KUWAIT

(UPDATED 2011)

GENERAL INFORMATION

1.1 COUNTRY OVERVIEW

1.1.1. GOVERNMENTAL SYSTEM

Kuwait is a constitutional monarchy that has directly elected parliament (National Assembly). The head of state is the Amir who is the commander in chief of Kuwait's armed forces and has the authority to appoint the Prime Minister (PM). The PM exercises his authority to form the government cabinet which consists of the state secretaries (Ministers).

The legislative authority is taken by the Amir and the National Assembly, while the executive authority is taken by the Amir and Council of Ministers and Ministers.

The system of government is based on the principle separating the powers of legislative, executive and judicial authorities and functioning in cooperation with each other.

1.1.2. GEOGRAPHY

Kuwait lies at the north-west corner of the Arabian Gulf, between 28º and 30º latitudes and between 46º and 48º longitudes. To the north and the west, it shares a border of 240 km with the Republic of Iraq, and to the south and south-west it shares 250 km with the Kingdom of Saudi Arabia. On the east it has a coastline of 290 km on the Arabian Gulf.

The total area of Kuwait is 17,818 km^2. Most of the mainland is a flat sandy desert gradually sloping towards sea level in the east. The western border land areas are 270 meters above sea level.

The weather is characterized by long, hot and dry summers and short, warm and sometimes rainy winters. Dust storms occur frequently with a rise in humidity during late summer. Typical extreme temperature ranges between the winter and summer is 0 ^{o}C to 50 ^{o}C.

1.1.3. POPULATION

By the end of 2010, the population is estimated to be 3.566 million of which 32% are nationals and 68% expatriates. About 5 to 6% of Kuwait's total area is inhabited. Almost all population is in Kuwait City and its suburbs and Jahra City. As a result of the population concentration within 6% of the country's territory and the absence of rural areas, the population density is considered to be high.

TABLE 1. POPULATION INFORMATION

					Ave. annual growth rate (%)
Year	**1996**	**2000**	**2005**	**2010**	**2000 to 2010**
Population (millions)	1.8	2.2	2.9	3.5	5.9
Population density (inhabitants/km2)	2020	2469	2712	3273	3.3
Urban Population as % of total	100	100	100	100	0
Area (1000 km^2)	17.818				

Source: Statistical Year Book - Electrical Energy, 2010, Ministry of Electricity and Water, Kuwait.

1.1.4. ECONOMIC DATA

TABLE 2. GROSS DOMESTIC PRODUCT (GDP)

					Ave. annual growth rate (%)
Year	**1996**	**2000**	**2005**	**2010**	**2000 to 2010**
GDP (millions of current *USD)	31,430	38,570	78,646	129,210	14.4
GDP (millions of constant USD)	35,310	38,570	56,973	65,563	5.6
GDP per capita (**PPP USD/capita)	35,616	31,823	36,952	38,983	2.1
GDP per capita (current USD/capita)	18,486	17,393	26,290	35,826	10.6

*USD 1 is approximately KD 0.3
**PPP: Purchasing Power Parity
Sources: Trading Economics (http://www.tradingeconomics.com)

1.2. ENERGY INFORMATION

1.2.1. ESTIMATED AVAILABLE ENERGY

Table 3 shows the reserves of fossil fuels and uranium, and potential renewable energy.

TABLE 3. ESTIMATED AVAILABLE ENERGY SOURCES

Fossil Fuel	**Nuclear**	**Renewables**

	Solid	Liquid	Gas		
Total amount (unit*)	0	13842	50517	0	NA**
Total amount (EJ)	0	621.1	68.3	0	

* Solid, Liquid: Million tons; Gas: Billion m^3; Uranium: Metric tons; Hydro, Renewable: TW.

** Data Not Available.

Sources: (1) Preliminary Economics Feasibility Study of a Civil Nuclear Program in Kuwait, KNNEC, Kuwait; (2) Organization of Arab Petroleum Exporting Countries (OAPEC), Annual Statistical Report, 2010.

1.2.2. ENERGY STATISTICS

TABLE 4. ENERGY STATISTICS IN EXA-JOULE (EJ)

					Ave. annual growth rate (%)
Year	**1996**	**2000**	**2005**	**2010**	**2000 to 2010**
Energy consumption*					
Total	0.55	0.68	0.92	1.15	6.0
Liquids	0.26	0.32	0..82	0.98	17
Gases	0.29	0.36	0.10	0.17	-0.2
Nuclear	0	0	0	0	0
Hydro	0	0	0	0	0
Renewables	0	0	0	0	0
Energy production					
Total	5.30	4.95	6.40	5.70	0.7
Liquids	4.76	4.47	5.80	5.10	0.8
Gases	0.54	0.48	0.60	0.60	0.9
Nuclear	0	0	0	0	0
Hydro	0	0	0	0	0
Renewables	0	0	0	0	0
Net import (import - export)					
Total	0	0	0	0	0

1 EJ = 0.164 billion barrel

* Energy consumption = Primary energy consumption + Net import (Import - Export) of secondary energy.

Source: Organization of Arab Petroleum Exporting Countries (OAPEC), Annual Statistical Report, 2010, 2005 and 2001.

1.2.3. ENERGY POLICY

Most of the energy sector is owned by the state. The exploration, production, refining, marketing of the primary energy resources (oil and gas) are carried out by state owned corporations. Through government organizations, the primary energy resources is converted to useful energy and transmitted and distributed to consumers.

The domestic consumption of the primary energy claims considerable amount. As a signatory of the Kyoto Protocol, Kuwait has taken the responsibility toward capping emissions. Hence, the government of the State of Kuwait has been exploring alternative energy resources including nuclear and renewables for the purpose of sustaining the production of useful energy, maximizing oil revenues and minimizing CO_2, NO_x and SO_x emissions.

1.3. THE ELECTRICITY SYSTEM

1.3.1. ELECTRICITY POLICY AND DECISION MAKING PROCESS

The electricity power system is vertically integrated structure which is owned and operated by a governmental organization, the Ministry of Electricity and Water (MEW). The system is solely dependent on oil and gas fuel to generate electricity and produce potable water. Fuel oil and gas are provided by a state owned organization, the Kuwait Petroleum Corporation (KPC). The main planning driver for the generation and electric network development and enforcement is the residential housing and commercial projects.

1.3.2. STRUCTURE OF ELECTRIC POWER SECTOR

As mentioned above, the electricity power system is vertically integrated structure owned and operated by a governmental organization. The current installed capacity is close to 12 GW and it is expected to reach 28 GW by 2030. The electric network consists of four voltage levels including 275, 132, 33 and 11 kV sub-networks. The network has been upgraded to 400 kV. The first 400 kV sub-station has been energized since March 2011.

1.3.3. MAIN INDICATORS

TABLE 5. ELECTRICITY PRODUCTION, CONSUMPTION AND CAPACITY

					Ave. annual growth rate (%)
Year	**1996**	**2000**	**2005**	**2010**	**2000 to 2010**
Capacity of electrical plants (GWe)					
Thermal	6.9	9.2	10.2	11.6	2.6
Nuclear	0	0	0	0	0
Hydro	0	0	0	0	0
Renewables	0	0	0	0	0
Total	6.9	9.2	10.2	11.6	2.6
Electricity production (TWh)					
Thermal	25.5	32.3	43.7	57.0	7.6

Nuclear	0	0	0	0	0
Hydro	0	0	0	0	0
Renewables	0	0	0	0	0
Total	25.5	32.3	43.7	57.0	7.6

Source: Statistical Year Book - Electrical Energy, 2010, Ministry of Electricity and Water, Kuwait.

TABLE 6. ENERGY RELATED RATIOS

Year	**1996**	**2000**	**2005**	**2010**
Energy consumption per capita (GJ/capita)	305	309	317	350
Electricity consumption per capita (kW.h/capita)	14166	14682	15069	16285
Electricity production/Energy production (%)	1.7	2.3	3.0	4.0
*Ratio of external dependency (%)	0	0	1.3	13.6

*Net import / Total energy consumption

Source: (1) Statistical Year Book - Electrical Energy, 2010, Ministry of Electricity and Water, Kuwait; (2) Organization of Arab Petroleum Exporting Countries (OAPEC), Annual Statistical Report, 2010

NUCLEAR POWER SITUATION

1.4. HISTORICAL DEVELOPMENT AND CURRENT ORGANIZATIONAL STRUCTURE

1.4.1. OVERVIEW

The first nuclear power programme in Kuwait was initiated in the 1970's in coordination with and support of the IAEA and UK Atomic Energy Authority. The Nuclear Energy Committee (NEC) was established by the Ministerial Cabinet and it was chaired by the Minister of Electricity and Water. The rational for the embarking of nuclear program was the high oil prices. Part of the program was the releasing of the Request for Proposal (RFP) for 50 MWe demonstration of power/ water reactor. The program was canceled in the late 70's due to the Three Mile Island accident, First Gulf War (Iraq-Iran War) and the collapse of oil prices.

Recently, with the rise of oil prices and rapid increase of electricity and water demand in the country, the nuclear program has revived. In March 2009, an Amiri Decree was issued to form the Kuwait National Nuclear Energy Committee (KNNEC) which is headed by the Prime Minister. KNNEC's board consists of ten distinguished members representing various relevant stakeholders. KNNEC's main goals are to develop policies for peaceful nuclear program, prepare all requirements and needs for hosting a peaceful nuclear program, collaborate with countries/owners of well developed and safe nuclear technologies, cooperate

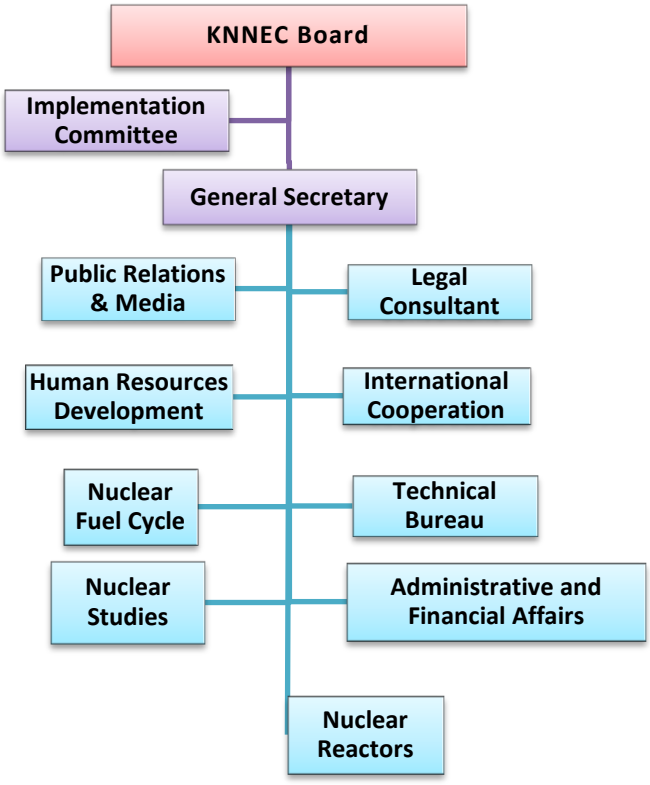
with competent organizations to have access to information and studies and research facilities on nuclear energy for peaceful purposes, and cooperate with IAEA and follow its guidelines.

Since its establishment, KNNEC has been executing several programs involving preliminary economic and siting consultancy studies, communication and public information, legal and regulatory affairs, capacity building and man power development, and international relations.

Furthermore, KNNEC has been working on the development of a roadmap to address the national position/policy and international relations, nuclear safety and security, business model, funding and financing, legislative framework and nuclear law, waste management, regulatory framework, manpower development, public information and national consensus.

1.4.2. CURRENT ORGANIZATIONAL CHART

Currently, there is no organizational structure in the typical ordinary sense (e.g. regulatory, operator, and safety organizations). However, KNNEC, which is the country's Nuclear Energy Program Implementing Organization (NEPIO), is working through the implementation of roadmap programs to form an official organizational structure.



KNNEC's role is to explore and prepare for the introduction of safe and secure peaceful nuclear power program. Its mission involves:

- Conducting technical studies to serve the national program
- Building local manpower capacity in nuclear

- Developing policies for the peaceful nuclear program.
- Collaborating with countries/owners of safe nuclear technologies
- Cooperating with competent organizations to have access to information, studies
- Cooperating fully with IAEA and following its guidelines
- Following up latest developments and techniques in the field of nuclear energy for peaceful purposes.

1.5. NUCLEAR POWER PLANTS: OVERVIEW

1.5.1. STATUS AND PERFORMANCE OF NUCLEAR POWER PLANTS

Not applicable

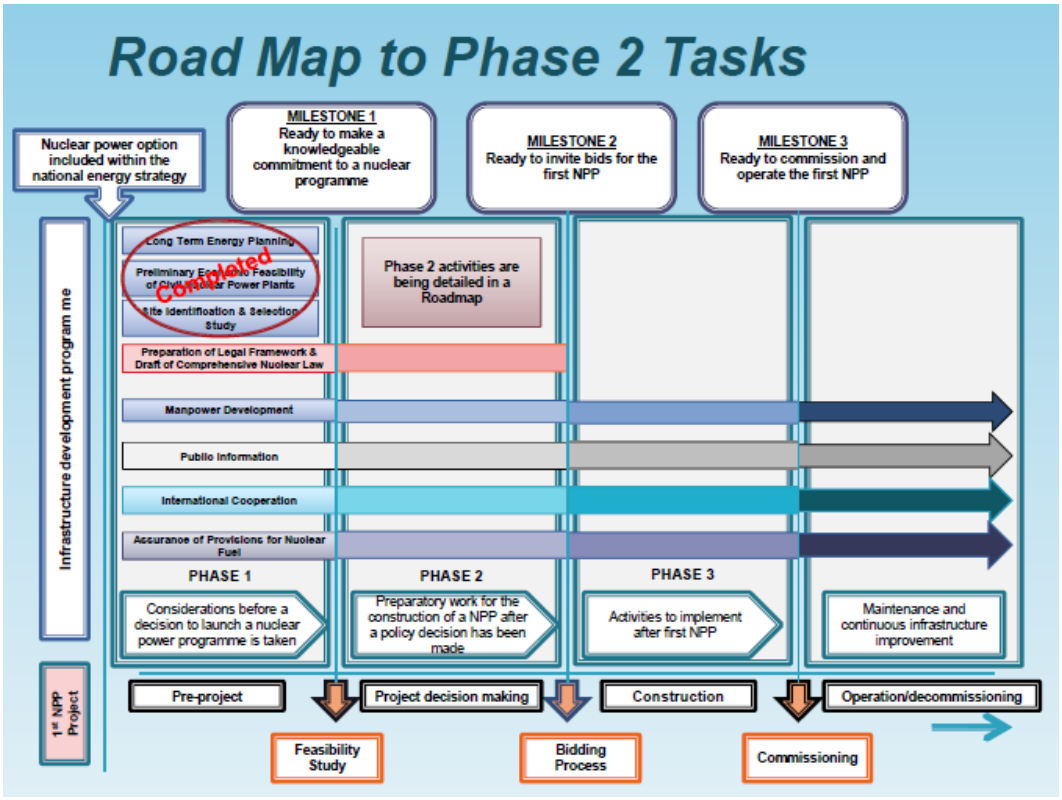
1.5.2. PLANT UPGRADING, PLANT LIFE MANAGEMENT AND LICENSE RENEWALS

Not applicable

1.6. FUTURE DEVELOPMENT OF NUCLEAR POWER

1.6.1. NUCLEAR POWER DEVELOPMENT STRATEGY

The strategy for the nuclear program is to meet the electricity and potable water demands, maximize the revenues of the indigenous fossil fuel and minimize the CO_2, SO_x and NO_x emissions. In order to adopt a nuclear program for peaceful applications, Kuwait needs to establish an infrastructure that is capable of supporting the nuclear program. KNNEC (Kuwait's NEPIO) has been closely working with IAEA and will follow the agency milestones accordingly.



In accordance with the IAEA guidelines, KNNEC has been developing a Roadmap to identify key tasks and prepare a detailed scope of work and terms of reference for studies/activities and actions/measures to be undertaken by KNNEC and relevant stakeholders. KNNEC will work with an experienced consultant to develop a framework and procedures for managing and executing the Roadmap.

The Roadmap will address the following five main issues:

i. Governmental Issues: Preparation of national position, legislations, ratification of appropriate treaties, and decommissioning fund.
ii. Regulatory Framework: Developing general structure handling safety, licensing requirements, radiation protection, safeguards, environmental protection, emergency planning, security, and waste management.
iii. Site Certification and Preparation of the Early Site Works: Site selection and qualification, environmental impact assessment, grid assessment and upgrade.
iv. Project Preparation and Management: Business plan, technology selection, ownership structure, contractual strategy, financial strategy, and public relations.
v. Training and education

1.6.2. PROJECT MANAGEMENT

To be declared.

1.6.3. PROJECT FUNDING

To be declared.

1.6.4. ELECTRIC GRID DEVELOPMENT

Site Certification and Preparation work task of the Roadmap will carry out detailed studies to determine the grid expansion, upgrades or improvements, which is to be declared after completion of Roadmap tasks.

1.6.5. SITE SELECTION

A preliminary site investigation study has identified a number of potential sites. Final selection and characterization of site(s) will be determined as part of the Roadmap tasks.

The pre-feasibility site identification study was carried out by two independent consultants for the purpose of data cross-validation and robustness of results. IAEA exclusionary criteria were primarily applied, but other standards were also employed (EPRI US; BRGM/IRSN; etc.).

The primary objective of the study was to identify potential sites that were suitable to host a nuclear power plant (NPP). The methodology led to the identification of three large swathes of land (areas/zones) that shared uniform characteristics whilst satisfying the exclusionary criteria applied. After applying further avoidance and suitability criteria, 17 potential NPP sites were identified within the three aforementioned areas.

Cooling water/heat sink was defined as one of the most pressing issues given the high temperatures reached by the northern Gulf waters in the summer months (>30°C). Other important criteria included extreme meteorological conditions (e.g. frequent dust storms) and seismic activities in the region, owing to the proximity of Kuwait to the Zagros belt.

1.7. ORGANIZATIONS INVOLVED IN CONSTRUCTION OF NPPS

To be declared.

1.8. ORGANIZATIONS INVOLVED IN OPERATION OF NPPS

To be declared.

1.9. ORGANIZATIONS INVOLVED IN DECOMMISSIONING OF NPPS

To be declared.

1.10. FUEL CYCLE INCLUDING WASTE MANAGEMENT

To be declared.

1.11. RESEARCH AND DEVELOPMENT

1.11.1. R&D ORGANIZATIONS

The main R&D institutes in the country are Kuwait Institute for Scientific Research (KISR) and Kuwait University (KU). The nuclear related R&D work is limited to radiation detection studies. Future nuclear R&D may include further areas depending on the outcomes of the Roadmap.

1.11.2. DEVELOPMENT OF ADVANCED NUCLEAR TECHNOLOGIES

Not applicable

1.11.3. INTERNATIONAL CO-OPERATION AND INITIATIVES

KNNEC has been working closely with the IAEA to benefit from the guidance and technical expertise of the agency as well as to maintain the transparency required for Kuwait's potential nuclear program for peaceful purposes.

In 2009, Kuwait pledged a US$10 million to the proposed IAEA Fuel Bank, which has been approved by IAEA Board in 2010. As representative of Kuwait, KNNEC has recently become a member in the International Framework for Nuclear Energy Cooperation (IFNEC) and World Nuclear Association (WNA).

Kuwait, represented by KNNEC, has signed (and in the progress of signing) Memoranda of Cooperation (MOC) with USA, France, Japan, UK, Russia, and South Korea. Moreover, MOCs have been signed (and in the progress of signing) with countries which are embarking on adopting nuclear programs including UAE and Jordan. Kuwait is expected to sign more MOCs and Memoranda of Understanding with other countries who have developed and developing nuclear program.

1.12. HUMAN RESOURCES DEVELOPMENT

KNNEC has coordinated with the Ministry of Higher Education to establish a study-abroad scholarship program for Nuclear Science and Engineering at both undergraduate and graduate levels. To date, more than 20 scholarships have been awarded to obtain Nuclear Science and Engineering degrees from leading universities in the field. The Nuclear Engineering and Science scholarship program will continue to meet the future manpower requirements in the various organization sectors.

The human resources development is one of the major tasks in the Roadmap. A work plan will be developed for manpower development in nuclear technology, safety and security, and legal fields.

1.13. STAKEHOLDER COMMUNICATION

KNNEC board members are executive officers (i.e., Prime Minister, Ministers and Institution Presidents) of the main and relevant stakeholders representing domestic and foreign policies, energy, environment, public health, research and development, and education. Thus far, the technical executive members of KNNEC (Secretary General and Advisor Member) are regularly updating and advising KNNEC board.

Furthermore, KNNEC has appointed technical staff from several stakeholder organizations to review proposals, interim reports, and final reports of related studies and consultancy outcomes.

Moreover, a part of the Roadmap tasks include public relation plan development. A communication plan will be developed to:

- Conduct regular opinion polls
- Develop a nuclear library composed of: Internet site, fact sheets, Kuwait position paper, brochures and videos on nuclear energy and waste management,

NATIONAL LAWS AND REGULATIONS

1.14. REGULATORY FRAMEWORK

1.14.1. REGULATORY AUTHORITY

Under preparation

1.14.2. LICENSING PROCESS

Under preparation

1.15. MAIN NATIONAL LAWS AND REGULATIONS IN NUCLEAR POWER

The first draft of the nuclear law is being prepared and will be presented to the National Assembly for review as soon as it is completed. A number of regulations pertaining to radiation protection and safety currently exist. Enforcement of these regulations are carried out by the following entities:

- The Ministry of Health (MOH)
- The Department of Civil Defense, Ministry of Interior (MOI)
- Kuwait Environmental Public Authourity (KEPA)

APPENDIX 1 - INTERNATIONAL AGREEMENTS AND TREATIES

International Agreements:

Active:

- Nuclear Cooperation Agreement (NCA) with France (Jan 2010)
- Memorandum of Cooperation (MOC) with Jordan (March 2010)
- Memorandum of Cooperation (MOC) with Department of Energy, USA (June 2010)
- Memorandum of Cooperation (MOC) with Japan (September 2010)
- Memorandum of Understanding (MOU) with Russia (September 2010)

Under Discussion:

- Memorandum of Cooperation (MOC) with UAE
- Nuclear Cooperation Agreement (NCA) with Russia
- Memorandum of Understanding (MOU) with Korea
- Memorandum of Understanding (MOU) with UK

Treaties Under Consideration:

- Protocol to amend the Vienna Convention on Civil Liability for Nuclear
- Damage (PVC)
- Joint protocol relating to the application of Vienna Convention and the Paris Convention (JP)
- Joint Convention on the safety of spent fuel management and on the safety of radioactive waste management (RADW)
- Convention on supplementary compensation for nuclear damage (SUPP)
- Co-operative Agreement for Arab States in Asia for research, development, and training related to nuclear science and technology (ARASIA)
- Vienna Convention on Civil Liability for Nuclear Damage (VC)
- Amendment to the Convention of physical protection of nuclear material (CPPNME)

APPENDIX 2 - STAKEHOLDERS AND CONTACT INFORMATION

- Kuwait National Nuclear Energy Committee: www.knnec.gov.kw
- Ministry of Electricity and Water, www.mew.gov.kw

- Ministry of Public Health, www. moh.gov.kw
- Kuwait Institute for Scientific Research, www.kisr.edu.kw
- Kuwait University, www.kuniv.edu

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