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Energy for Growth Hub
July 2025

The UAE is a successful non-proliferation model for nuclear newcomers

BLUF: The UAE provides a proven blueprint for countries planning to produce electricity from nuclear energy. The program quickly earned trust and access to technology by committing to non-proliferation agreements, opting for proliferation-resistant technology, establishing independent oversight, and engaging transparently with international stakeholders.

Relevance: New nuclear entrants must adhere to global standards

Interest in nuclear power is booming. According to the International Atomic Energy Agency (IAEA), 28 member states are considering developing their first nuclear power plant, 12 of which are planning to start by 2035. Nuclear power decisions are not purely about energy infrastructure; they are also political choices that hinge on proliferation concerns, since access to nuclear know-how, technology, and material can lead to the acquisition of nuclear weapons. As such, respecting the global non-proliferation standard is crucial for nations seeking to acquire nuclear power for the very first time. Failing to do so can limit countries' access to nuclear expertise, technology, and fuel supply.

Non-proliferation has multiple reinforcing steps

Countries must sign and ratify the Treaty on the Non-Proliferation of Nuclear Weapons and specific IAEA safeguards agreements, which form the foundation of the international non-proliferation framework. These legally binding agreements ensure — through monitoring, inspections, and verification of facilities and materials — that nuclear materials and activities remain exclusively for peaceful purposes (Table 1). Aligning with IAEA standards provides countries with access to critical technology and protects them from international scrutiny, diplomatic pressure, and potential sanctions. This creates a positive feedback loop: adherence to international norms builds trust, which enables nuclear development and continued access to advanced technology and knowledge exchange.

TABLE 1: Overview of core IAEA safeguard agreements

IAEA Safeguards Agreements	Purpose	Requirement
Comprehensive Safeguards Agreement (CSA)	Ensures that nuclear materials and facilities are not diverted for military purposes through an accounting and control system.	Mandatory for all non-nuclear weapon states
Small Quantities Protocol (SQP)	Only applicable to countries with little or no nuclear material, it requires material declarations, annual reports, and immediate notification if a country decides to develop a nuclear power plant, triggering the CSA.	Required, if nuclear material meets a certain threshold
Model Additional Protocol (AP)	Provides the IAEA with expanded rights of access to information and sites to enhance verification processes.	Voluntary, though strongly encouraged

How the UAE successfully acquired nuclear power through a robust commitment to non-proliferation

The UAE currently operates four nuclear reactors, generating 40 TWh annually, providing almost 25% of its electricity needs. The country undertook steps to acquire nuclear power and stand out as an example. The UAE:

1. **Adhered to non-proliferation through deliberate technology choices.** In 2008, the UAE signed a nuclear cooperation agreement with the US known as a 123 Agreement. As part of the deal, the UAE chose to forgo its uranium enrichment and spent fuel processing rights — two pathways to nuclear weapons development. Instead, it agreed to handle only the back end of the nuclear fuel cycle, after the fuel is removed from the reactor. This commitment paved the way for a partnership with KEPCO, a Korean electric utility that develops nuclear power plants using US-patented technology and has the ability to deal with sensitive material and technology. The UAE also chose to use light-water reactors, which are not only the industry standard but also have inherent non-proliferation advantages. Unlike some alternative reactor designs, light-water reactors produce less fissile material like uranium and plutonium that could be diverted for weapon use. This choice enhanced the collaboration with uranium fuel suppliers and created additional verification points across the fuel cycle.
2. **Established independent bodies for strong oversight and to address proliferation concerns.** Soon after signing with KEPCO, the UAE established a regulatory and an implementation body for the plant: the Federal Authority for Nuclear Regulation (FANR) and the Emirate Nuclear Energy Corporation (ENEC), respectively. They operate under their own legal frameworks with independent budgets, separate from governmental ministries. The ENEC, which oversees deployment and technical operations, uses the 4 eye principle, which requires two individuals to approve or

confirm critical decisions. These authorities also initiated a close collaboration with the IAEA's Nuclear Safety and Security Department on dual-use and export control measures, demonstrating commitment to international norms and proactively addressing safety and proliferation concerns.

3. **Embraced transparency beyond minimum requirements to build regional and international trust.** The UAE signed and ratified all treaty agreements, including the optional protocols. It also engaged and cooperated with various international stakeholders, including opening itself up for the IAEA's peer review process (the Integrated Nuclear Infrastructure Review (INIR). It then practiced maximal transparency by publicly disclosing the INIR report findings, which few other regional states have done. This approach yielded strategic benefits, enabling the UAE to expand its regional influence, strengthen its ties with the US, and be a role model. Today, the UAE leads regional dialogues and shares operational insights from its reactors, demonstrating how transparency and non-proliferation commitments build international trust and a successful path to nuclear development.

What remains to be improved

To remain successful, the Emirati nuclear program must continue to ensure effective oversight and prevent illicit proliferation. While the UAE maintains an export control list, its application remains inconsistent across the Emirates, creating vulnerabilities — particularly in high-traffic zones like Dubai's Free Trade Zones, which have previously been exploited for unauthorized transfers of sensitive materials. Oversight bodies like FANR and the ECEO have implemented licensing and verification procedures, but enforcement is uneven and complicated by overlapping jurisdictional authority. Further, continued reliance on foreign training and a non-indigenous workforce complicates efforts to build a sustainable, locally led nuclear infrastructure, while nascent training institutes and workforce development programs have yet to yield a fully capable Emirati leadership.

Conclusion: The UAE's nuclear energy program serves as a model for nuclear newcomer countries

UAE's success highlights the importance of strict non-proliferation commitments, transparent engagement with relevant stakeholders, and independent regulatory oversight to gain international trust. By doing so, the UAE secured access to critical technology and established itself as a regional leader in nuclear energy. This demonstrates that, beyond technical capability, nations seeking to develop nuclear energy for power supply must prioritize a strong and credible commitment to non-proliferation norms.

Endnote:

1. Carvalho Pinto, V. (2014). From "Follower" to "Role Model": The Transformation to the UAE's International Self-Image, Journal of Arabian Studies, 4(2), pp. 231-243, DOI: 10.1080/21534764.2014.974858