



PROSPECTS OF NUCLEAR ENERGY IN THE MIDDLE EAST: CURRENT STATUS AND FUTURE GROWTH

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Despite dangers associated with the dual-use nature of nuclear technology, its application for peaceful energy purposes is considered as one of the cleanest and environment friendly sources of energy. According to the International Atomic Energy Agency (IAEA), nuclear energy, currently, produces about 11% of the world's electricity, while releasing almost no greenhouse gases or air pollutants.¹

Like advanced nuclear nations, many developing nations are aspiring to acquire this greener source of energy. Several states in the Middle Eastern region have also developed interest in the peaceful application of nuclear technology. These countries include: Egypt, Iran, Israel, Jordan, Saudi Arabia, Turkey, United Arab Emirates (UAE), Oman and Iran, with an active civilian nuclear program. According to the US Energy Information Administration (EIA), nuclear electricity generation capacity in the Middle East is expected to be 14.1 GWe by 2028 as the Middle Eastern countries have started construction of nuclear power reactors and signing new agreements for reactor construction with advanced nuclear states.² The main reason of nuclear renaissance in the region is to reduce reliance on fossil fuel resources and to increase their energy security through energy mix, which includes nuclear energy as one of the sources.

¹ "Nuclear Power in the 21st Century," *International Atomic Energy Agency (IAEA)*, <https://www.iaea.org/newscenter/multimedia/videos/nuclear-power-in-the-21st-century>

² "Middle East Nuclear Power to Quadruple in Ten Years," *World Nuclear News (WNN)*, March 6, 2018, <http://www.world-nuclear-news.org/NP-Middle-East-nuclear-power-to-quadruple-in-ten-years-06031801.html>

According to the IAEA and the World Nuclear Association (WNA), as of February 1, 2018, the following chart shows the status of nuclear energy prospects in the Middle East:

Nuclear Energy in the Middle East (As of February 1, 2018)

Sr. No.	Country	Plants in Operation	Reactors Under Construction	Reactors Under Planning	Reactor Proposed
1.	Egypt	0	0	2 (2400 MWe)	2 (2400 MWe)
2.	Iran	1 (915 MWe)	0	4 (2200 MWe)	7 (6300 MWe)
3.	Israel	0	0	0	1 (1200 MWe)
4.	Jordan	0	0	2 (2000 MWe)	0
5.	Saudi Arabia	0	0	0	16 (17000 MWe)
6.	Turkey	0	0	4 (4800 MWe)	8 (9500 MWe)
7.	United Arab Emirates (UAE)	0	4 (5600 MWe)	0	10 (14400 MWe)

Source: Data compiled from: the IAEA, <https://www.iaea.org/PRIS/home.aspx> and World Nuclear Association (WNA) <http://www.world-nuclear.org/information-library/facts-and-figures/world-nuclear-power-reactors-and-uranium-requireme.aspx>

Nuclear Power Plants in the Middle East



Source: "Middle East Nuclear Power to Quadruple in Ten Years," World Nuclear News (WNN), March 6, 2018, <http://www.world-nuclear-news.org/NP-Middle-East-nuclear-power-to-quadruple-in-ten-years-06031801.html>

Along with the above mentioned states, Qatar, Oman, Kuwait, Syria and Bahrain have also expressed their willingness/interests in peaceful application of nuclear technology. Country profiles are provided below to determine the prospects and growth of application of peaceful nuclear energy in the Middle East.

Egypt

Egypt's interest in nuclear energy dates back to 1960s. Initially, in 1955, it established its Atomic Energy Commission (AEC) and later on, in 1976, it established its Nuclear Power Plant Authority (NPPA). However, due to lack of international cooperation and fears of nuclear safety and security, Egypt's dream to acquire nuclear technology was not materialized. In 2004, Egypt revived its desire and turned towards Russia and signed nuclear energy cooperation agreements with Russia's Rosatom.³ In December 2017, Egypt's dream became a reality, when final contracts were signed for the construction of four nuclear power plants (NPPs) at El Dabaa. It is estimated that the construction of four NPPs would cost around US\$30 billion,⁴ where Russia is going to give a loan of US\$25 billion. The project is expected to be completed by 2029. This deal is considered as the deal of the century and it is expected that it is going to transform Egypt's economy.⁵

Iran

Iran is the only country in the Middle Eastern region which already has an active civilian nuclear program. Iran's interests in nuclear energy dates back to 1957, when it established its peaceful nuclear program under the famous "Atoms for Peace" program. Currently, one nuclear reactor, Bushehr I, is producing around 915 MWe, it was the first NPP in the Middle East. Bushehr II is expected to be completed by 2026. To free up its oil resources, Iran, in past, was interested to develop 23,000 MWe through nuclear power generation, and it still has plans to develop around 8500 MWe through nuclear power. However, the international community remains suspicious of Iran's clandestine nuclear activities. Since 2002, after intense diplomatic efforts and multiple deadline extensions, the negotiations between Iran and P5+1 finally resulted in a long-term Joint Comprehensive Plan of Action (JCPOA) on July 14, 2015, in Vienna.⁶ The Iran-US deal is currently facing challenges as the Trump administration is interested in terminating the deal. Prospects of growth of nuclear energy in Iran now largely depends on the successful completion of the JCPOA, as it will ensure that Iran is not developing any nuclear weapons capability and its activities are solely aimed at peaceful activities.

³ "Nuclear Power in Egypt," World Nuclear Association (WNA), <http://www.world-nuclear.org/information-library/country-profiles/countries-a-f/egypt.aspx>

⁴ 'Rosatom to Build \$30bn El Dabaa Nuclear Power Station in Egypt', *Power Technology* (blog), 13 December 2017, <https://www.power-technology.com/news/rosatom-build-30bn-el-dabaa-nuclear-power-station-egypt/>

⁵ "Rosatom: El Dabaa NPP is a Dream Come True for Egypt's Society," *Albawaba*, March 12, 2018, <https://www.albawaba.com/business/pr/rosatom-el-dabaa-npp-dream-come-true-egypt%E2%80%99s-society-1101018>

⁶ For further details see, "Iran Nuclear Deal : Full Text of Joint Comprehensive Plan of Action," *The Guardian*, July 14, 2015, <http://www.theguardian.com/world/2015/jul/14/iran-nuclear-deal-full-text-of-joint-comprehensive-plan-of-action>

Israel

Israel's covert nuclear weapons program with an estimated 200 warheads is a major cause of concern for the entire Middle Eastern region. This has not only contested the growth of peaceful nuclear energy in the region, but it has also generated fears that other hostile states to Israel might acquire nuclear weapons technology to counter Israeli weapons threat. So far, it has not built any nuclear power plant.

Jordan

Jordan established its Atomic Energy Commission (JAEC) and Nuclear Regulatory Commission (JNRC) in 2007 and outlined a plan to meet 30% of its electricity through nuclear power.⁷ It has planned two NPPs named as Qasr Amra I and II with a capacity of 1000 MWe each, and also has plans to develop several small reactors of around 180 MWe. It has huge uranium reserves. Jordan has signed several agreements with France, Canada, UK, Russia and China including several other countries. Jordan has been conducting nuclear feasibility studies with Russia's Rosatom since 2016. In early 2017, Jordan solicited bids for supplying turbines and electrical systems and construction is expected to start in 2019 and to be completed by 2024.⁸

Saudi Arabia

On March 13, 2018, Saudi Arabia approved its official nuclear power generation policy.⁹ The Saudi national nuclear energy policy is solely aimed at developing peaceful nuclear energy program under the internationally defined measures. Earlier, Saudi Arabia announced its plans to develop 16 NPPs over the next 20-25 years with an estimated cost of more than US\$80 billion.¹⁰ The US and Saudi Arabia officials are discussing possibilities of a US-Saudi nuclear cooperation agreement. Such a deal would allow Riyadh to enrich and reprocess uranium in exchange for choosing the US companies to build reactors in the Kingdom. According to media reports, the Saudis are pressing to include such advanced nuclear capabilities as part of a deal with the US to establish a civilian nuclear power program. In a latest development in February 2018, the US Energy Secretary, Rick Perry, met with the Saudi officials in London to discuss the potential deal. However, on March 6, 2018, Israeli Prime

⁷ "Nuclear Power in Jordan," <http://www.world-nuclear.org/information-library/country-profiles/countries-g-n/jordan.aspx>

⁸ "Middle East Nuclear Power."

⁹ "Saudi cabinet approves nuclear power program national policy: SPA," *Reuters*, March 13, 2018, <https://www.reuters.com/article/us-saudi-nuclearpower-cabinet/saudi-cabinet-approves-nuclear-power-program-national-policy-spa-idUSKCN1GP2D5>

¹⁰ "Nuclear Power in Saudi Arabia," <http://www.world-nuclear.org/information-library/country-profiles/countries-o-s/saudi-arabia.aspx>

Minister Netanyahu, during a closed door meeting with the US Senate Foreign Relations Committee in Washington spoke out against any agreement that would allow the Saudis to enrich uranium and reprocess plutonium.¹¹ According to recent reports, Saudi Arabia is hiring lobbyist in Washington to win such a deal with the US.¹²

Turkey

Turkey has been planning to develop nuclear power generation since 1970. It signed nuclear cooperation agreements with the US, Russia, China and several other countries. To meet its growing energy demands and to diversify its energy resources, Turkey plans to build three nuclear plants by 2023-2030.¹³ The award for the construction of Turkey's first NPP was given to Rosatom in 2010; however, it is facing difficulties to find some local partners. There is a possibility that Turkey's first NPP might miss its 2023 target start-up date. The \$20 billion project is part of President Tayyip Erdogan's "2023 vision" marking 100 years since the founding of modern Turkey.¹⁴

United Arab Emirates (UAE)

The UAE was a part of a 2006 initiative of the six member states of the GCC – Kuwait, Saudi Arabia, Bahrain, the UAE, Qatar and Oman – when they announced to commission a study on the peaceful use of nuclear energy. Currently, four NPPs, with a combined capacity of 5600 MWe are under construction at Barakah. Construction of the first NPP is already complete and it is estimated that the plant would be operational by 2019.

Acquiring nuclear technology for peaceful purposes is a very difficult task. Dangers associated with nuclear technology such as its safety and security and public concerns; risks of nuclear proliferation for weapons purposes; huge cost involved in developing nuclear energy related infrastructure, regulations, training and education and regional and international cooperation, make its acquisition for peaceful purposes a distant dream. The Middle Eastern region is not an exception to these challenges. However, it could be accepted that the international community and the nuclear non-

¹¹ "Netanyahu Warns US Lawmakers About Saudi Nuclear Power Deal," *Bloomberg*, March 8, 2018, <https://www.bloomberg.com/news/articles/2018-03-07/netanyahu-warns-u-s-lawmakers-about-saudi-nuclear-power-deal>

¹² "Saudis Enlist Washington Lobbyists in Bid for Nuclear Plants," *Bloomberg*, March 9, 2018, <https://www.bloomberg.com/news/articles/2018-03-09/saudi-arabia-enlists-lobbyists-in-quest-to-build-nuclear-plants>

¹³ "Turkey to expand capacity to meet energy needs with 3 nuclear power plants in action," *Daily SABAH*, August 10, 2017, <https://www.dailysabah.com/energy/2017/08/11/turkey-to-expand-capacity-to-meet-energy-needs-with-3-nuclear-power-plants-in-action-1502395900>

¹⁴ "Turkey's planned \$20 billion Russian-built Nuclear Plant Facing Delay," *Reuters*, March 9, 2018, <https://www.reuters.com/article/us-russia-turkey-nuclear/turkeys-planned-20-billion-russian-built-nuclear-plant-facing-delay-idUSKCN1GL1W2>

proliferation regime is now strong enough to help control the spread of nuclear weapons technology without barring the countries of the Middle East from ensuring their energy security.