

# Special Report

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## Egypt's Quest for a Nuclear Future

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African perspectives  
Global insights

# Executive summary

In 2015 Egypt signed an agreement with ROSATOM, the Russian state atomic energy corporation, to build a nuclear power plant at Al Dabaa on the country's northern coast, west of Alexandria. The agreement is a culmination of around six decades of discussions and plans in Egypt to harness nuclear energy for peaceful purposes. Egypt first launched a civilian nuclear programme in 1954, two years after its independence, and has two research reactors, which are currently operational.

This report assesses Egypt's plans to proceed with the construction of the power plant, which are firmly underway. It gives an overview of the context in which the project has emerged, situating it within modern Egyptian history and politics. It also discusses the country's normative frameworks on nuclear energy and the current legal and regulatory governance of nuclear energy, including the role played by different nuclear entities and bodies. The report then examines the Al Dabaa project in depth, focusing on the involvement of international actors, the programme's financing, the country's energy needs, the project's localisation, and Egyptian technical expertise and education. It highlights various objections to the project – in terms of land, security, economy and the environment – that have been raised by diverse social groups and actors.

The revival of the power plant project is deeply interwoven with elements of techno-nationalism and modernism. It is one of several mega-projects that aim to boost national prestige. Its design and implementation have been top-down and highly centralised. Furthermore, concerns over risks and/or accidents have been met with a response that exclusively emphasises technological solutions, imbuing technology with a saviour-like role and rendering invisible any vulnerabilities inherent to nuclear energy.

# Abbreviations & acronyms

EAEA	Egyptian Atomic Energy Commission
ENMA	Egyptian Nuclear Materials Authority
ENRRA	Egyptian Nuclear and Radiological Regulatory Authority
GDP	gross domestic product
HLWMC	Hot Laboratory and Waste Management Centre
IAEA	International Atomic Energy Agency
MoEE	Ministry of Electricity and Renewable Energy
MoMP	Ministry of Military Production
NCNSRC	National Centre for Nuclear Safety and Radiation Control
NGO	non-governmental organisation
NPPA	National Power Plants Authority
NPT	Non-Proliferation Treaty (Treaty on the Non-Proliferation of Nuclear Weapons)
NRC	Nuclear Research Centre
OAU	Organization of African Unity
TPNW	Treaty on the Prohibition of Nuclear Weapons
WMDFZ	Weapons of Mass Destruction-Free Zone

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## Cover image

Electric power transmission, 2008, Egypt (Athanasios Gioumpasis/Getty Images)

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## CHAPTER 1

# Introduction: Overview of political context

Egypt's political space over the past decade has been turbulent. A popular uprising – part of the Arab Spring – in January 2011 ousted president Hosni Mubarak, who had been in power for nearly 30 years. The Egyptian military, which had governed the country since its independence from the UK in 1952, moved against Mubarak, who himself had been an army officer. It then placed itself in charge of the democratic transition and in June 2012 Muhammad Morsi of the Muslim Brotherhood's Freedom and Justice Party was elected.

On the one-year anniversary of Morsi's rule, he was overthrown by the defence minister, Abd al-Fattah al-Sisi, who cited Morsi's mismanagement of the country's affairs and the increased insecurity throughout the country, including a spate of terrorist attacks by armed groups. Sisi proceeded to outlaw the Muslim Brotherhood, alongside a crackdown on leftist and revolutionary groups and violent dispersal of protests.<sup>1</sup> He became president in 2014. Depicting himself as the saviour of the nation, Sisi's agenda has centred on two key issues: restoring security and stabilising the economy.

## Mega-projects and nuclear energy

The government has been prioritising large-scale, top-down, modernist projects. These mega-projects are depicted as patriotic enterprises that Egyptians need to embrace, or even finance. It consistently solicits funds to help with their construction, such as the Long Live Egypt fund.<sup>2</sup> Examples include the expansion of the Suez Canal in 2015<sup>3</sup> and the creation of a 'new' administrative capital city on the outskirts of Cairo, among dozens of proposed new cities (such as 'New Alamein' on the northern coast and 'New Rafah' in north-eastern Sinai). These projects have been controversial and are widely viewed as both costly and unnecessary, merely serving as ego-boosting status symbols.<sup>4</sup> Another mega-project

The government has been prioritising large-scale, top-down, modernist projects. These mega-projects are depicted as patriotic enterprises that Egyptians need to embrace

- 1 Ruth Michaelson, "Threat of Jail Looms Over Even Mildest Critics Under Egyptian Crackdown", *The Guardian*, January 24, 2020, <https://www.theguardian.com/world/2020/jan/24/threat-of-jail-shapes-egyptian-lives-nine-years-after-uprising>.
- 2 Yezid Sayigh, *Owners of the Republic: An Anatomy of Egypt's Military Economy* (Beirut: Carnegie Middle East Center, 2019), 208.
- 3 "Egypt Launches Suez Canal Expansion", *BBC News*, August 6, 2015, <https://www.bbc.com/news/world-middle-east-33800076>.
- 4 Maged Mandour, "Sisi's Vanity Projects", *Carnegie Endowment for International Peace*, August 6, 2019, <https://carnegieendowment.org/sada/79625>; David Sims, *Egypt's Desert Dreams: Development or Disaster?* (Cairo: The American University of Cairo Press, 2015).

revived in November 2015 is the establishment of a nuclear power plant at the Al Dabaa site on the country's northern coast (140km from Alexandria), in the governorate of Matrouh.<sup>5</sup>

Figure 1 Location of El Dabaa, Egypt



The project is predominantly funded through a \$25 billion loan from ROSATOM, the Russian state atomic energy corporation, repayable over 22 years.<sup>6</sup> The nuclear power plant is expected to contain four 1 200 megawatt (MW) pressurised water reactors (known as VVER-1200). China, France, Japan, the US and South Korea also reportedly submitted tenders for the project, and the process through which Russia was selected is unclear. The official website of the Egyptian State Information Service states that the decision was made

5 The text and terms of the agreement is available in Russian at <http://docs.cntd.ru/document/420328070>.

6 ROSATOM, "Egypt Builds Strong Partnership with Russia", *ROSATOM Newsletter* 221, September 2019, [http://rosatomnewsletter.com/?post\\_middleeast=egypt-builds-strong-partnership-with-russia](http://rosatomnewsletter.com/?post_middleeast=egypt-builds-strong-partnership-with-russia).

'after in-depth studies'.<sup>7</sup> Similarly, in an interview the head of the National Power Plants Authority (NPPA), Amgad al-Wakil, alluded to the internal nature of the decision-making process, saying, 'After studying the result of the negotiations with these countries, Russia was chosen as a strategic partner to participate in implementing the Egyptian nuclear programme.'<sup>8</sup>

The professed objective of the power plant project is to achieve self-sufficiency in energy in the face of increasing demand and a growing population of around 100 million people. However, the project has also been framed in terms of national prestige. In political speeches the plant has been likened to other moments celebrated and commemorated in the official national discourse.<sup>9</sup>

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7 State Information Service (SIS), "Nuclear Project Abdelnasser's Dream", <https://www.sis.gov.eg/section/4683/4685?lang=en-us&lang=en-us>.

8 Sami Abdelrahman, "New Chairman of the Nuclear Power Plants Authority in First Dialogue with 'Rosa el Youssef'", Non-Proliferation Policy Education Center, November 15, 2017, <http://www.npolicy.org/article.php?aid=1357&rtid=14>.

9 Abdelrahman, "New Chairman of the Nuclear"; see also SIS, "Nuclear Project Abdelnasser's Dream".

# Domestic nuclear context

Egypt's nuclear ambitions have a long history. The country launched a civilian nuclear programme in 1954 and has since trained cadres of nuclear scientists. In the years immediately following independence the logic of a nuclear programme was based on a combination of technological modernism, a leadership role in the Arab world and the Non-Aligned Movement, and a desire for a balance of power with Israel. The idea of a nuclear programme – even a peaceful one – is therefore associated with national pride, and each of the country's presidents has had nuclear aspirations. Plans to establish a civilian nuclear power programme were almost always under consideration but never implemented.

Currently, the Egyptian Atomic Energy Agency (EAEA) has four research centres. These are the Nuclear Research Centre (NRC); the Hot Laboratory and Waste Management Centre (HLWMC); the National Centre for Radiation Research and Technology; and the National Centre for Nuclear Safety and Radiation Control (NCNSRC). The NRC and the HLWMC are located at Inshas in the Western Delta (about 40km north-west of Cairo) while the other two research centres are in Nasr City, a district of Cairo.<sup>10</sup>

## History of Egypt's nuclear programme

In 1958 Egyptian president Gamal Abd al-Nasser acquired a pilot plant from the Soviet Union. The ETTR-1 2MW light-water research reactor, launched in 1961 with Soviet technical assistance, became operational three years later and continues to operate to this day. The plant is located at Inshas, whose primary focus is industrial and agricultural research. In 1964 Egypt proposed Sidi Krir (west of Alexandria, 135km east of Al Dabaa) as a nuclear reactor site, but the project was halted owing to the war with Israel in June 1967, which destroyed almost the entire Egyptian air force. In the 1950s and 1960s Egypt began to invest in nuclear science and technology. Compared with the rest of the Arab world, it was considered to have highly trained nuclear scientists.<sup>11</sup>

After Nasser's death the administration of president Anwar al-Sadat restarted the nuclear power plant project. US president Richard Nixon and Sadat released a joint statement in June 1974 announcing US plans to assist Egypt with the construction of two reactors.<sup>12</sup> However, the Nixon administration backtracked following concerns over proliferation in

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10 Mark Fitzpatrick, "Nuclear Capabilities in the Middle East", in *WMD Arms Control in the Middle East: Prospects, Obstacles and Options*, ed. Harald Muller (London: Routledge, 2015), 114.

11 One scholar estimated in 1989 that there were around 500 nuclear scientists working at Egyptian facilities. See Frank Barnaby, *The Invisible Bomb: The Nuclear Arms Race in the Middle East* (London: IB Tauris, 1989), 83.

12 "Text of Nixon-Sadat Statement", *New York Times*, June 15, 1974, 12.

the aftermath of the Indian nuclear test, which showed how civilian nuclear technology could be used to develop a military nuclear programme.<sup>13</sup> Members of the US Congress argued that Nixon's agreement with Sadat was premature. In particular, they highlighted the volatile political situation in the Middle East at the time, after another Arab-Israeli war in 1973 and the subsequent failure to reach a political settlement.<sup>14</sup> Fearing that the safeguards overseen by the International Atomic Energy Agency (IAEA) might be insufficient to deter Egypt from attempting to build a bomb, they imposed additional conditions, which Egypt ultimately rejected.

In 1991 the capacity of the Inshas reactor – an experimental training research reactor – was increased to 5MW in an agreement with India. The reactor 'has been used for solid-state, nuclear and reactor physics, chemical research, isotope production and biological irradiation'.<sup>15</sup> Egypt acquired another research reactor from Argentina in 1992, also at Inshas, which was inaugurated in 1998.<sup>16</sup> The light-water research reactor is apparently 'used [primarily] for radioisotope production, medical and nuclear solid state research, nuclear-engineering experiments, material-fuel tests, and various other fields to train scientists and technical personnel'.<sup>17</sup> In addition to the two research reactors, the Inshas facility has a pilot plant for fuel manufacturing and a pilot-scale conversion plant, all under IAEA safeguards, as well as an accelerator, a heavy-water laboratory and a cyclotron imported from Russia and used for nuclear physics training. The Inshas HLWMC aims to develop expertise in radioactive waste treatment and radioisotope production for medical and industrial applications, including hot cells for plutonium-extraction research. The NCNSRC also deals with the medical, industrial, environmental and agricultural applications of nuclear science, with some studies published on the use of isotopes in agriculture.<sup>18</sup> Working with various university faculties, the EAEA has supported work in nuclear medicine in Egypt. The Egyptian Society of Nuclear Medicine was established in October 1997 and remains active, with its own bi-annual journal on nuclear medicine since 2009.<sup>19</sup>

## Origins of Al Dabaa project

In 1981 Al Dabaa was suggested as the site of an electricity-generating power plant in a presidential decree by Mubarak, who became president after Sadat's assassination. The site was deemed to be the most feasible, based on several studies contracted by the Egyptian government, owing to its proximity to water, distance from the seismic belt, groundwater

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13 J Samuel Walker, "Nuclear Power and Nonproliferation: The Controversy over Nuclear Exports, 1974-1980", *Diplomatic History* 25, no. 2 (2001): 215-249.

14 US Government, "US Foreign Policy and the Export of Nuclear Technology to the Middle East, Hearing before the Subcommittees on International Organizations and Movements and on the Near East and South Asia of the Committee on Foreign Affairs, House of Representatives, Ninety Third Congress, Second Session, June 25; July 9, 18; and September 16, 1974" (Washington DC: US Government Printing Office, 1974), 168-170.

15 Fitzpatrick, "Nuclear Capabilities", 114.

16 For more information on Egypt's research reactors, see Federation of American Scientists, "Nuclear Research Center, Hot Laboratory and Waste Management Center, Inshas", <https://fas.org/nuke/guide/egypt/facility/nrc.htm>.

17 Fitzpatrick, "Nuclear Capabilities", 114.

18 Hassan El-Ramady et al., "Soil Research History", in *The Soils of Egypt*, eds. Hassan El-Ramady et al., (Cham: Springer, 2019), 24.

19 Further information is available at Egyptian Society of Nuclear Medicine Specialists, <http://www.esnms.net/>.

## The Al Dabaa plans were only revived in September 2006 as a result of growing energy needs coupled with rising oil and gas prices

movement and demographics (the area is relatively sparsely populated).<sup>20</sup> However, the pursuit of the reactors was frozen on the Egyptian side in 1986 owing to concerns following the Chernobyl disaster in Soviet Ukraine.<sup>21</sup>

During most of Mubarak's rule, the nuclear power plant project was shelved. The Al Dabaa plans were only revived in September 2006 as a result of growing energy needs coupled with rising oil and gas prices.<sup>22</sup> The project was proposed by Mubarak's son, Gamal, who had played a role in Egypt's economic liberalisation and was widely perceived as being groomed for succession.<sup>23</sup> After the project got parliamentary approval, Cairo signed a \$200 million contract with the Australian engineering consultancy firm WorleyParsons in 2009 regarding the specifications of the power plant.<sup>24</sup>

In the period between 2011 and 2013, after Mubarak was ousted, the project was not cancelled or officially frozen but little progress was made. Al Dabaa was still deemed the most suitable site for a nuclear reactor, and the government began moving residents in the area to make way for it. (It is worth noting that residents had not been consulted regarding this decision,<sup>25</sup> and this issue of land confiscation and resistance to the project will be explored in the penultimate section of the report.)

Meanwhile, the Fukushima Daiichi disaster in March 2011 led to renewed questions about nuclear energy in Egypt.<sup>26</sup> The project was restarted in earnest in 2014 after Sisi became president. It is one of two 'giant national projects' that the president has prioritised, alongside the expansion of the Suez Canal.<sup>27</sup>

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20 Mohamed M Megahed, "Feasibility of Nuclear Power and Desalination", *Desalination* 246, no. 1-3 (2009): 238-256.

21 "Egypt Unveils Nuclear Power Plan", *BBC News*, September 25, 2006, [http://news.bbc.co.uk/2/hi/middle\\_east/5376860.stm](http://news.bbc.co.uk/2/hi/middle_east/5376860.stm).

22 Charles K Ebinger and Sharon Squassoni, "Industry and Emerging Nuclear Energy Markets", in *Business and Nonproliferation: Industry's Role in Safeguarding a Nuclear Renaissance*, eds. John P Banks and Charles K Ebinger (Washington DC: Brookings Institution Press, 2011), 66-120.

23 Dominic Moran, "Egypt's Nuclear Imbroglio", ETH Zurich, Centre for Security Studies, <https://css.ethz.ch/en/services/digital-library/articles/article.html/106118/pdf>; "Egypt and Nuclear Power: Nuclear Succession", *The Economist*, September 28, 2006, <https://www.economist.com/middle-east-and-africa/2006/09/28/nuclear-succession>.

24 Tanya Ogilvie-White and Maria Rost Rublee, "The Nuclear Energy Aspirants: Egypt and Vietnam", in *Slaying the Nuclear Dragon: Disarmament Dynamics in the Twenty-first Century*, eds. Tanya Ogilvie-White and David Santoro (Athens, GA: University of Georgia Press, 2012), 151-187.

25 Jack Shenker, *The Egyptians: A Radical History of Egypt's Unfinished Revolution* (New York: The New Press, 2016).

26 Ebinger and Squassoni, "Industry and Emerging Nuclear", 96.

27 Sami, "New Chairman of the Nuclear".

## Uranium resources

Uranium exploration in Egypt began as early as the 1960s, and there have been reports of preliminary discoveries, particularly in the Sinai Peninsula and the Eastern Desert.<sup>28</sup> However, exploration and processing have stalled owing to a lack of funding for the Egyptian Nuclear Materials Authority (ENMA), the government agency responsible for uranium exploration. The ENMA has worked with the IAEA to develop its capabilities for uranium exploration and production through several technical cooperation projects that have lasted longer than a decade.<sup>29</sup> However, the exploration, extraction and development of Egyptian uranium remain in the early stages. According to the Nuclear Energy Agency and the IAEA's uranium 'Red Book', two sites in Egypt have been identified with 'reasonably assured resources': Gabal Gutter and Abu Zenima.<sup>30</sup>

There were reports of a large deposit of natural uranium in 2013.<sup>31</sup> Afterward, the Nuclear Materials Authority said it was seeking specialised expertise from international firms in terms of its excavation and extraction.<sup>32</sup> However, these reports remain unsubstantiated, and little progress appears to have been made. In late 2019 Egypt and Jordan announced that they were planning to sign an agreement on nuclear cooperation, which includes the exploration of nuclear ores, and the exploitation and extraction of uranium.<sup>33</sup> The agreement does not appear to have been finalised yet.<sup>34</sup>

## Non-proliferation and regional asymmetry

As a result of Egypt's historical role as a leader in the pan-Arab movement and its status as the most populous country in the Arab world, it has always been expected to develop a nuclear weapons programme.<sup>35</sup> Indeed, starting in the 1950s, various public figures

The country has opted for non-proliferation, and scholars have frequently used its path as a case study on nuclear restraint

28 NTI, "Egypt", <https://www.nti.org/learn/countries/egypt/facilities/>.

29 Nuclear Energy Agency and International Atomic Energy Agency, *Uranium 2018: Resources, Production and Demand*, Joint Report (Paris: Organisation for Economic Cooperation and Development, 2018), 31, <http://www.oecd-nea.org/ndd/pubs/2018/7413-uranium-2018.pdf>.

30 NEA and IAEA, *Uranium 2018*.

31 Kerry Hall, "Egypt Finds Highly Concentrated Natural Uranium Reserve", *Mining.com*, January 21, 2013, <https://www.mining.com/egypt-finds-huge-natural-uranium-reserve-56414/>.

32 Rana Khaled, "Egypt Discovers Large Amount of Uranium", *Egypt Independent*, January 18, 2013, <https://egyptindependent.com/egypt-discovers-large-amounts-uranium/>.

33 WISE Uranium Project, "New Uranium Mining Projects – Jordan", December 3, 2019, <https://www.wise-uranium.org/upjo.html>.

34 Since the announcement of this planned agreement in December 2019, there has been no new information released about it or any official record of the agreement's being signed.

35 Adel Safety, "Proliferation, Balance of Power, and Nuclear Deterrence: Should Egypt Pursue a Nuclear Option?", *International Studies* 33, no. 1 (1996): 21-33.

argued in favour of Egypt's need for the bomb.<sup>36</sup> However, the country has opted for non-proliferation, and scholars have frequently used its path as a case study on nuclear restraint.<sup>37</sup>

The Nasser administration's attempts to acquire nuclear weapons in the 1960s proved futile. Nasser reportedly approached the Soviet Union and China in his quest for nuclear weapons, but both countries were reluctant to help Egypt build a bomb. The former merely offered an extension of its weapons in the form of a nuclear guarantee, while the latter urged Egypt to pursue a path of indigenous development.<sup>38</sup> Eventually, Egypt opted to take a stand in favour of non-proliferation, and it currently views the development of nuclear weapons as contradicting its strategic interests.

Egypt's policy on nuclear weapons has been dictated by concerns over Israel's possession of the bomb. The issue continues to be a source of tension between Egypt and Israel, even as their security and foreign policy priorities become increasingly aligned.<sup>39</sup> After the wars in 1948, 1956, 1967 and 1973, Egypt and Israel signed the Camp David Peace Accords in 1979. Two years later Israel returned the Sinai Peninsula, which it had occupied during the 1967 War, to Egyptian control.<sup>40</sup>

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36 Ahmad Zaki 'Akif, "Al qunbula al-zariya: yajibu an tasna'uha misr" ("The Atomic Bomb: Egypt Must Build It"), *Al-Hilal* (June 1957): 82-84.

37 Gawdat Bahgat, "The Proliferation of Weapons of Mass Destruction: Egypt", *Arab Studies Quarterly* 29, no. 2 (2007): 1-15; Maria Rost Rublee, *Non-Proliferation Norms: Why States Choose Nuclear Restraint* (Athens, GA: University of Georgia Press, 2009), 99-148; Robert J Einhorn, "Egypt: Frustrated but Still on a Non-Nuclear Course", in *The Nuclear Tipping Point: Why States Reconsider Their Nuclear Choices*, eds. Kurt M Campbell, Robert J Einhorn and Mitchell N Reiss (Washington DC: Brookings Institution Press, 2004), 43-82; Etel Solingen, *Nuclear Logics: Constraining Paths in East Asia and the Middle East* (Princeton: Princeton University Press, 2007), 229-245.

38 Solingen, *Nuclear Logics*, 229.

39 David D Kirkpatrick, "Secret Alliance: Israel Carries Out Airstrikes in Egypt, with Cairo's OK", *The New York Times*, February 3, 2018, <https://www.nytimes.com/2018/02/03/world/middleeast/israel-airstrikes-sinai-egypt.html>.

40 The full text of the Camp David Peace Accords is available online at UN Peacemaker, "Israel and Egypt: Framework for Peace in the Middle East", June 14, 1979, [https://peacemaker.un.org/sites/peacemaker.un.org/files/EG%20IL\\_780917\\_Framework%20for%20peace%20in%20the%20MiddleEast%20agreed%20at%20Camp%20David.pdf](https://peacemaker.un.org/sites/peacemaker.un.org/files/EG%20IL_780917_Framework%20for%20peace%20in%20the%20MiddleEast%20agreed%20at%20Camp%20David.pdf).

# Normative framework and peaceful uses of nuclear energy

Egypt has used diplomatic avenues, such as the Non-Proliferation Treaty (NPT), to express its frustration with the global nuclear non-proliferation regime. Seeking to protest Israel's presence outside of the NPT consensus, Egypt has since the early 1990s refused to sign new treaties relating to nuclear matters. Cairo continues to argue in favour of the establishment of a Weapons of Mass Destruction-Free Zone (WMDFFZ) in the Middle East as the only solution to the issues of proliferation in the region. By emphasising its leadership role in non-proliferation diplomacy, Egypt can depict itself as a responsible actor in nuclear affairs, thereby garnering support for its nuclear energy project.

## Ratification of treaties

Egypt signed the NPT in 1968 but only ratified it in 1981. In addition, it has signed and ratified the IAEA Safeguards Agreement, the Vienna Convention on Civil Liability for Nuclear Damage, the Joint Protocol Relating to the Application of the Vienna and Paris Conventions, the Convention on Early Notification of a Nuclear Accident, and the Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency.<sup>41</sup> It signed the Convention on Nuclear Safety in 1994 but has not ratified it.<sup>42</sup>

Egypt is a member of the IAEA but has refused to sign the IAEA Additional Protocol, which grants the agency expanded right of access to and inspection of nuclear sites and activities.<sup>43</sup> Egypt has worked with the Nuclear Suppliers Group, but is not a member of the Zangger Committee or the Wassenaar Arrangement. The country has signed bilateral agreements on the peaceful use of nuclear energy with many countries, including Argentina, Australia, Belgium, Canada, China, France, Germany, India, Italy, South Korea, South Africa, Russia, the UK and the US. It has also signed a memorandum of understanding with Sweden and cooperation agreements with countries in the region, such as Jordan and Morocco. In addition, it has a nuclear waste disposal agreement with Israel.<sup>44</sup>

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41 The website of the Nuclear Power Plants Authority has a table summarising Egypt's international and multilateral treaties and agreements: NPPA, "International Agreements: Egypt - and the Non-Proliferation Treaty", <https://nppa.gov.eg/en/international-cooperation/#International-Agreements>.

42 See IAEA, "Egypt", <https://www-pub.iaea.org/MTCD/publications/PDF/cnpp2007/countryprofiles/Egypt/Egypt2005.htm>.

43 Mark Hibbs, "The Unspectacular Failure of the IAEA Additional Protocol", Carnegie Endowment for International Peace, April 26, 2012, <https://carnegieendowment.org/2012/04/26/unspectacular-future-of-iaea-additional-protocol-pub-47964>.

44 James F Keeley, "A List of Bilateral Civilian Nuclear Co-Operation Agreements, Volumes 1-5" (University of Calgary, Calgary, 2009), [https://dspace.ucalgary.ca/bitstream/handle/1880/47373/Treaty\\_List\\_Volume\\_02.pdf;jsessionid=B626010EF3F93D3B8C606E408A3C18B7?sequence=8](https://dspace.ucalgary.ca/bitstream/handle/1880/47373/Treaty_List_Volume_02.pdf;jsessionid=B626010EF3F93D3B8C606E408A3C18B7?sequence=8). See also the NPPA's website, which contains a table summarising Egypt's bilateral agreements: NPPA, "Bilateral Agreements", <https://nppa.gov.eg/en/international-cooperation/#Bilateral-Agreements>.

Egypt is an active participant in various aspects of nuclear diplomacy, and has participated in the US nuclear security summits, including the Washington 2016 Summit and other preparatory meetings.<sup>45</sup> However, since 1992 it has refused to sign new agreements pertaining to arms control until all regional actors ‘sign all treaties in the field of disarmament’, in the words of Amr Moussa, the Egyptian foreign minister who crafted this policy.<sup>46</sup> The objective of the policy is to signal its protest over the international nuclear non-proliferation regime’s failure to take measures against Israel’s undeclared, yet well-known, possession of nuclear weapons and what Egyptian officials view as double standards on the part of nuclear powers. For example, Egypt has refused to sign the Chemical Weapons Convention and has held on to chemical weapons to address the strategic imbalance in the region.<sup>47</sup> Despite this, Egypt is a member of the Conference on Disarmament.<sup>48</sup>

The country has cited the same reasons for its refusal to ratify the Comprehensive Nuclear-Test-Ban Treaty and the Biological and Toxin Weapons Convention. Egypt is also yet to ratify the African Nuclear-Weapons-Free Zone Treaty (Pelindaba Treaty).<sup>49</sup> Cairo’s refusal to do so may seem puzzling given the vital role it played in various stages of its negotiation. Representatives of African states met in Cairo in April 1996 for the signing ceremony of the historic treaty. During the event’s keynote address, Mubarak praised the treaty and called for a similar nuclear-weapons-free zone to be established in the Middle East. The Organization of African Unity (OAU) Summit in Cairo in July 1964 was the precursor to the Pelindaba Treaty, and it was during this meeting that the OAU and heads of state decided to undertake an agreement not to manufacture or acquire nuclear weapons.

Egypt’s policy of active participation in nuclear diplomacy is not at odds with its freeze on ratifying new nuclear agreements; rather, both are part of its efforts to draw attention and object to the prevailing nuclear asymmetry in the Middle East. Egypt was part of the New Agenda Coalition, alongside Brazil, Ireland, Mexico, South Africa and New Zealand, which supported the Treaty on the Prohibition of Nuclear Weapons (TPNW). This group of states argued that the TPNW could support the implementation of Article VI of the NPT, which calls on states that possess nuclear weapons to take steps towards disarmament.<sup>50</sup> Nevertheless, Egypt has not signed or ratified the TPNW – in line with its freeze on international nuclear-related agreements.

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45 See Nuclear Security Summit, “National Statement: Egypt”, <http://www.nss2016.org/document-center-docs/2016/4/1/national-statement-egypt>.

46 Israel Ministry of Foreign Affairs, “Joint Press Conference Israeli Foreign Minister Shimon Peres and Egyptian Foreign Minister Amre Moussa”, August 31, 1994, <https://mfa.gov.il/MFA/PressRoom/1994/Pages/JOINT%20PRESS%20CONFERENCE%20FMS%20PERES%20AND%20MOUSSA%20-%2031-A.aspx>.

47 Dany Shoham, “Chemical and Biological Weapons in Egypt”, *The Nonproliferation Review* 5, no. 3 (1998): 48–58.

48 UN Geneva, “Statement of the Arab Republic of Egypt to the Conference on Disarmament, by Ambassador Wafaa Bassim”, January 22, 2013, 1, [https://www.unog.ch/80256EDD006B8954/\(httpAssets\)/4A4AA225D72259F9C1257AFB004C8DD6/\\$file/1273Egypt.pdf](https://www.unog.ch/80256EDD006B8954/(httpAssets)/4A4AA225D72259F9C1257AFB004C8DD6/$file/1273Egypt.pdf)

49 David Santoro, “Status of Non-Proliferation Treaties, Agreements, and Other Related Instruments in the Middle East”, in *WMD Arms Control in the Middle East: Prospects, Obstacles and Options*, ed. Harald Muller (London: Routledge, 2015), 72.

50 Michael Hamel-Green, “The Nuclear Ban Treaty and 2018 Disarmament Forums: An Initial Impact Assessment”, *Journal for Peace and Nuclear Disarmament* 1, no. 2 (2018): 436–463.

## WMDFZ in the Middle East

Egypt played a leading role in opposing the indefinite extension of the NPT in the 1995 Review Conference for the same reasons and threatened to block the consensus. In fact, the Egyptian foreign ministry only agreed to the indefinite extension after the NPT adopted a resolution calling for the creation of a WMDFZ in the Middle East, and under heavy pressure from the US.<sup>51</sup> Cairo had sought to refer to Israel as the sole possessor of nuclear weapons and has continued to pursue an obstructionist policy at successive NPT Review Conferences to highlight the lack of progress made on the Middle East resolution. Egyptian nuclear diplomacy is based on its success in leveraging its leadership role among Arab states and rallying other members of the Arab group.

Cairo has been the main proponent of the establishment of a WMDFZ in the Middle East and has dedicated diplomatic efforts to reaching this objective. Alongside Iran, it was one of the original sponsors of the proposal at the UN General Assembly in 1974.<sup>52</sup> Egypt also prompted the UN secretary general to undertake a study on the proposal and make recommendations on confidence-building measures.<sup>53</sup> During Arab-Israeli regional talks in the early 1990s as part of the Arms Control and Regional Security Conference (under the auspices of the Madrid Peace Conference), Egyptian diplomats pushed for the establishment of a nuclear weapons-free zone, leading to escalating tensions with Israel.<sup>54</sup> While Egypt has pushed for Israeli accession to the NPT and the establishment of the WMDFZ, Israel has argued that peace should be a prerequisite for such a zone.

## Incidents of non-compliance

In 2004/5, Egypt faced scrutiny in international nuclear non-proliferation circles. The IAEA revealed that it was investigating several 'undisclosed experiments' related to atomic research in Egypt. The watchdog said it found traces of highly enriched uranium, leading to multiple media reports about clandestine efforts by Egypt to develop nuclear weapons and its alleged lack of compliance with the NPT.<sup>55</sup> The investigations eventually concluded that Egypt was not seeking to develop nuclear weapons and had not enriched uranium. The situation was diffused when IAEA inspectors visited the radioisotope production facility at Inshas.<sup>56</sup>

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51 SIS, "Egypt's Vision on Iran's Nuclear Crisis", <https://www.sis.gov.eg/section/7302/9392?lang=en-us>.

52 Mahmoud Karem, *A Nuclear-Weapons-Free Zone in the Middle East: Problems and Prospects* (New York: Greenwood Press, 1988), 55.

53 UN General Assembly, *Study on Effective and Verifiable Measures which Would Facilitate the Establishment of a Nuclear Weapons Free Zone in the Middle East* (Report of the UN Secretary General, New York, October 10, 1990), <https://undocs.org/pdf?symbol=en/A/45/435>.

54 Peter Jones, "Negotiating Regional Security and Arms Control in the Middle East: The ACRS Experience and Beyond", *Journal of Strategic Studies* 26, no. 3 (2003): 137-154.

55 "IAEA: Weapons-Grade Uranium Found in Egypt", *The Jerusalem Post*, May 6, 2009, <https://www.jpost.com/Middle-East/IAEA-Weapons-grade-uranium-found-in-Egypt>.

56 IAEA, *Implementation of the NPT Safeguards Agreement in the Arab Republic of Egypt GOV/2005/9*, Report by the Director General (Vienna: IAEA, 2005).

Nevertheless, Egypt had failed to comply with the requirement to report its inventory of nuclear materials (which includes various forms of uranium, both imported and domestically produced), as well as the import of fuel rods containing enriched uranium. It also carried out 16 experiments between 1990 and 2003, which it did not report, that involved ‘the irradiation of small amounts of natural uranium and the subsequent dissolution of the material’.<sup>57</sup> Egypt also failed to include further information on its radioisotope production facility at Inshas.<sup>58</sup>

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57 “Egypt Failed to Report ‘a Number’ of Nuclear Materials, Activities, Facilities, IAEA Says”, NTI, February 14, 2005, <https://www.nti.org/gsn/article/egypt-failed-to-report-a-number-of-nuclear-materials-activities-facilities-iaea-says-4666/>.

58 “Egypt Failed to Report”.

## CHAPTER 4

# Nuclear governance

The governance of peaceful uses of nuclear energy in Egypt is based on a comprehensive national law crafted in 2010. The Egyptian Parliament has since revised and expanded the country's legal framework, especially after the agreement with Russia to build a nuclear power plant at Al Dabaa. The IAEA has reportedly continued to help Egypt to develop a legal and regulatory framework for the introduction of nuclear power.<sup>59</sup>

### Policies and legislation

National legislation adopted in March 2010, known as Law No. 7/2010 on activities in the nuclear and radiation field, seeks to support the development of the nuclear energy sector. It was drafted with input from the IAEA and stipulates that the activities of all nuclear and radiation facilities in the country are strictly for peaceful purposes. It was decided to review the legal framework in 2007 when the Mubarak administration was taking its initial steps towards the acquisition of nuclear energy. The objective of this legislation was to bring the Egyptian regulatory framework for nuclear facilities further in line with international safety standards and protect individuals, society and the environment against radiological hazards. The legislation is also designed to fulfil Egypt's obligations in terms of the treaties and conventions to which it is a signatory.

The law seeks to comprehensively govern all elements of nuclear activity and security, and contains numerous provisions that deal with plant licensing, radiation protection, safety and security, radioactive waste management, spent fuel management, civil liability in case of nuclear damages, transport of radioactive material, emergency responses to disasters, and import and export controls.<sup>60</sup> In addition, Law No. 7/2010 creates a new regulatory body, the Egyptian Nuclear and Radiological Regulatory Authority (ENRRA), tasked with monitoring all nuclear and radiation facilities, activities and practices. This body is technically independent from the government as it does not fall under one specific ministry and reports directly to the prime minister.<sup>61</sup> The ENRRA was involved with the site evaluation of Al Dabaa. Within the ENRRA, the law also established a system of nuclear security that defines anticipated threats, reviews and evaluates the performance of nuclear security systems, monitors trafficking of nuclear or radioactive material, and so on.<sup>62</sup> The ENRRA has established a training and technical support centre for employees working on nuclear and radiation security.

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59 Elisabeth Dyck, "IAEA's INIR Service Looks Ahead to 2020 After Year's Final Mission to Egypt", IAEA News Center, November 7, 2019, <https://www.iaea.org/newscenter/news/iaeas-inir-service-looks-ahead-to-2020-after-years-final-mission-to-egypt>.

60 OECD and NEA, *Nuclear Law Bulletin* 85, no. 2010/1 (2010): 103, <https://www.oecd-nea.org/law/nlb/nlb85.pdf#page=101>.

61 IAEA, "Country Nuclear Power Profiles: Egypt (Updated 2015)", <https://cnpp.iaea.org/countryprofiles/Egypt/Egypt.htm>.

62 NSS, "National Progress Report: Egypt", March 31, 2016, <http://www.nss2016.org/document-center-docs/2016/3/31/national-progress-report-egypt>.

## Regulating and governing bodies

The rest of Egypt's regulatory and governing bodies pertaining to atomic energy are all under the authority of the Ministry of Electricity and Renewable Energy (MoEE), which itself falls under the oversight of the prime minister. There are three key nuclear-related authorities under the MoEE: the ENMA, the EAEA and the NPPA. Within these three main bodies, there are smaller cooperating agencies as well, such as the research clusters operating under the EAEA outlined above.

Established in 1955 as the Atomic Energy Commission, the EAEA is the oldest of these bodies. It has widespread outreach activities, such as producing a magazine, *Al-Taqa Al-Zariya* ('Atomic Energy'), and convening a training programme for interested scientists.<sup>63</sup> The ENMA was initially a department within the EAEA, the Geological and Nuclear Raw Materials Department. However, in 1977 it became a separate body that oversees the prospection, exploration and evaluation of raw nuclear materials. Its activities, according to an IAEA paper written by the head of the department, have included 'training of exploration teams, conduct[ion] of airborne, ground follow up and preliminary geological mapping as well as execution of limited exploration drilling'.<sup>64</sup> The NPPA was established in 1976 as the sole entity responsible for managing the construction and operation of Egypt's nuclear power plants. It is the main body currently overseeing the establishment of the Al Dabaa plant. For the fiscal year 2019–2020, the NPPA's budget was EGP<sup>65</sup> 6.2 billion (\$395 million). It is headed by al-Wakil, who was previously affiliated with the Military Technical College in Cairo.<sup>66</sup> The ENRRA, as a separate body with technical competence and legal authority, is designed to support and review the work of these three entities, and is also able to issue new regulations in line with its mandate (see Figure 2).

In addition, Egypt's parliament approved the creation of regulatory bodies on nuclear power in 2017. This move was aimed at supporting the nuclear deal with Russia.<sup>67</sup> The first, the Executive Authority for the Supervision of Nuclear Stations for Electricity Generation, affiliated with the Ministry of Electricity, provides technical supervision of electricity-producing nuclear stations. It assesses the performance of contractors hired to build nuclear stations and issues progress and annual reports, alongside other monitoring roles. A second body was established to conduct research on the establishment of electricity-generating nuclear stations in Egypt.<sup>68</sup> Generally, Parliament has offered little resistance to proposed policies and budgets pertaining to the nuclear power plant. It even passed

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63 See Egyptian Atomic Energy Authority, "Training", <https://eaea.org.eg/training/>; EAEA, *Al-Taqa Al-Zariya* ("Atomic Energy"), December 2019, <https://eaea.org.eg/wp-content/uploads/2019/12/inside.pdf>.

64 Nagdy Farag, "Uranium Exploration in Egypt: Past, Current, and Future Activities" (IAEA-CN-216, Abstract 091, IAEA, Vienna, 2014), [https://inis.iaea.org/collection/NCLCollectionStore/\\_Public/48/039/48039488.pdf](https://inis.iaea.org/collection/NCLCollectionStore/_Public/48/039/48039488.pdf).

65 Currency code for the Egyptian pound.

66 Al-Masry Al-Youm, "Parliament Committee Sets Draft Budget for NPPA at LE 6.2bnm", *Egypt Independent*, May 14, 2019, <https://egyptindependent.com/parliament-committee-sets-draft-budget-of-nppa-at-le6-2-bn/>.

67 Gamal Essam El-Din, "Egypt's Parliament Approves Laws Creating Nuclear Power Regulatory Bodies", *Al-Ahram*, November 27, 2017, <http://english.ahram.org.eg/NewsContent/1/64/282327/Egypt/Politics-/Egypts-parliament-approves-laws-creating-nuclear-p.aspx>.

68 Essam El-Din, "Egypt's Parliament Approves Laws".

**Figure 2 Structure of Egyptian electrical power sector**



Source: taken from IAEA, "Country Nuclear Power Profiles: Egypt (Updated 2015)", <https://www-pub.iaea.org/MTCD/Publications/PDF/cnpp2018/countryprofiles/Egypt/Egypt.htm>

nuclear legislation in an emergency session.<sup>69</sup> Meanwhile, there is virtually no input from civil society actors in policy planning and proposals related to the development of nuclear energy. In many ways, the public has largely been excluded from the development of the nuclear legislation framework.

The Ministry of Military Production (MoMP) – which organises and coordinates military factories around the country – has led a campaign to ‘nationalise nuclear technology’, in order to ensure Egypt has the necessary technical personnel to work at Al Dabaa.<sup>70</sup> The military is also a key interlocutor in various other stages in the project; for instance, it reportedly took over communications with residents of Al Dabaa from the Interior Ministry and the MoEE.<sup>71</sup> Furthermore, the Ministry of Defence is involved in building a city around the power plant, as well as roads connecting the area.<sup>72</sup> The military has also constructed the Muhamed Naguib military base, east of Al Dabaa, which will be responsible for the security of the nuclear power plant; the New Alamein city; oilfields in the area; and other vital installations west of Alexandria. The base was inaugurated in July 2017 after two years of construction and has been described as the largest military base in the Middle East and North Africa.<sup>73</sup>

69 "Al barlaman al-misri yu-qar niha'iyān qawanin inshāa mahatat al-Dabaa al-nawawiya" ("The Egyptian Parliament Conclusively Approves Legislation for the Construction of Al Dabaa Power Plant"), *Al Araby*, November 27, 2017, <https://www.alaraby.co.uk/economy/2017/11/27/>.

70 Abdelrahman, "New Chairman of the Nuclear".

71 Osman El Sharnouby, "Cause for Celebration? From Opposition to Acceptance of the Dabaa Nuclear Power Plant", *Mada Masr*, March 15, 2017, <https://madamasr.com/en/2017/03/15/feature/politics/cause-for-celebration-from-opposition-to-acceptance-of-the-dabaa-nuclear-power-plant/>.

72 Sayegh, *Owners of the Republic*, 249.

73 Associated Press, "Egypt's Sisi Opens Biggest Military Base in Middle East and Africa", *Al-Arabiya*, July 22, 2017, <https://english.alarabiya.net/en/News/middle-east/2017/07/22/Egyptian-President-opens-biggest-military-base-in-the-Middle-East-and-Africa>.

# Nuclear/atomic build programme

The Russian proposal for Al Dabaa was reportedly the most favourable of the bids received, but the details have not been shared with the public.<sup>74</sup> While there have been no public allegations of corruption regarding the proposal, there is virtually no transparency regarding the mechanisms through which the government reached its decision on which proposal was most favourable – a decision that may have been predominantly strategic rather than economic and is generally treated as a matter of national security. Other considerations, such as the resumption of Russian tourism to Egypt, could have played a role. Moscow had ceased flights to the country after the downing of a Russian plane by operatives affiliated with Islamic State (ISIS) in 2015.

## International actors involved in Al Dabaa

There are four contracts with Russia related to the nuclear power plant. In addition to building four Generation III+ VVER-1 200MW reactors at Al Dabaa, ROSATOM will supply nuclear fuel for the plant throughout its entire lifetime, as per the second contract. The third contract relates to operation and maintenance. It will also be involved in the training of Egyptian personnel and partners during the first 10 years of the plant's operations. The fourth contract deals with the disposal of spent fuel.

In parallel, Egypt and Russia reportedly signed a contract according to which Russia will construct storage and supply containers for spent fuel. Sources suggested that Egypt would export spent fuel to Russia, where it would be placed in uniquely fortified glass bottles before being sent back to Egypt for storage.<sup>75</sup> When asked about the risks of this agreement, the head of the NPPA dismissed it as a rumour. Spent fuel, he said, would be kept in containers and potentially used for other technology; after 100 years it would be disposed of after 'applying the proper methods followed in all states worldwide'.<sup>76</sup> This confusion and misinformation can be attributed to a lack of consultation in the public space and discussions with civil society more broadly. The practice of exporting and then re-importing spent fuel is unconventional. At the Russian-built civilian nuclear reactor in Iran, spent fuel is sent back to Russia.<sup>77</sup>

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74 Walaa Hussein, "Russia to Build Egyptian Nuclear Reactor", *Al-Monitor*, September 4, 2015, <https://www.al-monitor.com/pulse/fr/originals/2015/09/egypt-russia-offer-build-nuclear-reactor.html>.

75 Rasha Mahmoud, "Egypt Presses Ahead with Nuclear Power", *Al-Monitor*, April 30, 2019, <https://www.al-monitor.com/pulse/originals/2019/04/egypt-dabaa-site-license-nuclear-power-station.html>.

76 A transcript of the interview is available at NPPA, "The First Official Responsible for El Dabaa Nuclear Project in an Interview with Sada Al-Balad News: The Reactor is in its Preliminary Stage", September 3, 2018, <https://nppa.gov.eg/en/the-first-official-responsible-for-el-dabaa-nuclear-project-in-an-interview-with-sada-al-balad-news-the-reactor-is-in-its-preliminary-stage/>.

77 Lionel Beeher, "Russia's Nuclear Deal with Iran", Council on Foreign Relations, February 28, 2006, <https://www.cfr.org/backgrounder/russias-nuclear-deal-iran/>.

The US firm General Electric Power is expected to deliver four nuclear turbine islands for the project. According to unofficial estimates, the project is worth around \$700 million.<sup>78</sup> The company is also reportedly providing technical expertise for on-site installation and commissioning. This suggests a diversification in the actors involved in building the power plant. The process by which Egypt arrived at this division of labour has not been made public or discussed in the press. Meanwhile, the MoEE has also signed an agreement worth \$200 million with the Australian management consultancy Worley Ltd to advise on the Al Dabaa project. Worley has worked with the NPPA since 2009 (when still known as WorleyParsons). The consultancy is expected to provide technical support to the NPPA. In addition, there are two international consultancies involved that have yet to be named.

## Financing the programme

Approximately 85% of the financing for the Al Dabaa power plant will come from a \$25 billion loan from Russia. Egypt will begin repaying the loan in October 2029 on a biannual basis over 22 years, with 3% interest. The remaining 15% of the cost will be raised by the Egyptian government, but it is not clear whether this will come from the public or private sector. Although the precise share of the private sector's involvement in this project remains unclear, private sector firms in Egypt are expected to play a small role in the construction of the first reactor. In February 2020 three Egyptian private firms won tenders to participate in designing and building structures in the first phase of the plant. The NPPA has said that subcontractors in the nuclear project will be exempt from taxes.<sup>79</sup>

The nuclear power plant at Al Dabaa is comparatively more expensive than other nuclear projects currently in progress in the region

According to the Middle East Economic Survey, the nuclear power plant at Al Dabaa is comparatively more expensive than other nuclear projects currently in progress in the region, including Iran's, that are also built by ROSATOM (\$6.1 billion per gigawatt, in comparison to Iran's \$5.5 billion per gigawatt). The Egyptian government's decision to proceed with the plant at such a premium is an indication of its political and symbolic significance.

78 GE Power, "GE Power to Supply 4 Nuclear Turbine Islands for El Dabaa, Egypt's First Nuclear Plant", Press Release, October 9, 2018, <https://www.genewsroom.com/press-releases/ge-power-supply-4-nuclear-turbine-islands-el-dabaa-egypts-first-nuclear-plant>.

79 See NPPA, "The First Official Responsible".

## Energy needs and the electricity sector

Gas and oil represent more than 90% of Egypt's energy sources, according to 2016 figures, with gas increasingly representing a larger portion than oil in recent years.<sup>80</sup> This is followed by hydro-electricity as the country's third largest energy source, accounting for 7.2% of power generation. Egypt has hydro-electric power through four dams on the Nile River. The Aswan High Dam, by far the largest of these, was built in the 1960s as part of Nasser's push for industrialisation. According to 2017 figures, household consumption (eg, air conditioning, water heating, washing machines, lighting and cooking) constitutes nearly 42% of Egyptian energy demands.<sup>81</sup> Industrial consumption accounts for nearly 30%, followed by public utilities and government agencies (13%), other (8%), commercial usage (6%) and agriculture (5%).<sup>82</sup> The Egyptian government estimates that Al Dabaa will cover 5–10% of the country's electricity requirements.<sup>83</sup> The country has an electricity surplus at the moment, with supply outstripping demand, leading many to question the necessity of a nuclear power plant. However, the architects of the programme argue that it is needed for long-term electricity supply, as Egypt's population is growing and energy consumption is rising considerably. Demand for electricity in Egypt grew roughly three-fold over the past 20 years.<sup>84</sup> Demand in the country's two largest cities, Cairo and Alexandria, is expected to increase between 5–7% annually.<sup>85</sup>

The Egyptian government estimates that Al Dabaa will cover 5–10% of the country's electricity requirements

Egypt's urban areas have previously faced power outages, particularly in the summer, when air conditioning units place additional pressure on the country's electricity generation system. This worsened significantly under Morsi's one-year rule, with recurring power cuts of up to 12 hours a day and fuel shortages.<sup>86</sup> The Egyptian government has historically maintained heavy electricity subsidies, but these were cut under austerity measures

80 See US Energy Information Administration, "Egypt", <https://www.eia.gov/international/analysis/country/EGY>. Egypt is the largest consumer of oil and natural gas in Africa.

81 "Households Consume 42% of Egypt's electricity," *Egypt Oil and Gas Newspaper*, August 1, 2017, <http://egyptoil-gas.com/news/households-consume-42-of-egypts-electricity/#:~:text=Household%20consumption%20accounted%20for%2042,Company%20to%20Amwal%20Al%20Ghad>.

82 "Households Consume 42%".

83 International Renewable Energy Agency, *Renewable Energy Outlook: Egypt*, Report (Abu Dhabi: IRENA, 2018), [https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2018/Oct/IRENA\\_Outlook\\_Egypt\\_2018\\_En.pdf](https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2018/Oct/IRENA_Outlook_Egypt_2018_En.pdf).

84 Kareem Gerges and Ali Ahmad, "Egypt's Nuclear Power Program: Security and Economic Risks" (Policy Brief #6/2018, American University of Beirut, Issam Faris Institute, Beirut, October 2018), [https://www.aub.edu.lb/ifi/Documents/publications/policy\\_briefs/2018-2019/20181018\\_egypt\\_nuclear\\_power\\_program.pdf](https://www.aub.edu.lb/ifi/Documents/publications/policy_briefs/2018-2019/20181018_egypt_nuclear_power_program.pdf).

85 Gerges and Ahmad, "Egypt's Nuclear Power Program".

86 August Richard Norton, "The Return of Egypt's Deep State", *Current History* 112, no. 758 (2013): 338–344.

imposed by the Sisi government in 2015. Electricity prices rose consistently in 2016, 2017 and 2018; in some cases seeing a 40% increase. The country seeks to cut electricity subsidies entirely by 2022. Its initial objective was to do so in the 2018–2019 fiscal year, but this has been postponed. Energy subsidies, including those on fuel, were also slashed.

## Energy diversification plans

The Al Dabaa nuclear power plant is also pitched as diversifying the country's energy supply. Egypt currently relies heavily on fossil fuels for energy, particularly oil and gas. Significant natural gas deposits have been found in the country and accordingly replaced oil as the main source of electricity generation. In 2015 Italian firm Eni discovered a 'supergiant' gas field known as Zohr – up to 30 trillion cubic feet – in the Egyptian offshore area, said to be the largest-ever discovery in the Mediterranean Sea.<sup>87</sup> Given that Egypt currently has an energy surplus owing to offshore gas discoveries, independent analysts argue that the nuclear power programme has been rendered redundant.<sup>88</sup>

As part of its Sustainable Development Strategy: Egypt Vision 2030, Egypt has also begun investing heavily in renewable energy sources. It aims to extract one-fifth of its energy supply from renewable sources by 2022 and up to 45% by 2030.<sup>89</sup> Currently, only 9% of Egypt's energy sources are renewable. The country is particularly well-suited to solar energy. It is building a solar facility in Aswan governorate known as the Benban solar complex.<sup>90</sup> The cost of the facility, which can produce the same amount of energy as the nuclear power plant, is expected to be close to \$10 billion – one-third of the cost of Al Dabaa. Another project to build gas and wind plants, signed with German firm Siemens in 2015, costs \$9 billion.<sup>91</sup> Egypt has sought to situate nuclear power within its sustainable energy objectives. It depicts nuclear energy as a viable – and environmentally friendly – alternative for the future by minimising the discussion on its consumption of water, which is scarce in Egypt owing to meagre rainfall.

The new nuclear power plant has been described as a way to establish Egypt as a regional energy hub. A spokesperson for the Ministry of Electricity and Renewable Energy has argued that the Russian loan is economically beneficial to Egypt, as it can sell the energy generated from the reactors, thereby ultimately allowing it to break even.<sup>92</sup> This may be

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87 Eni, "Eni Discovers a Supergiant Gas Field in the Egyptian Offshore, the Largest Ever Found in the Mediterranean Sea", August 30, 2015, <https://www.eni.com/en-IT/media/press-release/2015/08/eni-discovers-a-supergiant-gas-field-in-the-egyptian-offshore-the-largest-ever-found-in-the-mediterranean-sea.html>.

88 Gerges and Ahmad, "Egypt's Nuclear Power Program".

89 Eman El-Sherbiny, "How Solar Energy Is Sparking New Business in Egypt", *Al-Monitor*, December 14, 2015, <https://www.al-monitor.com/pulse/originals/2015/12/solar-energy-egypt-business-renewable-fuel.html>.

90 Aidan Lewis, "Giant Solar Park in the Desert Jump Starts Egypt's Renewables Push", *Reuters*, December 17, 2019, <https://www.reuters.com/article/us-egypt-solar/giant-solar-park-in-the-desert-jump-starts-egypts-renewables-push-idUSKBNIYL1WS>.

91 Georgina Proshan, "Siemens Signs 8 Billion Euro Power Deal with Egypt", *Reuters*, June 3, 2015, <https://www.reuters.com/article/siemens-egypt-power/update-1-siemens-signs-8-billion-euro-power-deal-with-egypt-idUSL5N0YP41Z20150603>.

92 "Russia Lends Egypt \$25 Billion for Dabaa Nuclear Power Plant", *Al-Monitor*, February 26, 2020, <https://www.al-monitor.com/pulse/originals/2020/02/power-plant-nuclear-egypt-russia-loan.html>.

a direct response to Ethiopia's bid to position itself as a regional electricity supplier, given tensions between the two countries over the Nile.

There are reports of plans to share power with nearby states, such as Libya, Sudan, Jordan and Saudi Arabia, although Jordan and Saudi Arabia, along with the UAE, have also declared their intentions to build nuclear power plants.<sup>93</sup> There are also plans to connect Egypt's electricity grids with those of Greece and Cyprus – the \$4 billion 'Euro-Africa project'.<sup>94</sup> Furthermore, in a speech in December 2019 Sisi announced Egypt's willingness to export 20% of its surplus electricity to countries in Africa at low prices, calling for the construction of an electricity transmission network across the continent.<sup>95</sup>

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93 Rachel Bronson, "Power Shift in the Middle East", *Bulletin of the Atomic Scientists* 72, no.1 (2016): 10-15.

94 Further information on this project is available at EuroAfrica, "EuroAfrica Project Schedule", <https://www.euroafrica-interconnector.com/at-glance/project-timeline/>.

95 Rami Galal, "Egypt Moves into Position as Regional Energy Hub", *Al-Monitor*, December 26, 2019, <https://www.al-monitor.com/pulse/originals/2019/12/egypt-electricity-export-africa-gerd-low-price-ethiopia.html>.

# Current and future developments in peaceful uses of nuclear energy

The project to construct a power plant at Al Dabaa is still at an early stage of development. Currently, infrastructure to support the building of the plant is under construction. This includes housing for employees. There were delays in the finalisation of the agreement and the start of the construction of the power plant, including reports of concerns over the site raised by ROSATOM, as well as financing issues.<sup>96</sup>

Construction of the first power plant is expected to proceed in the second half of 2020, after all licensing for the project is complete. The NPPA argued that the schedule has not been affected by the outbreak of COVID-19 and that measures have been taken to ensure work on the project is proceeding.<sup>97</sup> According to the most recent timeline, the first reactor of the four is reportedly scheduled to become operational by 2026, with the rest following afterwards. The entire project – to build four reactors – is scheduled to be completed by 2040. Al-Wakil has argued that the nuclear power plant will bring Egypt revenue of over \$264 billion over its 60-year lifespan, but it is unclear how he arrived at this figure.<sup>98</sup>

## Project localisation

According to ROSATOM's website, the company will also work to increase the project's localisation.<sup>99</sup> This is expected to be done by supporting the training of Egyptian nuclear workers and building factories to manufacture components of the plants locally, while transferring nuclear technology to Egypt. For instance, ROSATOM has said that it will train 2 000 Egyptian personnel to work on the project. The facility, according to ROSATOM's newsletter, is also expected to create up to 50 000 new jobs in Egypt.<sup>100</sup> Of these, ROSATOM claims that around 15 000 people will be employed directly by the power plant. The firm's estimates are that 15% will be Russian experts, while the remaining 85% are

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96 Joy Nasr and Ali Ahmad, "Middle East Nuclear Energy Monitor: Country Perspectives 2018" (American University of Beirut, Issam Faris Institute for Public Policy and International Affairs, Beirut, 2018), 5. See also International Institute for Strategic Studies, *The Geopolitics of Nuclear Energy: New Dynamics of Supply and Demand*, Workshop Report (Moscow: IISS, 2 November 2018), <https://www.iiss.org/-/media/images/comment/analysis/2018/december/iiss-ceness-moscow-workshop-report-2018.pdf?la=en&hash=81DABE0B5BBF56D1F6FDDDB569ADCCF76C41B8A7F>.

97 Mohamed Farah, "COVID-19 Not Affecting Dabaa Implementation Timetable: NPPA", *Daily News Egypt*, April 2, 2020, <https://www.dailynewssegypt.com/2020/04/02/covid-19-not-affecting-dabaa-station-implementation-timetable-nppa-head/>. See also "ROSATOM Takes Measures in Egypt's Dabaa Nuclear Plant Over Coronavirus", *Egypt Today*, April 2, 2020, <https://www.egypttoday.com/Article/1/83267/Rosatom-takes-measures-in-Egypt%E2%80%99s-Dabaa-nuclear-plant-over-coronavirus>.

98 "Russia Lends Egypt \$25 Billion".

99 ROSATOM Communications Department, "The Second Nuclear Industry Suppliers Forum Held in Cairo", Press Release, October 10, 2019, <https://rosatom.ru/en/press-centre/news/the-second-nuclear-industry-suppliers-forum-held-in-cairo/>.

100 ROSATOM, "Egypt: Staff for Nuclear Industry", *ROSATOM Newsletter* 227, March 2020, [http://rosatomnewsletter.com/?post\\_middle\\_east-egypt-staff-for-nuclear-industry](http://rosatomnewsletter.com/?post_middle_east-egypt-staff-for-nuclear-industry).

expected to be Egyptian. These figures refer to workers employed directly by the power plant, rather than involved in its construction.

The localisation of the project was given as one of the reasons Egypt opted for the Russian proposal, along with the fact that it did not contain political pre-conditions that Egypt would have to fulfil.<sup>101</sup> It is unclear whether this is specifically related to Egypt's previous experience of having to deal with conditions for a US reactor, which then failed to materialise. All the Egyptian workers involved in operating the project are expected to receive training in Russia, according to ROSATOM's vice president, alongside some form of training in Egypt. The firm has also emphasised its role in driving 'public acceptance of nuclear power' in Egypt through the creation of an information centre, as it has done in other cases, such as South Africa.<sup>102</sup> A 2011 BBC poll suggested that public support for a nuclear reactor in Egypt was around 31%, but no public opinion surveys have been done since then.<sup>103</sup>

## Technical expertise and education

As part of the effort at project localisation, there are joint initiatives to enhance nuclear education in Egypt, including plans for joint research programmes between universities in Russia and Egypt. A fellowship programme has been launched for students of physics, chemistry and engineering at ROSATOM-affiliated universities in Russia. Egypt has also introduced further specialisation in nuclear-related disciplines at several universities and opened the Atomic Technical School of Al Dabaa, which was built by the government at a reported cost of EGP 70 million (\$4 million).<sup>104</sup> The objective of this technical programme is to create a workforce that can safely operate the power plant. The school admitted 75 students in a temporary location in Cairo in 2017 until the move to the headquarters in Al Dabaa's new city in 2018. It seeks to prepare the students for working at Al Dabaa upon graduation, while training students at the NPPA and the EAEA. The school will offer five-year programmes in physics, geology, mechanics and electronics. Residents of Matrouh province, many of whom relinquished their right to land in Al Dabaa, will get preferential admission.<sup>105</sup>

As part of the effort at project localisation, there are joint initiatives to enhance nuclear education in Egypt, including plans for joint research programmes

101 Walaa Hussein, "Russia to Build Egyptian Nuclear Reactor", *Al-Monitor*, September 4, 2015, <https://www.al-monitor.com/pulse/fr/originals/2015/09/egypt-russia-offer-build-nuclear-reactor.html>.

102 ROSATOM, "Projects", [rosatom.ru/en/investors/projects](http://rosatom.ru/en/investors/projects).

103 Richard Black, "Nuclear Power 'Gets Little Support from Public Worldwide'", *BBC News*, November 24, 2011, <https://www.bbc.com/news/science-environment-15864806>.

104 Rami Galal, "Inside Egypt's First Nuclear School", *Al-Monitor*, December 3, 2017, <https://www.al-monitor.com/pulse/originals/2017/12/egypt-nuclear-technical-school-education.html>.

105 Galal, "Inside Egypt's First Nuclear".

According to 2017 reports, the NRC at Inshas employs 1 400 scientists in the realms of nuclear science and engineering, alongside 2 300 technical and 1 300 administrative staff.<sup>106</sup> Various Egyptian agencies involved in the nuclear project have emphasised the government's prioritisation of further indigenous expertise, such as the aforementioned bid to 'nationalise nuclear technology' by the MoMP. According to the NPPA's website, the agency has already requested the appointment of 234 engineers and technicians at the plant and will train another 2 150 Egyptian engineers and technicians.<sup>107</sup>

In November 2019 an IAEA team of experts carried out an 11-day mission at the invitation of the NPPA to review the status of the project's infrastructure development and ensure it meets IAEA standards.<sup>108</sup> Four more visits were planned for 2020, known as the Integrated Nuclear Infrastructure Review missions, which would provide detailed guidance for the development of infrastructure.

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106 Sarah Burkhard et al., *Nuclear Infrastructure and Proliferation Risks of the United Arab Emirates, Turkey, and Egypt*, Report (Washington DC: Institute for Science and International Security, August 25, 2017), [https://isis-online.org/uploads/isis-reports/documents/Middle\\_East\\_Proliferation\\_Assessments\\_25Aug2017\\_Final.pdf](https://isis-online.org/uploads/isis-reports/documents/Middle_East_Proliferation_Assessments_25Aug2017_Final.pdf).

107 These figures are from an interview with the head of the NPPA. See NPPA, "The First Official Responsible".

108 "Egypt Completes IAEA Nuclear Power Infrastructure Mission", *World Nuclear News*, November 11, 2019, <https://world-nuclear-news.org/Articles/Egypt-completes-IAEA-nuclear-power-infrastructure>.

# Challenges and possible solutions

At the regional and international level there has generally been support for Egypt's bid for nuclear energy. The main concern of Western powers such as the US is Russia's geopolitical re-emergence and dominance in the Middle East. Russia has sold military equipment to Egypt, and Egypt has signed an agreement that allows the Russian military to use its airbases and airspace, signalling a further shift away from the US.<sup>109</sup> Western analysts have, in addition, expressed concern over Russia's growing pursuit of nuclear exports to countries in the Global South.<sup>110</sup> Meanwhile, individual Israeli analysts have pointed out that the project could help Egypt to build nuclear weapons eventually, but the Israeli government has not publicly commented on the project.<sup>111</sup> Domestically, various political, financial and socio-economic challenges are associated with the project.

## Disputes over land

The project was marred from the beginning by a dispute over the land on which the plant is to be built. Residents of Al Dabaa became increasingly vocal in their opposition to the project after the Arab Spring uprising in 2011, in the wake of earlier rounds of displacement owing to unrealised plans to build the plant. The movement lasted until 2013.

Around 60km of the land used for the nuclear power plant is owned by Bedouin tribes, a minority group that has faced discrimination in Egypt and have often had disputes with the central government. In February 2012 residents began protesting the demolition of their homes and expropriation of other land necessary for their survival, including agricultural, grazing and fishing areas, in exchange for minimal compensation by the Egyptian government.<sup>112</sup> Residents were highly sceptical of the government's promises of development. Part of this protest movement entailed re-occupying the site, dismantling existing buildings at the plant and building new homes.<sup>113</sup> Reports suggested that up to 500 protesters were involved in a 2012 break-in at the site, with damages estimated at around \$80 million. Thousands of residents of Al Dabaa and other neighbouring towns

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109 Alaa Elhadidi, "Egypt's Shifting Foreign Policy Priorities", *Cairo Review of Global Affairs* 29 (2018): 79-97.

110 Jason Burke, "Russia Pushing 'Unsuitable' Nuclear Power in Africa, Critics Claim", *The Guardian*, August 28, 2019, <https://www.theguardian.com/world/2019/aug/28/russia-pushing-unsuitable-nuclear-power-in-africa-critics-claim>; Ivan Nechepurenko and Andrew Higgins, "Coming to a Country Near You: A Russian Nuclear Power Plant", *The New York Times*, March 21, 2020, <https://www.nytimes.com/2020/03/21/world/europe/belarus-russia-nuclear.html>.

111 Raphael Ofek, "Egypt's Nuclear Deal with Russia" (Perspectives Paper 710, Begin Sadat Center for Strategic Studies, Ramat Gan, January 8, 2017).

112 Louisa Loveluck, "Resisting Relocation: Active Communities in Revolutionary Egypt", *Open Democracy*, July 31, 2012, <https://www.opendemocracy.net/en/resisting-relocation-active-communities-in-revolutionary-egypt/>; WISE Amsterdam, "Protest at Proposed Nuclear Construction Site Egypt", *Nuclear Monitor* 741, no. 6224 (February 3, 2012), <https://www.wiseinternational.org/nuclear-monitor/741/protest-proposed-nuclear-construction-site-egypt>.

113 Jeannie L Sowers, *Environmental Politics in Egypt: Activists, Experts and the State* (London: Routledge, 2013), 166.

staged frequent sit-in protests at the site, which reportedly began in August 2011 and subsided in 2013. The protests resulted in clashes between the military and demonstrators, reportedly leaving more than 40 people injured, including soldiers.<sup>114</sup> Some sources also claimed that the protesters managed to seize a safe containing radioactive material, but residents have denied this.<sup>115</sup>

After rising to power in 2013, Sisi reportedly struck a deal with the community to hand over the land in exchange for the construction of a new tourist city in the area, along with other short-term benefits.<sup>116</sup> The armed forces have accordingly built the new Dabaa city at a cost of EGP 1 billion (around \$145 million), where residents are expected to be given new homes in compensation. While residents have accepted the deal, they have sought further guarantees that there will be no detrimental effects emanating from the power plant.<sup>117</sup>

## Security concerns

There are concerns about the plant's being targeted by armed groups, during or after construction.<sup>118</sup> While armed groups have not attacked or threatened nuclear infrastructure thus far, some, such as the Sinai-based and ISIS-affiliated Wilayat Sinai, have previously orchestrated highly sophisticated attacks on the country's infrastructure. Attacks have been launched outside Sinai as well, including in the Western Desert. Furthermore, armed groups have proven their ability to infiltrate and attack areas that the military has ostensibly secured.

Other groups have also criticised the plans to build a power plant. Scientists, such as the Egyptian-American scientist and geologist Faruq al-Baz, have expressed concern over the decision to proceed with nuclear power, which was made in haste. Al-Baz described it as an 'unstudied political decision', citing lingering worries in countries that possess nuclear energy on how to deal with and store nuclear waste.<sup>119</sup>

Meanwhile, some argue that the project promotes a continued dependence on external expertise and materials, which leaves Egypt vulnerable and potentially jeopardises national security. They fear that the project creates a dependence on Russian expertise, which contradicts the stated objective of energy self-sufficiency. The vice president of the NPPA

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114 "Dabaa Nuclear Power Sit-In Continues in Wake of Clashes", *Egypt Independent*, January 14, 2012, <https://www.egyptindependent.com/dabaa-nuclear-power-sit-continues-wake-clashes/>.

115 Jano Charbel, "Egypt's Nuclear Dream, or Nuclear Nightmare?", *Egypt Independent*, July 15, 2012, <https://egyptindependent.com/egypt-s-nuclear-dream-or-nuclear-nightmare/>.

116 Osman El Sharnouby, "Cause for Celebration? From Opposition to Acceptance of the Dabaa Nuclear Power Plant", *Mada Masr*, March 15, 2017, <https://madamasr.com/en/2017/03/15/feature/politics/cause-for-celebration-from-opposition-to-acceptance-of-the-dabaa-nuclear-power-plant/>.

117 Aya Aman, "Egypt Moves Ahead with Nuclear Power Plant to Address Electricity Crisis", *Al-Monitor*, November 26, 2013, <https://www.al-monitor.com/pulse/fa/originals/2013/11/egypt-nuclear-program-energy-uranium.html>.

118 Gerges and Ahmad, "Egypt's Nuclear Power Program".

119 "'Al-Baz': misr ghayr mu'ahala lil-taqa al-nawawiya" ("Al-Baz: Egypt Is Unqualified for Nuclear Energy"), *Al Yawm al-Sabi*, April 16, 2011, <http://www.youm7.com/392152>.

has stated that Egypt does not have the experts to run the power plant, which means that Egypt will continue to hire Russian personnel for the first 10 years of its lifetime.<sup>120</sup>

## Economic concerns

Real estate entrepreneurs oppose the Al Dabaa project because they want to develop the land – which is along the country’s northern coast – and establish lucrative tourist resorts. Tourism is Egypt’s key source of revenue, accounting for around 12% of gross domestic product (GDP), and can be a vital source of foreign currency.<sup>121</sup> There are fears that the presence of a power plant in this area will discourage tourism. Beach resorts along the northern coast of Egypt, in Alexandria and westward to the city of Marsa Matruh are visited annually by the Egyptian middle and upper classes, and increasingly attract European visitors as well (although international tourism has declined in recent years). Land in this area is accordingly a prime commodity.

However, by far the biggest criticism of the project is that it wastes resources that the country does not have. Critics say that the project is both unnecessary and expensive, adding to Egypt’s significant public debt. In 2018 Egyptian public debt reached nearly \$230 billion – around 90% of its GDP.<sup>122</sup> The country’s economy has yet to recover fully from the shock it experienced during the revolution, and the government has imposed various austerity measures, consistently using patriotic language to urge Egyptians to endure economic hardship. Critics accordingly maintain that more pressing issues require the government’s financial resources, and view the nuclear power plant as an unwarranted mega-project. Building the plant, they say, is capital-intensive and requires significant planning, especially in comparison with solar and wind farms, which are more cost-effective.<sup>123</sup>

## Environmental concerns

There is no known anti-nuclear lobby in Egypt, and opposition from civil society has been limited in the post-2013 period via a state of emergency and other laws that limit freedom of expression, freedom of assembly and political activism generally. The Egyptian Progressive Green Party, active since the 1990s and revitalised during the Arab Spring, works to establish environmental projects but has largely avoided confrontation with the government on the nuclear power plant.<sup>124</sup> Nevertheless, some environmental groups and human rights organisations have managed to express their reservations. In a report

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120 Trager, “Egypt’s Costly Nuclear Project”.

121 Trading Economics, “Egypt Tourism Revenues”, <https://tradingeconomics.com/egypt/tourism-revenues>.

122 Trading Economics, “Egypt Government Debt to GDP, 2019”, <https://tradingeconomics.com/egypt/government-debt-to-gdp>.

123 IRENA, *Renewable Energy Outlook: Egypt* (Abu Dhabi: IRENA, 2018), 5, [https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2018/Oct/IRENA\\_Outlook\\_Egypt\\_2018\\_En\\_summary.pdf?la=en&hash=58DBAA614BE0675F66D3B4A2AC68833FF78700A0](https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2018/Oct/IRENA_Outlook_Egypt_2018_En_summary.pdf?la=en&hash=58DBAA614BE0675F66D3B4A2AC68833FF78700A0); Omnia Farrag, “The Dabaa Project in Numbers: Is Nuclear Energy the Right Option for Egypt?”, *Egypt Oil and Gas Newspaper*, June 12, 2018, <https://egyptoil-gas.com/features/the-dabaa-project-in-numbers-is-nuclear-energy-the-right-option-for-egypt/>.

124 The party is mainly active on its Facebook page. See Facebook, “The Egyptian Progressive Green Party”, [https://www.facebook.com/EgyGreens/?ref=page\\_internal](https://www.facebook.com/EgyGreens/?ref=page_internal).

published by non-governmental organisation (NGO), the Egyptian Initiative for Personal Rights, the author expressed concerns over the plant's consumption of water, which is a scarce resource in Egypt but has largely been excluded from discussions on the viability of the power plant.<sup>125</sup> In addition to cost and environmental concerns, NGOs have cited the potential for accidents, particularly those involving toxic waste.<sup>126</sup> For instance, when protesters stormed the Al Dabaa site in January 2012 some radioactive equipment had not been entirely dismantled, which exposed residents to various risks.<sup>127</sup>

Independent analysts have also criticised the opacity of the NRRRA, in terms of its institutional structure, administrative board and management, and scientific capacity and expertise, which bring into question its status as a supposedly independent body.<sup>128</sup> Similarly, there is no public information available regarding its budget.

## Civil society has become increasingly concerned about the reactor after the August 2019 nuclear explosion at the Russian naval testing range in Severodvinsk

At the same time, civil society has become increasingly concerned about the reactor after the August 2019 nuclear explosion at the Russian naval testing range in Severodvinsk. The explosion took place at a ROSATOM-controlled site and killed five nuclear scientists, leading Egyptians to question the company's expertise and whether the same mistakes may be repeated during the construction of Al Dabaa. They also questioned whether there were potential technical defects in modern Russian reactors. The Egyptian government has sought to allay these fears, stating that there is no relationship between the test that was conducted and the construction of nuclear power plants in general. The concerns raised, according to the statement, are 'misplaced and exaggerated'.<sup>129</sup>

In response to concerns over radioactive material, Egyptian sources frequently refer to ROSATOM sources stating that the Al Dabaa nuclear plant will be the 'world's safest and

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125 Khaled Diab, "Egypt's Nuclear Energy Folly", *Al Jazeera*, June 4, 2016, <https://www.aljazeera.com/indepth/opinion/2016/06/egypt-nuclear-energy-folly-160602110506962.html>; Egyptian Initiative for Personal Rights, "Nuclear Loses the Energy Race Against Better Alternatives" (Position Paper, EIPR, Cairo, April 23, 2019), <https://eipr.org/en/publications/position-paper-nuclear-more-expensive-and-more-dangerous>; Sherif Abdelmessih, "7 Reasons Why the Russian Nuclear Agreement is Bad for Egypt", Future Energy Corporation, <http://www.futurenergcorp.com/insights>.

126 EIPR, "Nuclear Loses the Energy Race".

127 WISE Amsterdam, "Protest at Proposed Nuclear".

128 Ragia Elgerzawy, "This Is Not the Safe Road to Dabaa: On Nuclear Energy Safety Procedures and Requirements", EIPR Blog, November 14, 2017, <https://eipr.org/en/blog/ragia-elgerzawy/2017/11/not-safe-road-dabaa-nuclear-energy-safety-procedures-and-requirements>.

129 "Qalaq misri min infijar rusiya al-nawawi wa-makhawif min mufa'il al-dabaa" ("Egyptian Concerns About Russian Explosion and Fears of the Nuclear Reactor"), *Al Jazeera*, August 16, 2019, <https://ajm.me/fkpb2>; "Ru'b wa-sukhriya fi misr bi-sabab al-hadith al-nawawi al-rusi" ("Horror and Derision in Egypt because of the Russian Nuclear Accident"), *Deutsche Welle*, August 13, 2019, <https://p.dw.com/p/3NqNR?maca=ar>.

would be fully fortified against any earthquake'.<sup>130</sup> Generally, the response of the NPPA to such fears has been to emphasise technological solutions. The head of the authority has declared that 'all safety and security factors related to the construction and operation process and all the following stages have been taken into consideration'.<sup>131</sup> According to him, using the 'most recent technological methods in the world', the reactors will be designed to shut down automatically if there is a malfunction. The NPPA's official website has a section on 'safety' that similarly emphasises technological responses to safety concerns.<sup>132</sup> There are undertones of techno-nationalism evident in Egypt's handling of the nuclear issue.

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130 Taha Saker, "Dabaa Nuclear Plant Will Be World's Safest: Ros Atom Vice President", *Egypt Independent*, December 17, 2017, <https://www.egyptindependent.com/dabaa-nuclear-plant-will-worlds-safest-ros-atom-vice-president/>.

131 "Russia Lends Egypt \$25 Billion".

132 NPPA, "El Dabaa NPP Project: Safety", <https://nppa.gov.eg/en/el-dabaa-npp-project-2/#Safety>.

# Conclusion

After five decades of on-and-off discussions under successive governments about Egyptian construction of a nuclear power plant, the project is now officially in progress, and Egypt is fulfilling its long-held aspirations of a nuclear future. Despite its many detractors, the highly ambitious project is likely to proceed, albeit most likely with numerous delays and escalating costs. Most observers have urged the country to reconsider its plans, but there are no indications that the Egyptian government is heeding this advice. Analysts insist that the power plant is a remedy for a non-existent problem, as Egypt is no longer in need of additional sources of energy, effectively rendering the power plant merely another mega-project driven by pride.<sup>133</sup>

The power plant is a remedy for a non-existent problem, as Egypt is no longer in need of additional sources of energy

With such widespread criticism and concern over the project, Egypt will have much to prove, both domestically and internationally. It will have to demonstrate that the project is not simply a luxury item the government has sought for purposes of prestige or signalling. One solution could be for Egypt to consider public consultation about the development of an appropriate nuclear governance framework that ensures greater confidence around issues of nuclear safety and compliance. The government's reluctance to discuss any risks associated with the reactor is worrying, demonstrating an ideological commitment to the project and a technological fetishism. This approach seeks to obscure the vulnerabilities associated with the project.

Egypt may be able to mollify international critics by signing additional treaties on nuclear power and continuing to work closely with the global community to ensure compliance with such nuclear governance frameworks. In that sense, the nuclear project could become a confidence-building measure, and as such an example in the Middle East and North Africa. However, this policy may have little sway with domestic critics of Egypt's bid for nuclear energy. Given the lack of public input into the project, they may not be convinced by accession to international treaties and other forms of input from international expertise. The challenges associated with the top-down pursuit of nuclear energy are deeply rooted

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<sup>133</sup> Mandour, "Sisi's Vanity Projects".

and have been echoed in the other mega-projects that seek to re-organise the lives of Egyptians. This demonstrates a distorted relationship between the state and the public. Finally, the Egyptian government will need to convince people that there is an economic benefit to the project, even if only in the long term, and that it is not squandering the resources of already cash-strapped taxpayers.



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