

# UAE preparing for the era of Nuclear Power Supply: Introduction to the UAE Federal Nuclear Regulatory Regime

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## **Introduction to the UAE Federal Nuclear Regulatory Regime**

This article provides an introduction to the current UAE federal regulatory framework established in preparation of the first nuclear power plant project in the Middle East.

### **Building a nuclear power plant in the Oil-Rich UAE: Why?**

In 2008, the UAE government projected its national electricity demand to grow from 15,000 MW's in 2008 to exceed 40,000 MW's by 2020. Although the UAE was still counted as the 8th largest oil producing country in the world in 2014, energy sources such as oil, gas and coal are no longer viewed as viable options from a commercial and environmental perspective. The UAE's energy sector is viewed insufficient to meet future demand for electricity, providing adequate fuel for only 20,000-25,000 MW's of power generation capacity by 2020. While burning crude oil was found to be viable, the projected cost was deemed extremely high from an environmental perspective. The UAE government concluded in 2008 that nuclear power would be an acceptable alternative to meet growing domestic demand and released a policy white paper on the "Evaluation and Potential Development of Peaceful Nuclear Energy" (the "White Paper"). The UAE government currently projects that a successful nuclear scheme would reduce CO2 emissions by 12 million tonnes by 2020.

In 2009, the UAE government awarded the Korea Electric Power Corporation ("KEPCO") led by a consortium of four KEPCO subsidiaries the project to construct and operate four nuclear power plant units in Barakah, Abu Dhabi. The construction contract to build the four nuclear reactors was commissioned to Hyundai Engineering and Construction and Samsung C&T Joint Venture.

For the past six years the UAE government has been setting up a new regulatory regime in preparation of the anticipated operation of the nuclear power plants by 2017.

### **International Agreements for Nuclear Non Proliferation, Safety and Liability**

By 2008 the UAE was already part of major international nuclear treaties related to nuclear accidents and safety, non-proliferation of nuclear weapons, test bans and suppression of acts of nuclear terrorism. As set out in the White Paper, the UAE's new peaceful nuclear program involved its commitment to several additional international treaties to provide assurances that the implementation of the nuclear power plant project would not pose a concern or risk to the international community.

In July 2009, the UAE signed its acceptance of the IAEA Amendment to the Convention on the Physical Protection (the "Convention") making it legally binding for states parties to 1) protect its nuclear facilities and material for peaceful domestic use, storage as well as transport; and 2) allow expanded cooperation and rapid measures to locate and recover stolen or smuggled nuclear material, mitigate any radiological consequences of sabotage, and prevent any combat related offences. The amendments will take effect once they have been ratified by two-thirds of the states parties of the Convention.

For the commitment to the safety of nuclear facilities and nuclear waste, the UAE acceded to the two remaining major IAEA agreements in October 2009, the IAEA Convention on Nuclear Safety and the IAEA Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management. The UAE also ratified the IAEA Additional Protocol to Safeguards Agreement in 2010 covering the IAEA inspections of nuclear plants, facilities and operations in the UAE.

In 2012, with respect to the nuclear liability regime, the UAE ratified the Protocol to Amend the Vienna Convention on Civil Liability for Nuclear Damage of 1997 and the Joint Protocol Relating to the Application of the Vienna Convention and the Paris Convention of 1988. The Protocol to Amend the Vienna Convention on Civil Liability for Nuclear Damage of 1997 expands the scope of nuclear damage to include environmental damage and preventive measures, extends the geographical scope and extends the period during which claims may be brought for loss of life and personal injury.

In July 2014, the UAE ratified the IAEA Convention on Supplementary Compensation for Nuclear Damage which is coming into force in 15 April 2015.

For the nuclear export control regime, the UAE plans to participate in the Nuclear Suppliers Group (NSG) and implement import and export control rules for nuclear equipment and technology.

### **Establishment of the federal authority on nuclear regulations (the “Authority”)**

Under the Federal Law by Decree No. (6) of 2009 Concerning the Peaceful Use of Nuclear Energy (the “Decree”), Article (4), the Federal Authority on Nuclear Regulations was established on 4 October 2009. The Authority guarantees the implementation of the responsibilities imposed on the UAE by virtue of its standing as a party to the nuclear conventions and agreements connected to the duties of the Authority by regulating the UAE nuclear sector through establishing proper security and operational conditions, accident prevention and mitigation of accidental consequences.

In addition, the Authority regulates the safe disposal and transportation of radioactive materials and oversees safety procedures for the protection of the public and the environment from unnecessary radiation risks.

### **FANR Regulations**

The Authority has so far published 21 regulations focusing on the operational needs of the Barakah nuclear facilities and continues to review and amend the regulations over a 5-year review period. All published regulations can be accessed through the FANR official website. ([www.fanr.gov.ae](http://www.fanr.gov.ae))

The Authority is still developing regulations for radioactive waste management and decommissioning process and is making further amendments to existing regulations to address Fukushima accident findings. The specific regulations in development are as follows:

- Decommissioning and Decommissioning Trust Fund
- Amendments to Design of Nuclear Power Plants
- Application for Operating License Extension for a Nuclear Facility
- Emergency Preparedness at a Nuclear Facility
- Regulated Material Waste Disposal and Spent Nuclear Fuel Disposal

### **Transparency: Article (9) of the Decree**

The authority is required to observe the highest standards of transparency under Article (9) of the Decree and to make available to the public all information related to its work including:

- all licenses and amendments, suspensions or cancellations;
- all valid regulations and amendments that may occur in their regard and all guidelines issued by the

- Authority in accordance with the Decree; and
- results of any investigation or inspection processes carried out by the Authority in respect to testing of materials.

## **FANR Licenses**

The Authority has issued licenses for the construction of the Barakah nuclear facilities as follows:

- License for Selection of a Site for the Construction of a Nuclear Facility
- License for preparation for a site for the Construction of a Nuclear Facility (Rev. 1)
- License for the Construction of Units One and Two of the Barakah Nuclear Facility and Related Regulated Activities (Rev. 1)
- License for the Construction of Units Three and Four of the Barakah Nuclear Facility and Related Regulated Activities

As mentioned under Article (9) of the Decree as part of the transparency requirement, the Authority has issued Safety Evaluation Reports which provide review of the applications for the construction of all four reactors.

## **Establishment of the emirates Nuclear Energy Corporation (“ENEC”)**

Law No. (21) of 2009 Establishing Emirates Nuclear Energy Corporation.

As stated in Article (4) of the Decree, the Emirates Nuclear Energy Corporation (“ENEC”) was established in December 2009 with a capital of AED 370 million. Its mandate is to develop, build, finance, operate, maintain, manage and possess nuclear reactors to be used for the peaceful purpose of energy generation, water desalination and all other relevant necessary activities including the establishment of companies for practicing such activities and commercial and industrial activities inside and outside the UAE within the scope of legally determined objectives of the Corporation subject to the Decree.

At the end of 2014, ENEC grew into an organization with over 1,300 employees, up from 64 in 2009 and is currently in cooperation with over 1,000 companies in the UAE, with the first reactor over 60% complete and on track to begin supply in 2017.

In the State of Energy Report UAE 2015, UAE’s plan is to generate 24% of its power supply needed through clean energy by 2020. The commercial operation of Unit One is planned to commence in 2017, Unit Two in 2018, Unit Three in 2019 and Unit Four in 2020. Once all four reactors become operative, ENEC will provide 25% of the UAE’s then anticipated electricity demand.

## **Conclusion**

With the ratification of these major international treaties, the UAE continues to develop its domestic legal framework in compliance with its commitment to nuclear security and the physical protection of materials and facilities for its nuclear power supply commencing in 2017. The Integrated Regulatory Review Service (“IRRS”) mission of the IAEA conducted a review of the UAE regulatory system in February 2015 concluding that FANR continues to improve the regulatory system for providing nuclear and radiation safety to the general public. Further recommendations by the IRRS included developing a national policy and strategy for the management and disposal of spent nuclear fuel and radioactive waste, and to further implement regulations for the safe transport of radioactive materials. FANR is also developing regulations regarding administrative liabilities, decommissioning, import and export controls and operational testing surveillance and reporting procedures.

The successful establishment of a sound legal framework will prove vital to the UAE’s emerging nuclear power sector and bolster the country’s energy plan for long-term sustainable growth.