

INCEPTION TO FUEL LOADING

1961: Then Pakistan government first took initiative for a nuclear power plant in Rooppur

1962: Then Pakistan government acquired 261 acres on the Padma. Successive governments since then took initiatives to have a nuclear power plant but could not make much headway

2008: Bangladesh undertakes a project to build Rooppur Nuclear Power Plant

2010: Bangladesh and Russia sign a framework agreement

2011: Bangladesh and Russia sign an inter-governmental agreement

2013: First phase financial deal worth \$500 million signed with Russia

2008 to 2013: Bangladesh signs deals with the IAEA over nuclear safety, and security

2015: Bangladesh Atomic Energy Commission and JSC Atomstroyexport sign a general contract worth \$12.65 billion



UNIT-1 OF ROOPPUR POWER PLANT

2016: Bangladesh and Russia sign loan deals worth \$11.38 billion

2016: Bangladesh Atomic Energy Regulatory Authority issues site licence

2017: BAERA issues construction licence for unit-1

2017: Concrete poured into unit-1 on November 30

2018: Concrete poured into unit-2 in July

2021: Reactor pressure vessel placed in unit-1

2022: Reactor pressure vessel placed in unit-2

2023: First batch of nuclear fuel arrives on September 28

2023: Nuclear fuel handed over to the power plant on October 5

2026: Plant gets commissioning licence for unit-1 on April 16

2026: Fuel is loading into the unit-1 core on April 28
Source: Official Website of Rooppur Nuclear Power Plant

Shadow over future nuclear energy ambition

A little-noticed clause in Bangladesh's new US trade agreement could complicate the future of its nuclear energy

STAFF CORRESPONDENT

When Bangladesh signed its reciprocal trade agreement with the United States in February, headlines focused on garments and tariffs. Less noticed was a short clause in Article 4.3. It makes clear that Bangladesh shall not purchase nuclear reactors, fuel rods, or enriched uranium from any country that "jeopardises essential US interests".

No country is named. But policymakers have no doubt: it refers to Russia, which is building Bangladesh's first nuclear power plant.

The Rooppur Nuclear Power Plant, with two 1,200-megawatt reactors, is expected to supply roughly a tenth of national capacity.

The first unit may start supplying power to the grid within months. Yet its operational future now hinges on a geopolitical question it was never designed to answer.

"If the agreement prevents the import of uranium or fuel rods from Russia, the nuclear plant simply cannot operate," said Professor M Tamim, a leading energy policy expert.

Officials have sought to calm concerns. Md Anwar Hossain, secretary of the science and technology ministry, said the existing project is insulated.

"Unit-1 and Unit-2 are being constructed under an international agreement following IAEA guidelines. The project utilises Russian technology and financial support, and a long-term fuel supply

agreement is already in place. Therefore, the recent trade agreement will not affect these two units," he said.

The deeper problem is structural. Dhaka has anchored its nuclear future to a supplier Washington has effectively blacklisted.

"The core of the issue lies in the reliance on Russia, which is currently a sanctioned country," Prof Tamim said.

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Existing project is insulated, says Md Anwar Hossain, secretary of science and technology ministry

Nuclear plants require continuous refuelling, with contracts for enriched uranium periodically renegotiated. Each renewal could force Bangladesh into the same dilemma: comply with Washington's conditions or face higher tariffs to its garment exports.

"This creates a situation where Bangladesh might be forced to seek US permission or exemptions for essential materials," Prof Tamim warned.

Pressed on how such constraints would

be managed, Secretary Anwar only said, "If challenges arise in the future, we will adapt our planning as necessary."

However, adjusting Bangladesh's nuclear energy policy as circumstances demand may prove far from easy.

The global nuclear market is tightly controlled by Russia's Rosatom, China's CNNC, the United States' Westinghouse, and France's Framatome. Switching suppliers mid-project is not an option. Reactors are engineered for specific fuel assemblies. Conversion costs are immense; downtime can stretch for years.

By the time Rooppur is complete, Bangladesh will have invested billions in Russian technology it may struggle to fuel beyond its initial cycle.

Prof Tamim is blunt: the US trade deal is "a very bad contract that limits sovereign decision-making."

There is, however, a narrow opening. The agreement allows exemptions for proprietary materials where no alternative supplier exists. In theory, Rosatom's fuel assemblies — designed specifically for VVER 1200 reactors — might qualify.

Prof Tamim acknowledges the possibility, cautiously. "There is some hope that proprietary technology might offer an escape clause," he said.

Future expansion raises further questions.

During his Bangladesh visit in April 2024, Rosatom Director General Alexey Likhachev said in a statement that both

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Elation, unease at Rooppur

AHMED HUMAYUN KABIR TOPU, *Pabna*

For residents of Rooppur, the nuclear power plant project was long seen as a pipe dream that remained unfulfilled for decades. As the plant now moves toward trial operations, a sense of excitement and uncertainty grips those living near the country's first-ever nuclear facility.

"As children, we watched that empty site with curiosity, having little grasp of what 'nuclear' truly meant. As we transitioned from childhood to middle age, we watched the geography of our homes shift, waiting for the promise to manifest," said Amirul Islam, a 65-year-old retired primary school teacher from Rooppur village.

Now, that dream is finally coming into view. The cooling towers of the Rooppur Nuclear Power Plant (RNPP) stand tall on the once-barren shoal land. With the recent commencement of fuel loading, the plant has officially transitioned from a construction site to an operational facility.

"This is a proud moment for all of us," said Amirul Islam. "But at the same time, we are worried about our safety."

The sentiments of this retired teacher mirror the duality felt across the community.

Rafiqul Islam Mukul, a teacher at Solimpur Degree College, said, "We urge the government to ensure safety planning for local people in the event of a crisis."

He noted that most residents do not know what to do if a risk arises. "We are also worried about radioactive waste. Although we know Russia will take back the spent fuel, we have no clear idea of how that process works," Mukul added.

Speaking in this newspaper, Dr Shafiqul Islam, a professor in the nuclear

engineering department at Dhaka University, noted that the RNPP utilises advanced technology with minimal risk, while also stressing the need for a robust evacuation plan.

"Almost everyone admits to lacking a clear understanding of how nuclear technology works," Dr Shafiqul noted. "People are unaware of how to survive in the event of a radiation leak. Most do not understand radioactive waste; much of their fear is based on rumours, which creates unnecessary anxiety."

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Amirul Islam, a retired school teacher from Rooppur

He stressed that as fuel loading begins, authorities must educate locals on safety protocols, evacuation plans, and emergency medical treatment. "The fear of nuclear energy must be addressed. Modern technology is significantly safer than previous generations, but that message isn't reaching the people."

EMERGENCY RESPONSE
Soikat Ahmed, the information focal point officer at the plant, told The Daily Star that an emergency response system has already been developed inside the facility, adding that awareness programmes are being carried out for the surrounding population.

"We are working to raise awareness by organising a series of field meetings in villages surrounding the plant. We inform

residents about the safety systems and how to act during a crisis," Ahmed said, noting that these meetings occur monthly to address public concerns.

Md Khalequzzaman, deputy project director, said the plant has a sophisticated multi-tiered Emergency Response System (ERS).

"Firstly, the 300-metre restricted zone, the highest-risk area, lies fully within the project boundary wall. Beyond that, a 5km warning zone is equipped with a Local Warning System (LWS) to alert residents of atmospheric changes. In addition, a 12.5km monitoring radius is covered by 23 Automatic Environment Radiation Monitoring Systems (AERMS), providing real-time data."

Khalequzzaman added that radiation levels would be continually monitored and that immediate action would be taken if any urgency arose.

He also noted that the facility also includes a fortified underground Emergency Response Center (ERC) capable of shielding 1,200 employees, allowing them to operate the plant remotely during a threat. Two external shelters are also prepared to house an additional 1,200 people.

When asked about evacuating the general public in the event of an emergency, the deputy project director said while it is practically impossible to evacuate such a large population quickly, the authorities will ensure the highest safety and security measures. This includes providing a necessary emergency response in any critical situation as per international guidelines.

Furthermore, emergency radiation prevention pills (iodine tablets) have been stockpiled for distribution if necessary, said the information focal point officer.

How power is generated at a nuclear plant

STAFF CORRESPONDENT

How nuclear energy and then electricity are produced is often feared as rocket science. The fact is that it is not that difficult to understand. It is, however, difficult to get it done safely and keep it under control.

Nuclear energy can be had in two ways. Nuclear fusion and nuclear fission.

In the case of nuclear fusion, two atoms are hammered into one, which releases a lot of energy. For example, the sun is currently fusing hydrogen atoms into helium. The energy released by this process lights up the sun and sustains life on earth. The problem is, man has not been able to reliably replicate the sun despite advancements in science and technology.

What man has been able to do, reliably and somewhat cheaply, is nuclear fission. In nuclear fission, an atom is split, which also releases energy.

The best way to do this, so far, is to hit a uranium-235 atom with a neutron, a sub-atomic particle.

When struck, the uranium-235 splits and releases a lot of energy and a few neutrons that can hit other uranium-235 atoms. If this chain reaction is not controlled, due to accidents, incidents or otherwise, bad things happen. Chernobyl or Fukushima stopped being names of places and became names of disasters.

To control this reaction, control rods with neutron absorbers are installed along with uranium fuel rods inside a reactor's core.

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