



2016 Top Markets Report **Civil Nuclear** Country Case Study

United Arab Emirates

Market Type: Newly Emerging

Since initiating its nuclear energy program in 2008, the UAE has moved swiftly to work with foreign exporters for its first nuclear power plant. A deal with a KEPCO-led consortium is providing the UAE's first four reactors at Barakah. The chief obstacle for U.S. civil nuclear companies in the UAE is robust and well-established foreign competition, but U.S. industry is well-positioned overall to provide well-financed subcontracting services.

New Builds

5

Existing Reactors

22

Decommissioning

N/A

Overall Rank

5

U.S. Ambassador to the United Arab Emirates: Barbara A. Leaf

U.S. Commerce Attaché to the United Arab Emirates: Nasir Abbasi (U.S. Commercial Attaché, Dubai), Dao M. Le (U.S. Commercial Counselor, Abu Dhabi)

The UAE is currently building its first four nuclear reactors at the Barakah site. The reactors are of the Korean design, APR-1400. The first will come online in 2017, with the final plant completed by 2020.

UAE's electricity demand is growing rapidly, about 9 to 10 percent per year, and the country is making strategic investments in new generating capacity. Almost all of its current electricity generation comes from fossil fuels, and its development of nuclear energy is an attempt to reduce its dependence on oil and gas for domestic consumption. Nuclear energy is expected to make up a substantial portion of the country's electricity generating capacity by 2030, requiring additional reactors beyond the four at Barakah. The UAE plans to export its nuclear-generated electricity as well.

The Federal Authority of Nuclear Regulation (FANR), established in October 2009, is the country's regulator. In November 2009, the UAE established the Emirates Nuclear Energy Corporation (ENEC), a public entity, to implement its civil nuclear plans and conduct site evaluations, technology selection and submission of the construction license application for the Barakah site.

Planned Nuclear Energy Projects

Owner: KEPCO-led consortium

Reactor Type: Type: APR-1400 reactors

Capacity: 5600 MWe (1400 x 4 reactors)

Value of Project: \$20.4 billion, with a high percentage of the contract being offered under a fixed-price arrangement. The consortium also expects to earn another \$20 billion by jointly operating the reactors for 60 years. In March 2010, KEPCO awarded a \$5.59 billion construction contract to Hyundai and Samsung for the first plants.

Construction Period: Construction began on one reactor per year from 2012 to 2015.

Operation: First reactor projected to come online in May 2017, with an additional reactor coming online each year through 2020.

Agreements with U.S. Industry: U.S. firms are providing significant support to the UAE's civil nuclear program. Westinghouse is part of the winning KEPCO team and is providing major components, instrumentation and control equipment, and design technical and engineering support services. Lightbridge Corporation has provided consulting services to the UAE on the design, development and management of the key elements required to implement a nuclear energy program based on the highest international standards. CH2M Hill won a 10-year contract to manage the UAE's nuclear program in October 2008. Paul C. Rizzo Associates is working on site placement and engineering during the planning process and quality assurance and control for ENEC.

Commercial Opportunities

Services (front-and back-end): Limited potential for site selection, regulatory assistance or other advisory services

Legal and Consulting Services: Limited potential

Licensing Support: Limited potential

Design, Construction, and Operation: Opportunities for future NPP sites and small modular reactors (SMRs)

Challenges and Barriers to Exports

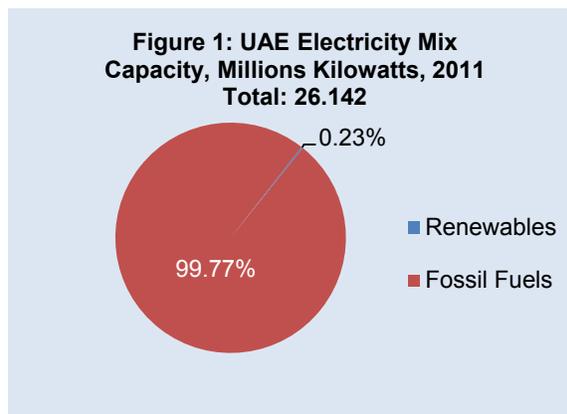
The UAE has moved swiftly and assuredly to implement its nuclear energy program. From the announcement of its first nuclear energy policy in 2008 to the awarding of the Barakah tender to KEPCO in December 2009 to the beginning of construction in 2012, the UAE government has shown strong support for nuclear energy development and has relied heavily on foreign industry for a variety of goods and advisory services. Despite losing the reactor technology bid for the Barakah plant, U.S. industry has had a high level of involvement. This promises to remain the case for years to come, especially if the UAE builds additional plants.

UAE scores highly on virtually all infrastructure and financial criteria, and public opinion is highly favorable toward nuclear energy development. The chief barrier to civil nuclear exports is the considerable strength of foreign competition.

Nuclear Infrastructure

Fuel: Canada-based Uranium One, UK-based Rio Tinto, France's Areva and Russia's Technobexport (Tenex) supply uranium concentrates to the UAE. Conversion services are to be carried out by Converdyn, Tenex and Areva. Enrichment will be done by Urenco, Areva and Tenex, and the fuel assemblies will be done by KEPCO.

Waste Management: The UAE is pursuing a national storage and disposal program as well as exploring regional cooperation options for radioactive waste management.



U.S. Government Collaboration

123 Agreement: The agreement will expire December 17, 2039. The 123 Agreement requires that the UAE permanently forgo domestic enrichment and reprocessing capabilities, a commitment which was implemented as domestic legislation in 2009.

Barakah Plant Financing: The Ex-Im Bank approved \$2 billion in financing for the Barakah plant in September 2012 for U.S. sourced components from Westinghouse and services from it and two other firms. Most of it was for coolant pumps and controls.

International Engagement

The UAE is cooperating with numerous countries in its nuclear program development. It has signed cooperation agreements with the United States, Republic of Korea, UK, France, Canada, Russia, Argentina, Japan and Hungary. In November 2015, the UAE finalized a framework for cooperation with Australia to import fuel.

Figure 2: Additional Agreements	
Non-Proliferation Treaty	✓
IAEA Comprehensive Safeguards Agreement & Additional Protocol	✓
Joint Convention on Safety of Spent Fuel Management	✓
Convention on Nuclear Safety	✓
Convention on Early Notification of a Nuclear Accident	✓
Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency	✓
Paris Convention on Third Party Liability in the Field of Nuclear Energy	
Vienna Convention on Civil Liability for Nuclear Damage	✓
Joint Protocol Relating to the Application of the Vienna Convention and Paris Convention	
Convention on Supplementary Compensation for Nuclear Damage	✓
Organization Membership	
IAEA	✓
Nuclear Suppliers Group	
OECD/NEA	
IFNEC	✓
GenIV International Forum (GIF)	

Resources

For more information on the commercial opportunities in the United Arab Emirates, contact: Dao Le (Senior Commercial Officer, Abu Dhabi, dao.le@trade.gov), Gary Rand (Commercial Officer, Abu Dhabi, gary.rand@trade.gov); Nasir Abbasi (Principal Commercial Officer, Dubai, nasir.abbasi@trade.gov), I&A Civil Nuclear Team: Jonathan Chesebro (jonathan.chesebro@trade.gov).

Emirates Nuclear Energy Corporation:

<http://www.enec.gov.ae/>

Federal Authority for Nuclear Regulation:

(<https://fanr.gov.ae/en>)

Sources

CIA Factbook, United Nations, World Nuclear Association, Asian Development Bank, and our contacts at the U.S. Embassy in Abu Dhabi and the U.S. Consulate in Dubai.