

The Sunni Arab Countries Going Nuclear

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Several countries in the Middle East and North Africa (MENA) including Egypt and Saudi Arabia have announced plans to build nuclear power plants over the next decade. Countries in MENA have justified their pursuit of nuclear energy, in the desire to meet a rapidly rising demand for electricity, support economic growth, achieve greater security of supply and diversify their energy mix.

The Arab states are worried about the Iranian nuclear program, especially in light of the Joint Comprehensive Plan of Action (JCPOA). Many countries in the Middle East and North Africa showing no trust in Iran's assurances that it does not seek to build nuclear weapons and they argue that the (JCPOA), only delays Iran's quest for nuclear weapons by 10 years.

The MENA countries have legitimate reasons to develop nuclear energy programs but the nuclear initiative among the MENA countries can be also viewed as a response to the Iranian nuclear program in the context of their strategic competition with Iran.

The UAE and nuclear energy

The United Arab Emirates (UAE) is preparing to launch the first nuclear power plant in the Arab-world. UAE Energy Minister Suhail al-Mazroui said that the first nuclear reactor was 96 percent complete and it would be operational by next year (2018).

The remaining three APR-1400 megawatt South Korean designed reactors are under construction simultaneously and will be gradually connected to the grid by May 2020.¹

The UAE is building a nuclear industry from scratch, hiring nuclear physicists, setting up a regulator, training operators and establishing institutes for radiation monitoring and accident prevention.²

The Barakah nuclear plant will deliver up to a quarter of the UAE's electricity when completed around 2020 and 50 percent by 2050.³

In an April 2008 white paper, Abu Dhabi made a commitment to forgo uranium enrichment. The same was reflected in its 2009 “123” nuclear cooperation agreement with the United States (named after Section 123 of the US Atomic Energy Act of 1954), whose language barring enrichment and reprocessing is often referred to in the nuclear community as the “nonproliferation gold standard.”⁴

According to the UAE’s Ambassador and Permanent Representative to the International Atomic Energy Agency (IAEA), Hamad al-Kaabi, the UAE has been continuously providing assistance to regional countries interested in launching nuclear programs. The UAE has shared its experience with all the interested partners and this goes with the assistance and support we can provide in the development of resources, approaches, regulations when it comes to building and licensing a power plant.⁵

“When the UAE developed its approach for nuclear power it looked for a responsible approach with a commitment to the highest standards of nuclear safety and nonproliferation, part of it was to share that information with other countries who are interested in nuclear power,” al-Kaabi said.⁶ The UAE has committed not to enrich uranium itself and not to reprocess spent fuel.⁷

Nawah, the joint venture between Emirates Nuclear Energy Corporation (ENEC) and Korea Electric Power Corporation (KEPCO), that was set up to run the Barakah plant, will receive its operating license next year (2018).⁸

Yemen's Houthi rebels claimed on December 3, 2017, that they have launched a cruise missile towards a nuclear plant in Abu Dhabi. According to a report in the Saba news agency, the missile hit the Barakah nuclear power station.⁹

The UAE has denied claims made by the Houthi militias in Yemen of a missile launch towards the UAE’s airspace. In a statement, UAE emphasized that the air defense system is capable of dealing with any threats and the Barakah Nuclear Power Plant has all necessary safety and security measures in place to avert crises.¹⁰

Egypt and nuclear energy

Egyptian President Abdel-Fattah El-Sisi and his Russian counterpart Vladimir Putin met in Cairo on December 11, 2017, to attend the signing of an agreement officially launching work on Egypt's nuclear power plant at El-Dabaa. Egypt's Minister of Electricity Mohamed Shaker and Alexi Likhatchev, the Director General of Russian state atomic energy corporation Rosatom, have signed the document to officially commence the project.¹¹

President Putin said that "upon the completion of the El - Dabaa project, Egypt will not only benefit from having a nuclear plant but also from gaining the latest and safest technology of nuclear energy."¹²

Rosatom has announced that work on the El-Dabaa plant, situated west of Alexandria, will start in December 2017 and that the company will service the plant’s four reactors for 60 years.¹³

The nuclear plant of El - Dabaa

The nuclear plant will be established in El - Dabaa, located in the Marsa Matrouh governorate on the Mediterranean coast.¹⁴ The plan will be implemented by Russian state-owned company Rosatom. The reactor will be composed of four nuclear power units each capable of producing 1,200 megawatts of energy (4,800 megawatts).¹⁵

El - Dabaa reactor will have new technology with strong safety measures that take into account lessons learned during the March 2011 Fukushima disaster in Japan. It will be able to withstand earthquakes up to 9 degree on a Richter scale, and the crash of a 400-tonne airplane.¹⁶

According to the agreement, Russia will loan Egypt the \$25 billion needed to finance the building and operation.¹⁷ Hussein El-Shafie, manager of the Egyptian Russian Foundation for Culture and Science, said that the loan provided by Russia to cover 85 percent of the El - Dabaa project will be paid over 22 years at an interest rate of 3 percent. "Egypt will begin repaying the loan in 2029, though by that time the El - Dabaa nuclear reactors will have generated \$17 billion in sovereign revenues for the government of Egypt," said El-Shafie.¹⁸

The threat of a nuclear weapon program

Egypt is a member of the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) and is the leading proponent of establishing a nuclear weapons-free Middle East. Although Egypt signed the (NPT) in 1968, it has refused to sign the NPT's Additional Protocol, which permits spot inspections, as well as treaties banning the possession of chemical and biological weapons.

Egypt's nuclear program, which began in 1954, features two research reactors and a hot-cell laboratory, all located at Inshas in the Delta.¹⁹ They are used for peaceful purposes and are under International Atomic Energy Agency – or IAEA – safeguards. Analysts agree that Egypt tried to acquire nuclear weapons back in the 1960s, but ultimately decided not to do so because of political and economic reasons.²⁰

If Egypt were to decide to develop nuclear weapons it would not be starting from zero. Past nuclear endeavors have left Egypt with an experienced group of physicists and engineers and a number of universities capable of training a new generation of nuclear scientists.

Despite possessing a relatively advanced capability in nuclear technology, Egypt is many years away from the ability to produce nuclear weapons if it chose to do so. Thus, it remains to be seen whether Egypt will change the nuclear policy in the future.

Saudi Arabia and the nuclear power

Saudi Arabia would be the second country in the Gulf Arab region to tap nuclear power after the United Arab Emirates. Over the past decade, Saudi Arabia has shown interest in developing its civil nuclear program. In August 2009 the Saudi government announced that it was considering a nuclear power program on its own. The Saudi focus on nuclear serves various of the kingdom's goals: diversification of its economy, reduction of its dependence on fossil fuels, countering a potential future Iranian nuclear capability, and enhancing efforts to ensure that Saudi Arabia rather than Iran emerges as the Middle East's long-term, dominant power.

In June 2011, Saudi Arabia announced an ambitious plan to build sixteen nuclear power reactors by 2030 at a cost of an estimated \$100 billion. These would generate about 20% of Saudi Arabia's electricity.

To advance its program, Saudi Arabia established the King Abdullah Atomic and Renewable Energy City (KA-CARE) devoted to research and application of nuclear technology. It is also responsible for supervising works related to nuclear energy and radioactive waste projects.²¹

In November 2011, Riyadh appointed Worley Parsons to conduct site surveys and regional analysis to identify potential sites, to select candidate sites then compare and rank them, and to develop technical specifications for a planned tender for the next stage of the Saudi nuclear power project. Three sites were short-listed as of September 2013: Jubail on the Gulf; and Tabuk and Jizan on the Red Sea. The Nuclear Holding Company was being set up in 2013.

Riyadh has taken a series of steps to develop commercial relationships with major nuclear suppliers, signing a memorandum of understanding with the United States (2008), France (February 2011), Argentina (June 2011), South Korea (November 2011), China (January 2012) and Russia (June 2015).²²

Saudi Arabia's nuclear agency has suggested that various steps of the nuclear fuel cycle, including fuel fabrication, processing, and enrichment, would lend themselves to local production.

Saudi Arabia has large uranium deposits of its own. Saudi Arabia plans to extract uranium domestically as part of its nuclear power program and sees this as a step towards "self-sufficiency" in producing atomic fuel. Preliminary studies have estimated Saudi Arabia has around 60,000 tons of uranium. In a speech at an international nuclear power conference in Abu Dhabi, Hashim bin Abdullah Yamani, head of the Saudi government agency tasked with the nuclear plans²³, did not specify whether Saudi Arabia seeks to also enrich and reprocess uranium, steps in the fuel cycle which are especially sensitive as they can open up the possibility of military uses of the material.²⁴

Cooperation on nuclear energy was one of 14 agreements worth \$65 billion signed during the visit of Saudi King Salman to China. The agreement is for a feasibility study for the construction of high-temperature gas-cooled (HTGR) nuclear power plants in the kingdom as well as cooperation in intellectual property and the development of a domestic industrial supply chain for HTGRs built in Saudi Arabia.

Saudi Arabia acceded to the NPT as a non-nuclear weapon state in 1988, and signed a comprehensive safeguards agreement with the International Atomic Energy Agency (IAEA) in 2005, eventually bringing it into force in 2009. Saudi Arabia expressed its support for the establishment of a WMD-free zone in the Middle East.²⁵

Saudi officials have repeatedly insisted that the kingdom is developing nuclear capabilities for peaceful purposes such as medicine, electricity generation, and desalination of sea water. They said Saudi Arabia is committed to putting its future facilities under the supervision of the International Atomic Energy Agency (IAEA).

The Kingdom has also played a central role in the Gulf Cooperation Council's (GCC) efforts to launch a regional initiative in 2006 to examine and eventually develop a joint civil nuclear energy program.²⁶

Saudi Arabia would, for now, focus on building up its civilian nuclear infrastructure as well as a robust nuclear engineering and scientific workforce. This would allow the kingdom to take command of all aspects of the nuclear fuel cycle at some point in the future.

Saudi Arabia is likely to maintain its position as long as Iran adheres to the nuclear agreement and US President Donald J. Trump does not act on his campaign promise to tear up the accord. Mr. Trump has toughened US attitudes towards Iran but has so far backed away from tinkering with the nuclear agreement.

Saudi cooperation with Pakistan

Saudi Arabia has long aspired to achieve nuclear capacity of its own, in order to counter Iran's atomic ambitions. Saudi Arabia hasn't hidden its ambition, openly stating to the U.S. as early as 2009 that it would also seek capacity if "Iran crossed the threshold." In May 2012, former senior U.S. diplomat Dennis Ross confirmed for the first time that Saudi Arabia's King Abdullah explicitly warned that if Iran obtains nuclear weapons, Saudi Arabia would seek to do so as well. Saudi Arabia has had the missile technology to deliver warheads since the late 1980s.²⁷

Saudi Arabia has little nuclear infrastructure of its own and it could rely on its close ally, Pakistan, that has a history of proliferating nuclear technology and equipment. Saudi Arabia provided generous financial support to Pakistan that enabled the nuclear program to continue, especially when the country was under sanctions. Saudi cooperation with nuclear power Pakistan has been a source of speculation about the kingdom's ambition. It has long been rumored, that in return for bankrolling the Pakistani nuclear weapons project, Saudi Arabia has a claim on some of those weapons in time of need.²⁸

There are two main versions:

- Future Pakistani "assistance would not involve Pakistan supplying Saudi Arabia with a full nuclear weapon or weapons, however, Pakistan may assist in other important ways, such as supplying sensitive equipment, materials, and know-how used in enrichment or reprocessing.
- Saudi Arabia has purchased nuclear weapons from Pakistan which are ready for delivery to the kingdom and that it possesses missiles capable of delivering nuclear warheads.

It has never been proved though, nor has it ever been clear how such a deal would work.

Egypt – Saudi Arabia nuclear cooperation

Egypt's President Abdel-Fattah El-Sisi has approved an agreement on cooperation in peaceful uses of nuclear energy with Saudi Arabia. The agreement, which was initially signed in April 2016 during a visit to Cairo by Saudi King Salman, involves cooperation on peaceful uses of nuclear power, nuclear security and an exchange of information on nuclear safety.

Egypt and Saudi Arabia are already working on connecting their power grids through a \$1.6 billion deal, approved by Egypt's cabinet in January 2015, where they would share 3,000 megawatts of electricity by 2017.²⁹

Committees within Egypt's parliament discussed on August 7, 2016, a nuclear power agreement signed during Saudi King Salman's visit to Cairo in April 8, 2016. Egypt's cabinet approved the deal with Saudi Arabia on May 27, 2016.³⁰

A report prepared by parliament's Legislative and Constitutional Affairs Committee, explains that the agreement covers important areas of cooperation between Egypt and Saudi Arabia in the field of "peaceful use of nuclear power." The report disclosed that the cabinet of Saudi Arabia, headed by deputy Crown Prince Mohamed Bin Nayef, proposed in September 2015 that an agreement be signed with Egypt in the area of nuclear power generation due to Egypt's experience in this sector.³¹

The nuclear agreement between Egypt and Saudi Arabia is a part of a strategic alliance between the countries to redesign the regional security issues. President Abdel Fattah El-Sisi described the relations between the countries as "a paradigm shift for the upcoming generations of both countries."³²

Nuclear Power in Jordan

Jordan imports over 95% of its energy needs, at a cost of about one-fifth of its GDP. Jordan's Committee for Nuclear Strategy, set up in 2007, set out a program for nuclear power to provide 30% of electricity by 2030, and to provide for exports. The nuclear law was modified in 2007 to establish the Jordan Atomic Energy Commission (JAEC) and the Jordan Nuclear Regulatory Commission (JNRC), including radiation protection and environmental roles.³³

JAEC's functions include safety and security, nuclear science and technology, and safeguards and verification. Its commission is to transform Jordan from net energy importer to net electricity exporter by 2030, to provide power to fuel economic growth at low cost, and to end dependence on fossil fuels.

The International Atomic Energy Agency (IAEA) has completed on December 12, 2016, a safety assessment of Jordan's first nuclear reactor ahead of its routine operation. The Jordan Research and Training Reactor (JRTR) has finished its test run and been declared complete by its Korean constructors. The 5 MW, JRTR has been built for the JAEC by a consortium headed by the Korean Atomic Energy Research Institute with Daewoo at the Jordan University for Science and Technology. Construction of the reactor began in 2010, and Korea's Ministry of Science, ICT and Future Planning declared it complete on December 7, 2013.³⁴

The reactor will be used for research and development, education and training and to produce medical and industrial radioisotopes. As well as being Jordan's first nuclear reactor, JRTR is the first nuclear reactor exported by Korea. Korean-designed power reactors are also under construction at Barakah in the United Arab Emirates.³⁵

The reactor was formally inaugurated by Prime Minister Hani al-Mulki, on behalf of King Abdullah II, at a ceremony attended by Korean science minister Choi Yang-hee. Choi said the country would "proactively support" the reactor's operation and would also "partner with Jordan for the country's introduction of nuclear power reactors and technological development".

In October 2013 JAEC announced that Rosatom's reactor export subsidiary Atom Story Export (ASE) would be the supplier of two AES-92 nuclear units, while Rusatom Overseas will be strategic partner and effectively the operator of the plant through a joint venture. Rusatom Overseas will contribute 49.9% of the project's \$10 billion cost, with the state-owned Jordan Nuclear Power Co (JNPC) being responsible for the controlling 50.1%.

Jordan has signed in Amman in March 2015, a \$10bn deal with Russia to build the kingdom's first nuclear power plant, with two 1,000-megawatt reactors in the country's north. Jordan plans to finish construction of the plant in Amra by 2022. Under the deal, Jordan must buy fuel from Rosatom for the reactors for 10 years, after which it may seek other suppliers. The Jordanian government will have a slight majority ownership, with Rosatom owning 49 percent of the plant, according to the Jordan Times.³⁶

Jordan is endowed with significant Uranium resources. The Central Jordan Area, located about 80km south of Amman, is home to 36,389 metric tons of uranium oxide that is easily mined and can be extracted cost-effectively. Estimation of the uranium resources in the central region are expected to increase as more exploration is carried out by JUMCO in the 350sq.km area.³⁷

Jordan has completed in 2015, the required design for the production of yellow cake, necessary for fueling the country's planned nuclear reactors and has launched a pilot project producing several kilograms of yellow cake from uranium in the central parts of the country.³⁸

In September 2015 JAEC said that it was negotiating for the Industrial and Commercial Bank of China with China National Nuclear Corporation (CNNC) to finance not less than 50% of the construction project, though the main nuclear island would use Russian technology.³⁹

Jordan – Saudi Arabia nuclear cooperation⁴⁰

In March 2017 an agreement between JAEC and Saudi Arabia's King Abdullah City for Atomic and Renewable Energy (KA-CARE) was signed for a feasibility study on construction of two small modular reactors (SMRs) in Jordan for the production of electricity and desalinated water.

No particular technology was mentioned, but KA-CARE has an agreement with Korea Atomic Energy Research Institute (KAERI) to build its 330 MWt (100 MWe) SMART pressurized water reactor, and as described above and in the Research and development section below, JAEC has close ties with KAERI and KEPKO.

Sudan

The Russian State Corporation for Atomic Energy (Rosatom) said on December 22, 2017, it has signed in Khartouman agreement to build the first nuclear power plant to produce electricity in Sudan. The deal came a month after a visit by the Sudanese President Omer al-Bashir to Russia during which a nuclear energy cooperation agreement was signed between the two countries.⁴¹

The document was signed by Dmitri Bazhenov, Marketing & Business Development Director at Rusatom Overseas (a Rosatom Group company), and Musa Omer Abu El-Gasim, Undersecretary of the Ministry of Water Resources and Electricity of Sudan.⁴²

The parties agreed to carry out a feasibility study for the construction of a nuclear power plant in Sudan. The study includes site surveys and estimation of key project parameters, such as technical solutions to be used, capacity, core equipment, project schedules and milestones, and financing mechanisms.

Civil nuclear cooperation between Russia and Sudan started earlier this year after Sudanese President Omar al-Bashir visited Sochi (Russia) on November 24, 2017, and signed a framework agreement with Russia on peaceful uses of nuclear energy. The agreement was preceded by the memorandum of understanding made between Rosatom and the Ministry of Water Resources and Electricity of Sudan in June within on the margins of Atomexpo 2017 held in Moscow.⁴³

Russia and Sudan signed in November 2017, an intergovernmental agreement on cooperation in the sphere of peaceful use of nuclear energy, Russian state nuclear corporation Rosatom said on November 24, 2017. The document creates a legal basis for interaction between the two countries in peaceful use of nuclear energy across a wide range of areas, such as assistance in creating and developing nuclear infrastructure of Sudan, fundamental and applied research in peaceful use of nuclear energy, production of radioisotopes and their use in industry, healthcare and agriculture, education, training and advance training of specialists for the nuclear sector.⁴⁴

Water Resources, Irrigation and Electricity minister Muataz Musa said the project is part of a government plan to generate more than 5000 megawatts by 2020. Since several years, Sudan announced it had plans to build a four-reactor nuclear power plant to fill the gap in power generation by 2030.⁴⁵

Russia and nuclear energy in the Middle East

As a part of the Russian strategy to be a dominant regional power in the Middle East, Russia is ready to support countries to build nuclear plants and to provide the technology. Russian offers come accompanied by thousands of Russian advisors in each Sunni Arab country. Moscow thus has an opportunity to further consolidate its influence and control over oil rich countries and the strategic waterways through which the oil passes.

In April 2016, Rosatom announced that it had opened an office in Dubai, the United Arab Emirates. The office will help oversee the company's many nuclear power projects in the Middle East.⁴⁶

Algeria

Algeria has been planning to build a nuclear plant since 2001, when President Abdelaziz Bouteflika first discussed the matter with Vladimir Putin. In February 2009 Algeria announced that it had put that date back to 2020, and added that might build a further unit every five years thereafter. In 2013 the target became 2025, and a Nuclear Engineering Institute was established to build up the country's nuclear skills base.

An intergovernmental agreement on nuclear energy had been signed in September 2014.

The intergovernmental agreement, was signed by Sergey Kiriyenko, the director general of Rosatom, Youcef and Yousfi, Algeria's energy minister. Rosatom will provide the design, construction, operation and servicing of nuclear power plants and research reactors. All technologies, materials and equipment will be transferred to Algeria and will be used exclusively for peaceful purposes, according to Rosatom.⁴⁷

According to World Nuclear News, Algeria has operated two research reactors since 1995, at Draria and Ain Ouessara. The 15MW Es-Salam plant is a Chinese heavy water reactor that started up in 1992, the Nur 1 MWe pool unit was built by INVAP of Argentina in the 1980s.⁴⁸

Tunisia

Russia has signed in June 2015, a Memorandum of Understanding (MOU) on nuclear cooperation with Tunisia.⁴⁹ In September 26, 2016, on the sidelines of the 60th General Conference of the IAEA in Vienna, the MOU was expanded into a nuclear cooperation agreement.⁵⁰

The Agreement is the legal basis for bilateral cooperation between Tunisia and Russia in quite a number of areas of the civil nuclear power, which include assistance in development and improvement of Tunisian nuclear infrastructure in compliance with international recommendations; design and construction of nuclear power and research reactors, as well as desalination plants and particle accelerators; uranium exploration and mining; research of mineral resources of Tunisia for the purposes of the nuclear industry development; nuclear fuel cycle services for nuclear power plants and research reactors; radioactive waste management; production of radioisotopes and their application in industry, medicine and agriculture; nuclear and radiation safety; education, training and retraining of nuclear specialists, etc.⁵¹

The Agreement envisages the formation of the coordination committee that will control the Agreement implementation, handle any issues that may arise in the process of the implementation, and consult on any matters related to peaceful uses of atomic energy. The Parties also agreed on creating joint work teams that will carry out particular projects and scientific research, share experiments, organize seminars and symposiums, assist in scientific and technical personnel training, exchange scientific and research information for the purposes of the Agreement.⁵²

Conclusion

The Middle East is in the process of going nuclear. Several countries in the Middle East and North Africa (MENA) including Egypt, Jordan, Saudi Arabia and UAE, have announced plans to build nuclear power plants and over the next decade, new nuclear power plants are scheduled to be operational throughout the MENA region.

Countries in MENA have justified their pursuit of nuclear energy, in the desire to meet a rapidly rising demand for electricity, support economic growth, achieve greater security of supply and diversify their energy mix. But the nuclear initiative among the MENA countries can also be considered as a status symbol and a response to the Iranian nuclear program in the context of their strategic competition with Iran.

Israel has long argued that a nuclear Iran would set off a regional nuclear race, as Tehran's traditional rivals in the Middle East — Egypt, Saudi Arabia, Turkey, Jordan and the Persian Gulf states — would quickly move to respond to the Iranian nuclear program challenge.

Egypt's, Saudi Arabia's and the UAE's desire for a nuclear program could also be seen as part of the greater Sunni reaction to Iran's program and what they fear will be a Shia nuclear bomb, which will cast a shadow over the entire region. Iran's program has already triggered a number of civilian nuclear programs in other Sunni Arab countries.⁵³

The Arab states are concerned from the Iranian nuclear program, especially in light of the Joint Comprehensive Plan of Action (JCPOA). The JCPOA, if it remains intact, buys Iran's neighbors a decade during which they can continue with their nuclear push to better prepare themselves for Tehran's rise. The efforts to acquire nuclear weapons technology will increase as the Iran nuclear deal reaches its final leg in 10 years.

The transition from civil nuclear power to nuclear weapons, however, is not that straightforward, although it can be argued that the technology required for peaceful purposes makes militarization easier.

Notes

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