United Arab Emirates

2012

1. GENERAL INFORMATION

The United Arab Emirates (UAE) is a federation of seven Emirates (Abu Dhabi, Dubai, Sharjah, Ajman, Fujairah, Umm Al Quwain and Ras Al Khaimah.) with the second largest economy in the Arab Middle East, after Saudi Arabia.

The UAE is the region's third largest exporter of crude oil, after Saudi Arabia and Iran. It has the world's sixth largest proven reserves of conventional crude oil and the fifth largest proven reserves of natural gas (ADNOC).

The rapid increase in electricity and water demand has created the need to evaluate alternative sources of power production. In 2008, the UAE released a white paper on an energy study that found nuclear power to be a safe and environmentally friendly option that could supplement the existing power plants in meeting growing energy needs.

FIGURE 1: MAP OF THE UNITED ARAB EMIRATES
Source: CIA Factbook

In the early 1930s, the first oil company teams conducted geological surveys. In 1962, the first cargo of crude oil was exported from Abu Dhabi. At the beginning of 1968, Abu Dhabi acted rapidly to establish closer ties with the other Emirates, calling for a federation that would include not only the seven Emirates that together made up the Trucial States, but also Qatar and Bahrain.

Agreement was reached between the rulers of six of the Emirates (Abu Dhabi, Dubai, Sharjah, Umm Al Quwain, Fujairah and Ajman), and the Federation to be known as the United Arab Emirates was formally established on 2 December 1971. The seventh Emirate, Ra's Al Khaimah, acceded to the new Federation the following year.

1.1 Country Overview

1.1.1. Governmental System

United Arab Emirates (UAE) is a sovereign, federal, presidential and elected monarchy, comprising seven absolute monarchical Emirates: Abu Dhabi, Dubai, Sharjah, Ajman, Fujairah, Umm Al Quwain and Ras Al Khaimah. Abu Dhabi is the capital of the Union.
The Federation was formally established on 2 December 1971. This day is celebrated as National Day throughout the UAE. Since its establishment, the UAE has adopted the Constitution, which declares the main purpose of the establishment of the federation, its objectives and its components on the local and regional levels. The Constitution enumerates public rights, responsibilities and freedoms.

The Constitution of the UAE also deals with financial affairs of the federation, armed and security forces provisions, and legislative, executive and international jurisdictions between the federation and member Emirates. The UAE's Constitution allows certain flexibility in the distribution of authority between the Federal and Local Governments. This allows the seven Emirates to incorporate in their own local government, matters not included in the Constitution.

The federal system of government includes: the President, the Prime Minister, the Supreme Council, Crown Princes and Deputy Rulers, the Federal National Council, and the Council of Ministers or the Cabinet.

H. H. Sheikh Khalifa bin Zayed Al Nahyan is the President of the UAE**.** He is also the emir of Abu Dhabi. He succeeded his father, the late H. H. Sheikh Zayed bin Sultan Al Nahyan, on 3 November 2004, after the Supreme Council unanimously elected him as the President of the UAE.

H.H. Sheikh Mohammed bin Rashid Al Maktoum is the Prime Minister and the Vice-President of the UAE. He took over as the ruler of Dubai on 4 January 2006, after the demise of H. H. Sheikh Maktoum bin Rashid Al Maktoum. On 5 January 2006, the members of the Supreme Council elected H. H. Sheikh Mohammed the Vice President of the UAE. On 11 February 2006, UAE President His Highness Sheikh Khalifa bin Zayed Al Nahyan nominated Sheikh Mohammed to become the Prime Minister of the UAE; the Council approved this nomination.

The Federal Supreme Council is the highest constitutional authority in the UAE. It is also the highest legislative and executive authority. It draws up the general policies and approves the various federal legislations.

The Supreme Council consists of rulers of the seven Emirates constituting the federation, or their deputies in their Emirates in case of a ruler's absence or unavailability. Each Emirate has one single vote in council resolutions and deliberations. The Supreme Council meets at five-year intervals to reaffirm the existing President or elect a new one.

The Federal National Council (FNC) has both a legislative and supervisory role. The FNC is the UAE's advisory council, comprising 40 members: eight from Abu Dhabi and Dubai; six from Sharjah and Ras Al Khaimah; and four from Ajman, Umm Al Quwain and Fujairah.

Since February 1972, the FNC has completed 14 legislative sessions, discussing issues and draft laws concerning the people and economy. According to the Constitution, federal draft laws have to pass through the FNC for review and recommendations. A majority of its recommendations and amendments have been adopted by the Government and original draft laws from the Cabinet have been amended by the FNC.

The Council of Ministers or the Cabinet headed by the Prime Minister is the executive authority for the federation. Under the supreme control of the President and Supreme Council, it manages internal and foreign affairs of the federation, as laid down by the constitution and federal laws. The cabinet consists of the cabinet's president and two deputies and ministers. The general secretariat shall be handled by the secretary general of the cabinet.

A closer look at the working of the federal and local governments, both separately and combined, underlines the UAE's unique amalgamation of traditional and modern political systems, which has guaranteed national stability and laid the foundation for development.

1.1.2. Geography and Climate

The United Arab Emirates is bordered by the Arab Gulf from the North, Gulf of Oman and the Sultanate of Oman from the East, the Kingdom of Saudi Arabia and the Sultanate of Oman from the South, and the State of Qatar and the Kingdom of Saudi Arabia from the West. The country is located between 22-26.5 N latitude, and 51-56.51 E longitude.

The area of the country is 83,600 km^2, with the desert dominating most of this area with many popular oases. Most of the country's coast is dominated by sand, except for the northern area at Ras Al Khaimah, which constitutes the Hajer mountain cape.

1.1.3. Population

TABLE 1: POPULATION INFORMATION

Year	2005	2006	2007	2008	2009	2010	Average annual growth rate (%)
Population (millions)	4,106,427	5,012,384	6,219,006	8,073,626	8,199,996	8,264,070	5.3 from 1995-2005 6.3 in 2009 7.1 from 1990-2010[1]
Population density (inhabitants/km²)	58	71	88	114	115	116	

[1] UNICEF statistics, http://www.unicef.org/infobycountry/uae_statistics.html

Urban Population as % of total	3,384,839 (as per last census)						10.4 from 1970-1990 7.4 from 1990-2010 1.9 from 2010-2030[2]
Area (1000 km²)	83.6	83.6	83.6	83.6	83.6	83.6	83.6

* Latest available data

Source: UAE Statistics, National Bureau of Statistics, UNICEF statistics

The population of the UAE is growing rapidly. The UAE has a population of 8.19 million and is continuing to grow at a rapid rate despite the global downturn, according to a **comprehensive report**[3] by the National Bureau of Statistics on the country's economy, unveiled in May 2010. The *Report on Economic & Social Dimension 2009* reveals that the majority of the population, 81.9%, is in the 15 to 59 age group. Just 1.3% is aged 60 or over. The Report put the UAE's population at nearly 8.2 million at the end of 2010. A breakdown by the Bureau showed expatriates stood at nearly 7.316 million, accounting for around 88.5% of the country's total population.[4] The Bureau's report showed Emiratis were estimated at 947,997, nearly 11.5% of the total. Abu Dhabi Emirate is the most populous member of the UAE, followed by Dubai, which had around two million people at the end of March 2012.[5] While the average population density varies around 60 people/km^2, the majority of the population lives in urban centers.

1.1.4. Economic Data

As of 2008, the UAE Gross Domestic Product was US$254 billion (934 billion Dirham). Since 2001, annual GNP growth has ranged from 7.3% to 30.7%.

As one of the leading suppliers of crude oil, the UAE was initially insulated from the global downturn by high oil prices, which had soared to a record US$147 per barrel in July 2008. However, the country was eventually affected by the deepening global downturn that led to a slump in the demand for oil, dragging prices to less than a third of the July 2008 peak. In the final months of 2008, the tremors reverberating through international economies were finally felt in the region.

The UAE's growth in 2009 was sharply down from previous years. in October 2009, the Ministry of Economy forecast growth of 1.3% for the year. In November 2009, the International Monetary Fund (IMF) predicted a contraction of about 0.2%. The IMF predicted, however, that the UAE would return to positive figures in 2010, with an expansion of 2.4%. Other analysts were more optimistic, with forecasts ranging from 3.4% to 5% in 2010.

The UAE, and primarily Abu Dhabi, is continuing to diversify its economy by decreasing the overall percentage contribution of hydrocarbons to GDP. This is being done through an increasing investment in sectors such as: petrochemicals, metals, aviation, pharmaceuticals,

[2] UNICEF statistics, http://www.unicef.org/infobycountry/uae_statistics.html
[3] http://www.uaeinteract.com/docs/Population_leaps_to_8.19_million/41204.htm
[4] http://www.uaeinteract.com/docs/UAE_population_put_at_7.2_million/48889.htm
[5] http://www.uaeinteract.com/docs/UAE_population_put_at_7.2_million/48889.htm

biotechnology, tourism, healthcare, transportation and trade, education, media, and telecommunication services.

TABLE 2: GROSS DOMESTIC PRODUCT (GDP)

	2001	2002	2003	2004	2005	2006	2007	2008	2009	Average annual growth rate (%)
GDP (millions of current US$)	69,216	74,285	87,597	105,579	137,971	175,194	206,373	254,353		5.95 from 2000-2011[6]
GDP (millions of constant 2000 US$)[7]						106,344,193,033	112,831,188,808	118,585,579,437	117,755,480,381	
GDP per capita (thousand US$/capita)	21.9	22.2	24.7	28.1	34.6	38,581[8]	47,565[9]	58,272[10]	50,070[11]	-4.9 from 1970-1990 0.5 from 1990-2010[12]

* PPP: Purchasing Power Parity

** Latest available data

Sources: UAE Ministry of Economy, World Bank, UNICEF statistics

1.2. Energy Information

The United Arab Emirates (UAE) has the world's sixth largest proven oil reserves and the fifth largest natural gas reserves, making the country a critical partner and responsible supplier in global energy markets. Although a mainstay in the economy, oil exports actually account for only about one third of economic activity, as a result of aggressive government policies designed to diversify the UAE economy. However, domestic energy consumption has continued to rise steadily with all electricity production and water desalination being generated by thermal plants, which has resulted in the UAE becoming a net importer of natural gas since 2008.

1.2.1. Estimated available energy

TABLE 3: ESTIMATED AVAILABLE ENERGY SOURCES

Estimated available energy sources		
Fossil Fuels	**Nuclear**	**Renewables**

[6] http://www.tradingeconomics.com/united-arab-emirates/gdp-growth
[7] http://data.worldbank.org/indicator/NY.GDP.MKTP.KD
[8] http://data.worldbank.org/indicator/NY.GDP.PCAP.CD
[9] http://data.worldbank.org/indicator/NY.GDP.PCAP.CD
[10] http://data.worldbank.org/indicator/NY.GDP.PCAP.CD
[11] http://data.worldbank.org/indicator/NY.GDP.PCAP.CD
[12] UNICEF statistics, http://www.unicef.org/infobycountry/uae_statistics.html

	Solid	Liquid	Gas	Uranium	Hydro	Other Renewable
Total amount in specific units*	0 coal[13]	Oil 98 billion barrels[14]	212 trillion cubic feet (tcf)[15]		641Km3 (Abu Dhabi)[16]	
Total amount in Exajoule (EJ)						

* Solid, Liquid: Million tons; Gas: Billion m3; Uranium: Metric tons; Hydro, Renewable: TW

Source: ADNOC

1.2.2. Energy Statistics

TABLE 4: ENERGY STATISTICS

										Average annual growth rate (%)	
Energy Consumption	1971	1980	1990	2000	2004	2005	2006	2007	2008	1971 to 2000	2004 to 2008
- Total	0.04	0.23	0.66	1.04	1.10	1.10	1.10	1.36	1.42	11.23%	6.52%
- Solids	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00%	0.00%
- Liquids	0.01	0.12	0.24	0.28	0.33	0.35	0.36	0.38	0.46	11.49%	8.42%
- Gases	0.03	0.08	0.37	0.62	0.60	0.56	0.04	0.73	0.72	10.44%	5.67%
- Primary electricity	0.00	0.02	0.05	0.13	0.17	0.19	0.21	0.24	0.25	16.78%	9.40%
Energy Production											
- Total	2.21	3.78	4.61	6.38	7.06	7.12	7.60	7.57	7.56	3.66%	1.70%
- Solids	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00%	0.00%
- Liquids	2.18	3.51	3.91	4.98	5.25	5.30	5.70	5.61	5.80	2.85%	2.48%
- Gases	0.03	0.27	0.70	1.40	1.81	1.82	1.90	1.96	1.76	13.25%	-0.61%
- Primary electricity	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00%	0.00%
Net Import (Import - Export)											
- Total	-2.17	-3.39	-3.40	-4.44	-4.50	-4.46	-4.79	-4.45	-4.31	-2.34%	1.10%
- Solids	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00%	0.00%
- Liquids	-2.17	-3.30	-3.28	-4.19	-3.97	-3.93	-4.25	-4.07	-4.56	-2.15%	-3.52%
- Gases	0.00	-0.09	-0.12	-0.25	-0.53	-0.53	-0.54	-0.38	0.25	-7.50%	56.83%

** Energy values are in Exajoules*

Sources: UN Energy Balances & Electricity Profiles, and IEA Energy Database

1.2.3. Energy Policy

Each Emirate controls its own oil production and resource development. Abu Dhabi holds 94% of the UAE's oil resources, or about 92.2 billion barrels. Dubai contains an estimated 4

[13] http://www.fas.org/sgp/crs/misc/R40872.pdf

[14] ADNOC (http://www.adnoc.ae/content.aspx?newid=306&mid=306)

[15] ibid

[16] EAD (http://www.ead.ae/_data/global/files/water%20resouces%20stat/water-statistics%202006%20english.pdf)

billion barrels, followed by Sharjah and Ras Al Khaimah, with 1.5 billion and 100 million barrels of oil, respectively.

The UAE exports more than 40% of its crude oil to Japan, making it the UAE's largest customer. The UAE is a net importer of natural gas, and gas exports are primarily to Japan, the world's largest buyer of liquefied gas. The Dolphin Project, which began importing natural gas from Qatar to the UAE by pipeline, in 2007, was the first major cross-border energy deal between Gulf countries.

Economic growth across the UAE has led to massive increases in the demand for electricity. Current estimates indicate that the domestic demand for power will more than double by 2020, even given the global economic slowdown. With limitations on how much and how fast conventional energy resources, like natural gas, can be brought to market, as well as concerns about climate change, the UAE government launched various initiatives aimed at identifying alternative means for producing the power needed to fuel its economy.

As a result of this study, the UAE is pursuing a peaceful, civilian nuclear energy program that upholds the highest standards of safety, security, nonproliferation and operational transparency. Government officials, nonproliferation advocates, and energy experts worldwide have called the UAE approach a gold standard for countries interested in exploring nuclear energy for the first time.

In developing its nuclear energy policy, the UAE made its peaceful objectives unambiguous. A policy document titled "***Policy of the United Arab Emirates on the Evaluation and Potential Development of Peaceful Nuclear Energy***", released in April 2008, outlined a series of commitments, including the decision to forgo domestic enrichment and reprocessing of nuclear fuels. Throughout the process, the UAE has worked closely with the International Atomic Energy Agency (IAEA).

Climate Change and Energy Policy

The UAE is pursuing groundbreaking renewable energy and energy efficiency programs. In 2005, the UAE ratified the Kyoto Protocol to the UN Convention on Climate Change, becoming one of the first major oil-producing countries to do so. According to the protocol, the UAE, as a non-Annex 1 country, is not obligated to reduce its emissions. However, the UAE is taking a number of steps to respond to this critical issue.

The UAE has started the transition to curb emission of greenhouse gases, focusing on natural gas and developing peaceful civilian nuclear energy to meet significant power generation demands and water desalination requirements.

The UAE's largest Emirate, Abu Dhabi, has committed more than $15 billion to renewable energy programs. The Masdar Initiative underscores twin commitments to the global environment and diversification of the UAE economy. The Masdar Initiative focuses on the development and commercialization of technologies in renewable energy, energy efficiency, carbon management and monetization, water usage and desalination. It has four key elements:

- **An innovation center** to support the demonstration, commercialization and adoption of sustainable energy technologies.

- **The Masdar Institute of Science and Technology**, with graduate programs in renewable energy and sustainability, located in Masdar City, the world's first carbon-neutral, waste free, car-free city.
- **A development company** focused on the commercialization of emissions reduction, and Clean Development Mechanism solutions, as provided by the Kyoto Protocol.
- **A Special Economic Zone** to host institutions investing in renewable energy technologies and products.

The gases that contribute most to the greenhouse effect are carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O) and fluorine compounds. Burning of fossil fuels is the main cause of emissions of greenhouse gases.

The UAE's CO_2 emissions increased from 60,809,000 tons in 1990 to 94,163,000 tons in 2002. Due to better technology and the transition to more natural gas in power plants, emissions of CO_2 per capita have decreased. In 1990, the UAE emitted 32.6 tons CO_2 per person per year. In 2002, this figure had dropped to 25.1 tons per person per year.

1.3. The Electricity System

1.3.1. Electricity Policy and Decision Making Process

The electricity sector is controlled by each Emirate rather than at the central federal level (Figure 2).

The Abu Dhabi Water and Electricity Authority (ADWEA) is responsible for Abu Dhabi city, Al Ain and the western region. The Dubai Electricity and Water Authority (DEWA) is responsible for Dubai, with the Sharjah Electricity and Water Authority (SEWA) and the Federal Electricity and Water Authority (FEWA) providing power to Sharjah, Umm Al Quwain, Fujairah, Ajman, and Ra's Al Khaimah. ADWEA accounts for 53% of the federation's total capacity, followed by DEWA, with 29%. SEWA and FEWA own 11% and 7%, respectively.

1.3.2. Structure of Electric Power sector

The grids of Abu Dhabi and Dubai have been connected, marking the first step towards the creation of the Emirates National Grid (ENG), which will amalgamate the power generation, transmission and distribution networks of the seven Emirates into a single national grid. The ENG is expected to be connected the Gulf Cooperation Council (GCC) grid, linking the UAE with Qatar, Bahrain, Saudi Arabia, Kuwait, and Oman.

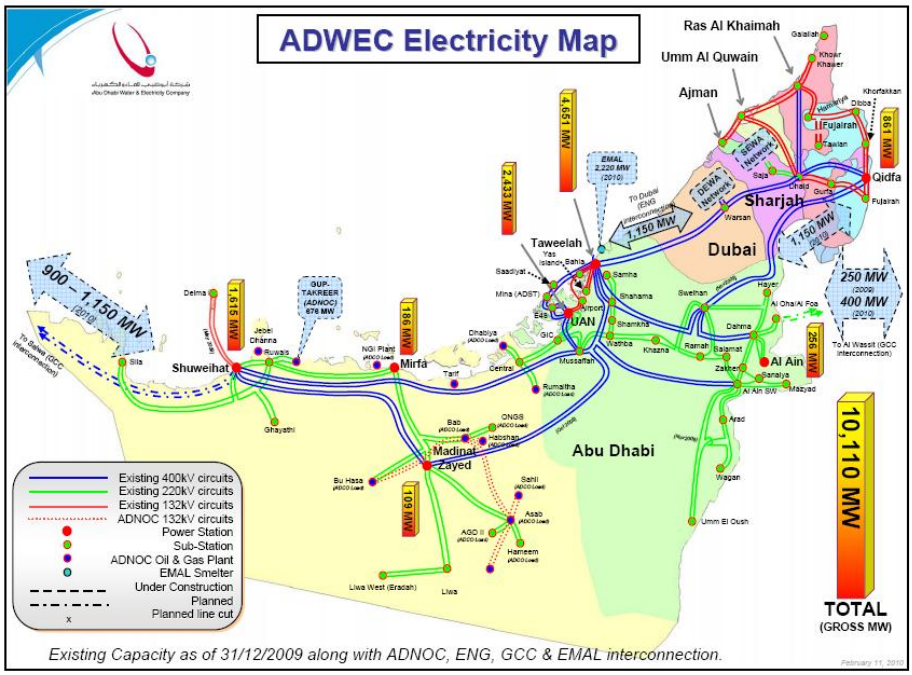

FIGURE 2: UAE ELECTRICITY GRID
Source: Abu Dhabi Water and Electric Company (ADWEC)

1.3.3. Main indicators

TABLE 5: ELECTRICITY PRODUCTION, CONSUMPTION AND CAPACITY

										Average annual growth rate (%)	
Electricity Production (TWh)	1971	1980	1990	2000	2004	2005	2006	2007	2008	1971 to 2000	2004 to 2008
- Total	0.20	6.31	17.08	39.94	52.42	60.70	66.77	76.11	86.26	18.27%	12.36%
- Thermal	0.20	6.31	17.08	39.94	52.42	60.70	66.77	76.11	86.26	18.27%	12.36%
- Hydro	-	-	-	-	-	-	-	-	-		
- Nuclear	-	-	-	-	-	-	-	-	-		
- Geothermal	-	-	-	-	-	-	-	-	-		
Electricity consumption											
- Total (TWh)	0.19	5.87	15.54	38.59	48.95	56.26	61.89	70.54	75.76	18.25%	10.69%
- Per GDP (kWh per kUSD)	0.04	0.24	0.68	1.10	1.08	1.16	1.16	1.22	1.22	11.43%	3.00%
- Per population (MWh per capita)	0.71	5.78	8.33	11.89	12.40	13.71	14.57	16.16	16.90	9.71%	7.62%

Sources: UN Energy Balances & Electricity Profiles, and IEA Energy Database

TABLE 6: ENERGY RELATED RATIOS

	1970	1980	1990	2000	2005	2006	2007	2008
Energy consumption per capita (GJ/capita) Primary energy use (before transformation to other end-	3,809	7,047	10,645	10,405	10,543	10,722	11,833	13,030

use fuels) in kilograms of oil equivalent, per capita[17]								
Electricity consumption per capita (kW.h/capita)	710	5780	8330	11890	13710	14570	16160	16900
Nuclear/Total electricity (%)	0	0	0	0	0	0	0	0

(1) Net import / Total energy consumption.
Source: World Bank

2. Nuclear Power Situation

2.1. Historical development and current nuclear power organizational structure

2.1.1. Overview

The development of a peaceful, civilian nuclear energy program was based on an in-depth evaluation of the UAE's future energy needs. An initial study determined that national annual peak demand for electricity is likely to rise to more than 40,000 megawatts by 2020, reflecting a cumulative annual growth rate of about 9% from 2007. Even with adjustments to account for the worldwide economic slowdown, the projected demand is well beyond current capacity.

The UAE then studied options to meet this demand. This evaluation was wide-ranging and determined that:

- Natural gas that could be made available to the nation's electricity sector would be insufficient to meet future demand.
- The burning of liquids (crude oil and/or diesel) would be logistically viable but costly and environmentally harmful.
- Coal-fired power generation, while potentially cheaper, would be environmentally unacceptable, and potentially vulnerable from a security of supply standpoint.
- And finally, deployment of renewable and other alternative energy supplies, while desirable, would be able to supply only 6 to 7% of the required electricity generation capacity by 2020.

As previously highlighted, in developing its nuclear energy policy, the UAE government made its peaceful objectives unambiguous. A policy document entitled "***Policy of the United Arab Emirates on the Evaluation and Potential Development of Peaceful Nuclear Energy***, released in April 2008, outlined a series of strategies and commitments:

- The UAE is committed to complete operational transparency.
- The UAE is committed to pursuing the highest standards of non-proliferation.
- The UAE is committed to the highest standards of safety and security.
- The UAE will work directly with the IAEA and conform to its standards in evaluating and potentially establishing a peaceful nuclear energy program.

[17] World Bank, World development indicators

- The UAE hopes to develop any peaceful domestic nuclear power capability in partnership with the governments and firms of responsible nations, as well as with the assistance of appropriate expert organizations.
- The UAE will approach any peaceful domestic nuclear power program in a manner that best ensures long-term sustainability.

These policies are enshrined in a number of mechanisms, including the UAE Federal Nuclear Law signed in October 2009.

The UAE Nuclear Law takes into account all obligations and commitments that stem from the international instruments and obligations. The UAE views the application of a comprehensive safeguards agreement, bolstered by the IAEA Additional Protocol, as an important component of its model for the adoption of peaceful nuclear energy, and as being consistent with its commitment to complete operational transparency and the highest standards of non-proliferation.

The UAE signed a number of agreements for co-operation in the field of peaceful nuclear energy with numerous countries, including France, Republic of Korea, the United States, and UK. Other co-operation agreements are envisioned to be concluded in the future.

2.1.2. Current organizational charts

The key entities implementing the UAE's nuclear energy program are the:

- **Federal Authority for Nuclear Regulation (FANR).** An independent federal regulatory authority charged with the regulation and licensing of all nuclear related activities in the UAE, with public safety as its primary objective.

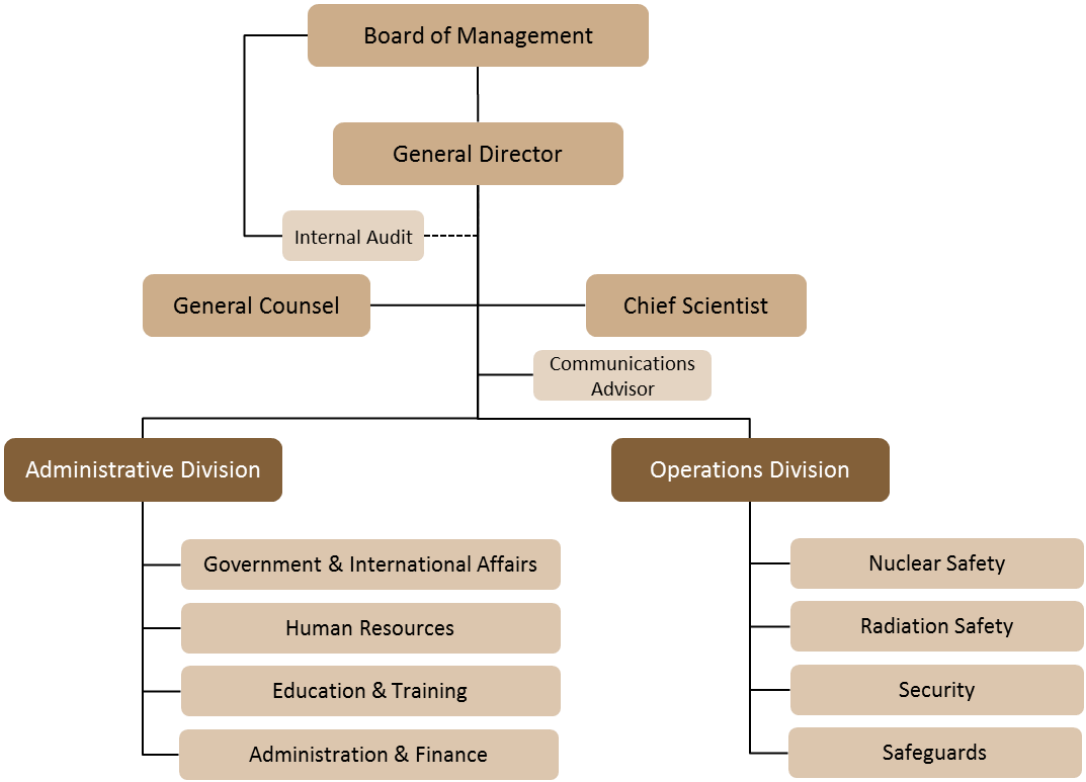

FIGURE 3: ORGANIZATION OF THE FEDERAL AUTHORITY FOR NUCLEAR REGULATION

- **Emirates Nuclear Energy Corporation (ENEC).** A corporation, wholly-owned by the Abu Dhabi government, charged with developing nuclear power plants within the UAE. One of ENEC's responsibilities – among others – is to contract with a primary contractor for the construction of UAE nuclear power plants. For this purpose, KEPCO has already been appointed as a Prime Contractor.

FIGURE 4: ORGANIZATION OF THE EMIRATES NUCLEAR ENERGY CORPORATION

Note: The Quality Assurance Director does not report to CEO.

- **International Advisory Board (IAB)** is a concept developed by the UAE government to augment the transparency of its peaceful nuclear energy program. The board includes world-class expertise in the areas of nuclear safety, security and non-proliferation, as well as regulation, quality assurance, operations, human resource development and waste management associated with the construction, operation and decommissioning of civil nuclear power plants. Led by Dr. Hans Blix, the former Director General of the International Atomic Energy Agency (from 1982-1997), the IAB is charged with conducting semi-annual reviews of the UAE's entire peaceful nuclear energy program and subsequently preparing a semi-annual report summarizing their observations, findings and recommendations.

Environmental Agency – Abu Dhabi (EAD) is the environmental regulator for Abu Dhabi. The environmental aspects of the nuclear power plants project are subject to its regulation, in addition to nuclear safety regulation and oversight from FANR.
EAD and FANR have coordinated their work on the non-nuclear Environmental Impact Assessment and FANR's assessment of ENEC's application for a license to prepare a site

2.2. Nuclear Power Plants: Overview

2.2.1. Status and performance of nuclear power plants

Not applicable. No nuclear power plants are currently in operation.

2.2.2. Plant upgrading, plant life management and license renewals

Not applicable.

2.3. Future development of nuclear power

2.3.1. Nuclear power development strategy

As the UAE is currently in the initial stages of deployment of a civil nuclear power program, its current focus is on the development and maturity of the necessary infrastructure and on effective management of its prime contractor for delivery of the initial units.

On December 27th, 2009, the Emirates Nuclear Energy Corporation (ENEC) announced that it had selected a team led by Korea Electric Power Corporation (KEPCO) to design, build and help operate civil nuclear power plants for the United Arab Emirates' peaceful nuclear energy program.

Pending regulatory approvals, the first of the four units is scheduled to begin providing electricity to the grid in 2017, with the three later units being completed by 2020.

ENEC has decided to build KEPCO's APR1400, a Generation III, 1400 Megawatt nuclear power plant with evolutionary improvements in safety, performance, and environmental impact. A certificate for the standard design approval was issued for the APR1400 by the Korean regulatory authority in 2002. The APR1400 is similar to, but represents an improvement over, the System 80+ design, which was previously certified by the Nuclear Regulatory Commission (NRC) in the United States.

The first of the APR1400 units, Shin-Kori units 3&4, are now under construction in the Republic of Korea, having obtained a Construction Permit from the Korean regulatory authority, the Korean Institute of Nuclear Safety (KINS). Shin-Kori unit 3 is scheduled to be connected to Korea's grid by 2013. The first UAE nuclear power plant will be the fifth unit of the APR1400 plants in the world, and the Shin-Kori plants will serve as the "reference plants" for the UAE program.

As a Generation III reactor, the APR1400 has been designed to meet heightened safety goals developed in accordance with the latest international safety standards, which aim to secure an additional margin of safety to protect the public health. The APR1400 design incorporates more than 30 years of operational learning and resulting enhancements in safety, reliability and efficiency.

The contract with KEPCO calls for extensive training, human resource development and education programs, as the UAE builds the capacity to eventually staff the majority of the nuclear energy program with national talent and develops the industrial infrastructure.

TABLE 8: PLANNED NUCLEAR POWER PLANTS

Station/Project Name	Type	Capacity	Expected Construction Start Year	Expected Commercial Year
Barakah 1	APR-1400, Generation III nuclear power plant	1400-MW civil		2017
Barakah 2	APR-1400, Generation III	1400-MW civil		2018

	nuclear power plant		
Barakah 3	APR-1400, Generation III nuclear power plant	1400-MW civil	2019
Barakah 4	APR-1400, Generation III nuclear power plant	1400-MW civil	2020
TOTAL		5600 MWe	

Source: United Arab Emirates Self-Assessment report: National Infrastructure for the Civil Nuclear Energy Program July 2010
http://world-nuclear.org/info/UAE_nuclear_power_inf123.html

Given the growth in electricity demand projected for the United Arab Emirates, it is possible that additional units beyond the original four will be procured in the future as the UAE expands its fleet of civil nuclear power plants.

2.3.2. Project management

Federal Authority for Nuclear Regulation (FANR)

On September 25th, 2009, the Federal Authority for Nuclear Regulation (FANR) was established, following Federal Law by Decree No. 6 of 2009, concerning the peaceful uses of nuclear energy (the Nuclear Law). It is an independent regulatory authority, responsible for ensuring long-term safety, security and sustainability in the peaceful uses of nuclear energy and ionizing radiation in the UAE by establishing world-class regulations and supervising their implementation.

For that purpose, FANR is responsible for developing and enforcing binding safety standards and regulations, guidelines and safeguards that ensure nuclear safety, nuclear security, non-proliferation and radiation protection by:

1) Reducing any harmful impact of the use of nuclear technology and ionizing radiation on human life, health and living conditions for both present and future generations, the environment and property,

2) Keeping worker and public exposure to ionizing radiation to a level which is as low as reasonably achievable, and

3) Preventing any diversion of nuclear or radioactive materials and nuclear technology for non-peaceful purposes.

The key tasks of the Authority are:

- Issue regulations
- Issue licenses to conduct regulated activities
- Carry out safety assessments
- Establish and maintain SSAC (state system of accounting for and control of nuclear material)
- Establish frameworks for physical protection, emergency preparedness and response for nuclear facilities and activities
- Determine civil and criminal penalties for any violations of the Nuclear Law
- Capacity-building strategies to ensure sustainability

- Appropriate oversight of the obligations under the international treaties, conventions and agreements in the nuclear sector entered into by the UAE
- Administrative standards which support excellence in regulation

Under the UAE Nuclear Law, the Authority is the body in charge of the issuance, revocation and suspension of licenses for regulated nuclear activities in the UAE. However, each licensee is accountable for taking all steps necessary to reduce the risk of an accident to a level that is as low as reasonably possible.

The Authority is also responsible for inspection and control, investigating any breaches of the Nuclear Law of the UAE and imposing penalties in such cases. It also abides with high standards of transparency and facilitates public access to information pertaining to its activities.

To achieve its goals for safety and security, FANR also co-operates with relevant government bodies as well as international organizations in areas of: environmental protection, public and occupational health, emergency planning and preparedness, radioactive wastes, public liability, physical protection and safeguards, water and food consumption, land use and planning and safety in the transport of dangerous goods.

FANR is managed by a board comprised of nine members. It is chaired by H.E. Dr. Ahmed Mubarak Al Mazrouei, with H.E. Abdulla Nasser Al Suwaidi as Deputy Chairman.

Emirates Nuclear Energy Corporation (ENEC)

On December 23rd, 2009, Emirates Nuclear Energy Corporation (ENEC) was established by Abu Dhabi decree as the owner and operator organization in charge of implementing the UAE nuclear energy program.

ENEC's main responsibilities are:

1) Contracting, constructing and operation of nuclear power plants.

2) Working with Abu Dhabi and the Federal Government to ensure that the civil nuclear power program is aligned with industrial and infrastructure plans for the UAE (community development, roads, utility, telecommunication projects etc.).

3) Building human resources capacity for the nuclear energy program in parallel with the educational sector in UAE (co-operation with other stakeholders including Khalifa University, Institute of Applied Technology).

4) Developing public communications and education programs to ensure that UAE residents understand the civil nuclear energy program.

ENEC work and activities are subject to the oversight and regulation of FANR. Both FANR and ENEC have distinct roles, with FANR being an independent nuclear regulator and ENEC being the implementer of the project.

ENEC top management consists of a board of Directors chaired by H.E. Khaldoon Khalifa Al Mubarak. Other members of the board are: Deputy Chairman H.E. Shaikha Lubna al Qasimi, Jasem Mohamad Al Za'abi, Mohamad Sahu Al Suwaidi and David V. Scott.

2.3.3. Project funding

The contract calls for the KEPCO team to design, build and help operate four 1,400-MW civil nuclear power units. The value of the contract for the construction, commissioning and initial fuel loads for four units equaled approximately US$20 billion.

In addition to the delivery of the four plants, ENEC and KEPCO have also agreed to key terms under which Korean investors will have an equity interest in the project. This arrangement will further strengthen the business relationship and powerfully incentivize the partners to ensure that the necessary experience, technology and skills are available to achieve on-time and on-budget delivery and safe and reliable operation of the plants.

2.3.4. Electric grid development

Currently, according to the recent UAE self-assessment report which was finalized in July 2010, the following key accomplishments have been completed with regard to the electric grid:

- A grid study was completed by KEMA, and provided recommendations as well as indicating the initial acceptability of adding a nuclear power plant to the grid.
- A national interagency working group on energy, which will ensure coordination of the grid and support infrastructure for the civil nuclear power program, was developed.
- The requirements for power during construction and commissioning as well as supporting infrastructure (operators' village, visitors centre, etc.) have been defined and provided to the electricity transmission company.
- Work has started on generation planning to formally include the expected NPP generation schedules into the generation requirement outlook and to optimize power and water production plans for the required work for the initially planned NPP fleet.
- Coordination has begun with several Government departments and companies to ensure that all necessary supporting infrastructures and utilities required for early stages of the NPP program are in place and will be executed by the required time, including all local permits, approvals and budgets.[18]

2.3.5. Site selection

FANR has issued a number of licenses to the Emirates Nuclear Energy Corporation (ENEC):

- Site Selection License – Approved 28 February 2010
- Site Preparation License – Approved 8 July 2010
- Limited Construction License (LCL) for Manufacturing – Approved 8 July 2010
- LCL Phase 1 issued 6th March 2012 to allow safety related work to begin on rock mapping and inspection
- Construction license on July 17th 2012, for Units 1 and 2 of Barakah

2.4. Organizations involved in construction of NPPs

As Prime Contractor, KEPCO will supply the full scope of works and services for the UAE Civil Nuclear Power Program, including engineering, procurement, construction, nuclear fuel and operations and maintenance support, with the assistance of other members of the KEPCO team, including Samsung, Hyundai, Doosan Heavy Industries and KEPCO subsidiaries:

- Korea Hydro and Nuclear Power Co., Ltd. (KHNP), which will play a key role as the Engineering, Procurement and Construction (EPC) contractor and operator

[18] United Arab Emirates National Infrastructure for the Civil Nuclear Energy Program, July 2010, p78

- KEPCO E&C, which will provide the nuclear power plant design and engineering service
- Korea Nuclear Fuel Co., Ltd. (KNF), which will provide the nuclear fuel
- Korea Plant Service and Engineering Co., Ltd. (KPS), which will be involved in plant maintenance

KEPCO, a government owned-utility, is the world's third largest nuclear energy business, with an installed nuclear generation capacity of 17,716MW as of the end of 2008. KEPCO operates 20 commercial nuclear power units as of 2009, with 8 more units currently under construction and an additional 10 units planned to be built by 2030.

Non-Korean companies involved in the KEPCO team include Westinghouse of the US, and Toshiba of Japan.

2.5. Organizations involved in operation of NPPs

No nuclear power plants are currently in operation in the UAE. Pending regulatory approvals, the first nuclear power plant is expected to be in operation in 2017.

The Emirates Nuclear Energy Corporation (ENEC) is the organization responsible for operating future NPPs. For more information about ENEC, please re-visit earlier specifications in sections above, in particular section 2.3.2.

2.6. Organizations involved in decommissioning of NPPs

Not applicable.

2.7. Fuel cycle including waste management

The UAE is in the process of developing and implementing a strategy for the management of all nuclear fuel cycle activities, including the procurement, use, and short- and long-term management of nuclear fuel for its nuclear power plants. The strategy conforms to guidelines established by the International Atomic Energy Agency and will be continually updated, taking into account new information and technological advances from the nuclear industry during the next decades, before the long-term spent fuel management plan is implemented.

The UAE is establishing the basis for the safe and efficient processing, storage, and disposal of radioactive wastes which will be generated by future nuclear power plant operations.

2.8. Research and Development

The government is supportive of establishing a nuclear R&D program, especially through expanding partnerships with existing supplier nations. However, besides the human resource training and education programs, there are currently no significant R&D programs underway.

2.8.1. R&D organizations

Central to the UAE's approach to developing a nuclear energy program has been the importance of building a qualified workforce in the short and long term. ENEC has joined with the Khalifa University of Science, Technology and Research, the Institute of Applied Technology, the Federal Authority for Nuclear Regulation and other parts of the UAE educational system, as well as with universities internationally, in order to ensure that there will be a reservoir of talent, both Emirati and expatriate, well into the future.

2.8.2. Development of advanced nuclear technologies

Although the UAE anticipates future co-operation to develop advanced nuclear generation systems, no specific programs are underway.

2.8.3. International co-operation and initiatives

As a member of the International Atomic Energy Agency (IAEA), the UAE has committed itself to various IAEA strategies on operational transparency, non-proliferation and safety. UAE seeks IAEA technical assistance in the areas of safeguards, physical protection, safety and liability, as well as in the assessment of potential technology options and appropriate managerial approaches.

In August 2008, the UAE pledged US$10 million to support an IAEA-administered international uranium fuel-bank initiative. The IAEA fuel-bank is designed to provide assurances against supply disruptions, while strengthening the nuclear non-proliferation regime. On December 3rd, 2010, the IAEA Board of Governors approved the establishment of IAEA LEU fuel-bank.

The UAE has concluded multiple bilateral agreements with other governments for co-operation in the peaceful nuclear field, including agreements with France, the US, the Republic of Korea, the UK, and Australia. Others agreements are underway.

The UAE is working through multiple initiatives, such as the US Department of Energy Megaports Initiative, aimed at deterring terrorists from using the world's seaports to ship illicit materials, detecting nuclear or radioactive materials if shipped via sea cargo, and interdicting harmful shipments. Furthermore, the UAE is a member of the Proliferation Security Initiative (PSI), which is aimed at stopping shipments of weapons of mass destruction, their delivery systems and related materials worldwide. The UAE is also a member of the International Framework for Nuclear Energy Cooperation (IFNEC) as well as the Global Initiative to Combat Nuclear Terrorism

In addition to several agreements signed with the US Nuclear Regulatory Commission (NRC), the Korea Institute of Nuclear Safety (KINS) and the Korea Institute of Nuclear Non-proliferation and Control (KINAC), FANR has broadened its co-operation with international regulators in other countries in nuclear safety, nuclear security, and safeguards-related matters.

In December 2011, FANR and the Korea Nuclear Safety and Security Commission (NSSC) signed a framework agreement that would allow co-operation in the areas of nuclear safety, security and safeguards through the exchange of information, experience, staff and

technology. This was a reinforcement of the similar earlier agreement between FANR and the previous Korean regulator, the Ministry of Education, Science and Technology (MEST).

In November, FANR and Finland's Radiation and Nuclear Safety Authority (STUK) entered into a similar co-operation arrangement in the fields of nuclear and radiation safety, security and safeguards.

Further bilateral arrangements are being finalized with other nuclear bodies worldwide, such as the French Institute for Nuclear Safety (ASN), the French Institute for Radiological Protection and Nuclear Safety (IRSN) and the Office of Nuclear Regulation of the United Kingdom.

2.9. Human Resource Development

The UAE has taken an incremental approach to rapidly building the capabilities needed to successfully execute a nuclear power program, based on a mix of advisors, support companies and indigenous staff.

Initially, a relatively small group of advisors were engaged to assist in the early planning and development. This early influx of nuclear talent aided the start-up of both the UAE nuclear regulator (FANR) and the owner/operator (ENEC).

Following this strategy, ENEC selected a nuclear experienced managing agent to support its development and solicitation of bids for the nuclear power program. Key positions within the organization were filled with experienced nuclear contractors and other key positions are supported with nuclear experts. In addition, ENEC was able to tap into the experienced professionals from the UAE's long-established oil and gas, energy and mega-project industries to build its management ranks.

The UAE recognizes the importance of developing indigenous capabilities for the long-term success of the nuclear program. The UAE has established a nuclear scholarship program, which will produce engineers to support the nuclear plant staff, regulatory staff and educational infrastructure. It has also begun a program under which high school and technical school students participate in training programs in Korea.

In keeping with this effort, an extensive relationship with Khalifa University of Science, Technology and Research (KUSTAR), located in the UAE, has been established. This university will support a bachelor degree program in mechanical engineering and a master degree program in nuclear engineering. Recognizing the near-term need for qualified engineers, relationships with universities located in the United States and South Korea with strong nuclear engineering programs have also been established to support UAE nuclear scholarship.

2.10. Stakeholder Communication

In line with the UAE's policy commitment to complete operational transparency in the development of a peaceful civil nuclear energy program, the Emirates Nuclear Energy Corporation has developed a comprehensive public education and outreach program to ensure that the UAE community has a greater understanding of nuclear energy and the aims of the UAE nuclear energy program.

ENEC's community engagement program provides multiple sources of accurate and up-to-date information about the program, as well as multiple channels for members of the community to put forward any questions or concerns they may have regarding nuclear energy in the UAE.

ENEC's current activities include:

- Nuclear Energy Forums – ENEC's community forums focus on educating the public about nuclear energy and the UAE Nuclear Energy Program. Forums address common myths surrounding nuclear energy technology. ENEC discusses human resource development and job opportunities. The sessions also feature open question and answer sessions, where the community can have their questions answered by a member of the ENEC senior management team.

- Regular interactions with IAEA through UAE Ministry of Foreign Affairs (MOFA), the World Association of Nuclear Operators (WANO) and the Institute of Nuclear Power Operations (INPO).

- ENEC provides regular briefings for government officials and departments, and runs specialized nuclear energy forums for UAE government departments.

- ENEC regularly participates in career fairs for UAE students, and runs frequent advertising campaigns related to human capacity development for the UAE nuclear energy industry, specifically regarding the Student Scholarship Program.

- ENEC has developed a comprehensive website that includes key information on nuclear energy, nuclear energy in the UAE and the ENEC program. This content is provided in Arabic, English, and seven other languages commonly used in the UAE.

- In 2011, ENEC launched a comprehensive stakeholder research program to monitor stakeholder and general public engagement on nuclear energy and awareness of the UAE peaceful nuclear energy program. Initial findings indicated strong support for the nuclear energy program.

FANR has exclusive responsibility in the UAE for licensing regulated activities related to nuclear and radiation safety and security. FANR is also responsible, pursuant to the Nuclear Law, for co-operation with the other competent authorities which have related responsibilities.

FANR uses various methods of engagement with the stakeholders and the public including:

- Direct Engagement through one-to-one meetings or round table discussions with the competent authorities, to enable the Authority to access information, resources and relevant expertise.
- As part of its responsibility to fulfill the International Conventions, FANR had lead various National Joint Steering Committees, supporting the production of unified reports and materials requested as an obligation of the international conventions that the UAE has ratified. These include the National Steering Committee established to

prepare the UAE's 1st National Report on the Convention on Nuclear Safety, and the National Steering Committee formed to prepare the 1st National Report on the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management.

- Through the early-established National Channel for Consultation on Nuclear Regulation, FANR is able to reach out to 47 key governmental stakeholders, seeking their review and input into the Authority's regulations and guides, excepting those related to national security or industrial sensitivity. The channel provides valuable feedback to FANR before regulations are approved by the Board of Management and published in the Official Gazette.
    - In an effort to increase the knowledge of the stakeholders, hundreds of representatives from over 20 government entities across the country are invited to various FANR events on safety, security or safeguards issues.
    - The largest event FANR, held in 2011, was a series of awareness sessions to help licensees understand FANR regulations and guides. The sessions focused on FANR's comprehensive understanding of safety, security and safeguards, also known as the '3S approach', and on how this would be applied in licensing and inspection activities. The four-day events in Abu Dhabi and Dubai, held in October, attracted almost 500 representatives from the industrial and medical sectors in the UAE, ranging from oil companies to dentists.
    - Domestically, FANR has formalized its partnership with some competent authorities by signing Memorandums of Understanding (MoUs) with:
        - Khalifa University of Science, Technology & Research, on the establishment of nuclear safety research and educating the UAE's future nuclear workforce
        - National Transport Authority (NTA), on the transportation of nuclear regulated material.
        - More MoUs are being negotiated with EAD, NCEMA and SPC.
    - In light of the UAE celebration of the 40th National Day, FANR has launched its 1st social responsibility initiative by visiting some special needs centers.

FANR also maintains an active public information programme including:

- Annual Reports highlighting FANR's yearly activities and accomplishments.
- Media Coverage, including press releases, web stories, press conferences and interviews, for publicizing and drawing attention to major FANR milestones and news.
- FANR coporate website with content covering FANR's mission, vision and core values, in addition to corporate information about its key business as well as Board of Management decisions and resolutions
- The website www.fanr.gov.ae, which includes various features such as e-services, e-participation introducing public discussion forum, direct access to the Director General, comments platform, events calendar and the soft launch for social media tools, starting with the YouTube channel.
- FANR Corporate video, highlighting its role and function.
- Public information sessions throughout the UAE, starting with Abu Dhabi's Western Region, planned in May 2012.

3. National Laws and Regulations

3.1. Regulatory framework

3.1.1. Regulatory authority(s)

In September 2009, the UAE President, H.H. Sheikh Khalifa bin Zayed Al Nahyan, approved Federal Law by Decree No 6 of 2009, Regarding the Peaceful Uses of Nuclear Energy. This establishes the Federal Authority for Nuclear Regulation (FANR) as the UAE's nuclear regulatory body.

As previously mentioned, the Federal Authority for Nuclear Regulation (FANR) is the independent government body charged with regulating and licensing nuclear activities in the UAE, which, in addition to the nuclear power program, includes radioactive material and radiation sources used in medicine, research, oil exploration and other industries. The Authority determines all matters relating to the control and supervision of the nuclear sector in the UAE, in particular nuclear safety and security, radiation protection and safeguards. All obligations under the relevant international treaties, conventions or agreements entered into by the UAE are carried out by FANR.

The FANR Board of Management (BoM) is composed of nine members, including a Chairman and Deputy Chairman. All members are appointed by Minister's Cabinet Resolution and must be citizens of the United Arab Emirates. The Board of Management appoints the Director General and is responsible for managing the Authority.

3.1.2. Licensing process

The National Law provides requirements for the granting, revocation, and suspension of licenses. The law prohibits any person from conducting any 'Regulated Activity' in the UAE unless licensed to do so by FANR. "Regulated Activity" includes the siting, construction, operation and decommissioning of nuclear facilities.

The law provides requirements for inspection and control of licensee activities, requiring FANR to establish a planned and systematic inspection program and to conduct inspections covering all areas of regulatory responsibility to ensure that the operator is in compliance with the law, regulations and license conditions. In undertaking inspections, FANR has the power to undertake enforcement actions, which are defined by the law as including corrective actions, written warnings, revocation of a license, and administrative penalties and fines. The law includes provisions for civil liabilities and criminal penalties for various offences related to the requirements of the Nuclear Law.

3.2. Main national laws and regulations in nuclear power

The legislative framework includes three types of instruments: laws adopted within the UAE, multilateral instruments to which the UAE has become a party or is taking steps to join, and bilateral agreements with States that will be participating in the UAE program. The following list of instruments) include:

Laws of the United Arab Emirates:

- Federal Law by Decree No. (6) of 2009 Concerning the Peaceful Uses of Nuclear Energy, which came into effect on 24 September 2009 (referred to as the Nuclear Law).

- Law No. (21) of 2009 Establishing the Emirates Nuclear Energy Corporation, issued on 20 December 2009.

- Federal Law No. (24) of 1999 for the Protection and Development of the Environment, issued 17 October 1999.

- Law No. (14) of 2007 Concerning the Establishment of the Critical National Infrastructure Authority, which came into force on 27 May 2007.

SUMMARY OF THE UAE NUCLEAR LAW

The Federal Law by Decree No. 6 of 2009 Concerning the Peaceful Uses of Nuclear Energy
• Affirms UAE commitment to develop and control the Nuclear Sector towards peaceful purposes only and in accordance with the Policy and international treaties and agreements o Highest priority given to Safety, Nuclear Safety, Radiation Protection and Safeguards o Enrichment and reprocessing forbidden in UAE
• Establishes and empowers the Federal Authority for Nuclear Regulation as an independent regulator to determine all matters relating to the regulation, inspection, and oversight of the Nuclear Sector with respect to Safety, Nuclear Safety, Nuclear Security, Radiation Protection and Safeguards
• Includes o Licensing, inspection and control regime o Powers to set up and operate national system of accounting and control of Nuclear Material o Arrangements for radioactive waste and decommissioning o The frameworks for physical protection and emergency preparedness and response
• Determines civil and criminal penalties, including penalties consistent with the convention on Physical Protection of Nuclear Material

In order to put in place requirements covering the early regulated activities under the Nuclear Law, FANR has given priority to developing a number of regulations, including (as of April 2010):

- FANR REG-01, Management Systems for Nuclear Facilities;
- FANR REG-02, Siting of Nuclear Facilities;
- FANR REG-03, Design of Nuclear Facilities;
- FANR REG-04, Radiation Dose Limits and Optimization of Radiation Protection for Nuclear Facilities;
- FANR REG-05, Application of Probabilistic Risk Assessment at Nuclear Facilities;
- FANR REG-06, Application for a License to Construct a Nuclear Facility;
- FANR REG-07, Nuclear Facility Construction;

- FANR REG-08, Physical Protection for Nuclear Material and Nuclear Facilities;
- FANR REG-09, Import/Export Controls;
- FANR REG-10, Safeguards and Nuclear Material Accounting and Control;
- FANR REG-11, Radiation Protection and Radioactive Waste Management for Nuclear Facilities;
- FANR REG-12, Emergency Preparedness at a Nuclear Facility;
- FANR REG-13, Transportation of Radioactive Materials; and
- FANR REG-14, Application for a License to Operate a Nuclear Facility.

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Emirates Nuclear Energy Corporation, www.ENEC.gov.ae

Emirates National Grid, www.ENG.ae

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APPENDIX 1: INTERNATIONAL, MULTILATERAL AND BILATERAL AGREEMENTS

Multilateral Instruments Adopted by the UAE

- Convention on Nuclear Safety, acceded 31 July 2009
- Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management, acceded 31 July 2009
- Convention on Early Notification of a Nuclear Accident, acceded 2 October 1987
- Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency, acceded 2 October 1987
- Convention on the Physical Protection of Nuclear Material INFCIRC/274, acceded 16 October 2004
- Amendment to the Convention on the Physical Protection of Nuclear Material, accepted 31 July 2009
- Comprehensive Safeguards Agreement between the United Arab Emirates and the International Atomic Energy Authority, 2003
- Protocol Additional to the Agreement between the United Arab Emirates and the International Atomic Energy Agency for the Application of Safeguards in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons, 2009
- Non Proliferation Treaty (NPT), 1995

Bilateral Cooperation Agreements

- UAE-Republic of Korea Agreement for Cooperation in the Peaceful Uses of Nuclear Energy, effective date 27 June 2009
- UAE-United States Cooperation Agreement Concerning Peaceful Uses of Nuclear Energy, January 2009[19]
- UAE-France Cooperation Agreement on the Development of Peaceful Uses of Nuclear Energy, made on 15 January 2008 in Abu Dhabi
- UAE-United Kingdom MOU Concerning Cooperation in Peaceful Uses of Nuclear Energy, 15 May 2008
- Implementing Arrangements between FANR/MEST (Ministry of Education, Science & Technology) and FANR/KINS (Korean Institute of Nuclear Safety), May 2010

APPENDIX 2: MAIN ORGANIZATIONS, INSTITUTIONS AND COMPANIES INVOLVED IN NUCLEAR POWER RELATED ACTIVITIES

Federal Authority for Nuclear Regulation
PO Box: 112021
Abu Dhabi, United Arab Emirates
+971 2 651 6666
www.fanr.gov.ae

[19] Nuclear Threat Initiative, http://www.nti.org/analysis/articles/us-uae-nuclear-cooperation/

Emirates Nuclear Energy Corporation
PO Box 112010
Mamoura B Building
Muroor Road/4th Street
Abu Dhabi, United Arab Emirates
+ 971 2 659 5555
www.enec.gov.ae

Khalifa University
PO Box: 127788
Abu Dhabi, United Arab Emirates
+971 2 401 8000
www.kustar.ac.ae

Critical National Infrastructure Authority (CNIA)
62220
Airport Road
Al Bateen Air Base
Abu Dhabi, United Arab Emirates
+971 2 655 5555
www.cnia.gov.ae

Environment Agency - Abu Dhabi
P.O Box: 45553
Al Mamoura Building, Muroor Road
Abu Dhabi, United Arab Emirates
+971 2 445 4777
www.ead.ae

Ministry of Cabinet Affairs
PO Box: 899
Abu Dhabi, United Arab Emirates
+917 2 681 1113
www.uaecabinet.ae

Ministry of Foreign Affairs
PO Box: 1
Abu Dhabi, United Arab Emirates
+971 2 444 44488
www.mofa.gov.ae

Ministry of Environment and Water
PO Box: 213
Abu Dhabi, United Arab Emirates
+917 2 449 5100
www.moew.gov.ae

National Crisis and Emergency Management Authority
PO Box: 113811

Abu Dhabi, United Arab Emirates
+917 2 417 7000
www.ncema.ae

Health Authority Abu Dhabi (HAAD)
PO Box: 5674
Abu Dhabi, United Arab Emirates
+971 2 444 9822
www.haad.ae

National Centre for Meteorology and Seismology
PO Box: 4815
Abu Dhabi, United Arab Emirates
+971 2 666 1575
www.ncms.ae

Dubai Health Authority
PO Box: 4545
Dubai, United Arab Emirates
+971 4 337 0031
www.dha.gov.ae

His Excellency Ambassador Hamad Al Kaabi, UAE Permanent Representative to the IAEA and Special Representative for International Nuclear Cooperation, is the Focal Point, contributing to the CNPP, via the Permanent Mission of the UAE to IAEA, established in Vienna, Austria.

Name of report coordinator:
Ambassador Hamad Al Kaabi
Institution:
Permanent Mission of the UAE to IAEA, Vienna
Contacts:
Tel: +43 1 715 0025
Fax: +43 1 715 0028 – 5555
Email: **general@uae-iaea.org**