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Emerging nuclear power countries

Driven by demand growth, fossil fuel scarcity, diversification and environmental considerations are driving many nations to develop nuclear power development plans which in total call for many tens of giga-watts (GW) of nuclear power stations over the next two decades. While it is unlikely that all of this capacity will be build there is still significant growth potential and investment opportunities.

This briefing note summarises the activity in the most prominent of the emerging nuclear power countries.

Gulf states

The Gulf states are suffering something of an energy crisis with frequent black-outs and brown-outs and a growing demand for electricity and desalination. Currently all electricity needs are met by oil and gas-fired power stations but longer term these supplies are limited and this, together with environmental concerns, is driving the Gulf states down a nuclear energy path with the public sector planning 4GW of new nuclear by 2016 & a further 16GW by 2025.

In 2006 the six member states of the Gulf Cooperation Council - Kuwait, Saudi Arabia, Bahrain, the United Arab Emirates (UAE), Qatar and Oman - announced a study on the peaceful use of nuclear energy and the following year they agreed to cooperate on a feasibility study for a regional nuclear power and desalination program. France agreed to work with them on this, and Iran pledged assistance with nuclear technology.

This year the UAE independently published a comprehensive policy on nuclear energy projecting an additional 25GW of electricity demand by 2020 with natural gas supplies sufficient for only half of this and imported coal dismissed as an option due to environmental and energy security implications. 20GW nuclear is envisaged with nearly one quarter of this operating by 2020. The UAE has set up a Nuclear Energy Program Implementation Organization and the Emirates Nuclear Energy Corporation (a public entity) to evaluate and implement nuclear power plans within UAE. The UAE envisages offering joint-venture opportunities to foreign investors for the construction and operation of nuclear power plants and has appointed the global nuclear service firm CH2M Hill to manage the UAE's plans for bringing nuclear power to the UAE.

Several nuclear energy cooperation agreements are already in place – USA/Saudi Arabia, USA/Bahrain, USA/UAE, UK/UAE and France/UAE.

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Turkey

Turkey is experiencing strong demand growth for electricity and currently relies heavily on gas–fired power stations (approx 45%) with around two-thirds of the gas coming from Russia.

Nuclear power has suffered several false starts in Turkey since it was first proposed in the 1970s and vendors – such as Westinghouse, Mitsubishi, AECL, Framatome & Siemens - may be feeling some frustration after incurring the significant expense of submitting bids only to see plans abandoned.

In 2007 a new bill paved the way for construction and operation of nuclear power plants. Tenders were requested in March 2008 for a nuclear power plant at Akkuyu however only one bid from the Russian designer Atomstroyexport was received despite several other parties looking at the tender. After reviewing the bid, Turkey's Council of Ministers will have to decide whether to proceed to contract negotiations with Atomstroyexport or restart the bidding process.

One consideration for the Council of Ministers' may be that of energy security – with an existing heavy dependence on Russian gas will the Turks wish to extend that dependence by importing Russian reactor technology?

Turkey and the US entered into a 15 year agreement on civilian nuclear cooperation in June 2008

Egypt

Egypt is facing strong demand growth for electricity and currently has a reliance on gas; 85% of its electricity comes from gas-fired power stations. In October 2006 its Energy Minister announced that a 100MW nuclear power station would be built in-country by 2015 to provide electricity and desalination and that the project would be open to foreign participation.

Egypt has entered nuclear cooperation agreements with Russia and China and is currently reviewing bids from foreign companies to carry out feasibility studies and preparatory work aimed at operating two nuclear reactors by 2017 with a second pair on line by 2022.

Vietnam

Vietnam is forecasting rapid growth in electricity demand (15% p.a. to 2010); currently 60% of its electricity comes from hydro. In 2008 demand has been significantly higher than capacity and rationing has been introduced.

Vietnam's nuclear power development plan targets the first two reactors to be online by 2018 following a feasibility study due to be completed in 2009. The overall target is to have 10GW nuclear online by 2030.

Vietnam has entered nuclear energy cooperation agreements with several countries; France, China, Canada, USA, South Korea & Japan.

Jordan

Jordan currently imports about 95% of its energy needs (fossil fuels) and has growing demands for electricity – it expects to grow its installed capacity from 2000MW to 3200MW by 2015. Much of the increasing electricity demand is for desalination plants. Jordan launched a nuclear energy strategy last year to reduce its dependence on imported fossil fuels which are estimated to cost about 20% of its GDP.

The Jordan Atomic Energy Commission (JAEC) has entered an agreement with Canadian companies Atomic Energy of Canada Ltd and SNC-Lavalin to conduct a 3-year feasibility study on building an AECL designed Enhanced Candu-6 reactor using natural uranium fuel, for power and desalination. Jordan has also signed nuclear cooperation agreements with the USA, the UK and China and is seeking help from the IAEA

Jordan has its own uranium resources and plans to mine these have been announced by the government. In October 2008 JAEC announced a joint venture with French nuclear services company Areva to mine uranium resources in Jordan.

Poland

Poland uses coal-fired power stations to provide more than 90% of its electricity requirements. Demand growth, EU restrictions on CO_2 emissions and diversification considerations influenced a cabinet decision in 2005 to introduce nuclear power; a 2007 draft energy policy proposes 10 MWe of nuclear capacity by 2030.

In addition Poland is participating in the proposed nuclear station that will replace the Ignalina units in Lithuania that are scheduled to close in 2009.

Australia

Australia relies on coal-fired power stations to supply 80% of its electricity resulting in high CO_2 emissions and, in response to emissions concerns, discussions started on a possible nuclear energy strategy via a Prime Minister's expert taskforce.

The taskforce's report was released at the end of 2006 and concluded that while nuclear costs could be between 20-50% higher than those of coal it was the least cost, low emission source of base load electricity. Australia has the largest uranium reserves in the world.

Morocco

Morocco has growing demand for electricity and also has desalination requirements. It relies heavily on fossil fuels for electricity production. The Moroccan government has plans for building an initial nuclear power plant by 2017; the Russian reactor designer, Atomstroyexport is assisting with feasibility studies for this. Morocco is also studying (with assistance from the Chinese) the use of nuclear reactors to power desalination plants.

In October 2007 Morocco signed a partnership with France on nuclear energy cooperation agreement.

Chile

Chile imports more than 70% of its energy and has a high dependence on natural gas from Argentina. Its Energy Ministry announced in February 2007 that it was beginning technical studies into nuclear power development.