Implementation of Simple Measures for Savings Water and Energy Consumption in Kuwait Government Buildings

Eng. Hassan Albahrani
Dr. Ahmad Al-Mulla

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Historical Background - Electricity

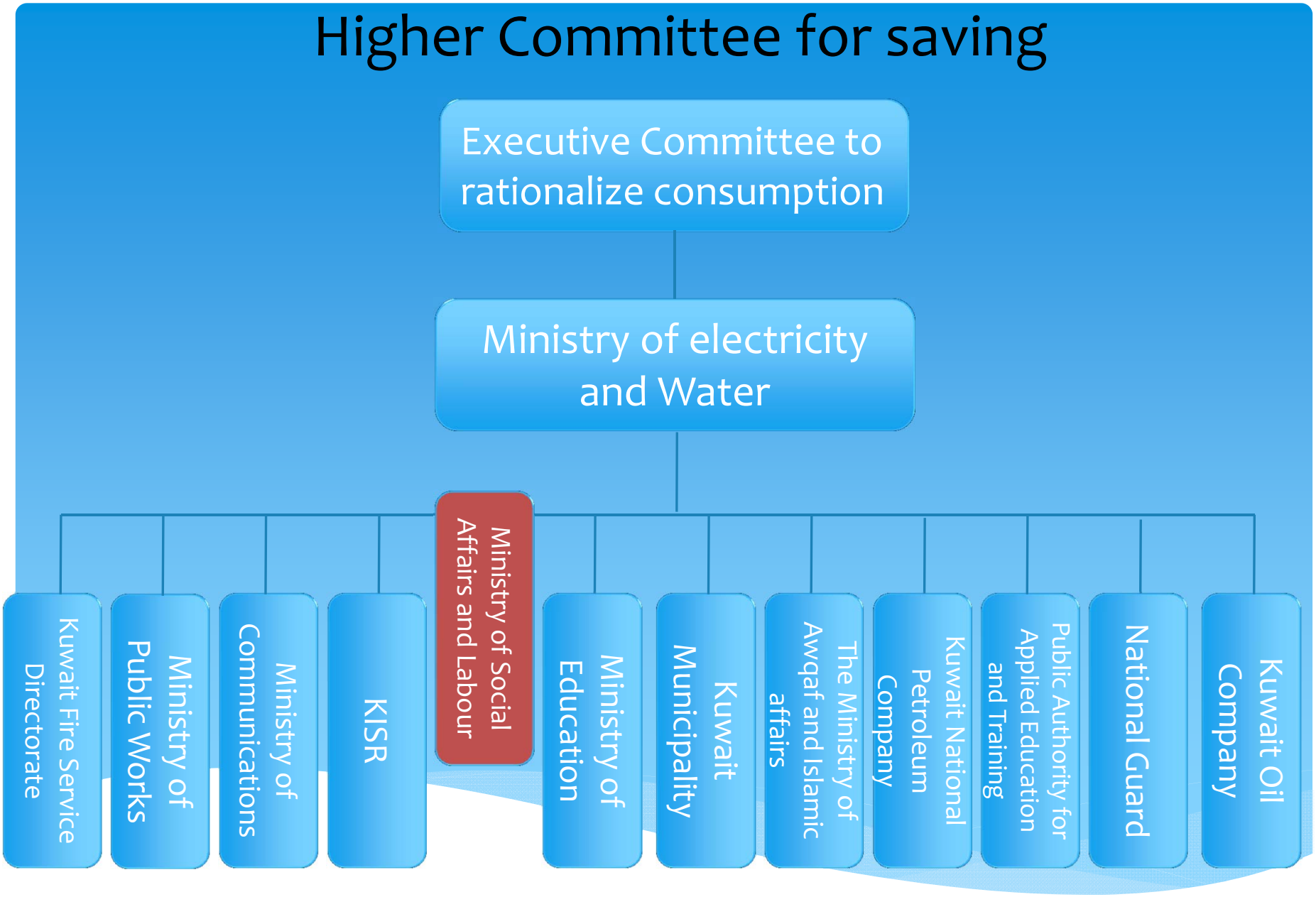
* In 1913, the first electric machine was installed in Kuwait to operate 400 lamps for AlSeef Palace.
* In 1934, two electric generators were installed with a total capacity of 60 kW.
* In 1949, the first power generation plant was established in Murgab with a total capacity of 60 kW.
* In 1951, Kuwait established the General Department of Electricity and then the Ministry of Electricity & Water in 1961.

Historical Background - Water

- < 1925 - rain water and shallow wells
- 1925 - 1951 - water imported from Shatt Al-Arab, Iraq
- 1951 - public water supply service established and managed by the State
- 1951 - KOC installs a small desalination plant
- 1960 - discovery of fresh water at AlRaudhatain
- 1970 - to date - rapid increase of desalination capacity

Electricity Generation and Water Desalination

No.	Power Station	Established	Electricity Generation	Water Production
		Year	Million kW	Million emperor/day
1	Shuwaikh Plant	1955	33	4
2	Shuaiba North Plant	1965	72	9
3	Shuaiba South Plant	1970	3.032	30
4	Al-Doha East Plant	1977	4.630	42
5	Al-Doha west Plant	1984	11.010	110
6	Al-Zour South Plant	1989	101.212	36
7	Sabiya Plant	1998	29	100


Higher Committee for saving
Executive Committee to rationalize consumption
Ministry of electricity and Water
Kuwait Fire Service Directorate
Ministry of Public Works
Ministry of Communications
KISR
Ministry of Social Affairs and Labour
Ministry of Education
Kuwait Municipality
The Ministry of Awqaf and Islamic affairs
Kuwait National Petroleum Company
Public Authority for Applied Education and Training
National Guard
Kuwait Oil Company

MOSAL's Responsibilities

* Social activities such as nursing homes for youths, sport clubs, and civil organizations.
* Regulation of foreign labour in private sector.
* Supervising the Co-operative societies in the country.

MOSAL's Buildings

* Manage around 135 buildings distributed over six Kuwait governorates.
* The load of these buildings are around 150 MW.
* Maintenance of electrical, mechanical, A/C, plumbing and firefighting systems for all MOSAL's buildings are executed by Public Services Department (PSD).

Spreading the culture of rationalization

* Official correspondences to all departments and ministry facilities.
* Official cites visit to educate the employees on rationalization.

METHODOLOGY

* Installation of programmable thermostats for A/C units and implementing new lighting schedules.
* Replacement of old A/C units and lighting systems with more energy-efficient systems.
* Putting in shutters and solar films for windows.
* Setting up insulation materials for roofs and walls and low-flow water tools.

Programmable Thermostat

PSD installed Programmable thermostats in most of their A/C units. These have two settings for occupancy and non-occupancy periods.

Periods	Temperature Range	Time Range
Occupancy	70 -72	05:00 – 14:30
Non-occupancy	78 - 80	14:30 – 05:00

This measure reduced the energy consumption by 20%.

Replacement of Air-conditioning and Lighting Systems

* More efficient PAC and mini-splits were replaced with existing ones.
* Low power consumption lamps were replaced to reduce the energy consumption.

The savings in energy consumption for the new installed A/C units ranged between 15% and 20%, Where as savings in lighting systems reached up to 73%.

Shutter and solar films for windows

* Shutter and solar film helps reduce heat entering the buildings.
* Cooling loads and energy consumption are therefore reduced.

Additional measures

* Installation of insulation materials such as extruded polystyrene for roofs and walls .
* Putting in low-flow water tools for faucets .

A/C units types

* Two types of A/C units are used in MOSAL buildings which are mini-splits and PAK.
* 90% of the A/C systems used in the ministry's buildings are the mini-splits.

Future plan

* Collaborating with the country's expertise to improve the using of and saving energy and water.
* Installing Occupational thermostats.

Conclusion

* Installation of programmable thermostats reduced the energy consumption for the A/C by 20%.
* The saving in energy consumption for the new installed A/C units ranged between 15% to 20%, compared against the old ones. And the saving in lighting systems was up to 73%.
* Installation of shutters, solar films, and insulation materials decreased the cooling loads which in turn reduced the power demand and energy consumption to these buildings.

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