



## JICA's Cooperation for Electricity Sector in Jordan



JICA Jordan Office

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## Message from Chief Representative of JICA Jordan Office

*Mr. Shokichi SAKATA*

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60 years have passed since the diplomatic relation between Jordan and Japan was established in 1954. In 1985, two agreements between the two countries on JICA activities were concluded. One is the technical cooperation agreement and the other is the agreement on Japan Overseas Cooperation Volunteers. In addition to that, for the promotion of South-South Cooperation in the region, Japan-Jordan Partnership Program was agreed in 2004, furthering Jordan's position as a donor country and entering a new stage of relationship between the two countries.



During this history, the Government of Japan and JICA has supported Jordan in the various fields with 3.8 billion dollars till now, including training for more than 2,200 Jordanians in Japan, dispatch more than 1,400 experts and volunteers to Jordan.

Looking back to the long history of Japanese Official Development Assistance (ODA) to Jordan, Electricity sector is one of the most important fields of JICA's cooperation activities in Jordan to enhance the capacity of electricity sector people through extraordinary effort of Jordanian Counterparts, JICA Experts, Embassy of Japan in Jordan and JICA Jordan Office staffs. I appreciate their great contribution in this field so I would like to introduce some of our achievements by this brochure.

Even though Electricity sector in Jordan is facing some challenges, I believe that Jordanian people can overcome and JICA will cope with the issues together Jordanian people in order to realize JICA's vision "Inclusive and Dynamic Development".



## Message from Managing Director of NEPCO

*Eng. Abdelfattah Aldaradkah*

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Over the last three decades NEPCO together with JICA played a key role in developing the electrical sector in the region and as a part of the fruitful Japanese – Jordanian partnership, the mutual achievement is crowned by the high level of accomplishments in building up the capacity of the electrical sector in the region covering Iraq, Yemen and Palestine which was gained under the Third Country Training Program in cooperation with JICA.



NEPCO could not ignore the clear imprint of JICA in the development of NEPCO in different aspects starting from their participation in several technical studies by delegation of experts from Japan or participation in different of NEPCO activities by Japanese volunteers and currently handling the project for the Study on Electrical Sector Master Plan in the Hashemite Kingdom of Jordan which will start in year 2015, and finally their support through numerous contributions to the development of the equipment of the Electrical Training Center to the latest brands to suit the requirements of training over the region and through developing the experience of ETC staff.

NEPCO has been awarded the 7<sup>th</sup> JICA's Recognition Award among 21 persons and 4 organizations from four corners of the world.

NEPCO will continue supporting the bilateral relations between Japan and Jordan following the directives of His Majesty King Abdullah, through offering the best of its efforts through the continuous cooperation with JICA in all aspects to enhance the main goal of the development plan at all levels to face the various challenges and developments regionally and in the Middle East.



## JICA's Cooperation Policies in the Energy Sector

JICA has set up the following basic policies: Energy with Low-Cost, Low-Carbon, and Low-Risk (3L Policies).

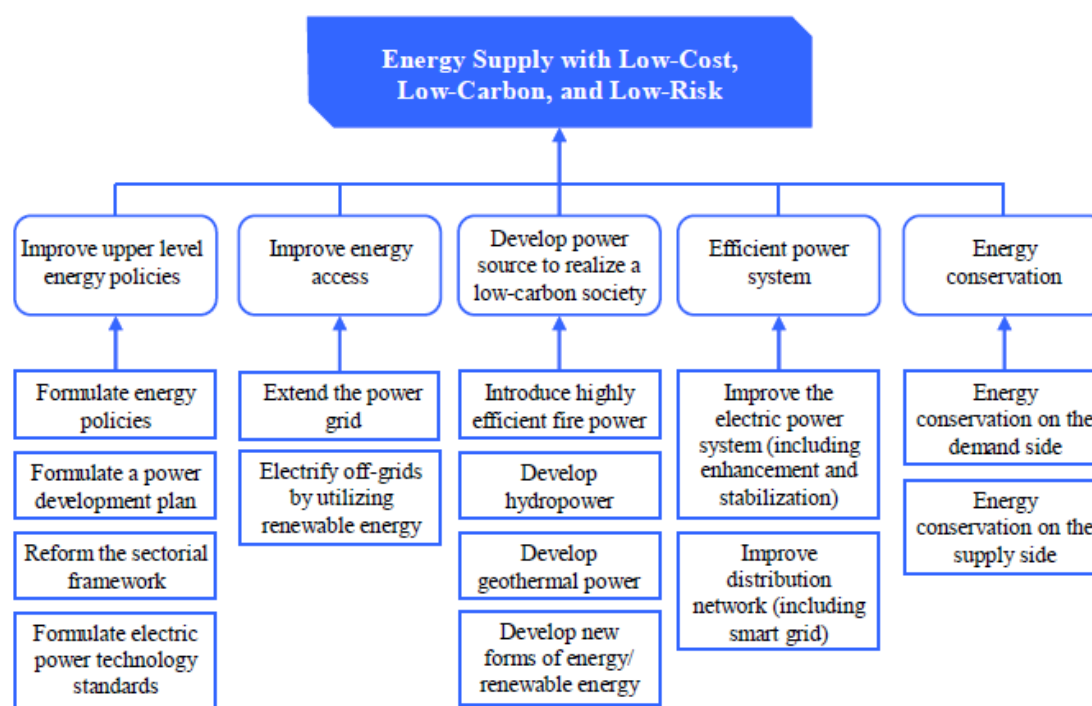
### “3L Policies”

The “Low-Cost” Policy refers to reducing the total cost, not just limited to the initial investment. More specifically, while introducing technology for excellent environmental performance with low carbon, high efficiency, and high reliability, the policy contributes to reducing the total cost that includes the life cycle cost and external diseconomies. In order to avoid overdevelopment, the policy also contributes to utilizing commercial investments under an appropriate development plan.

The “Low-Carbon” Policy refers to realizing low carbon emissions. More specifically, it targets the core power system (i.e., major source of CO<sub>2</sub> emissions), and contributes to CO<sub>2</sub> reduction as much as possible by utilizing Japan’s excellent technologies, introducing such low-carbon power sources as highly efficient thermal, hydro, geothermal, and other sources of renewable energy, reducing loss from power grids, and promoting energy conservation.

The “Low-Risk” Policy refers to reducing risks that threaten a stable supply of energy. More specifically, the policy contributes to stably securing the primary energy, realizing the best mix of energy, avoiding or reducing climate risks, and ensuring power system stabilization.

In order to achieve the development issues of the “3L Policies,” it is necessary to solve the issues indicated in the systematic diagram below.



## Overview of JICA's Cooperation for Electricity Sector in Jordan

No.	Contents	Counterpart	Amount (JPY)
<b>1</b>	<b>Yen Loan Project</b>		
1)	1994: Energy Sector Adjustment Loan	GoJ	8,393,000,000
2)	1994, 1996: Aqaba Thermal Power Plant Expansion Project (I) (II)	JEA→CEGCO	15,306,000,000
<b>2</b>	<b>Technical Cooperation Project</b>		
1)	1986.3-1991.2: Technical Cooperation Project for the Electric Power Training Center in the Hashemite Kingdom of Jordan	JEA	1,111,000,000
2)	1993.5-1995.3: The Aftercare Program for the Electric Training Center in the Hashemite Kingdom of Jordan (I)	JEA	40,000,000
3)	1998.11-2000.3: The Aftercare Program for the Electric Training Center in the Hashemite Kingdom of Jordan (II)	NEPCO	35,000,000
4)	2004.5-2005.9: Rehabilitation of National Electric Power Co. Training Center	NEPCO	51,000,000
<b>3</b>	<b>Development Study</b>		
1)	1995.7-1997.3: The Study on Electric Power Loss Reduction of Transmission and Distribution Networks in the Hashemite Kingdom of Jordan: Master Plan (M/S)	JEA→NEPCO	153,000,000
2)	1998.12-2000.10: The Feasibility Study on the Loss Reduction Project of Distribution Network in the Hashemite Kingdom of Jordan	NEPCO	159,000,000
3)	2015.1-2017.3: The Project for the Study on Electrical Sector Master Plan in the Hashemite Kingdom of Jordan	NEPCO, MEMR, EMRC	
<b>4</b>	<b>Training in Japan/Dispatch of Japanese Experts</b>		
1)	1965-2013: Training in Japan		72 participants
2)	1971-2013: Dispatch of Japanese Experts		62 experts
3)	1999-2013: Dispatch of Japanese Volunteers		3 volunteers
<b>5</b>	<b>Third Country Training Program</b>		
	Participated countries: Algeria, Bahrain, Egypt, Iraq, Malawi, Mauritania, Morocco, Oman, Palestine, Qatar, Saudi Arabia, Sudan, Syria, Tunisia, Yemen		15 countries 899 participants
<b>6</b>	<b>Others (Providing equipment)</b>		
1)	1994: Technical training equipment for equipment maintenance		64,000,000
2)	1995: Technical training equipment for Thermal Plant maintenance		10,000,000
3)	2012: Equipment for National Electric Power Co. Training Center		38,929,000

\* GoJ: The Government of Jordan, JEA: Jordan Electricity Authority, CEGCO: Central Electricity Generating Company, NEPCO: National Electric Power Company, MEMR: Ministry of Energy and Mineral Resources, EMRC: Energy and Minerals Regulatory Commission



## Yen Loan Project

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### Aqaba Thermal Power Plant Expansion Project (I) (II)

#### Outline of Project

In 1994, the available generation capacity was 988.8 MW while the peak load was 794 MW in Jordan. It means the electrical demand and supply was almost balanced because of stop of generation by overhaul and repair. In addition to that, Jordan's economic and social development had been experiencing growth. Real Gross Domestic Product (GDP) grew at 5.7% in 1994 and the generated energy forecast in Jordan was continued to increase at an average growth rate of 6.0 % from 1995 to 2000.

In response to the situation, the project was implemented to enhance the capacity of generation in Aqaba Thermal Power Plant by constructing two Steam Turbines (130 MW x 2) and necessary facilities such as power generators, natural circulation boilers, and transformers.

#### Project Impact

Aqaba Thermal Power Plant expansion positively contributed to the economic, social, and environmental aspects of the country's development plan. The availability of the electric energy promoted Aqaba Special Economic Zone Authority to realize their ambitious plans through boosting the industrial and tourist sectors in that region, Furthermore, this project increased the installed generating capacity of the country and became enable it to meet the increasing demand of electrical energy.



## Technical Cooperation Project, Third Country Training Program

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### The Electric Power Training Center

#### Outline of Project

The Electric Power Training Center (ETC)<sup>1</sup> was established in 1987 aiming at raising the efficiency of the technical staff working in the areas of serving the electrical system. JICA supplied Electric Training Center with all modern instruments and equipment for laboratories and workshops and aids to ensure the objective of the establishment, which provides ETC training programs specifically designed for staff in the field of electric power industry to keep pace with the rapid evolution and development skills of workers in the electricity industry.

#### Project Impact

ETC adopted as a regional hub by a number of international organizations as well as the JICA, to train and build the capacity of the technical staff working in the Jordan and neighboring countries to strengthen regional cooperation.

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<sup>1</sup> ETC located near Zarqa city about 40 KM from Amman, the total Center's building area approximately 6000 m<sup>2</sup>, 3500 m<sup>2</sup>, are designated for laboratories and workshops, and 2500 m<sup>2</sup>, are for lecturing rooms and administration building.



## Development Study

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### The Study on Electric Power Loss Reduction of Transmission and Distribution Networks in Jordan

#### Outline of Project

A 10-year Master Plan Study for electric power loss reduction in Jordan aims to provide countermeasures and recommendations for reducing the power loss in the transmission and distribution network down to a level reasonably attainable for the purpose of improving the energy efficiency of Jordan and sparing electric power equipment in the long run. The power losses to be studied were technical power losses in transmission lines, substations and distribution lines, excluding the auxiliary consumptions in the power stations. A consecutive implementation of feasibility study is required for the implementation of this plan study.

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### The Feasibility Study on the Loss Reduction Project of Distribution Network in Jordan

#### Outline of Project

As a country heavily dependent on imported fuels, Jordan is focusing on measures for power loss reduction from the view point of reduction of fuel related costs, conservation of energy and prevention of environmental pollution. The objectives of this study were to formulate technically and economically feasible plans to improve and reinforce the distribution network at the first stage for electric power loss reduction based on the recommendations of the "The Master Plan Study on Electric Power Loss Reduction of Transmission and Distribution Networks in Jordan", which was carried out on the nationwide power system during the period from July 1995 till March 1997.



# JICA's Future Cooperation for Electricity Sector in Jordan

## The Project for the Study on Electricity Sector Master Plan in Jordan

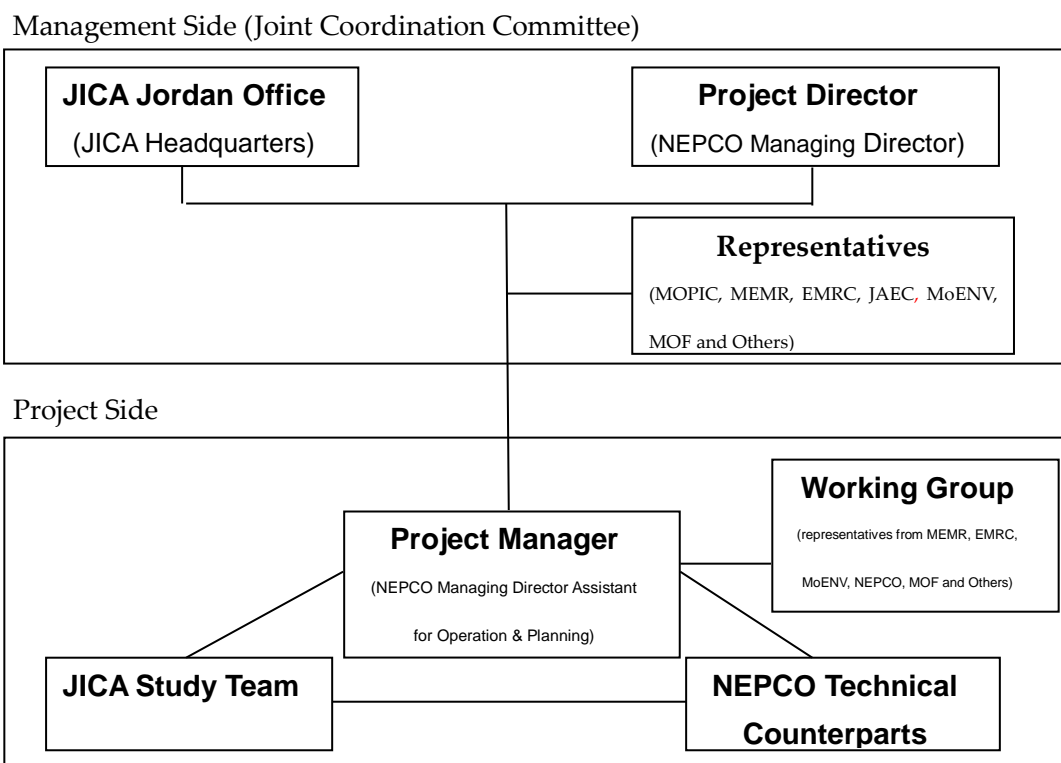
### Objective

The objectives of the Study which will cover the period 2015-2034, are to prepare Electricity Sector Master Plan for Jordan consisting of a long –term demand forecast, master plan for generation and transmission expansion, strategic environmental assessment and NEPCO investment plan, aiming at stable and economic electricity supply of Jordan for a long term. The project is expected to start from January 2015 and complete in March 2017.

### Expected outputs

- (1) Long-term load forecast
- (2) Master plan for generation and transmission expansion
- (3) Strategic Environmental Assessment Report
- (4) NEPCO Investment plan

### Project Organization Chart



\*MOPIC: Ministry of Planning and International Cooperation, JAEC: Jordan Atomic Energy Commission, MoENV: Ministry of Environment, MOF: Ministry of Finance,

## Message from Deputy Chief Program Officer of JICA Jordan Office

*Eng. Hani Kurdi*

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Jordan is among the highest in the world in dependency on foreign energy sources, import of natural gas and oil products from neighboring Arab countries are amounting 98% of Jordan's energy needs. This complete reliance on foreign oil imports consumes a significant amount of Jordan's GDP. This challenge led the country to plan to utilize local and renewable resources and to substitute oil with nuclear energy in generating electricity. The energy strategy is aiming to increase reliance on the local and renewable energy targeting 20% in the year 2020.



JICA have been contributing to the development of energy sector since early 1980s, electricity generation projects, master plan and feasibility studies, provision of equipment, dispatch of experts and capacity building of technical staffs from Jordan and neighboring countries were extended to Jordan.

Recently, and as energy sector rank of the highest priority and receives special attention from the Government of Jordan and the Donors, JICA will start on January 2015 the implementation of the Electricity Sector Master Plan Study covering the period from 2015-2034, aiming at stable and economic electricity supply of Jordan for a long term.

JICA is cooperating to the development of the energy sector in the areas where it is extremely needed, not forgetting the excellent Jordanian counterparts to whom thanks and appreciation is extended.



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