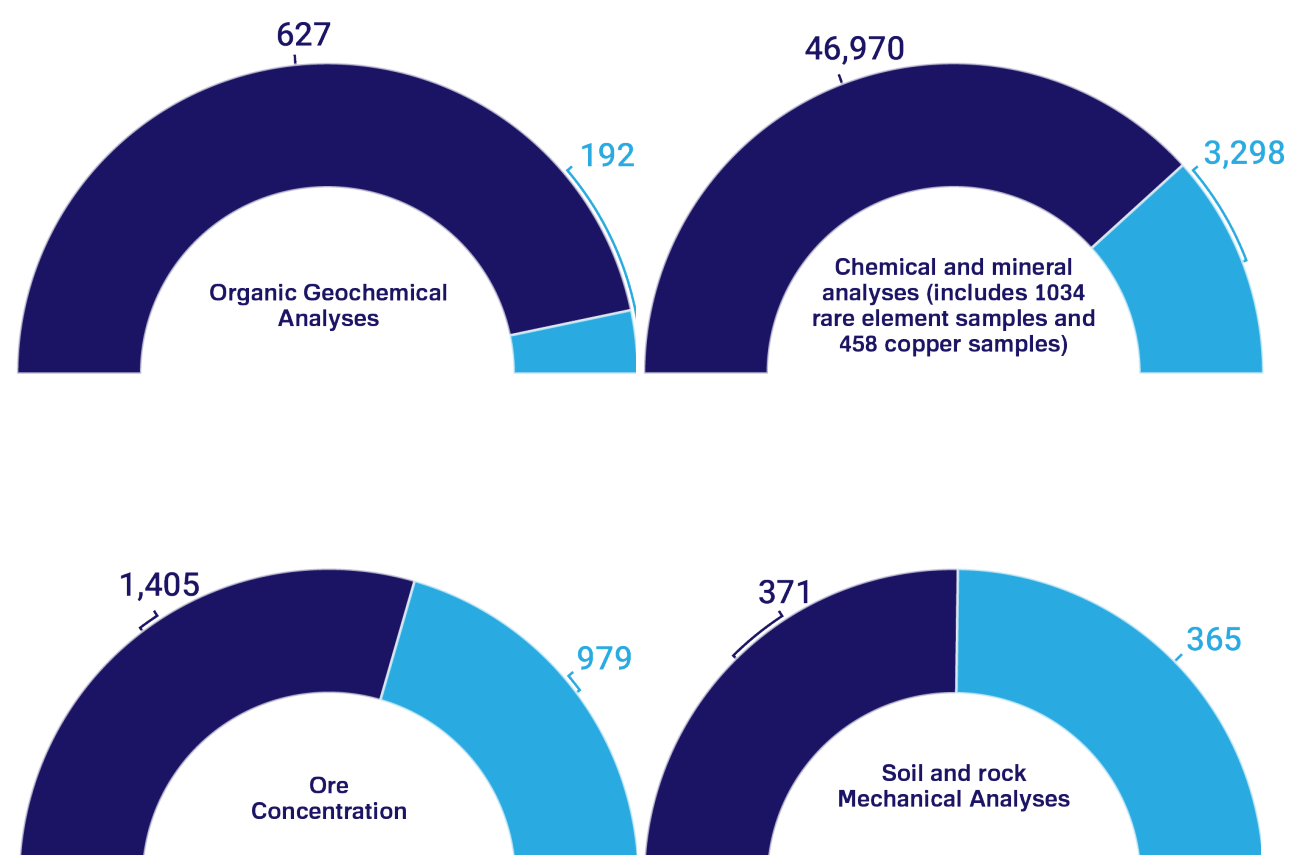
- Follow-up of the copper exploration project in Dana.
- Follow-up of potash evaluation in the Lisan Peninsula of the Dead Sea.

7. Laboratory Analyses

Ministry laboratories provide the service of conducting all chemical and mineral analyses and tests of various natural rocks samples for the public and private sectors and various directorates of the Ministry, in accordance with ISO17025 IEC/2005. All 14 laboratory tests were approved by the accreditation unit of the Jordan Standards and Metrology Organization.

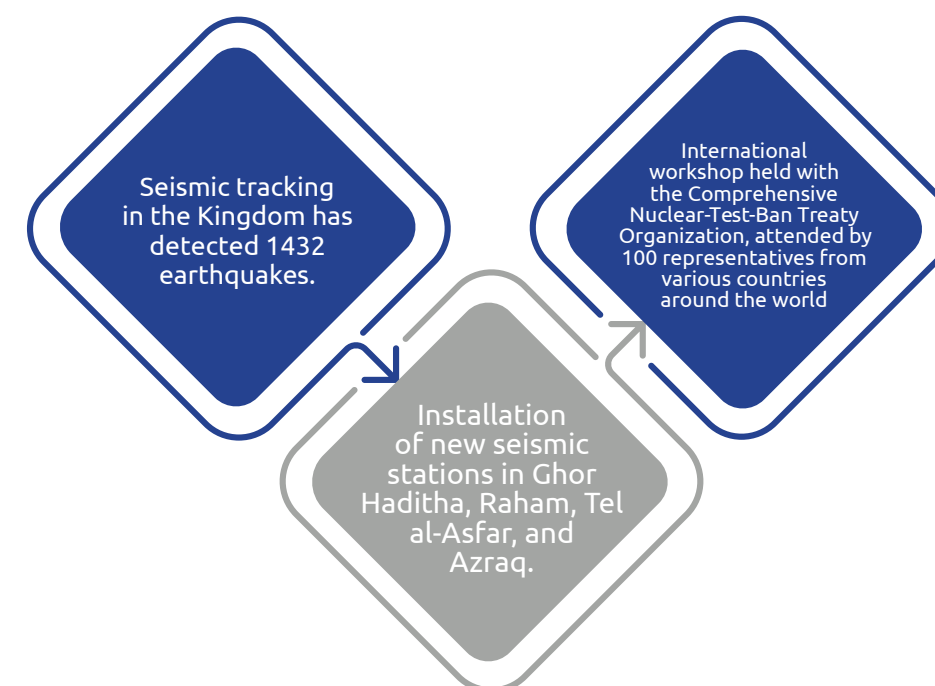
There have been 49,373 tests, as detailed below.

Number of Laboratory Tests Conducted in 2019



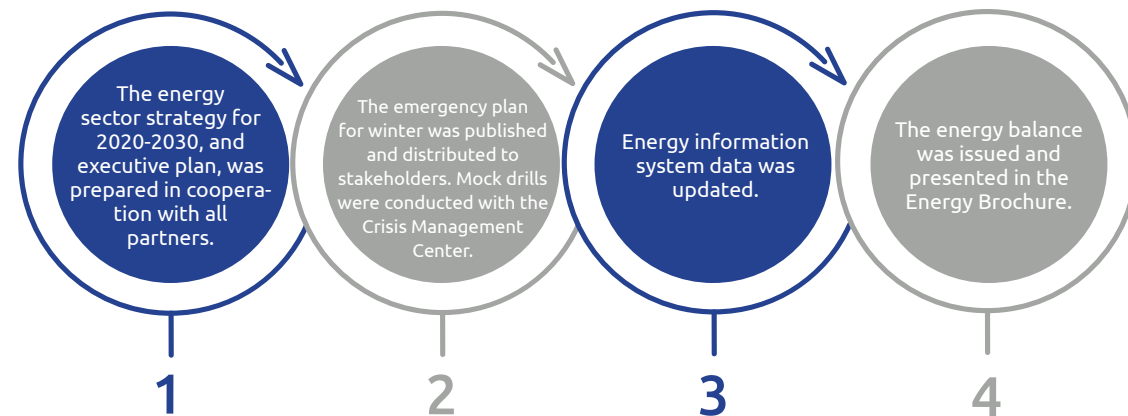
عدد العينات ■ عدد التحاليل والفحوصات

7.1 Seismology

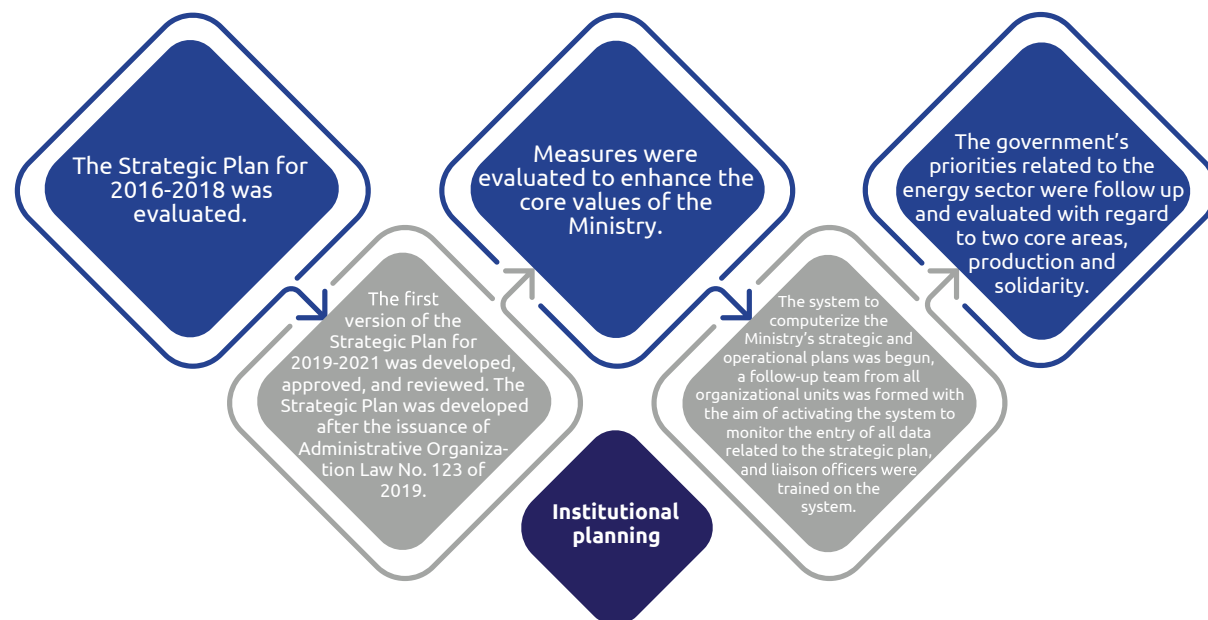


8. Institutional Planning and Development

8.1 Energy sector planning

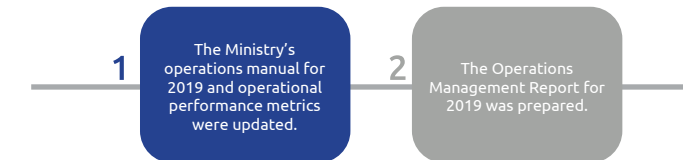


8.2 Institutional planning



8.3 Development of operations and services

Based on the comprehensive methodology for operations management for 2019:

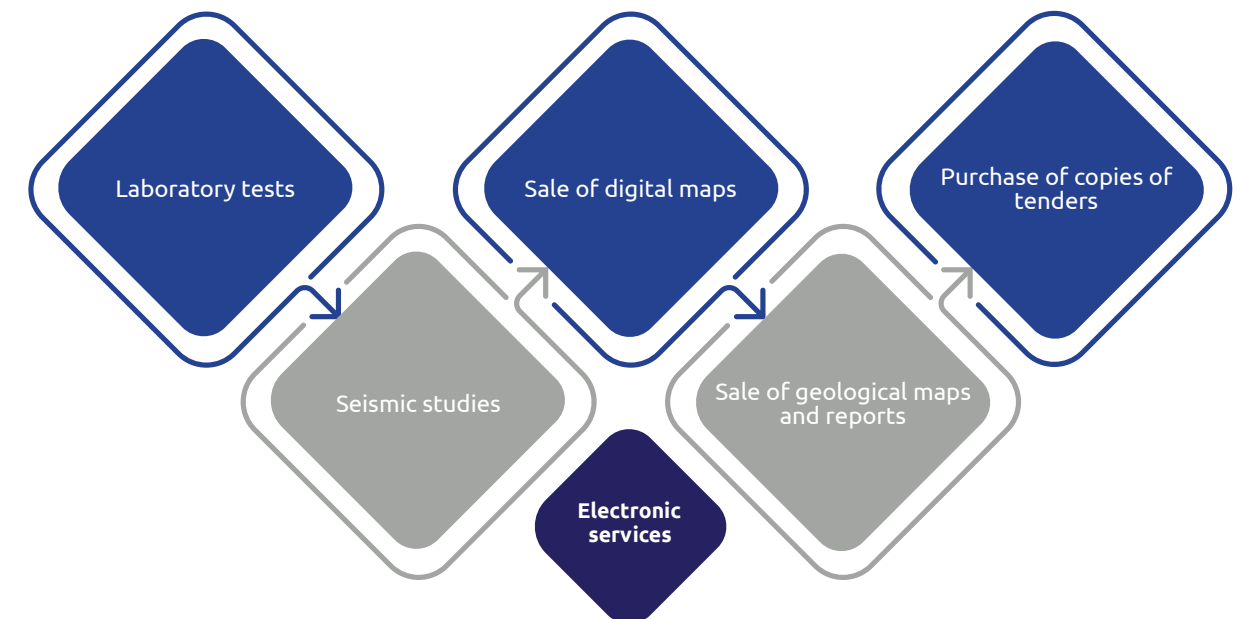


Based on the methodology for managing the relationship with customers for 2019:

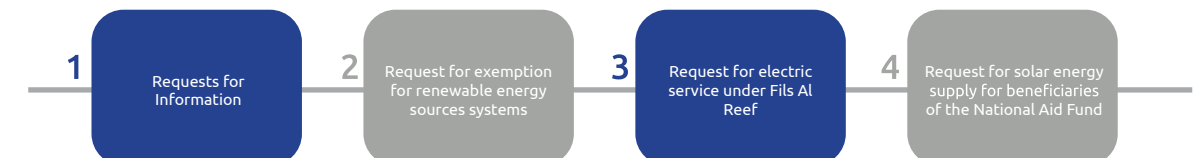


8.4 Electronic services

In order to facilitate the customer, five electronic services have been launched whereby a request for service is submitted through the Ministry's website, and payment is made through the eFAWATEERcom electronic payment system for the following services:



Likewise, the following service request forms were also automated:



8.5 Electronic readiness

- %91 of employees are provided with new computers, and %98 of these devices are equipped with internet and email service.
- Number of electronic systems: 16

8.6 Management of knowledge and innovation

- The methodology for information and knowledge management methodology and for holding lectures was approved for 2019.
- 19 awareness lectures on various topics were held, with the intellectual impact of the lectures in 2019 reaching %99.57.
- Clear knowledge assets were inventoried, and confidential documents in all organizational units were updated.
- 84 requests for information (77 electronic and 7 papers) were responded to. The response rate was 2.5 per day, and customer satisfaction was %92.8, according to the status of requests for information in the Ministry for 2019.
- The celebration of Right to Access Information Week was celebrated in the Ministry as follows:
 - Awareness brochures on the right to access information were distributed in the vicinity of the Ministry.
 - Awareness sessions were held with the organizational units most subject to requests for information from 2019-2018.
 - Awareness messages on the right to access information were featured on electronic screens on Ministry floors.

8.7 Mineral resources planning

- Drafting of the mineral resources strategy was begun by preparing a report on the performance of the mineral resources sector in Jordan.

8.8 International cooperation

- The following Memoranda of Understanding were signed:
 - Memorandum of Understanding between the Jordanian Ministry of Energy and Mineral Resources and the Lebanese Ministry of Energy and Water for cooperation in the field of energy, renewable energy, and energy conservation, through joint projects utilizing the Eight Countries Electric Interconnection Project (including Jordan, Egypt, Iraq, Syria, Turkey, Libya, Lebanon, and Palestine) and through exchanging information and expertise in the energy field.
 - Record of Discussion between the Ministry of Energy and Mineral Resources, the National Electric Power Co., and the Japan International Cooperation Agency (JICA) to begin a project incorporating renewable energy into the electric network. This is related to Japan's Technical Assistance program.
 - Memorandum of Understanding between the Ministry of Energy and Mineral Resources and Mubadala/Abu Dhabi in the field of electric energy, with the main goal of formalizing the intention of the parties to discuss the feasibility of developing Jordan's energy sector.
 - Memorandum of Understanding to implement a 400 KV Jordanian-Saudi connection project.
 - Memorandum of Understanding to implement a 400 KV Jordanian-Iraqi (eastern corridor) connection project in two stages.
 - Memorandum of Understanding signed for a trilateral (Gulf, Jordanian, Egyptian) project.
 - Memorandum of Understanding between Jordan and Iraq to import 10,000 barrels of Iraqi oil per day.
 - Memorandum of Understanding signed between the government of the State of Palestine and the government of the Hashemite Kingdom of Jordan to ensure supply of the Palestinian market's need for petroleum products.
 - Work is underway to complete the process of signing 10 Memoranda of Understanding with the following countries: France, Czech Republic, United States of America, India, Bulgaria, Morocco, Saudi Arabia, Kazakhstan, the Germany's University of Freiburg, and the Sultanate of Oman.
 - Five joint high committee meetings were held.
 - Proposed points for bilateral cooperation in the field of energy and mineral resources with 20 countries were prepared.

Measures Taken to Reduce Energy Costs for Production Sectors

1

A capacity of 100 MW on the electric grid was allocated for the benefit of small and medium industries.

2

New industries that switch to the use of natural gas were exempted from the special tax for a period of three years, and concessions on gas prices were granted to investors in various local industries in order to reduce costs and increase the competitiveness of local products.

3

Major consumers were allowed to reserve capacity from solar energy projects to cover their consumption.

4

Preferential pricing was approved for all production sectors for the additional consumption of electricity compared to the previous year, at 7.5 fils/kilowatt hour (additional consumption). This takes into account the selling price of electricity for the quantities of electricity consumed in any year that exceeds the amount of consumption in the preceding year, at 7.5 fils/kilowatt hour (day and night). This is for all production sectors with an electrical tariff that exceeds 7.5 fils/kilowatt hour, effective 2020.

5

The electricity tariff on the medium and small industry sector was reduced by 10 fils/kilowatt hour, effective January 1, 2020.

6

To reduce the burden on the agricultural sector, reduce production costs by reducing the cost of electricity borne by farmers, and increase export opportunities, the peak load penalty on the agricultural sector was reduced and made equal to the peak load penalty for medium industries, i.e., JD 2 /kilowatt hour instead of the JD 3.79 currently in effect.

7

The tariff for pumping water was reduced by 10 fils/kilowatt hour, i.e., to 105 fils/kilowatt hour from the current 115 fils/kilowatt hour.

Measures Taken to Reduce Energy Costs for Citizens and the Public Sector

1

Implementation has begun on a project to install solar water heating systems to the poor (recipients of makruma), with 2448 solar water heater systems installed in all governorates of the Kingdom, with full grants from JREEEF.

2

A project to heat government schools was implemented in 128 schools (Royal Initiative).

3

Four tenders were offered for all municipalities of the Kingdom, in coordination with the Ministry of Municipal Affairs, to replace all traditional street lighting in all municipalities of the Kingdom with energy-saving units. Through Fils Al Reef, the Ministry will fund JD 35 million of the value of the project over seven years, at a rate of JD 5 million annually. Implementation is expected to start during the fourth quarter of this year.

4

The first phase of 12 bids to install solar photo voltaic system with a capacity of no more than 2 KW in the homes of poor and beneficiaries of the National Aid Fund were awarded through Fils Al Reef to contractors in all governorates of the Kingdom. Work has started on 2213 homes at various sites within the Kingdom's governorates.

5

The second phase of 11 bids to install solar photo voltaic system with a capacity of no more than 2 KW in the homes of poor and beneficiaries of the National Aid Fund were tendered through Fils Al Reef in all governorates of the Kingdom for 3166 homes.

6

Rural electrification programs are ongoing with regard to installing solar water heater(swh) that are not connected to the grid for families who have obtained a social survey study, for artesian wells, and for schools and tourist areas in remote regions.

Energy Sector Obligations within the Priorities of Government Work in 2019

State of Production

- By %35,2020 of Jordan's electricity comes from local energy sources, including renewable energy (%20) and oil shale (%15).
- Reducing the cost of electricity for small and medium industries via providing solutions and alternatives, such as designating 100 MW of electricity from renewable energy.
- Reducing the cost of electricity for the production sector.
 - Providing loans through the Agricultural Credit Corporation for small farmers to install solar energy systems, with interest paid by JREEEF.
 - Signing agreements between the National Electric Power Co. and the Phosphate Company to benefit from the stage one renewable energy projects, thus reducing their electric costs.
 - Supporting four hotels in Petra to install energy efficient systems.

State of Solidarity

- Replacing all traditional street lighting in all municipalities of the Kingdom with energy-saving units, with the Ministry, through Fils Al Reef, financing JD 35 million of the value of the project over a period of 7 years at a rate of JD 5 million annually.
- Installing renewable energy systems to fuel the consumption of municipal buildings.
- Reducing the burden of electric bills on poor families and those benefiting from the National Aid Fund.

Performance Metrics for the Energy and Mineral Resources Sector

Jordan's Notable Global Energy Rankings





MINISTRY OF ENERGY AND MINERAL RESOURCES

www.memr.gov.jo

TEL: +962 6 5803060

FAX: +962 6 5865373



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