

SHUTDOWN THIS MISGUIDED ENERGY POLICY

Relevant for: Indian Economy | Topic: Infrastructure: Energy incl. Renewable & Non-renewable

A candle vigil in Mitaka, Tokyo | Photo Credit: AFP

Nuclear technology is hazardous. The world was reminded of this on March 3, when a fire broke out near the Zaporizhzhia nuclear plant in Ukraine (Europe's largest) during the course of a military battle. Had the fire affected the cooling system, the plant's power supply, or its spent fuel pool, a major disaster could have occurred. Luckily, this did not happen.

Eleven years ago, the people of Japan were not as fortunate. On March 11, 2011, multiple reactors at the Fukushima Daiichi nuclear plant suffered severe accidents after an earthquake and a tsunami. Those reactors were quickly "[shut down](#)" following the earthquake. But their radioactive cores continued producing heat and eventually melted down because the tsunami knocked out the cooling system.

The aftershocks of the Fukushima disaster were felt beyond Japan and led to a slump in nuclear energy in most of the world. Yet, some policymakers insist on expanding nuclear power, ostensibly in response to climate-change concerns.

On December 15, 2021, the Indian government [informed Parliament](#) that it plans to build "10 indigenous reactors... in fleet mode" and had granted "in principle approval" for 28 additional reactors, including 24 to be imported from France, the U.S. and Russia. Given the post-Fukushima global and national trends in the nuclear industry, such a policy seems misguided; nuclear power is neither an economical source of electricity nor a viable route to meeting India's climate goals.

Nuclear power plants are capital intensive and recent nuclear builds have suffered major cost overruns. An illustrative example is the V.C. Summer nuclear project in South Carolina (U.S.) where costs rose so sharply that the project was abandoned — after an expenditure of [over \\$9 billion](#).

In contrast, renewable-energy technologies have become cheaper. The Wall Street company, Lazard, [estimated that](#) the cost of electricity from solar photovoltaics and wind turbines in the U.S. declined by 90% and 72%, respectively, between 2009-21. In 2020, the International Energy Agency dubbed solar energy the "[new king of electricity](#)".

This contrast has stymied plans for expanding nuclear power. In 2008, the U.S. government projected an expansion of nuclear capacity [to 114.9 gigawatts](#) by 2030; in 2021, it predicted that capacity would contract [to 83.3 gigawatts](#). This mirrors a global trend: in 1996, [17.5%](#) of the world's electricity came from nuclear power plants; by 2020, this figure had declined to [just around 10%](#).

India has also had to drastically cut its nuclear ambitions after Fukushima. In 2008, then chairman of the Atomic Energy Commission, Anil Kakodkar, projected that India [would have 650GW of installed capacity by 2050](#); his successor, Srikumar Banerjee, predicted in 2010 that capacity would reach 35 gigawatts by 2020. Installed capacity today is only [6.78 GW](#).

Such targets were based on the expectation that India would import many light-water reactors after the India-U.S. civil nuclear deal. But, the deal has not led to the establishment of a single new nuclear plant, [over 13 years](#) after it was concluded. The worrying part of the Government's

recent parliamentary submission is that these plans for imports have not been cancelled, as is widely believed, and [still remain on the books](#).

Of the 24 foreign reactors with “in principle” approval, six are of the VVER (water-water energetic reactor) design that has had multiple operational problems at Kudankulam in Tamil Nadu. The cumulative load factors for the Kudankulam-1 and two reactors in 2020 were just [53%](#) and [52%](#), respectively.

Twelve reactors are proposed to be imported from the U.S., including at least six AP1000 reactors — the same design that was abandoned in South Carolina. Elsewhere in the U.S., the Vogtle project comprising two AP1000 reactors has escalated [from an initial estimate of \\$14 billion to over \\$30 billion](#).

The remaining six are of the EPR design that France has been unable to successfully complete in its home country. The single EPR plant being constructed in Flamanville in France is now estimated [to cost €12.4 billion](#), four times what was forecast when construction started [in 2007](#).

[We estimated in 2013](#) that had the six planned EPRs at Jaitapur in Maharashtra been constructed on schedule, electricity from these reactors would cost at least 15 per unit excluding transmission costs. Given recent cost escalations, this is most likely an underestimate. The figures from Vogtle suggest that the proposed AP1000 reactors would produce power that would similarly be costly.

Compare that figure with recent low bids of 2.14 per unit for [solar power](#), and 2.34 for [solar-wind hybrid projects](#); even in projects coupled with storage, bids are around [4.30 per unit](#). If nuclear electricity is to be sold at a competitive rate, it would have to be greatly subsidised by the Indian government, which operates all nuclear plants through the Nuclear Power Corporation of India.

Safety concerns following the Fukushima accident have led to protests against each planned reactor. Vijay Rupani, then Chief Minister of Gujarat, admitted in the State Assembly in March 2018 that “locals turned against” the Mithivirdi nuclear project after the Fukushima disaster.

Contrary to the condescending opinion held by some nucleocrats, peoples’ concerns are not based on an irrational fear of nuclear energy. In a densely populated country such as India, land is at a premium and emergency health care is far from uniformly available. Local citizens understand that a nuclear disaster might leave large swathes of land uninhabitable — as in Chernobyl — or require a prohibitively expensive clean-up — as in Fukushima, where the final costs may eventually [exceed \\$600 billion](#).

Concerns about safety have been accentuated by the insistence of multinational nuclear suppliers that they be indemnified of liability for the consequence of any accident in India. Under pressure from multinational manufacturers, India’s liability law already largely protects them. But [the industry objects to the small window of opportunity](#) available for the Indian government to hold them to account.

The message to local citizens is simple: manufacturers do not really believe in their own claims about how safe their reactors are. If they did, they should have been willing to accept responsibility for any failure rather than insisting on special legal arrangements not available to any other industry.

Climate change will increase the risk of nuclear reactor accidents. The day after the fire at the Zaporizhzhia nuclear plant, a wildfire approached the Hanul nuclear power plant in South Korea and President Moon Jae-in ordered [“all-out efforts”](#) to avoid an accident at the reactors there. In

2020, a windstorm caused the [Duane Arnold nuclear plant](#) in the U.S. to cease operations. The frequency of such extreme weather events is likely to increase in the future.

Therefore, nuclear power is not the right choice to “adapt” to climate change, which requires resilience in power systems. It is also not the appropriate choice for mitigating India’s carbon emissions since it cannot be deployed at the necessary scale. The resources spent on nuclear plants will yield quicker results if they are redirected to renewables.

Given the inherent vulnerabilities of nuclear reactors and their high costs, it would be best for the Government to unambiguously cancel its plans for a nuclear expansion.

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