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Monitored this issue:

World's first purpose-built floating nuclear plant Akademik Lomonosov reaches Murmansk

Author: Jan Haverkamp

NM861.4721

On May 19, the world's first purpose-built floating nuclear power plant was moored at the Atomflot wharf on the edge of Murmansk, a port city in north-western Russia, with extensive celebrations. The arrival of the Akademik Lomonosov two days earlier in the bay of Murmansk was met a lot more critically by environmental NGOs Greenpeace, Socio-Ecological Union (Friends of the Earth Russia) and Ecodefense. The groups asked Rosatom, the Russian Ministry of Environment and Russian nuclear regulator Rostechnadzor, as well as the cooperation body the Arctic Council to assure that the further development of the project will be submitted to an environmental impact assessment and will take place under full, independent and peer-reviewed nuclear regulatory oversight.[1]

A month earlier, it looked like the Akademik Lomonosov was going to start its 8,000 km voyage from St. Petersburg to its final destination Pevek in the Russian far north-east province of Chukotka without a lot of attention. A year ago, hefty protests in St. Petersburg and from the countries around the Baltic Sea and Norway had taken out the most vulnerable sting. The construction of the barge with two 35 MW ice-breaker type nuclear reactors was finalised at the Baltiysky shipyard in the centre of St. Petersburg. Plans to load and test the reactors on that spot and then tow them in an irradiated state along the rocky coasts of the Baltic Sea and Norway triggered a 12,000 strong petition in St. Petersburg, and a flurry of diplomatic visits and letters.

Rosatom gave in and shifted loading and testing from 2.5 km from the St. Isaac Cathedral to the nuclear shipyard at Murmansk. The fuel was to be shipped by train. And with that, attention fell away.

However, on the 32nd anniversary of Chernobyl, April 26, Greenpeace pointed out fact that the project was going ahead without proper nuclear regulatory oversight, without a transboundary environmental impact assessment and without guidance that was promised by the IAEA years ago under the London Convention.

The attention grew when the Akademik Lomonosov departed on April 28 in a convoy consisting of the unloaded nuclear barge, towed by the tug Umka and accompanied by a second tug Jasny and a rescue tug Karev. Through Danish waters, it was escorted by the Greenpeace vessel Beluga II and the passage of the Storebelt bridge – the longest bridge in Denmark – was observed by dozens of small boats filled with journalists.

Shortly after the Beluga II had made contact with the flotilla, the rescue tug Karev tried to push the Beluga out of the way, fearing direct actions against the Akademik Lomonosov. The Swedish coast guard had to intervene when the Karev went on a dangerous course towards the Beluga. Rosatom reacted with a press release in which it accused aggressive environmental activists of attacking the Akademik Lomonosov and praising the Swedish and Danish coast guards for 'protecting' the convoy.[2]

In reality the protection was the other way around, with attempts from the Karev and Jasny to spray the Beluga and its accompanying inflatables, even though they maintained at all times safe distance from the difficult-to-navigate combination of tug and barge.[3] Greenpeace also noted that, contrary to Rosatom's claims, it maintained regular contact with Rosatom and with the Russian nuclear regulator Rostechnadzor before and during the construction of the Akademik Lomonosov, and that many other environmental NGOs severely criticise the increased introduction of nuclear technology into the Arctic region.

The cat-and-mouse game did, however, deliver beautiful pictures in front of one of Denmark's off-shore wind parks, Nysted I, that produces three times as much electricity as the Akademik Lomonosov will. Further media attention in Norway with critical comments by the environmental NGO Bellona increased the pressure.

The 144 metre long and 30 metre wide barge is to be the first in a series of floating nuclear reactors that Rosatom intends to build for the Arctic. Like the Akademik Lomonosov, these power stations are to power the further expansion of oil, gas and coal exploitation that now becomes possible because of the climate change-induced retraction of the ice. Greenpeace for that reason strongly objects when 'ecomodernist' Ben Heard echoed Rosatom's claims that the Akademik Lomonosov will be good for nuclear safety and the climate because it will replace the ageing Chernobyl type Bilibino nuclear power station and a smaller coal power plant.[4]

Greenpeace argues that locking the planet into decades of new fossil fuel exploitation and doing that with the introduction of a fleet of floating nuclear plants is a double whammy of risks, and that alternatives in the form of energy efficiency and renewable energy sources are amply available. It furthermore criticises Rosatom's plans to export floating nuclear plants to 15 countries including Indonesia, the Philippines and Sudan.[5]

Greenpeace, the Socio-Ecological Union and Ecodefense raised three demands during the voyage.[5] The first relates to the lack of nuclear regulatory oversight of the project. Because of a gap in the nuclear law, the Russian nuclear regulator Rostechnadzor only has access once a year for an inspection, and that pre-announced. It has no further

A Greenpeace vessel with the Akademik Lomonosov in the background.

regulatory mandate until the barge is moored and made operational in Pevek. This is seen as a critical flaw by the organisations, and they demand immediate, full and unrestricted oversight by Rostechnadzor with peer-review from nuclear regulators from the Arctic region.

Secondly, the potential impacts of this nuclear adventure were not assessed and reviewed by other Arctic countries, as was agreed for new activities in the Arctic region by the cooperation body the Arctic Council in the form of a transboundary Arctic Environmental Impact Assessment (EIA). The organisations call on Russia and the Arctic Council to carry out such an EIA before the Akademik Lomonosov will be loaded and tested in Murmansk. It has to assess all further preparation, the transport to Pevek, operation, but also further transports in 12 years' time with spent nuclear fuel on board back to Murmansk for maintenance and refuelling, final decommissioning after three or four operational periods and management of radioactive waste.

Thirdly, the organisations expressed their dismay that guidelines for floating nuclear power plants – promised by the IAEA under the London Convention – have still not been presented, while the construction of the Akademik Lomonosov is already finalised.

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5 reasons why a floating nuclear power plant in the Arctic is a terrible idea

1. It's a catastrophe waiting to happen: This nuclear titanic has been constructed without any independent experts checking it. This plant's flat-bottomed hull makes it particularly vulnerable to tsunamis and cyclones. A large wave can pitch the power station onto the coast. It also can't move by itself. If it comes loose from its moorings, it can't move away from a threat (an iceberg or a foreign vessel, for example) increasing the risk of a deadly incident. A collision could damage its vital functions and lead to a loss of power and damage its cooling function, and that could lead to a release of radioactive substances into the environment.

2. Imagine how hard it will be to deal with the consequences: There are so many things that could go wrong here: it could flood, or sink, or run aground. All of these scenarios could potentially lead to radioactive substances being leaked into the environment. In the case of a collapse, the core will be cooled by the surrounding seawater. While this seems like a good idea, when melting fuel rods come into with seawater, it will first lead to a seawater explosion and potential hydrogen explosions that will spread a large amount of radioactive isotopes into the atmosphere. A damaged reactor could contaminate much of the marine wildlife in the near vicinity.

3. The terrible track record of nuclear ships, icebreakers and submarines: There is a very long list of incidents and accidents with existing nuclear submarines and icebreakers. The very first nuclear icebreaker, Lenin, had a cooling accident in 1965, resulting in a partial meltdown of the core. The damaged radioactive core was dumped in the Tsivolki Bay near the Novaya Zemlya archipelago in 1967. In 1970 the reactor of a nuclear submarine (K-320) started up by itself at Krasnoye Sormovo wharf in Russia, releasing large amounts of radiation and causing hundreds of people to be exposed. An accident during fuel loading of the reactor of a nuclear submarine in Chazma in 1985 irradiated 290 workers leading to 10 casualties and 49 people injured. The list goes on.

4. A nuclear dumping ground on water: We already have more nuclear waste than we know what to do with. We don't need any more. The reactors on this plant are smaller than conventional land-based nuclear plants and will need refueling every two to three years. The nuclear waste will be stored onboard until it returns after 12 years of operation. That means that radioactive waste will be left floating around in the Arctic for years at a time. Not only is this incredibly risky, there is still nowhere secure for the spent fuel to be transported to once it's on land. No power source should create waste that takes millennia to be safe.

5. It's using nuclear power to help extract more fossil fuels: As if this floating nightmare wasn't absurd enough, the reason it's being towed to the Arctic is to help Russia dig for more fossil fuels. The main reason it exists is to provide northern oil, gas, coal and mineral extraction industries with power. And we don't need to repeat the reasons why more fossil fuels are terrible news for the climate. We just need to protect the Arctic from this potential disaster.

A longer, referenced version of this article is online: Jan Haverkamp, 2 May 2018, '5 reasons why a floating nuclear power plant in the Arctic is a terrible idea', www.greenpeace.org/international/story/16277/5-reasons-why-a-floating-nuclear-power-plant-in-the-arctic-is-a-terrible-idea/

Pro-uranium government in power in Greenland

Niels Henrik Hooge

NM861.4722

After general elections were held in Greenland on April 24, a new coalition government has come into power. It consists of four political parties, of which three have historically been pro-uranium and one has deferred to the new government's pro-uranium position. Together, they control 16 of the Parliament's 31 seats.

The former government, consisting of Siumut, Inuit Ataqatigiit (IA) and Partii Naleraq, had agreed to disagree on the uranium question and not make a decision on the controversial Kvanefjeld uranium / rare earths mining project, instead waiting for the outcome of the elections.

By returning to the government policies that led to the abolishment of the so-called uranium ban in 2013, it is now expected that the Kvanefjeld mining project will move forward after being stalled for almost two years. It is currently undergoing an EIA procedure. At least in the mid-term, it is the only viable uranium project on the agenda in Greenland. According to the owner, the Australian mining company Greenland Minerals and Energy Ltd. (GMEL), Kvanefjeld contains the second largest uranium deposit in the world. Only the deposit at the Olympic Dam uranium mine in South Australia is bigger. However, the Ilimaussaq-complex, of which Kvanefjeld is a part, is not yet fully explored.

In the latter part of 2016, the Danish Broadcasting Cooperation gained access to the draft of the Kvanefjeld EIA report under Greenland's Act on Transparency of Public Administration. Later, Greenland's biggest media outlet, Sermitsiaq/AG, and The URANI NAAMIK / NO TO URANIUM Society in Narsaq also applied. GMEL intervened and the government suspended access and decided to make it permanent.

However, in March 2017, a group of Greenlandic and Danish NGOs published the draft EIA together with an analysis of the draft by the Dutch expert Jan Willem Storm van Leeuwen. From his analysis, it was clear that the mining project would not meet Greenland's Mineral Resources Act's environmental and climate requirements.

In spite of the shift in government policies, Greenland's population is still split down the middle on the uranium question. At the recent opening of the Parliament's spring session, there were demonstrations in the capital, Nuuk, and in Narsaq, near Kvanefjeld. One of the speakers at the demonstration in Nuuk was Sara Olsvig, leader of IA, the biggest opposition party and the only political party that wants to bring back the uranium ban. The demonstrators and IA demand a referendum on uranium mining, before operations start at Kvanefjeld. A promise of a referendum was given by the then government in 2013, when the uranium ban was lifted.

More information (including the 2017 van Leeuwen report): https://noah.dk/uranium

Recent anti-uranium protest in Greenland.

Has India really scaled down its nuclear power ambitions?

Kumar Sundaram – Editor, DiaNuke.org

NM861.4723

Last month, it was reported that the Indian government plans to cut nuclear capacity additions by two-thirds.[1] These reports quoted a statement by Jitendra Singh, the State Minister in the Prime Minister's Office, which directly presides over the country's Department of Atomic Energy (DAE). Most journalists and analysts highlighted a scaling down from the previous projection of India achieving nuclear capacity of 63,000 MW by the year 2030 to 22,480MW in the same period, or roughly two-thirds.[2]

A closer look at the Minister Jitendra Singh's statement, however, reveals a totally different story.[3]

The government's announcement actually does not talk about cutting back nuclear power or cancelling any projects that have been discussed. In fact, two projects that have essentially been rejected figure in the list provided by the minister to the Indian parliament, under the category 'Green field sites, accorded 'In-Principle' approval'.[3] One is at Mithivirdi in Gujarat's Bhavnagar district where US corporation Westinghouse was allotted a project for six nuclear reactors. The Nuclear Power Corporation of India Limited (NPCIL) abandoned it last year after the project failed to acquire environmental clearance.[4] Similarly, the Haripur Nuclear Power Project proposed in Bengal, for which the state government under Mamata Bannerjee has denied land ever since it came to power and continues to rule out the project[5], is present in Jitendra Singh's list under 'Green field sites, accorded 'In-Principle' approval'.

The reality is the nuclear program has been delayed, not slashed as assumed. Such huge delays and under-performance have been the hallmark of India's Department of Atomic Energy. In the early 1950s, the DAE estimated that it would achieve nuclear capacity of 20,000 MW by the year 1980, whereas capacity was merely 540 MW when that year arrived. Again, DAE hoped that by 2000 it would have installed capacity of 10,000 MW, but it achieved only 2,720 MW.

After 2000, the DAE's capacity addition increased slightly, but again immensely exaggerated future projections were made. In 2007, the DAE thought capacity of 20,000 MW by the year 2020[6] was achievable and 30,000 MW by 2030[7] was an achievable target. These ambitions took a massive jump in 2008 after the culmination of the Indo-US deal under which India got an exemption from the Nuclear Suppliers' Group (NSG) and re-entered global nuclear commerce. In 2008, projections were made for achieving 63,000MW by 2030[8] and a whopping 275,300 Gigawatts by 2052.[9]

However, despite the NSG exemption in 2008 and subsequent agreements with the US, France and other countries for the supply of nuclear reactors, not a single imported nuclear project has taken off. Construction

Status	Location	Units	MW
Built	Tarapur, Maharashtra	4	1.400
	Rawatbhata, Rajasthan	6	1.180
	Narora, Uttar Pradesh	2	440
	Kakrapar, Gujarat	2	440
	Kaiga, Karnataka	4	880
	Kalpakkam, Tamil Nadu	2	440
	Kudankulam, Tamil Nadu	2	2.000
	India 2018	**22**	**6.780**
Under Construction	Kakrapar, Gujarat	2	1.400
	Rawatbhata, Rajasthan	2	1.400
	Kudankulam , Tamil Nadu	2	2.000
	Gorakhpur, Haryana	2	1.400
	Kalpakkam, Tamil Nadu	1	500
	Under Construction	*9*	*6.700*
	India 2024	**31**	**13.480**
Financial Sanction	Gorakhpur, Haryana	2	1.400
	Chutka, Madhya Pradesh	2	1.400
	Kaiga, Karnataka	2	1.400
	Kudankulam, Tamil Nadu	2	2.000
	Mahi Banswara, Rajasthan	4	2.800
	Financial Sanction	*12*	*9.000*
	India 2031	**43**	**22.480**
Proposed	Jaitapur, Maharashtra	6	9.900
	Kovvada, Andhra Pradesh	6	7.248
	Bhimpur, Madhya Pradesh	4	2.800
	Chhaya Mithi Virdi, Gujarat	6	6.000
	Haripur, West Bengal	6	6.000
	Proposed	*28*	*31.948*
	India 20??	**71**	**54.428**

Nuclear expansion scenario envisaged in the State Minister's statement presented to the Indian Parliament.

is yet to begin in places like Jaitapur and Kovvada, despite the Indian government's rush to violently force local communities to give away their land and provide consent for environmental clearance. This has to do on the one hand with the terminal crisis of the global nuclear industry after Fukushima, leading to financial meltdowns and bankruptcies; as well as the reluctance of nuclear suppliers to accept India's nuclear liability law.[10] The latter reveals much about the nature of multinational nuclear companies: the law caps the total liability in the case of a potential nuclear accident to an amount that is much less than the potential cost of an accident or the price tag of a nuclear power plant. The Modi government has tried every trick in the book to dilute even that.[11]

The Indian minister's statement should be viewed in this context. Since imported rectors have not progressed at the pace that the country's nuclear establishment hoped for, it is now focusing on expanding the fleet of "indigenously-designed" reactors to several existing and new nuclear power plant sites. These 700 MW Pressurised Heavy Water Reactors (PHWRs) are in essence scaled-up models of a reactor design called the CANDU imported from Canada.

Protest against the Koodankulam nuclear power plant.

The recent statement, in fact, envisages a 'realistic' and determined shift in the strategy to expand nuclear power in India, although at a slower pace than advertised before. The Minister's announcement includes setting up ten 10 'greenfield' PHWR/CANDUs of 700 MW each by 2024 (four each in Gorakhpur and Mahi-Banswara and two in Chutka) for which administrative approval and financial sanction have been granted already. These constructions will result in an additional electricity generation capacity of 13,460 MW (PHWRs plus Russian VVERs), besides the 500 MW Prototype Fast Breeder Reactor (PFBR), which the DAE has been claiming to commission 'this year' for the past several years.

The statement also lists another category of new projects – greenfield sites for whom 'in-principle' approval has been obtained and the DAE doesn't see any external obstacle. By 2031, this category of planned projects would bring 22,480 MW of additional capacity online. These include – Jaitapur (6 x 1650 = 9,900 MW), Kovvada (6 x 1208 = 7,248 MW), Mithi Virdi (6 x 1,000 MW = 6,000 MW) and Haripur (6 x 1,000 = 6,000 MW), besides a newly included project at Bhimpur in Madhya Pradesh (4 x 700 = 2,800 MW). The Minister's statement also mentions that pre-project activities are underway at these sites.

This new focus on PHWRs has severe consequences for communities at sites that have so far not been directly subject to nuclear risks. This includes Gorakhpur in Haryana, Mahi-Banswara in Rajasthan, and Chutka in Madhya Pradesh. In Chutka, the local communities have waged an intense agitation against their second displacement.[12] They were first displaced for the Bargi dam on Narmada river in 1990, and now they have been served eviction notices. The government agencies have again approached them with the same promises – jobs, electricity, development, rehabilitation and welfare measures, but they know the reality. In Gorakhpur, the NPCIL is constructing a 2,800 MW plant merely 150 km from the national capital New Delhi with a population of 24 million –the plant depends on a small canal for the supply of water for cooling the reactors in normal operation and even during potential accidents.[13]

Therefore, the much-touted 'cut-back' is far being a reflection of any rethink in the Indian nuclear establishment. Moreover, the zeal to trample all safety, environmental and democratic norms continues unabated as reflected in the recent police atrocities against peaceful anti-nuclear protests in Chutka[14] and Jaitapur[15]. It will be ironic for the villagers who continue to face fabricated sedition charges for their peaceful protest to find their government winning praise internationally for the sanity of an illusory nuclear cut-back.

The author is thankful to Dr. M.V. Ramana and Peter M. for their insights.

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Reactor restarts and energy policy in Japan

Author: Jim Green – Nuclear Monitor editor

NM861.4724

A Strategic Policy Committee under Japan's Advisory Committee for Natural Resources and Energy has released a draft national Strategic Energy Plan.[1,2] The draft plan is likely to be endorsed by Cabinet in mid-2018, possibly with minor revisions.

The proposed electricity generation mix in 2030 is 22-24% for renewables, 20-22% for nuclear, and 56% for fossil fuels (27% LNG, 26% coal, 3% oil).[1] The Strategic Energy Plan approved by Cabinet in 2014 described nuclear power as an "important base-load energy source" but did not specify growth targets.

Nuclear power is again described as an "important base-load energy source" in the latest draft energy plan, and the government will "further intensify efforts" to achieve the 20-22% nuclear target. Those efforts will include activities such as Fukushima reconstruction and restoration, nuclear power safety improvements, the creation of stable business environments, and efforts to resolve nuclear waste issues.[1]

Regardless of the government's commitment to the 20-22% nuclear target, it will be near impossible to achieve and would represent a six-fold leap from the current state: in 2017, nuclear accounted for just 3.6% of electricity generation.[3,4]

Achieving the target would require a total of about 30 operating reactors. Former World Nuclear Association executive Steve Kidd noted in March 2018: "Most assessments foresee only 20-25 reactors ever returning, and all forecasts of when, how and where exactly this will happen have so far proved wide of the mark."[5]

Of the 55 operable reactors before the Fukushima disaster, 16 have been permanently shut down – the six Fukushima Daiichi reactors, the Monju fast breeder, and nine others (Mihama-1 and -2, Ohi-1 and -2, Ikata-1 and -2, Genkai-1, Shimane-1 and Tsuruga-1).[6,7]

That leaves 39 reactors, of which eight are operating: Kansai's Ohi-3 and -4 (both PWR, 1180 MW) and Takahama-3 and -4 (both PWR, 870 MW); Kyushu's Sendai-1 and -2 (both PWR, 890 MW) and Genkai-3 (PWR, 1180 MW); and Shikoku's Ikata-3 (PWR, 890 MW).[8,9]

Applications to restart an additional 17 reactors are slowly progressing.[10] Most but not all of those 17 reactor restarts will probably proceed in the coming years. The prospects are at best uncertain for the 14 reactors that have not yet begun the slow restart approval process.

Another difficulty for the industry is the aging of the reactor fleet – almost half of the current fleet of reactors are at least 30 years old.[3] To get anywhere near the 20-22% target would require reactor lifespan extension approvals (from 40 years to 60 years). Takeo Kikkawa, a Tokyo University of Science academic and member of the Strategic Policy Committee, said the 2030 target would be impossible to achieve unless all remaining reactors are granted lifespan extensions, and that in the absence of lifespan extensions or new reactors Japan will have no operating reactors by 2050.[11] Nuclear would account for at most 15% of electricity generation in the coming years if lifespan extensions are blocked.[12]

Last November, the head of the Nuclear Regulation Authority said that the pace of restarts is unlikely to gain any momentum in years to come.[13] The pace of reactor restarts has in fact picked up over the past twelve months … but the number of post-Fukushima permanent shut-downs (16) doubles the number of restarts (8), and shut-downs exceed restarts (9:8) even if excluding the six Fukushima reactors and the Monju fast reactor.

Japan's Institute of Energy Economics predicts that a total of 10 reactors will have restarted by the end of March 2019.[14] That prediction is dramatically lower than the Institute's wildly inaccurate prediction in July 2016 when it predicted 19 restarts by the end of March 2018 (the true number was seven).[15]

Ohi-3 and -4 reactors – two of the eight currently operating reactors.

The abandoned V.C. Summer project in South Carolina that was largely responsible for the bankruptcy of Toshiba subsidiary Westinghouse.

New reactors?

The draft proposal does not comment on the option of building new nuclear reactors, although it will be difficult to meet the 2030 target in the absence of new reactors ... and impossible to maintain it in subsequent decades without them. Strategic Policy Committee chair Masahiro Sakane described new build as the "inconvenient truth" from which the government averted its eyes.[11] In June 2017, Japan's trade minister said the government is not considering building new nuclear plants and denied a media report claiming otherwise.[16]

Tentative steps are being taken to secure approval to complete two reactors that were under construction before the Fukushima disaster (Shimane-3 and Ohma-1 a.k.a. Oma-1).[17,18] The government does not deem the two reactors as "new or additional" as construction started before the Fukushima disaster.[19] That logic was lost on 1,100 citizens who took legal action to prevent the Ohma reactor project going ahead – but their case was rejected in the Hakodate District Court.[20,21]

Leaving aside the two partially-built reactors, the obstacles to new reactor projects are mind-boggling. The obstacles include public and political opposition[12], and the severe financial pressures facing Japan's energy companies. Another obstacle is that the industrial and technological capacity to build new reactors has withered in Japan. There has been only one reactor grid-connection in Japan in the past decade, and only five in the past 21 years.[3]

Nikkei Asian Review reported in April 2017 (before Toshiba exited the reactor construction business):[22]

"The three major Japanese reactor makers – Hitachi, Mitsubishi Heavy Industries and Toshiba – are seeking to keep their nuclear power business afloat by generating profit from work intended to boost the safety of existing plants.

"They have no choice because no new reactor has begun operation since the No. 3 unit at the Tomari nuclear plant in Hokkaido, Japan's northernmost island, came onstream in 2009. "We have also stopped our efforts to transfer skills and expertise to younger generations of employees," said a senior executive at a major reactor maker.

"The situation also bodes ill for suppliers of reactor parts. The construction of one reactor requires the involvement of anywhere between 300 and 500 suppliers possessing special technologies. "It is not easy to regain technology once it is lost," warned Juichiro Takada, president of Takada, a Kitakyushu, Fukuoka Prefecture-based company in southwestern Japan that has supplied storage tanks and done piping work for many nuclear plants. The company has not been involved in construction work for any new reactor since the Oma project was suspended."

Exports

Japan's reactor manufacturing capabilities might be revived with contracts to build in other countries (and perhaps in Japan in the longer-term). The draft Strategic Energy Plan reiterates the Abe administration's policy of promoting nuclear exports.[2]

But Japan's nuclear export prospects are shaky at best. *Japan Times* reported in February 2017 that Japanese firms have attempted "with little success" to sell their technologies to countries as diverse as France, Vietnam, India, Turkey, Hungary, Poland, Slovakia, the Czech Republic and the United Arab Emirates.[23] *Japan Times* further noted that in June 2016 Toshiba said its goal was to win orders for 45 or more overseas reactors by 2030 … but the company has exited the reactor construction business.

Hitachi is seeking extraordinary financial backing from both the Japanese and UK governments before committing to building advanced boiling water reactors in Wales (the Wylfa project).[24] Mitsubishi Heavy Industries is slowly progressing plans to build reactors in Turkey but another Japanese company, Itochu Trading House, recently pulled out of the project.[24]

Pro-nuclear commentator Dan Yurman wrote on May 7:[24]

"The biggest black eye that Japan has gotten in recent years isn't from cleanup troubles at Fukushima, but from the multi-billion dollar cost overruns at the V C Summer site [in South Carolina] where Toshiba's Westinghouse ran the project into the ground with self-inflicted management failures. Toshiba sold the Westinghouse business unit in February unloading it for $1 billion less than it paid to purchase the firm ten years ago.

"Japan has also been pushed out of an opportunity to provide four full size nuclear reactors to Vietnam. In fairness, that country also cancelled similar plans to acquire four Russian nuclear reactors. The country cancelled all of its plans for nuclear power stations in November 2016. The main reasons were fears about costs and the inability of the government to stand up a nuclear safety agency, a regulatory framework, and capability to oversee a construction project involving eight 1000 MW nuclear reactors.

"Japan needs a "win" to get back in the game, and the Sinop project in Turkey is its best chance to get one. Putting together a workable cost and schedule package that can be sold to investors is a big challenge. The country's future in exporting nuclear energy technologies depends on it."

Tom Corben wrote in *The Diplomat* last December: "Many of Turkey's largest earthquakes have occurred uncomfortably close to the Sinop site, and seismic safety assessments conducted by Japanese government-commissioned research firms have produced questionably optimistic results. The European Parliament has already called on Turkey to abandon the construction of another reactor complex at Akkuyu due to the risk of a serious industrial-environmental disasters, and there is arguably a similar risk at Sinop. An accident there would present Tokyo with complex moral and legal questions, and discredit Japanese nuclear technology."[25]

Corben also noted that Japan's willingness to supply India's nuclear power program is problematic: "Meanwhile, as a non-signatory to the Nuclear Non-Proliferation Treaty, the ambiguous nature of assurances from the Indian government that Japanese technology will not be used to produce nuclear weapons is worrying, as is the lack of legal definition around the circumstances in which Japan may justifiably abandon the deal."[25]

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The future of nuclear power in China

NM861.4725

Mark Hibbs from the Carnegie Endowment for International Peace has written a detailed report on China's nuclear power program. The report's summary and an excerpt from the concluding chapter are reproduced here:

China is on course to lead the world in the deployment of nuclear power technology by 2030. Should it succeed, China will assume global leadership in nuclear technology development, industrial capacity, and nuclear energy governance. The impacts will be strategic and broad, affecting nuclear safety, nuclear security, nonproliferation, energy production, international trade, and climate mitigation. Especially critical is whether China achieves an industrial-scale transition from current nuclear technologies to advanced systems led by fast neutron reactors that recycle large amounts of plutonium fuel.

Uncertainties for nuclear power

China's nuclear power wager might not indefinitely pay high dividends. Until now, the state has boosted the nuclear power industry with incentives that, in the future, may come under pressure. The electric power system is subject to reform in the direction of more transparent oversight and pricing that might disadvantage nuclear investments. President Xi Jinping supports state control of strategic economic sectors, but he also advocates market reforms that have helped lead Western nuclear power industries into crises.

The nuclear sector must withstand what Xi calls "new normal" conditions: a gradual slowing down of China's economy, characterized by diminishing returns on capital goods investments and translating into rising debt and overcapacity. Nuclear investments may be affected by demographics, changes in electricity load profile, and technology innovations including emergence of a countrywide grid system able to wheel bulk power anywhere.

There is also political risk. Public support for nuclear power in China is volatile and may be low. Concerns since the Fukushima Daiichi accident in Japan have prompted Beijing not to proceed with long-established plans to build most of China's future nuclear plants on inland sites. Should this policy continue into the 2020s, prospects for China's nuclear construction sector will decline; indefinitely continuing nuclear construction at eastern coastal sites (where nearly all of China's nuclear power is generated) may encounter resistance on economic, capacity, and political grounds.

Under Xi, China's globalization continues but the state is assuming ever-greater liability. Political decision-making and corporate culture may not support an indefinite increase in the risk presented by more nuclear power investments. Some quasi-official projections before Fukushima that China by 2050 might have 400 or more nuclear power plants have been cut in half. Beijing's risk calculus may reflect that China's population would blame the Communist Party and the state for a severe nuclear accident. In a country with a patchy track record for industrial safety, said one Chinese planning expert in 2016, "The more reactors we have, the greater our liability."

Opportunities and risks in advanced technologies

Until now, China's impressive nuclear development has relied on technologies invented a half-century ago by others and that China has replicated. During this century, China aims to replace light water nuclear power plants with advanced systems launched elsewhere but never compellingly deployed before. China today is poised to make these investments but lacks deep industrial expertise for some technologies it has selected; to succeed it must effect transitions from R&D to commercial deployment.

China's current heavy nuclear R&D spending must be sustained to succeed since some systems may not be ready for commercial deployment before the 2030s.

China's nuclear industry must depend on the state to make its nuclear technology transition; Beijing must down-select technologies and decide whether to trust the market to make economic decisions.

Whether China succeeds or fails, the global repercussions will be significant. If China merely replicates others' collective past experience, it will reinforce the view that fast reactors and their fuel cycles are too risky, complex, and expensive to generate large amounts of electricity. If, instead, China clearly succeeds in its ambitions, it may significantly raise the profile of nuclear power toward the twenty-second century. If so, China will deeply influence global rules and understandings governing the risks associated with nuclear power systems.

Conclusions and outlook

Predicting China's future is a fool's errand. Some contemporary authors claim that China will soon collapse, others that China will instead dominate the world.326 No such narratives have captured the imaginations of analysts looking at China's nuclear power system but, based on information available for this report, one could derive two very different speculative boundary scenarios to describe the future of China's nuclear energy program.

If China's nuclear program moves along the trajectory Chinese strategists and scientists set forth three decades ago, perhaps by 2050 China will be operating several hundred power reactors, implementing a transition from PWRs to more advanced nuclear systems, and it may have demonstrated a closed fuel cycle at industrial scale. The government might reach an opaque compromise with stakeholders allowing higher costs for advanced technologies to be shouldered by Chinese taxpayers and ratepayers. China may be the world's leading nuclear exporter thanks to global rulemaking leadership and it may have invested enough in oversight infrastructure to manage its nuclear activities without suffering a severe nuclear safety, security, or proliferation accident. Forced development of nuclear and renewables may have cleaned the air in China's megacities by 2030, and the country may continue to invest in nuclear technology confidently assuming that it will rely on nuclear power for hundreds of years.

Alternately, by 2050, China may instead be preparing to wind down an ageing fleet of about 100 PWRs, having failed to effectively manage costs and overcome the economic, technical, and political challenges of commercially exploiting more promising and complex nuclear technologies. China's nuclear power plants may be threatened with obsolescence as a result of breakthroughs in alternative power generation and storage technologies. Over time, the companies that pioneered China's first big wave of nuclear plant investment in the 2000s and 2010s might not continue to assume the debt that sustained nuclear investment requires, especially if Chinese demand for power approaches the near-zero growth levels that obtain in many Western countries. Human resources may increasingly migrate to other fields, contributing to low nuclear plant availability, nuclear safety problems, lack of public trust, increased regulation, and corporate and government risk aversion.

No one can say whether either of these two possible but perhaps unlikely outcomes will happen because there are formidable unknowns.

Mark Hibbs, 2018, 'The Future of Nuclear Power in China', https://carnegieendowment.org/2018/05/14/future-of-nuclear-power-in-china-pub-76311

Direct download: https://carnegieendowment.org/files/Hibbs_ChinaNuclear_Final.pdf

NUCLEAR NEWS

Exelon executive: no new nuclear plants in the US, and SMRs 'prohibitively expensive'

William Von Hoene, senior vice president and chief strategy officer at Exelon, which operates 23 reactors in the US, predicts there will be no new nuclear plants built in the US due to their high operating costs.

"I don't think we're building any more nuclear plants in the United States. I don't think it's ever going to happen," Von Hoene said in April at the annual US Energy Association meeting in Washington, D.C. "I'm not arguing for the construction of new nuclear plants. They are too expensive to construct, relative to the world in which we now live."

Von Hoene described nuclear power as "a bridge to a different kind of carbon-free world" with renewables and storage, adding: "I think it's very unlikely that absent some extraordinary change in environment or technology, that any nuclear plants beyond the Vogtle plant will be built in my lifetime, by any company."

The two-unit Vogtle nuclear plant in Georgia has experienced massive delays and cost overruns, while its sister plant in South Carolina was abandoned last year after at least US$9 billion was spent on the project, leading to the bankruptcy of main contractor Westinghouse.

Von Hoene also expressed skepticism about small modular reactors and Generation IV designs. "Right now, the costs on the SMRs, in part because of the size and in part because of the security that's associated with any nuclear plant, are prohibitive," he said. "It's possible that that would evolve over time, and we're involved in looking at that technology. Right now they're prohibitively expensive."

Steven Dolley, 12 April 2018, 'No new nuclear units will be built in US due to high cost: Exelon official', www.platts.com/latest-news/electric-power/washington/no-new-nuclear-units-will-be-built-in-us-due-26938511

Petition to oppose nuclear weapons in South Asia

This month marks 20 years of the nuclear tests by India and Pakistan in 1998. In these two decades, far from providing any security, nuclear weapons have made the region far more insecure and conflict-prone. South Asia is the only region today, where two nuclear-armed neighbours are constantly engaged in dangerous, hot-and-cold conflicts. The rise of religious extremism and jingoist nationalism in both countries has made things worse.

It is time to say a resounding 'NO' to nuclear weapons in South Asia. When the two Koreas can come together to talk, India and Pakistan can also resolve all issues through amicable dialogue and reconciliation.

We urge you to sign this international citizens' appeal initiated and endorsed by leading activists in South Asia: visit www.tinyurl.com/india-pakistan-petition or register your support via email to editor@dianuke.org.

The appeal demands an immediate stop to the nuclear build-up and asks India and Pakistan to sign the historic Nuclear Ban Treaty that was adopted by the UN last year.

– Kumar Sundaram

Editor, DiaNuke.org

Leave uranium in the ground

Günter Wippel writes:

Just over 30 years ago – on April 10, 1988 – seven indigenous activists from different parts of the world set out on a three-week public awareness tour through Germany. They called their tour "Leave Uranium in the Ground." Its purpose was to bring the detrimental impacts of uranium mining and nuclear weapons tests on health, environment and indigenous peoples, to the awareness of German people and decision-makers in provincial and federal parliaments.

Why Germany? Because West German companies were directly involved in uranium extraction in countries around the world. And often, these operations were carried out on indigenous lands. (In the former East Germany, the Wismut uranium mines that supplied the Soviet Union operated until after reunification, closing in 1991.) ...

The struggle against uranium exploitation as a first step in the nuclear fuel chain remains. Even as the nuclear industry grinds to a kind of standstill with new construction too expensive and already obsolete, there remain some 400 reactors around the world that still require uranium to fuel them.

At the forefront of the struggle to halt the use of nuclear power we still find indigenous peoples as well as disadvantaged local communities in what is called the "Third World." And it is often they who point out the many human rights violations on different levels, from taking away peoples' land and livelihood, down to individual death threats, all in the name of so-called "development".

The full article is online: https://beyondnuclearinternational.org/2018/05/06/leave-uranium-in-the-ground/

Günter Wippel founded and coordinates the Uranium Network, http://uranium-network.org.

Germany's energy transition

Germany is continuing with its nuclear phase out, while pushing renewables strongly, with well over 100GW of wind and solar so far. Renewables overall, including hydro and biomass, should soon be supplying nearly 40% of its electricity. That has been helped by the fall in their costs and by continued support from consumer self-generation, mainly using PV, and locally owned projects, including wind.

For example, the result of the first competitive German onshore wind tender in 2016 had prices ranging between 52–58 €/MWh for 807 MW. That's down from €80/MWh under the old FiT support system. Of the 70 successful projects, 65 were community-driven or co-operative schemes.

Despite setbacks, it does not seem to be the case, as some insist, that Germany is replacing nuclear with coal, so that emissions are rising. The 2017 World Nuclear Industry Status report notes that, between 2010 (the last year prior to the post-Fukushima shutdown of the eight oldest nuclear plants in Germany) and 2016, "the increase of renewable electricity generation (+84.4 TWh) and the noticeable reduction in domestic consumption (-20.6 TWh) were more than sufficient to compensate the planned reduction of nuclear generation (-56 TWh), enabling also a slight reduction in power generation from fossil fuels (-13 TWh) and a threefold increase in net exports".

Germany's carbon emissions have been growing slightly, however that is mainly due to increases from transport.

Dave Elliot, 23 May 2018, 'Germany stays on track', Environmental Research Web, http://blog.environmentalresearchweb.org/2018/05/23/germany-stays-on-track/

Sellafield faces huge fine over worker's exposure to radiation

Sellafield Ltd, which handles the waste from the UK's nuclear power stations as well as spent fuel from Japan and the US, faces a multimillion-pound fine after an employee was exposed to high levels of radiation.[1] The Office for Nuclear Regulation said its investigation had led it to begin a prosecution under the Health and Safety at Work Act in relation to a February 2017 accident when a site employee was wounded while handling equipment, leaving him open to internal radiation exposure up to three times the annual limit.[2] The prosecution is due to begin at Workington magistrates court in Cumbria on July 20.

In 2016, a BBC investigation found that the Sellafield site is riddled with serious safety flaws.[3] The BBC investigation was prompted by a whistleblower, once a senior manager in Sellafield, who revealed a litany of safety concerns including degraded infrastructure, improper storage of highly radioactive materials and chronic under-staffing across the site.

In 2014, *The Ecologist* published a set of leaked images from an anonymous source showing decrepit nuclear waste storage facilities at the Sellafield plant.[4] The images show the state of spent nuclear fuel storage ponds that were commissioned in 1952 and used until the mid-1970s to store spent fuel until it could be reprocessed. They were abandoned in the mid-1970s and have been left derelict.

In June 2013, Sellafield Ltd was fined £700,000 and ordered to pay £72,635 in costs at Carlisle Crown Court for sending several bags of radioactive waste to a landfill site in Cumbria in 2010.[5] The bags should have been sent to a specialist facility that treats and stores low-level radioactive waste.

A November 2012 National Audit Office report said the Sellafield site posed a "significant risk to people and the environment" because of the deteriorating conditions of radioactive waste storage facilities.[6] In February 2013, a report from the House of Commons Public Accounts Committee described Sellafield as "an extraordinary accumulation of hazardous waste, much of it stored in outdated nuclear facilities", and chair of the committee, Margaret Hodge MP, said Sellafield posed an "intolerable risk".[6]

Sellafield is in transition – its badly underperforming Thermal Oxide Reprocessing Plant (Thorp) ceases operations in November this year, while the Magnox reprocessing plant – which handles waste from Britain's early nuclear power stations – is scheduled to close in 2020.

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New Mexico: Native Tribes try once again to stop uranium mining at sacred Mt. Taylor

Linda Pentz Gunter writes:

It's a tale almost as old as time, except that the "White Man" has not been around as long as that. But long enough to massacre, expel, plunder, desecrate, abandon, repeat. It's the story Native Americans know all too well – a Trail of Tears that never really ended. Sacred places and burial sites disrespected, traditions ignored, the health and well-being of people dismissed, while the fundamental civil rights of indigenous populations in the United States continue to be trampled on by the US government and its friends in industry.

It would be tempting to say that the current battle over resumption of uranium mining at the sacred Mount Taylor, which sits atop one of the richest known uranium ore reserves in the country, is just the latest in this long and shameful saga. But it is not alone. There are stories like this everywhere in Indian Country – Bears Ears would be just one more example.

Mt. Taylor, located in the southwestern corner of New Mexico's San Mateo Mountains, is a pilgrimage site sacred to at least 30 tribes including the Navajo Nation, the Hopi, the Zuni, and the nearby Laguna and Acoma Pueblos. ...

The existing uranium mine site on Mt. Taylor has not been operational since 1990 but got its first standby permit in 1999. The 1993 New Mexico Mining Act allows mines to remain inactive in standby status for a maximum of 20 years before reclamation must be required. Instead, on December 29, 2017, the New Mexico Mining and Minerals Division issued a Return to Active Permit for the Mt. Taylor uranium mine, owned by Rio Grande Resources (RGR).

The decision to allow resumption of uranium mining is based on spurious economic claims, say the groups fighting the decision, including the broad coalition, MultiCultural Alliance for a Safe Environment (MASE) and Amigos Bravos. They face an uphill battle. ...

Petuuche Gilbert, a member of MASE and the Laguna Acoma Coalition for a Safe Environment, said: "Mt Taylor is sacred to Acoma and other indigenous peoples, but it is equally important to other people. It must not be polluted by uranium mining. It is important to all people for water and its other natural resources."

Read the full article online: Linda Pentz Gunter, 20 May 2018, "We were rich in uranium, and we have been sacrificed", https://beyondnuclearinternational.org/2018/05/20/we-were-rich-in-uranium-and-we-have-been-sacrificed/

Illinois: class action federal lawsuit for uranium hexafluoride contamination

A class action federal lawsuit has been filed by residents of Metropolis, Illinois, against Honeywell International for uranium hexafluoride (U6) contamination. The plaintiffs' statement reads, in part:

"On the outskirts of Metropolis, Illinois sits a plant that made uranium hexafluoride (UF6) from at least 1963 until at least 2017. The air inside the plant was monitored regularly and found to always contain low levels of uranium. What the populace did not know was that continuously for decades the plant expelled air laden with radioactive material and other metals through a system of fans and ducts operating around the clock to vent air from within the plant to the atmosphere. For over a half century winds have carried the radioactive materials and other metals throughout the area in such concentrations that radioactive materials and metals can still be found deposited in soils and buildings in and around Metropolis. …

"Honeywell, from at least 1963 until at least late 2017, operated the UF6 plant on the outskirts of Metropolis along the Ohio River. Fifty-five gallon drums, bolted shut and filled with powdered uranium ore from all over the world, would come to the UF6 plant where they would be emptied with an automated "drum dumper." Each time the drum dumper emptied a barrel, radioactive dust containing metals would be released into the air. After the drums were dumped they were cleaned. Earlier in the plant's history workers sandblasted the drums, which also released radioactive and metal-contaminated dust into the air. Later, a water cleaning method replaced sandblasting.

"Six-inch berms around a concrete cleaning pad contained the wastewater that then entered a series of drains leading to the UF6 plant's wastewater treatment facility where, after moving through a single settling pond, the water was discharged into the Ohio River. In 2006, Honeywell pled guilty in federal court to criminal violations of the Clean Water Act for discharging radioactive materials into the Ohio River."

The full complaint is posted at:

www.huntingtonnews.net/sites/default/files/n64/metro%20law%20suit.pdf

Fukushima radioactive particle release was significant

Scientists from Japan and the UK have studied the release of caesium-rich micro-particles from the Fukushima disaster and their disturbing results have been published in the peer-reviewed journal *Environmental Science and Technology*.

The researchers identified the contamination using a new method and say if the particles are inhaled they could pose long-term health risks to humans.

In the immediate aftermath of the Fukushima Daiichi nuclear accident, it was thought that only volatile, gaseous radionuclides, such as caesium and iodine, were released from the damaged reactors. However, in recent years it has become apparent that small radioactive particles, termed caesium-rich micro-particles, were also released.

The abundance of these micro-particles in Japanese soils and sediments, and their environmental impact is poorly understood. But the particles are very small and do not dissolve easily, meaning they could pose long-term health risks to humans if inhaled.

The scientists tested rice paddy soil samples retrieved from different locations within the Fukushima prefecture. The samples were taken close to (4 km) and far away (40 km) from the damaged nuclear reactors. The new method found caesium-rich micro-particles in all of the samples and showed that the amount of caesium associated with the micro-particles in the soil was much larger than expected.

Dr Satoshi Utsunomiya, Associate Professor at Kyushu University, Japan, and the lead author of the study said "when we first started to find caesium-rich micro-particles in Fukushima soil samples, we thought they would turn out to be relatively rare. Now, using this method, we find there are lots of caesium-rich microparticles in exclusion zone soils and also in the soils collected from outside of the exclusion zone".

Abridged from: Eurekalert, 24 May 2018, 'Fukushima radioactive particle release was significant says new research', www.eurekalert.org/pub_releases/2018-05/uom-frp052418.php

Ryohei Ikehara et al., 2018, 'Novel Method of Quantifying Radioactive Cesium-Rich Microparticles (CsMPs) in the Environment from the Fukushima Daiichi Nuclear Power Plant', Environmental Science and Technology, http://dx.doi.org/10.1021/acs.est.7b06693