



Policy Planning for Energy Efficiency & conservation

From June 1, 2014 To June 20, 2014

JICA-Japan

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OUTLINE

 **Jordan Overview**

 **Electricity Sector in Jordan**

 **NEPCO Activity & Challenges**

 **Energy Policy**

 **Renewable Energy**

 **Energy Efficiency Strategies**

 **Primary Fuel Resources in Jordan**

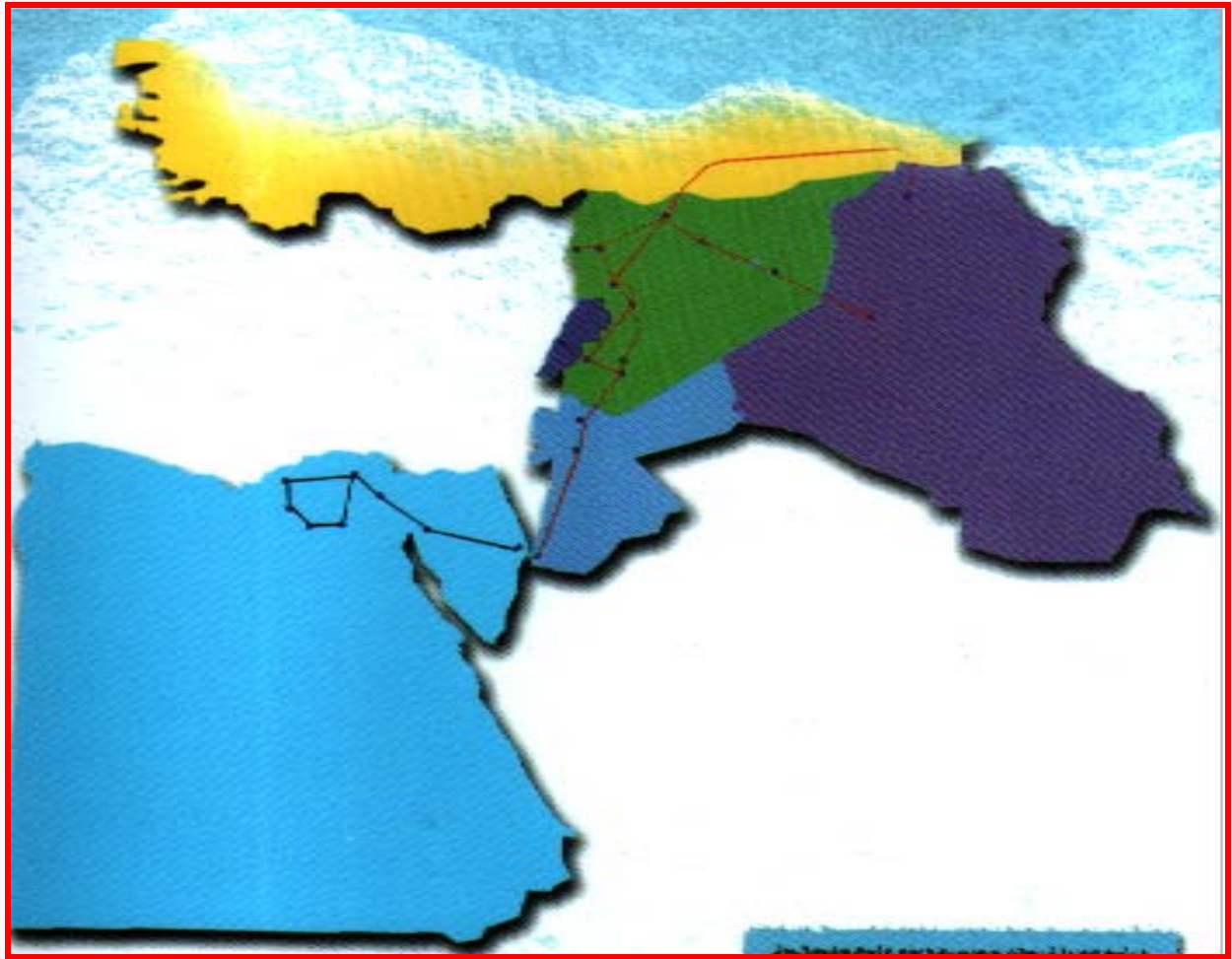
 **Participant's Job**

 **Participating Goals**





Jordan Overview.



Jordan is located in the heart of the Middle East.



Name : The Hashemite Kingdom of Jordan.

Jordan Borders

South: Saudi Arabia. East: Saudi Arabia & Iraq

North: Syria. West: Palestine & Israel.

Capital city: Amman.

Total area: 89 342sq. Km.

Population: 6.837 million

Official language: Arabic.

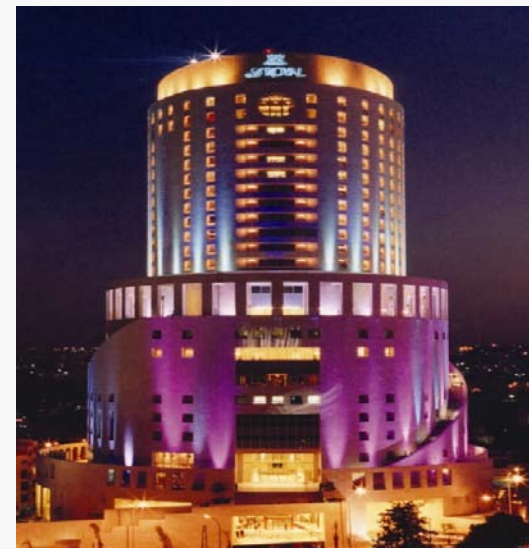
Sea Port: Aqaba.

Coast Line: 26 Km.





Jordan is one of the most developed nations in the Middle East. It is not only advanced in the educational and the electrical fields but also in the medical, agricultural, industrial, and pharmaceutical fields.



National Electric Power Company , Jordan

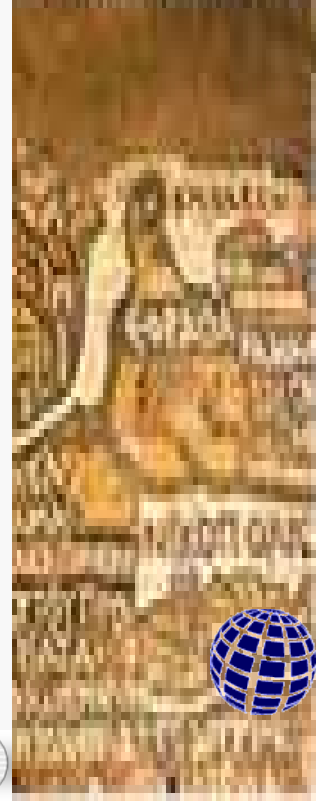
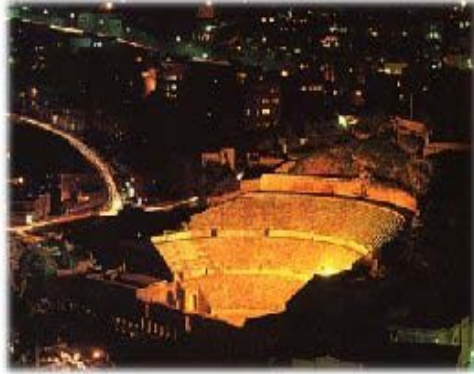
شركة الكهرباء الوطنية





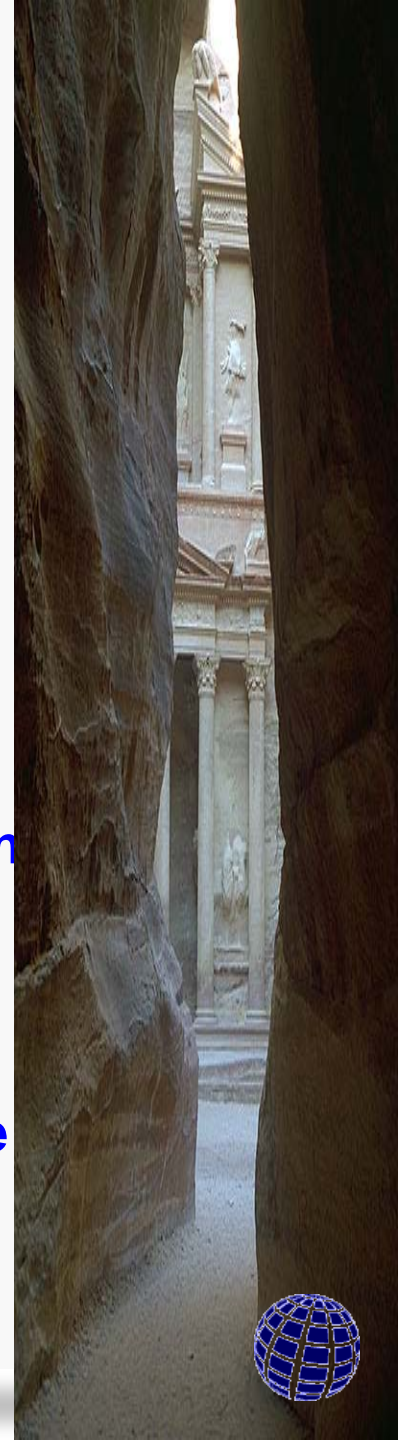
Despite its small area, visitors would be impressed by its diverse terrain and landscape .





The Jordan Valley, the mountains, the Dead Sea, and the desert are behind the beauty of the country. Furthermore , Jordan has a number of mineral springs and areas of forest, especially in the northern hills that attract tourists from all over the world. .





Nowadays , Jordan occupies a distinguished position among developing countries. It is primarily due to the Jordanian Monarch alertness and the Jordanian citizens that a great progress in all aspects of life have been made mainly in the fields of economy, education, and electricity .



Climate

The climate in Jordan is semi-dry in summer with average temperature in the mid 30°C and relatively cold in winter averaging around 13 °C.

The Northern part of the country receives greater precipitation during the winter season from November to March and snowfall in Amman and North Heights.

Predominant religion : Islam.

Other Religion in Country : Christian.

GDP: 28,328 million \$

Energy/GDP: 1.06 toe/1000 \$

OUTLINE



Electricity Sector in Jordan

Policy Maker

Ministry of Energy & Mineral Resources

Observer & Regulator

Electricity Regulatory Commission

Generation

GENCOS

CEGCO (privatized)

SEPGCO

AES Jordan PSC (IPP1)

Interconnection Lines

IPPs

Transmission

NEPCO

JEPCO (private)

Distribution

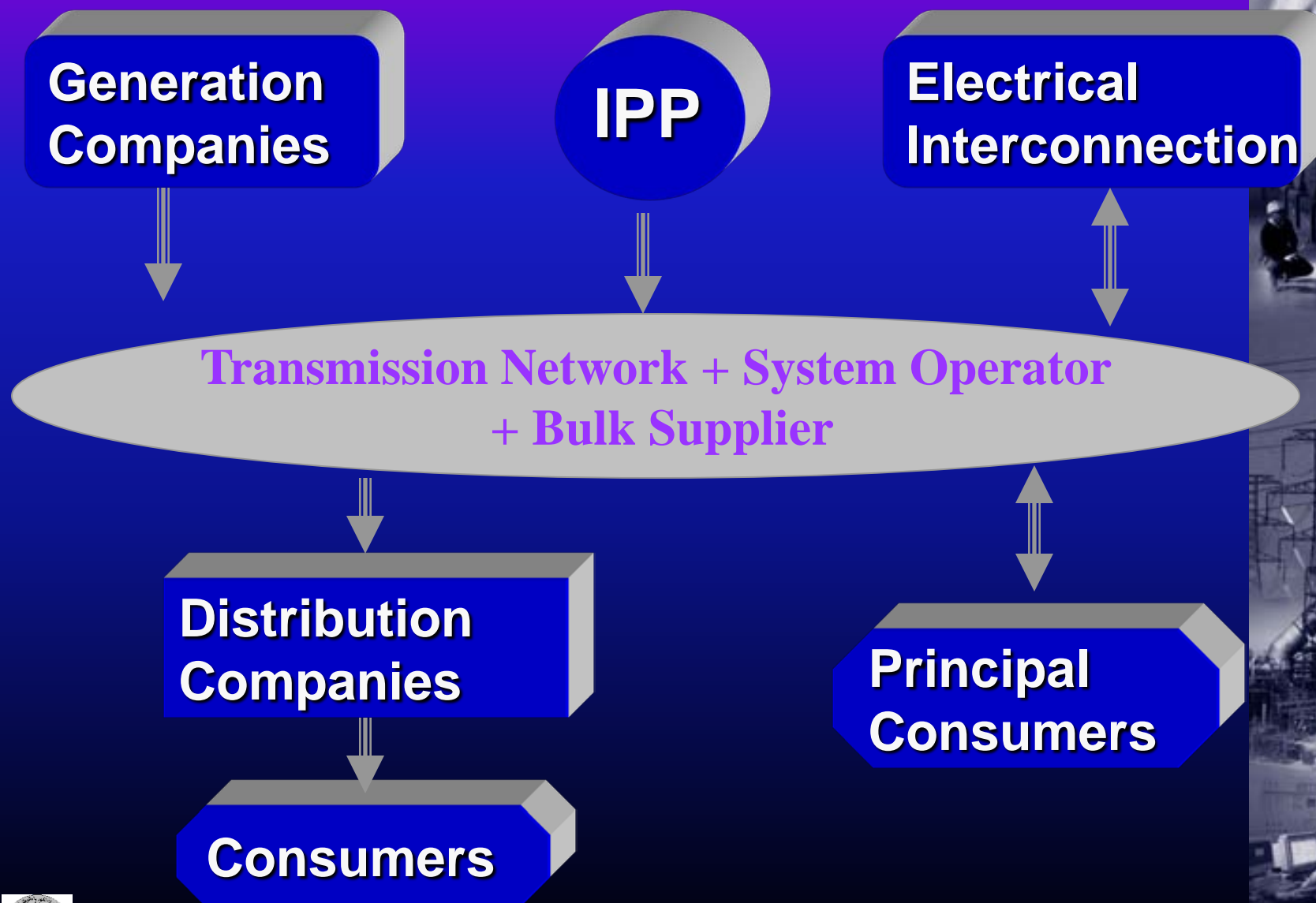
DISCOs

IDECO (privatized)

EDCO (privatized)



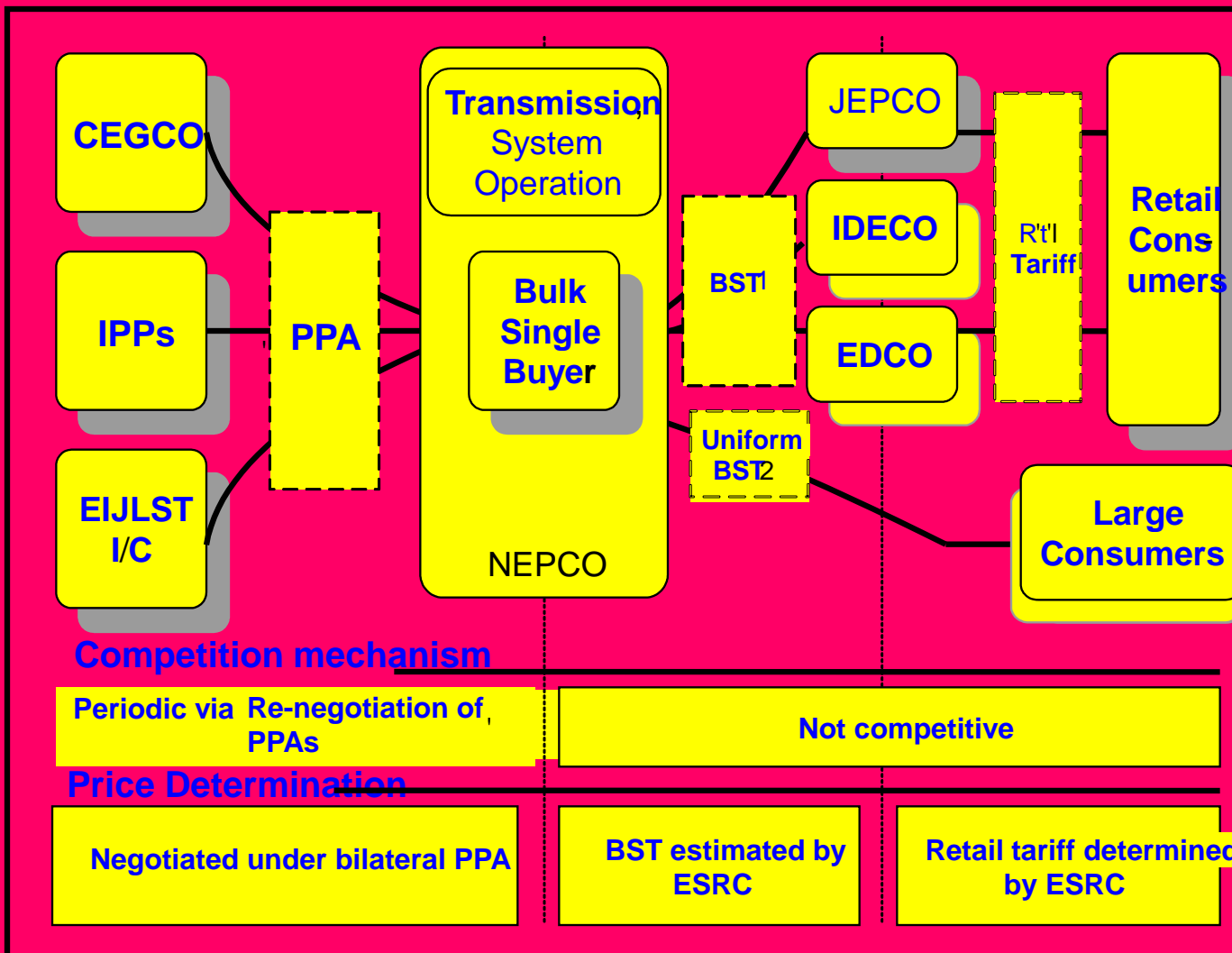
Single Buyer Model



Toward
Competitive
Market

Current Industry Structure

Single Buyer Model



National Electric Power Company , Jordan



 **Securing electric power for Jordan .**







 **Safe and economic operation of the power system.**

 **Exchanging electric energy with neighboring countries.**





NEPCO Activity & Challenging

-  **Planning, Constructing, developing, operating and maintaining the power system.**
-  **Purchasing Electrical Energy from Various Sources and Selling it to distribution companies and large consumers.**
-  **Gas procurement for power stations.**
-  **Safe and economic operation of the power system.**
-  **Import and Export of Electric Power.**
-  **Contracting new generation capacities to meet electrical demand.**



Jordanian Power System (2013)



Peak Load: **2975 MW**



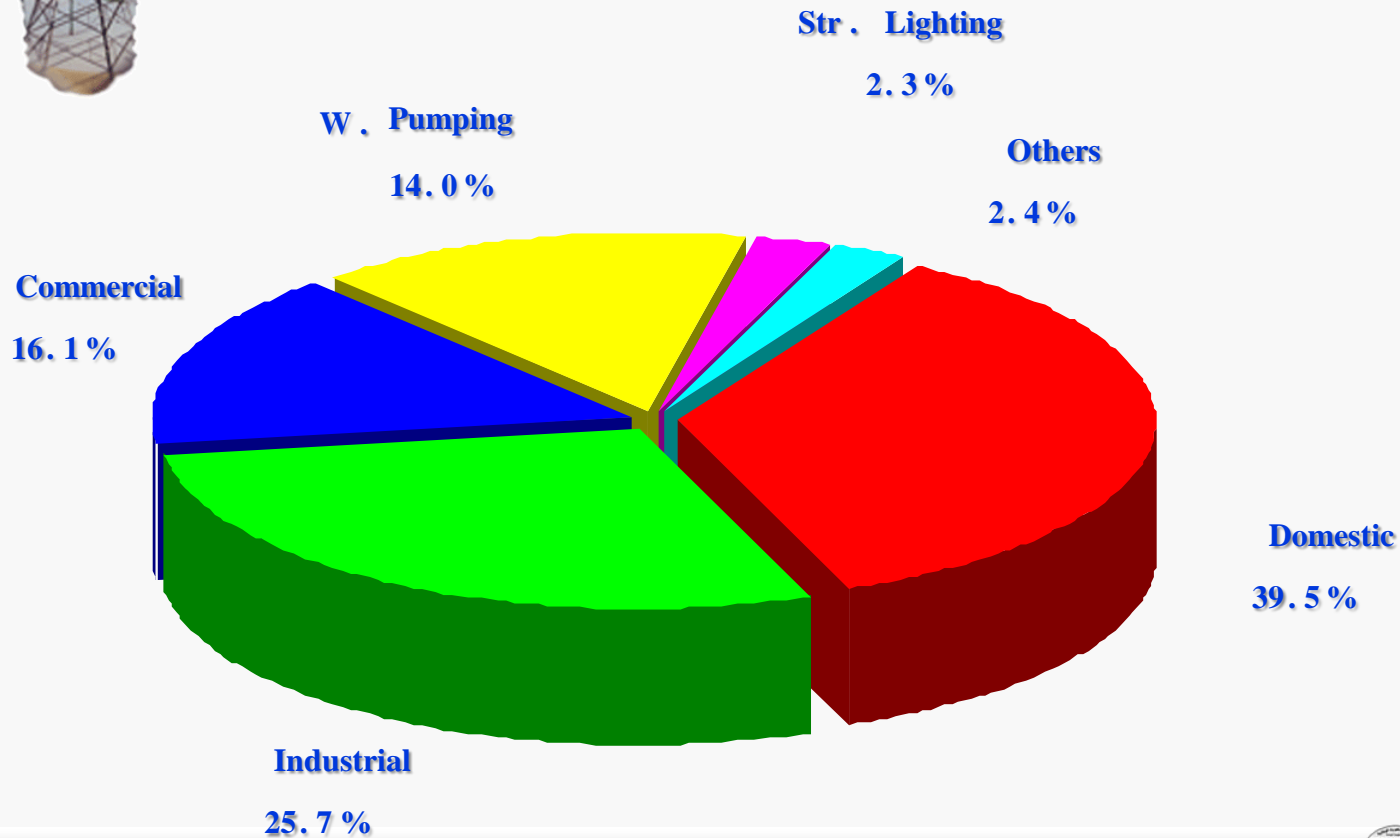
Generated Energy: **16785 GWh**



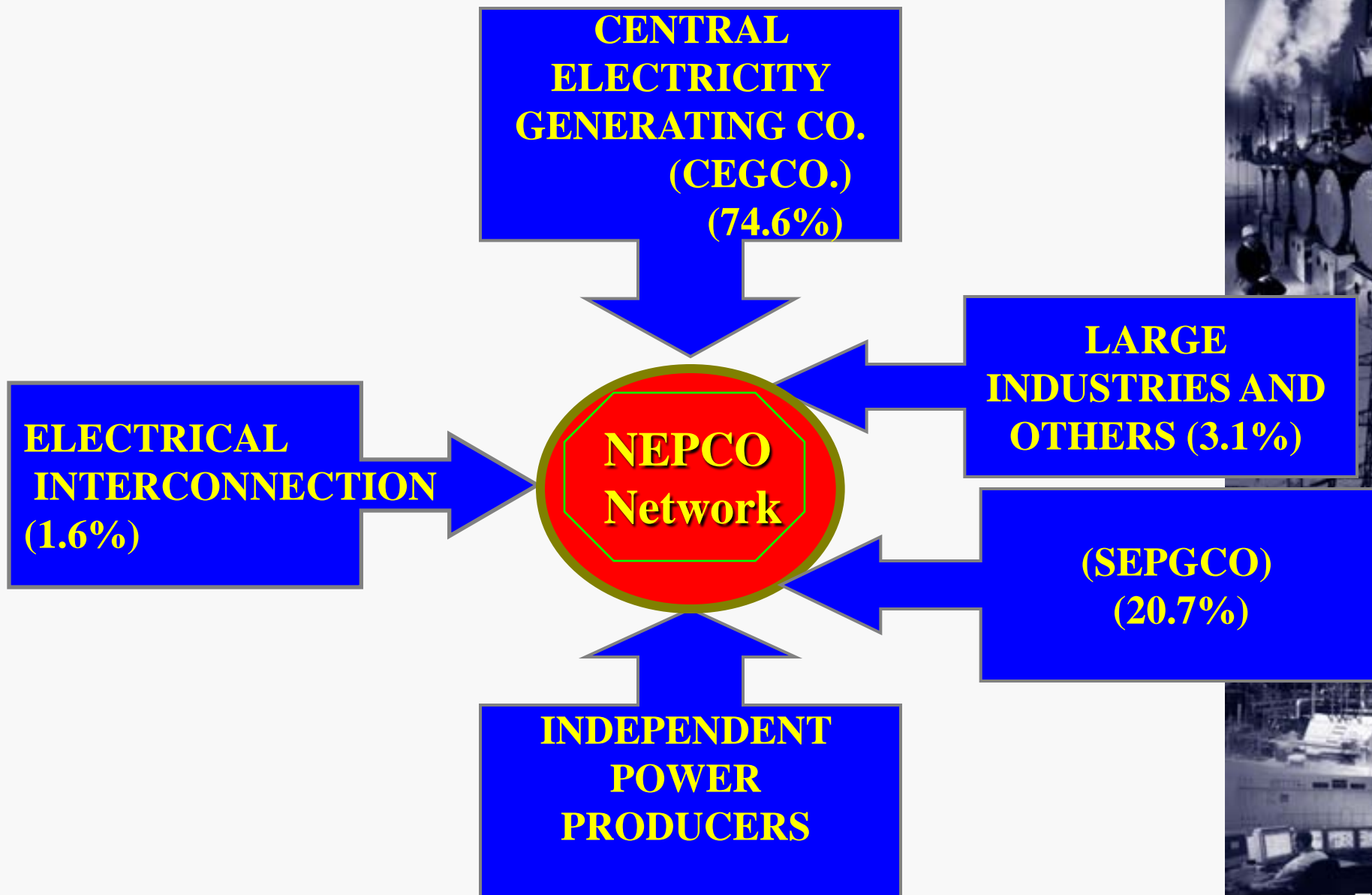
Installed Capacity: **3040 MW**



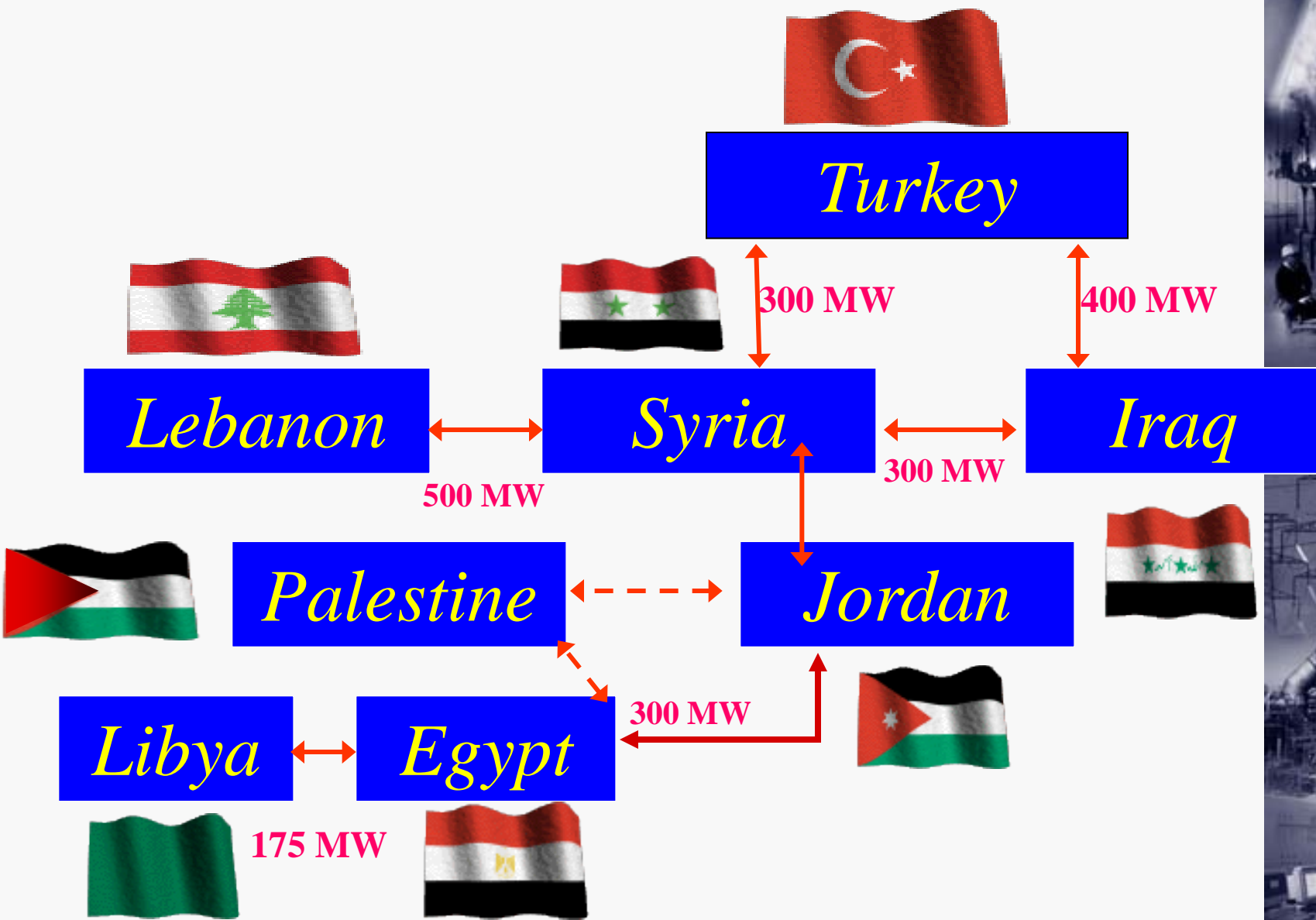
Population under supply: **99.9%**



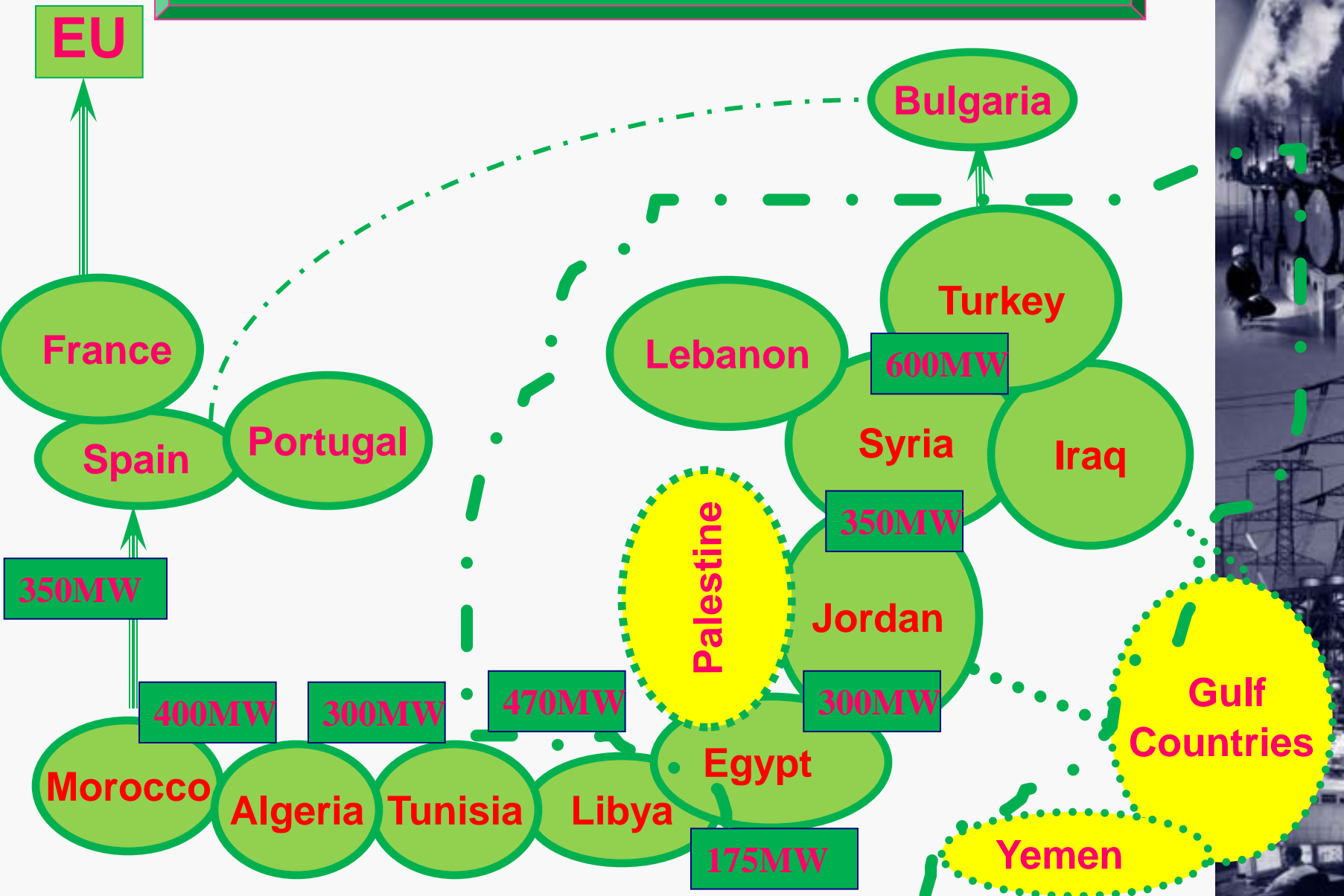
Sources Of Electricity Generation, 2014



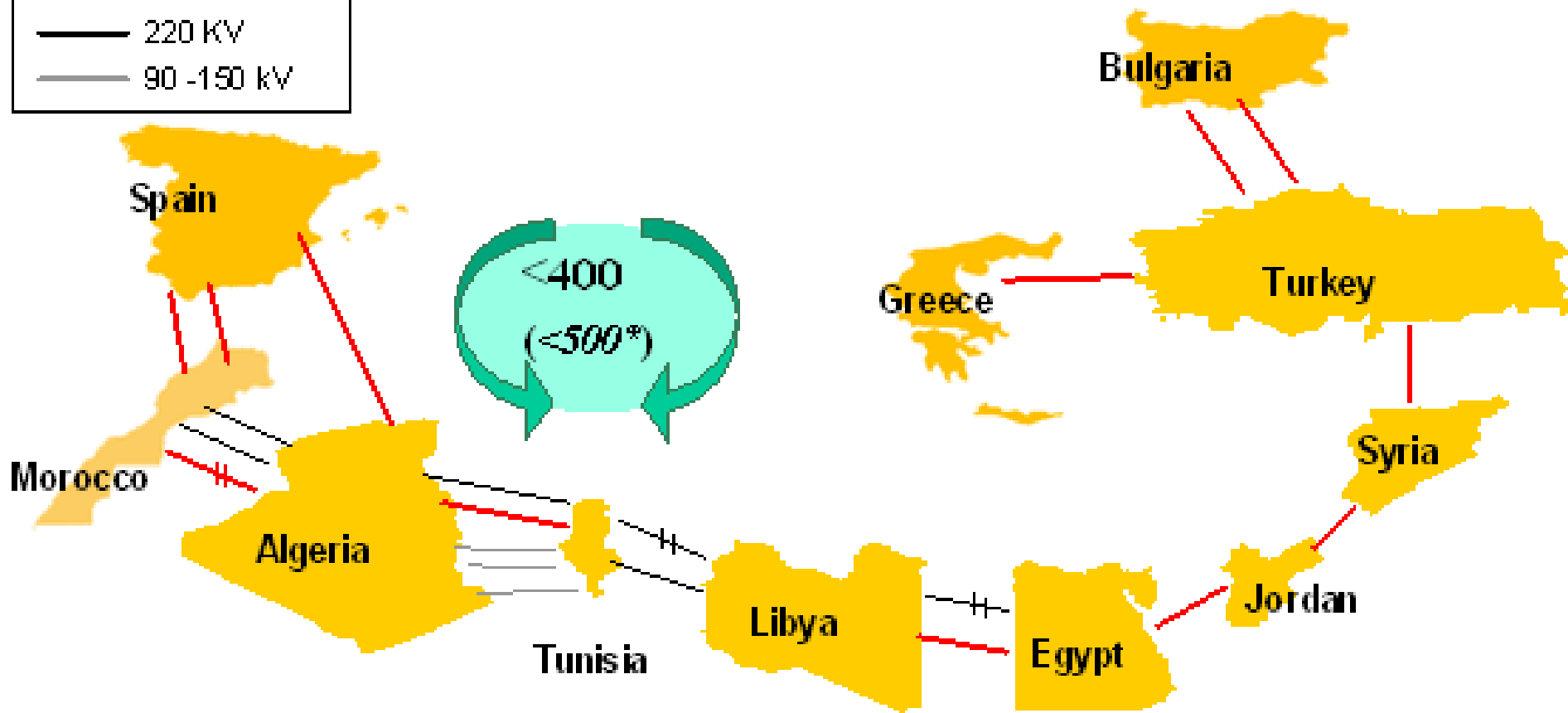
Eight countries Interconnection Project



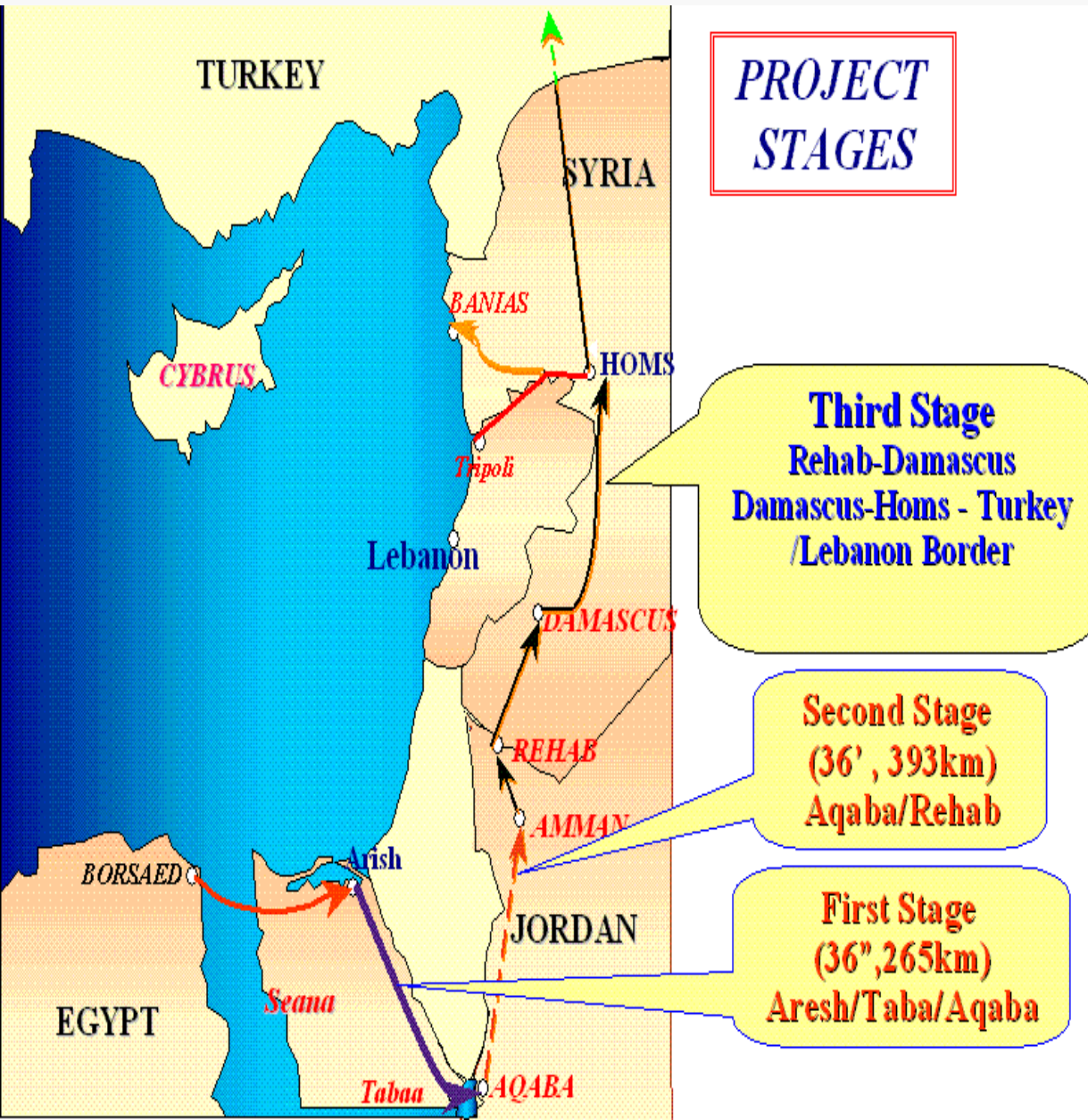
Regional Electrical Interconnection



— 400 - 500 KV
— 220 KV
— 90 - 150 KV



Arab Gas Pipeline Project



PROJECT STAGES

Third Stage
Rehab-Damascus
Damascus-Homs - Turkey
/Lebanon Border

Second Stage
(36", 393km)
Aqaba/Rehab

First Stage
(36", 265km)
Aresh/Taba/Aqaba

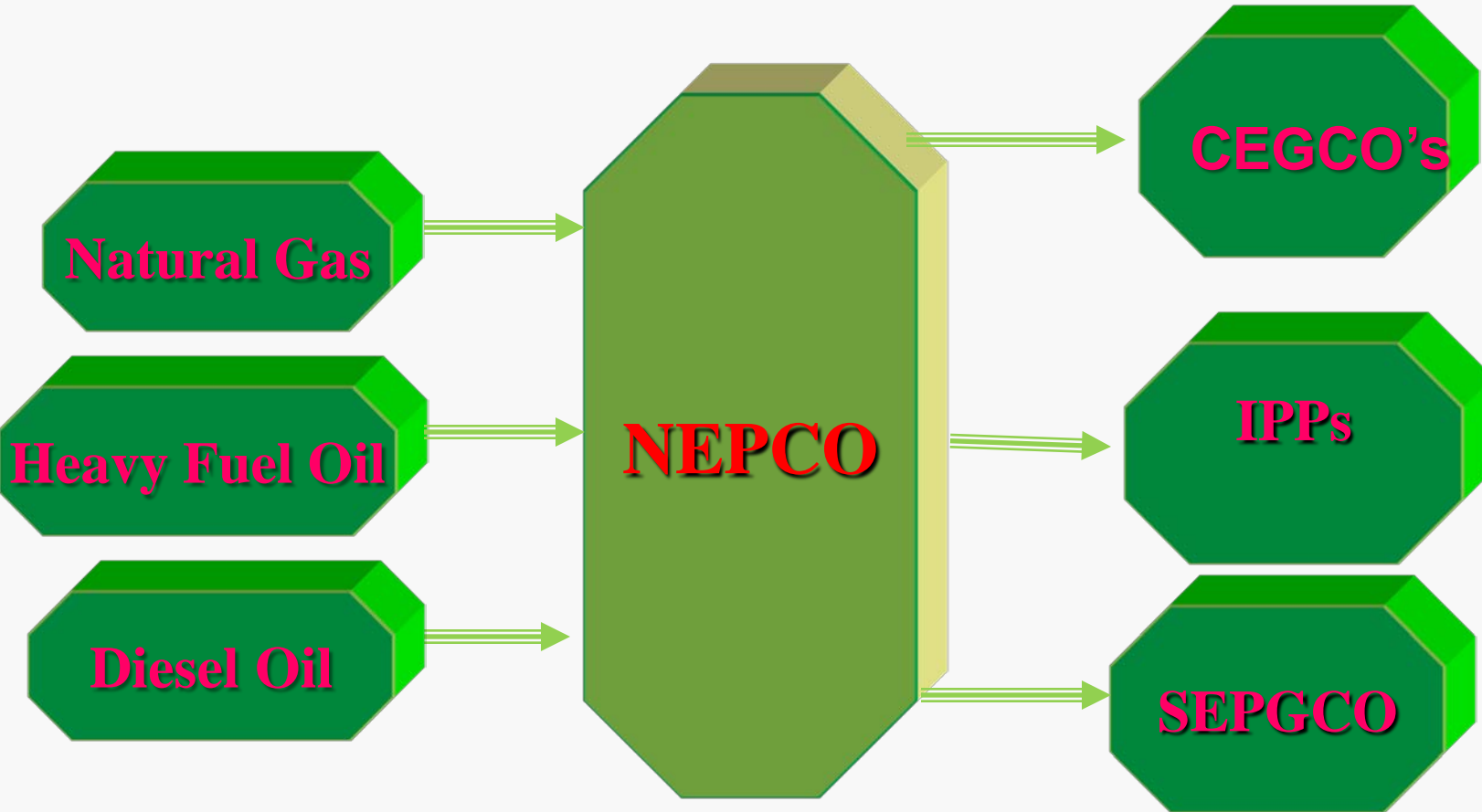
(Jordanian Borders –
Syrian / Turkish Borders)
In service 2008

(Aqaba / Jordan – Syrian Borders)
Natural gas burning started
at Rehab P.S and Samra P.S
in 2006

(El-Areesh / Egypt – Aqaba / Jordan)
Natural gas burning started at
ATPS in 2003








Role of NEPCO in the Issue of Fuel & Gas Sales for Generators



Challenges



-  Growing energy demand.
-  Increasing energy costs.
-  Lack of conventional energy resources.
-  Increasing dependence on imported fuel.
-  Lack of water resources.



Imported NG (Natural Gas):

- Short term option.

Renewable technologies option:

- Limited in utilization according to wind speed and solar density.
- Can't be used as base load.

Oil Shale option:

- Medium term option
- Feasibility is to be proven.

Local NG option:

- Medium term option
- Reserve is under investigation.

Nuclear option:

- Long term option.





Energy Policy

- ❑ Ensuring security of supply of all energy forms.
- ❑ Diversification of energy sources.
- ❑ Enhancing the efforts to utilize the local energy resources.
- ❑ Increasing the share of the renewable energy in the total mix of primary energy.





Nuclear Energy

Introduction

- ❑ Estimated reserves of uranium = 80 thousand tons + 100 thousand tons located in the phosphate ores.
- ❑ An agreement was signed between the Jordanian government and the French company Areva for the exploration and mining of uranium ores in 2008.
- ❑ Work is underway to sign agreements for the exploration and uranium mining in east and south of Jordan.



Why Nuclear?

- ❑ Low cost of production of electrical energy compared with conventional sources.
- ❑ Stabilize energy prices, electricity produced from nuclear units and not affected by global fuel prices.
- ❑ A local source of fuel (the reliability of supply).
- ❑ Competitive source of electrical energy.
- ❑ Enhancing export of electrical energy due to new interconnect. project.
- ❑ Desalination projects.



Challenges

- ❑ High investment cost.
- ❑ Human resources.
- ❑ Plant siting, security, and cooling water needs.
- ❑ Huge Spinning Reserve (for big size units).
- ❑ Spent fuel management solutions.
- ❑ International & regional political climate.


Infrastructure:

- ✓ Fabrication and manufacturing capacity
- ✓ Engineering capability
- ✓ Transmission grid & reliability






Oil Shale

 Oil shale is available in large quantities in Jordan. These quantities are estimated at about (40) billion tons.

 Major deposits are located in the central part of Jordan.

 MEMR & NEPCO signed a *Head of Terms Agreement* with EESTI ENERGIA to build an Oil Shale Power Plant (OSPP) using direct burning technology with a proposed capacity between 600 MW and 900 MW.

 The OSPP is expected to be in operation by the year 2018.





JORDAN ENERGY EFFICIENCY STRATEGY

In 2004, an energy efficiency strategy was developed by the Ministry of Energy and Mineral Resources (MEMR) in cooperation with NERC to complement the National Energy Strategy with specific goals and policies to deal with the emerging energy challenge. The key goals of the Strategy were to:

- Reduce consumption without negatively effecting production or the standard of living for Jordanians.
- Improve the standards of living.





- **Achieve a balance between imports and exports.**
- **Reduce production cost and improve competitiveness of local industries.**
- **Lower the investment needs in the generation, transmission and distribution of energy through efficiency improvements.**

The EE strategy identified the following specific policies and tactics to be used to help achieve the target goals:

❑ Energy tariff policy

The rising cost of importing energy resources has prompted the Government of Jordan to phase out the subsidy on energy end-use products.

❑ Energy legislations

- Taxation policies**
- Minimum energy efficiency standards for energy using equipment**
- Energy building codes should be enforced in certain zoning areas**
- Customs duties incentives**
- Legislations aimed at reducing traffic congestions**



❑ **Awareness and training campaign**

❑ **Financial policies**

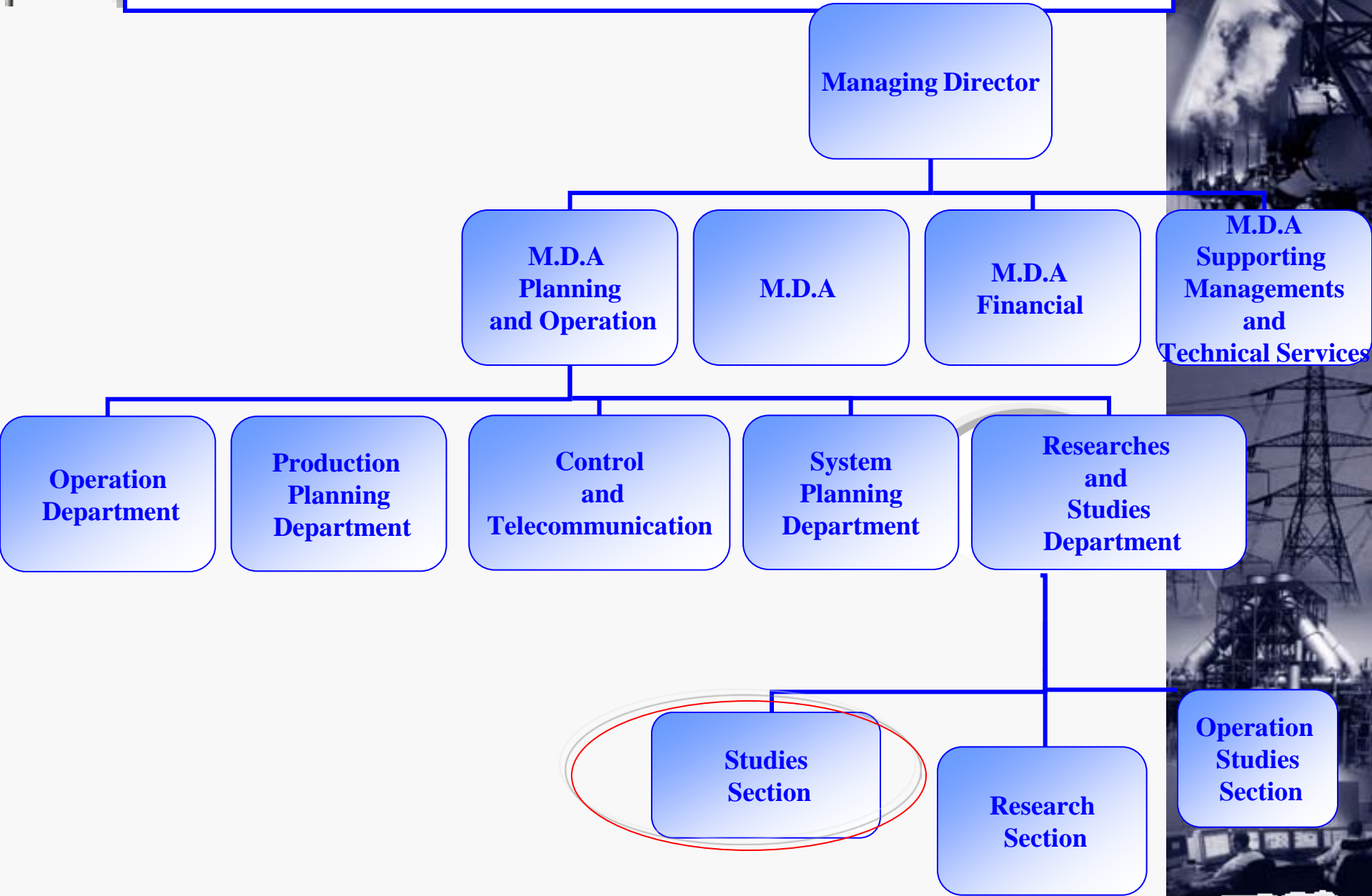
Increasing awareness of energy efficiency viability among the financing community

Establishing a special fund for financing energy efficiency projects with a shared capital between the government and donors to provide preferential terms.





Participant's Job



Job Description

Conduct short circuit calculations, directional and unidirectional over current and earth fault, distances Relays setting and coordination, also, defense plan and Inter-trip schemes to protect system from total and partial blackout by using automatic under frequency Load shedding schemes.

Fault diagnosis and analysis

Participate in energy efficiency & demand management strategies.

Participate in network planning.





Participating Goals

- ❑ Increase my knowledge and Develop my skills in policy planning for energy efficiency and conservation.
- ❑ After finishing this course I will suggest to my company to conduct some workshops and training courses to the electric facilities in Jordan in order to transfer the knowledge I will gain in this training course.





Thank you



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