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Monitored this issue:

Vogtle's reprieve: snatching defeat from the jaws of defeat
Last year, the V.C. Summer twin-reactor AP1000 project in South Carolina was abandoned after the expenditure of at least US$9 billion. Last month, the last remaining reactor project in the US – the Vogtle twin-reactor AP1000 project in Georgia – came close to being abandoned due to massive cost overruns.

IPCC bets on the renewables revolution
The UN's Intergovernmental Panel on Climate Change has issued a landmark report warning that global warming must be kept to 1.5˚C. In the IPCC's low-carbon scenarios, nuclear power accounts for only a small fraction of energy/electricity supply (even if nuclear output increases) whereas renewables do the heavy lifting.

California strives toward 'carbon neutrality'
In September, California Governor Jerry Brown announced a plan that raises the state's level of ambition with regard to its carbon footprint. Not only will electricity in the state be carbon-free "as soon as possible, but no later than 2045", the entire Californian economy will be "carbon neutral". The likelihood of any nuclear power in the mix is small. California has only two remaining nuclear power reactors, slated for closure in 2024 and 2025.

ICAN Nobel Peace Prize Ride:
On the road to a future free of nuclear weapons
A diverse group of supporters of the International Campaign to Abolish Nuclear Weapons recently participated in a Peace Ride, cycling 900 kms from Melbourne to Canberra, Australia's capital, taking with us the Nobel Peace Prize medal and a giant copy of the UN's Treaty on the Prohibition of Nuclear Weapons. The treaty currently has 69 signatories and 19 state parties and the UN has announced its expectation of an early entry into force.

Unraveling the New York nuclear subsidy scam
In its 2016 Clean Energy Standard, the New York State Public Service Commission quietly authorized charging ratepayers up to US$7.6 billion over 12 years on their electric bills to subsidize nuclear giant Exelon to keep running upstate nuclear plants it threatened to close. The nuclear subsidy scam started in New York, and it's getting exported to other states.

Nuclear News
– Transatomic Gen IV startup shuts down
– USA: Another nuclear power plant bites the dust

Vogtle's reprieve: snatching defeat from the jaws of defeat

Author: Jim Green: Nuclear Monitor editor

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Last year, the V.C. Summer twin-reactor AP1000 project in South Carolina was abandoned after the expenditure of at least US$9 billion. The project was initially estimated to cost US$9.8 billion[1]; when it was abandoned, the estimate was around US$25 billion.[2]

Last month, the last remaining reactor project in the US – the Vogtle twin-reactor AP1000 project in Georgia – came close to being abandoned due to massive cost overruns. The construction cost blowout at Vogtle is just as bad as that in South Carolina:

- c.2008: US$9.5 billion 'initial' budget for the twin-reactor Vogtle project according to electric power utility JEA.[4]
- 2008: US$10.4 billion[5]
- 2009: US$14–14.3 billion[6,7]
- 2013: US15.5 billion[8]
- Aug. 2017: US$25–30 billion. Total Vogtle cost likely to exceed US$25 billion and could exceed US$27 billion according to a Southern Co. filing with the Securities and Exchange Commission.[9] An analysis by the *Augusta Chronicle* found that total costs could approach US$30 billion.[10]

Aug.–Sept. 2018: US$27–30+ billion: In August, Southern Co. announced US$2.3 billion in additional cost overruns for Vogtle.[4] S&P estimates the cost to be US$27–28 billion including financing costs[5] and states that "significant risks remain … and additional overruns or project delays are possible."[11] JEA estimates total costs of "more than $30 billion" and notes that there is "no guarantee that this amount will not continue to increase".[12] Morgan Stanley analysts say there is a "very high likelihood" of additional cost overruns.[16]

The current cost estimate for Vogtle reactors #3 and #4 is 10 times greater than Westinghouse's 2006 estimate of US$1.4–$1.9 billion to build one AP1000 reactor.[3] To find another blowout of that magnitude you'd need to go back to … Vogtle #1 and #2! Built in the 1970s and 1980s, the cost of the first Vogtle twin-reactor project skyrocketed 13-fold, from US$660 million to US$8.7 billion (around US$18 billion on today's money).[13]

The Vogtle project is 5.5 years behind schedule: planned startup dates of April 2016 and April 2017 have been pushed back to November 2021 and November 2022.

The project was 69.9% complete as of the end of July 2018, and construction 55.3% complete.[14] Thus there is plenty of scope for further cost increases and delays.

Near-death experience

Vogtle's recent near-death experience began with the latest multi-billion-dollar cost increase: a US$2.3 billion increase announced in August. That automatically triggered a Project Adverse Event under the terms of the Vogtle Joint Ownership Agreement, requiring a vote by the four project owners – Georgia Power (45.7%), Oglethorpe Power Corp. (30%), MEAG (22.7) and Dalton Utilities (1.6%) – about whether to go ahead or to abandon the project.[15] Georgia Power, MEAG and Dalton agreed to proceed. Oglethorpe held out for concessions but eventually agreed to proceed after several extensions to a deadline for a decision.

Under the revised agreement, Southern Co. subsidiary Georgia Power would pay an increased share (55.7% – an additional 10%) of cost overruns up to US$1.6 billion beyond the current cost estimate and 65.7% of costs up to US$2.1 billion over the current estimate. Beyond that, minority owners would have the right to sell a portion of their stake in the project to Georgia Power, unless Georgia Power chose to abandon the project.[15] Morgan Stanley analysts say there is a "very good chance" that future cost increases could exceed US$2.1 billion.[16]

Overall, the three smaller project partners (Oglethorpe, MEAG and Dalton) won minor risk reductions in relation to the inevitable future cost increases, but cost increases will no longer trigger a Project Adverse Event or another vote on the project.[19] The minor partners were steamrolled according to the Energy and Policy Institute and "now only have one option for recourse; wait until costs go up by another $2.1 billion and forfeit their investment."[19]

The revised agreement also includes a provision to address a lawsuit from Jacksonville Electric Authority (JEA), which is doing everything it can to exit a Vogtle power purchase agreement it signed with MEAG.[6] If JEA succeeds in exiting its agreement, Georgia Power would provide MEAG with up to US$250 million in loans to finance the plant's completion.[17]

JEA's legal filing against MEAG bemoans its "unlimited obligation to fund the exorbitant and ever-ballooning cost of constructing units of a nuclear power plant that JEA does not own, over which it has no control and which will be owned and controlled by private enterprises."[18] It goes on to say: "JEA must satisfy this open-ended obligation to pay for MEAG's yet unknown and uncapped debt service regardless of the amount, regardless of

whether the Additional Units are ever built or ever become operational, and regardless of whether JEA ever receives any electricity, capacity, or benefit whatsoever from the Additional Units."[12]

Carrots and sticks from the federal government have been important. Federal tax credits will amount to a subsidy of around US$2 billion. In addition, the federal government has provided loan guarantees to Vogtle project partners of US$8.7 billion, and has offered additional loan guarantees of US$3.7 billion. Last month, the Department of Energy lobbied the project partners to go ahead with Vogtle and warned that: "If the owners decide to cancel the project, the Department is prepared to move swiftly to fully enforce its rights under the terms of the Loan Guarantee Agreements, including the repayment provisions."[12]

Snatching defeat from the jaws of defeat

US Department of Energy spokesperson Shaylyn Hynes said the revised Vogtle agreement "will reaffirm America's international leadership in nuclear technology and ... mark the beginning of a nuclear renaissance in America."[15]

Yeah, right.

Long before the latest multi-billion-dollar cost increase, in May 2017, *Atlanta Journal-Constitution* journalists wrote: "Years behind schedule, billions over budget, and with a key contractor's bankruptcy clouding its future, the troubled Vogtle project near Augusta is fast becoming Exhibit A for why no U.S. utility before Atlanta-based Southern had tried building a new reactor in 30-plus years."[20]

Exhibit B is the abandoned V.C. Summer project in South Carolina.

Bloomberg opinion columnist Liam Denning argued that Southern Co. "snatched defeat from the jaws of a different kind of defeat" with the revised project agreement.[21] He continued:

"While Vogtle may well be completed due to sheer political doggedness, it won't be for any reasonable economic reason. Even assuming no further overruns, it will already cost more than $11,000 per kilowatt of capacity, multiples of what a new gas-fired plant or utility-scale solar array would cost. …

"Nuclear power proponents rightly point out that it provides vast quantities of carbon-free, uninterrupted energy. They also raise concerns about the U.S. falling behind on nuclear technology. That may be a valid concern, but does rather raise the question as to why the good ratepayers of Georgia should be saddled with the costs of maintaining national security.

"The problem, however, is that these plants are gigantic, one-off projects prone to cost overruns and requiring years of planning and construction before they generate a cent of revenue. This is just an unacceptable risk for most commercial operators, and why government assistance in the form of regulated cost recovery, price guarantees or finance is so often crucial to getting them built."

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IPCC bets on the renewables revolution

Author: Jim Green – Nuclear Monitor editor

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The UN's Intergovernmental Panel on Climate Change (IPCC) has issued a landmark report warning that global warming must be kept to 1.5˚C, requiring "rapid and far-reaching" transitions in land, energy, industry, buildings, transport, and cities.[1]

The world must invest US$2.4 trillion in clean energy every year through 2035 and cut the use of coal-fired power to almost nothing by 2050 to avoid catastrophic damage from climate change, according to the IPCC. To put the US$2.4 trillion figure in context, about US$1.8 trillion was invested in energy systems globally in 2017, of which about 42% was invested in electricity generation and about 18.5% in renewables.[2]

Unsurprisingly, the World Nuclear Association (WNA) used the IPCC report to promote nuclear power. WNA Director General Agneta Rising said the IPCC report "makes clear … the necessity of nuclear energy as an important part of an effective global response" to climate change and that it "highlights the proven qualities of nuclear energy as a highly effective method of reducing greenhouse gas emissions, as well as providing secure, reliable and scalable electricity supplies."[3] In a separate statement, the WNA falsely claimed that nuclear power increases under all of the IPCC scenarios compatible with limiting warming to 1.5˚C.[4]

Almost all of the WNA's claims are false or exaggerated. The IPCC report raises numerous concerns about nuclear power (discussed below). In general terms, nearly all of the scenarios presented in the IPCC report envisage a decline in nuclear power generation to 2030 followed by an upswing.[5] No logical rationale – or any rationale at all – is provided to support the upswing from 2030 to 2050.

The points that jump out from the IPCC's low-carbon 1.5°C scenarios are that nuclear accounts for only a small fraction of energy/electricity supply (even if nuclear output increases) whereas renewables do the heavy lifting. For example, in one 1.5°C scenario, nuclear power more than doubles by 2050 but only accounts for 4.2% of primary energy whereas renewables account for 60.8%.[6] In another 1.5°C scenario, nuclear nearly doubles by 2050 but its contribution to total electricity supply falls to 8.9%, compared to 77.5% for renewables.[7]

The IPCC report notes that: "Nuclear power increases its share in most 1.5°C pathways by 2050, but in some pathways both the absolute capacity and share of power from nuclear generators declines. There are large differences in nuclear power between models and across pathways … Some 1.5°C pathways no longer see a role for nuclear fission by the end of the century, while others project over 200 EJ / yr of nuclear power in 2100."[8]

Nuclear lobbyist Michael Shellenberger has a very different take on the IPCC report to the WNA … and most of his claims are false as well.[9] Shellenberger takes the IPCC to task for stating that nuclear power risks nuclear weapons proliferation.[10,11] That is "unsubstantiated fear-mongering", he claims, although Shellenberger himself has written at length about the manifold and repeatedly-demonstrated connections between nuclear power and weapons.[12] "No nation has used its civilian nuclear plants to create a weapon", Shellenberger now claims – which is garbage.[13]

Shellenberger seems troubled by the IPCC's claims about a possible connection between nuclear power and childhood leukemia – but he doesn't explain why. The IPCC's comments are modest: "Increased occurrence of childhood leukaemia in populations living within 5 km of nuclear power plants was identified by some studies, even though a direct causal relation to ionizing radiation could not be established and other studies could not confirm any correlation (low evidence/agreement in this issue)."[10] In fact the evidence of a link is stronger than the IPCC suggests.[14,15]

Shellenberger complains about "biased and misleading cost comparisons" in the IPCC report though the report simply notes that nuclear power provides an example of "where real-world costs have been higher than anticipated ... while solar PV is an example where real-world costs have been lower".[16]

Shellenberger claims that solar and wind contributed 1.3% and 3.9% to global electricity supply in 2017 – the true figures are 1.9% and 5.6%.[17] He fails to note that all renewables combined supplied 26.5% of global electricity supply in 2017 (2.5 times more than nuclear) or that renewable supply has doubled over the past decade while nuclear power has been stagnant.

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California strives toward ‘carbon neutrality’

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On September 10, California Governor Jerry Brown announced a plan that raises the state’s level of ambition with regard to its carbon footprint. The announcement came on the eve of a Global Climate Action Summit, a conference held in San Francisco and hosted by the Governor, to showcase ‘best policies’ to address the threats of climate change in regions and communities around the world.

In part, the plan follows guidelines for sourcing of the energy supply set out in (State) Senate Bill 100, a draft of which cleared the Senate in August. SB-100 was controversial – most Republicans opposed it, Democrats supported it. The opposition included powerful agricultural interests and the state’s major privately owned utilities. On the other hand, luminaries like ex-California Governor Arnold Schwarzenegger (Republican) and former US Vice-President Al Gore urged its passage.

California had an ambitious climate policy even before the announcement. A Climate Scoping Plan adopted in 2017 charts the way toward the goal that all electricity sold to, or generated by, public and private users in the state should be from ”renewables” by 2050. The new bill and executive order move the deadline forward, to 2045. Progress will be assessed at three checkpoints, with specified target shares of retail sales of ”zero-carbon” electricity for each. The checkpoints set the pace of reform for public utilities and other energy providers in the state.

The Governor’s executive order, however, takes a giant step further. Not only will electricity in the state be carbon-free “as soon as possible, but no later than 2045”, the entire Californian economy will be “carbon neutral”. That means that Californians will remove at least as much carbon from the atmosphere as they add to it. As stated in the Governor’s order: “The achievement of carbon neutrality will require both significant reductions in carbon pollution and removal of carbon dioxide from the atmosphere, including sequestration in forests, soils, and other natural landscapes.” A truly ambitious goal.

Naturally, there are doubters.

Rich in energy resources, but ...

California, the most populous state of the Union and the fifth-largest economy in the world, uses quite a lot of energy and has a heavy climate footprint.

The California Energy Commission estimates that 32% of retail energy sales are generated from renewable sources today. Renewables are notoriously variable, but one sunny day this past June solar panels alone produced nearly half the state’s electricity.

California also has the benefit of both geothermal (north of San Francisco; covering 6% of energy needs) and large-scale hydroelectric power to fill the gaps, albeit protracted drought in recent years has made even hydro something of a ’variable’, too. For these reasons, increasing the efficiency of electricity storage media and upgrading the state’s transmission grid system are key to achieving the plan’s goals. Both are the object of high priority R&D programs started in the past few years.

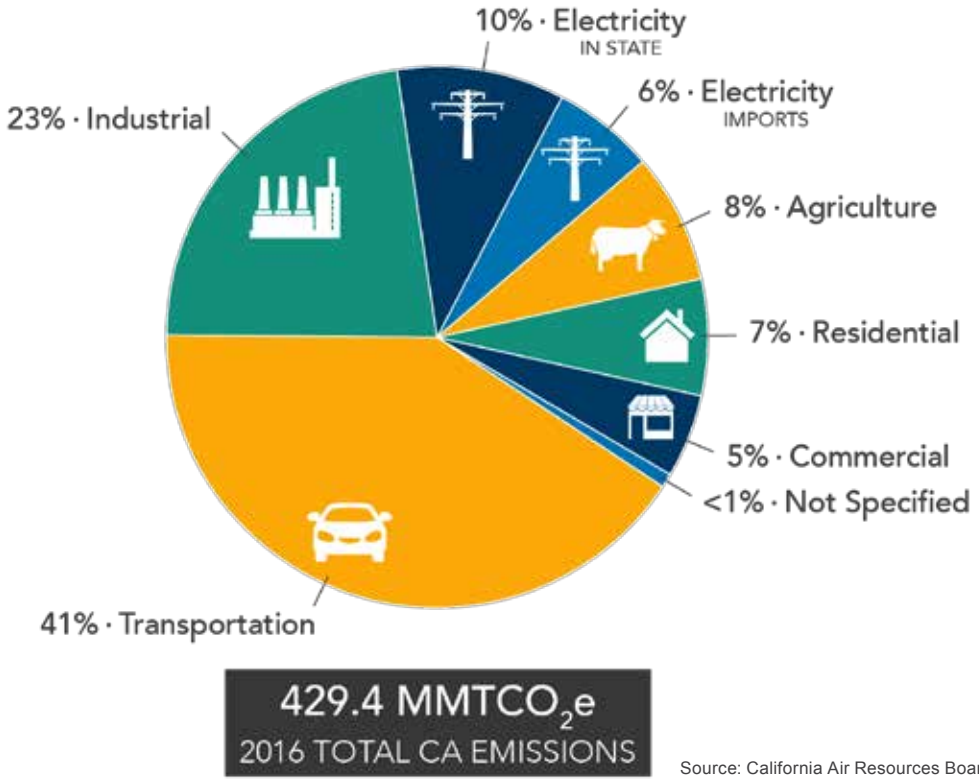
The Executive Order sets out other principal climate policy measures:

- “Requiring significant reductions of destructive super pollutants including black carbon and methane;
- Supporting clean transportation to reduce petroleum use 45 per cent by 2045;
- Setting a goal of 5 million zero emission vehicles by 2030;
- Proposing to double the reduction in the carbon intensity of fuels by 2030;
- Moving the state to 100 percent clean energy by 2045;
- Requiring the state to double the rate of energy efficiency savings in buildings;
- Extending and improving the state’s cap-and-trade program;
- Directing cap-and-trade funds to greenhouse gas reducing programs which benefit disadvantaged communities;
- Developing a Forest Carbon Plan to better manage California’s forest land.”

Will nuclear power play any part in this?

’Renewable’, ’zero-emissions’, ’carbon-neutral’. The terms are used interchangeably – in daily parlance and, significantly, in the Governor’s announcement. In an interview with *MIT Technology Review,* Jane Long at Livermore National Laboratories points out the importance of a slight change of wording in SB-100, compared to previous documents on the issue. The bill uses ’zero carbon’ and ’zero emissions’ as the criterion. The State of California has explicitly excluded nuclear power from its definition of renewable power resources, but nuclear power does qualify as a ”zero-emission” resource in US usage. As noted above, the target is ”carbon neutrality” for the state in 2045, a term that neatly skirts the lexical issue. Other than the ban on carbon emissions, there are no specifics as to how Californians will go about reaching that target.

Long term, the likelihood that any nuclear power in the mix would be generated in California is small. California has only two remaining nuclear power reactors, both at Diablo Canyon in San Luis Obispo County (on the south-central coast). Today, the plant supplies about 8–9%



Source: California Air Resources Board, ww2.arb.ca.gov

of the state's electricity, but in 2016 the operator PG&E announced plans to take the reactors offline in 2024 and 2025, before they become too much of an "economic liability", as the company put it. In January 2018, the Public Utilities Commission gave its unanimous approval.

PG&E cited changes in the California power supply and demand – notably the growth of renewables and greater energy efficiency. The emergence of community choice aggregators in many communities was a third concern. The head of PG&E's electricity division stressed the company's willingness and preparedness to adapt to these new trends. In sum, nuclear 'new build' appears to be out of the question.

California regularly imports electricity from a number of western states in the US. SB-100 prohibits reliance on electricity from any source that adds to carbon emissions, whether inside or outside the state. But, pending further clarification, the possibility that out-of-state nuclear facilities might be called upon cannot be ruled out.

'America' is greater than Donald Trump

California's climate policy has been described as "a symbolic strike against the Trump administration". Donald Trump has made headlines worldwide for his refusal to acknowledge the problems climate-altering emissions pose, a position which led him to take the US out of the 2015 Paris Agreement and to do what he can to promote both 'fracking' to extract fossil gas and a revival of coal mining in the country.

Mr. Trump may be the chief executive, but he is hardly representative of the US as a whole. A majority of states, 28 of the 50, have adopted climate policies that conform with the Paris accord – or better.

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ICAN Nobel Peace Prize Ride: On the road to a future free of nuclear weapons

Author: Gem Romuld – Australian director of the International Campaign to Abolish Nuclear Weapons

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Nuclear weapons pose a threat to everything we hold dear. Yet nine nations cling to 14,500 nuclear weapons, enough to annihilate our planet many times over. The *Bulletin of the Atomic Scientists* recently shifted the hands of the Doomsday Clock to two minutes to midnight, the closest it has been since 1953, signaling grave concern that we are entering a new nuclear arms race.

The risk is real and growing. Driven by deep concern for the humanitarian impacts of nuclear weapons, a global majority of nations are taking action. Chemical and biological weapons have long been outlawed by international treaty. Last year, 122 nations united to put nuclear weapons in the same legal category. In July 2017, they voted to adopt the Treaty on the Prohibition of Nuclear Weapons at the United Nations.

The Australian-founded International Campaign to Abolish Nuclear Weapons (ICAN) was awarded the 2017 Nobel Peace Prize for our role in helping to achieve this treaty. Regrettably, Australia hasn't yet signed on to the ban. Our Liberal / National Party government is a proud signatory to the treaties prohibiting landmines, cluster munitions, biological and chemical weapons, but is resisting signing the nuclear weapon ban treaty. This must change, to reflect the will of the vast majority of Australians who do not want weapons of mass destruction used in their name.

A diverse group of ICAN supporters recently participated in a Peace Ride, cycling 900 kms from Melbourne to Canberra, the nation's capital, taking with us the Nobel Peace Prize medal and a giant copy of the nuclear weapon ban treaty. We slept in church halls, shared potluck dinners with locals and hosted events in regional towns Benalla, Albury and Gundagai.

Our journey culminated in Canberra on September 20, the first anniversary of the nuclear weapon ban treaty opening for signature at the United Nations. Our cyclists were joined by local supporters for the final "glory lap", before we marched our message up to Parliament House with a giant banner reading calling for Australia to join the ban. While the Government refused to meet with us, many of our supporters within Parliament welcomed the cyclists and spoke up about the ban treaty inside and outside the chambers. The ACT Government passed a resolution calling on Australia to sign and ratify the treaty, while 32 giant ICAN flags flew proudly on Commonwealth Avenue.

ICAN Ambassador and Kokatha Aboriginal elder Aunty Sue Coleman-Haseldine stood outside Parliament and spoke up about the legacy of nuclear testing that her community has suffered:

"Aboriginal people … at that time knew nothing about the effects of radiation and the future poisonous outcomes. There's so many deaths in a region of various cancers. There has been no long-term assessment of health impacts in the region. What we urgently need to change is Australia's position on the nuclear ban treaty.

"I'm really proud to be here to ask the government to change their minds about the treaty and to sign on so that we can look forward to a nuclear free future. To all the policy and change makers here today, you can make this happen."

The Treaty on the Prohibition of Nuclear Weapons currently has 69 signatories and 19 state parties, as of 28 September. The treaty is setting a record pace for ratifications compared to other WMD treaties, and the UN has announced its expectation of an early entry into force.

Momentum is growing for Australia to sign and ratify the ban, with 76% of Labor Party members having pledged their support, along with a number of government, Greens, Centre Alliance and independent parliamentarians. While Australia initially resisted signing on to the treaty prohibiting landmines, it now boasts of being a proud state party. One day Australia will boast of being a state party to the nuclear weapon ban treaty as well. This treaty provides the path we desperately need, to reach a world free of nuclear weapons.

Peace riders and parliamentarians at Parliament House, Canberra.

Unraveling the New York nuclear subsidy scam

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Across the country, nuclear plant owners are insisting states and the federal government approve billion-dollar subsidies to bail them out – even if they're profitable. In its 2016 Clean Energy Standard (CES), the New York State Public Service Commission quietly authorized charging ratepayers up to US$7.6 billion over 12 years on their electric bills to subsidize nuclear giant Exelon, so it would keep running upstate nuclear plants it threatened to close (FitzPatrick, Ginna, and Nine Mile Point). Since these surcharges kicked in last spring, New Yorkers have already handed over US$656 million and counting to prop up these failing nuclear plants.[1]

The nuclear subsidy scam started in New York, and it's getting exported. After they were imposed here, Exelon and other nuclear owners used the same playbook to obtain billions more in subsidies in Illinois (US$2.4 billion), New Jersey (US$3.6 billion), Connecticut (estimated up to US$3 billion), and soon, Pennsylvania and other states. They did it by falsely claiming their nuclear plants are "clean energy" and "zero emissions," and threatening to shutter them and terminate their workers if they don't get the money, escalating their lobbying activity all the while.

Such tactics shouldn't work, yet they do. For example, in New Jersey Exelon and PSEG threatened to close plants and spent a combined US$2.6 million last year on lobbyists, who kept dogging the New Jersey legislature until the unpopular subsidy package finally passed.[2]

To date, the fairness and legality of these subsidies have not been challenged and judged in court. But that's about to change. A suit in New York State Supreme Court (Matter of Hudson River Sloop Clearwater v. NYS Public Service Commission, Albany County, 7242-16) is finally examining whether these subsidies are illegal or improper, if they violate the public trust and due process of law, and if PSC overstepped its authority by granting them without due process. The suit, of which I am a plaintiff, survived motions to dismiss, and hearings are pending which will have far-reaching implications.

New York is where the nuclear subsidy trend started. The PSC sold subsidies as a way to preserve jobs and "carbon-free" power as a kind of radioactive "bridge" to developing renewables. Now the New York State Supreme Court could be where those specious arguments unravel.

Dirty, obsolete nuclear plants are neither "clean energy" nor "zero emissions" and don't deserve "zero emissions credits." Subsidizing them squanders billions that won't be invested in renewables or efficiency, the two best ways to lower greenhouse emissions and fight climate change. In its first year, New York's Clean Energy Standard spent 99.5% of its money to subsidize nuclear plants, and just 0.5% on renewables.

Nuclear subsidies aren't a public good, but a private wealth transfer, enriching wealthy nuclear owners at ratepayers' expense. As Illinois subsidies kicked in this year, Exelon Generations' earnings growth shot from 8% to a cork-popping 36%.[3] In New Jersey, the Salem and Hope Creek nuclear plants obtained ratepayer subsidies, yet they're profitable and will remain so at least through 2021.[4] Nuclear owner PSEG's CEO admitted to The Bergen Record the subsidy was calculated to guarantee an 18% profit – almost double the average return for a regulated utility in New Jersey.[5]

Could it be that behind such greedy profiteering is an enlightened desire on the part of nuclear owners to save us from climate change or preserve local jobs and tax bases? Is it unfair to accuse them of ratepayer money grabs?

Hardly. A March 2017 presentation by a former Exelon lobbyist that recently resurfaced brags about its nuclear subsidies representing a huge return on its "investment" in lobbying and political influence.[6] One slide asked rhetorically, "Is Politics Profitable?", and answers by comparing Exelon's outlays in New York for the FitzPatrick plant, capital expenditures, and lobbying and PR campaigns to the US$7.6 billion it got back in subsidies. It boasts that represented a "return on investment" of 750%. An image on the slide showed copious amounts of cash spiraling down a vortex.

That image is emblematic of what's wrong with these subsidies: lobbying and politicking for profit, dumping billions in ratepayers' money down the drain to enrich wealthy plant owners, instead of investing in renewables and efficiency. Those are the real issues, and as the New York State Supreme Court lawsuit goes to trial this year, they will finally get heard.

Tim Judson is the Executive Director of the Nuclear Information and Resource Service (NIRS), one of the plaintiffs in the New York lawsuit.

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NUCLEAR NEWS

Transatomic Gen IV startup shuts down

We wrote about Transatomic Power's proposed molten salt reactor (MSR) in the last issue of *Nuclear Monitor*.[1] Since then, the startup has shut down.[2,3]

Transatomic had raised more than US$4 million from Founders Fund, Acadia Woods Partners, and others. But it was unable to raise US$15 million required for the next phase of the project.

In 2016, following the revelation of false calculations, Transatomic abandoned its plan to use waste (spent fuel) as fuel and it abandoned the associated claim that its 'Waste-Annihilating Molten-Salt Reactor' could "generate up to 75 times more electricity per ton of mined uranium than a light-water reactor".[4] Its waste-annihilating reactor was reinvented as a waste-producing, uranium fueled reactor.

Transatomic co-founder Leslie Dewan put a positive spin on the company's collapse: "Today the advanced nuclear technology sector is thriving, with over 70 advanced reactor projects in progress, financing actively flowing to new technologies, promising engagement with the NRC, multiple films and TV documentaries covering innovations, and even bipartisan political support."[2]

According to the Third Way pro-nuclear lobby group, "at least five companies are already working with the Nuclear Regulatory Commission to prepare for licensing".[5] In other words, not one of the Gen IV startups has gone further than to notify the Nuclear Regulatory Commission of their intent to engage in regulatory interactions – and only five have taken that modest step.[6]

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USA: Another nuclear power plant bites the dust

Exelon Generation's Oyster Creek nuclear power plant was retired from service on September 17 after almost 49 years of electricity generation. The single-unit boiling water reactor was the oldest operating nuclear power plant in the USA.[1]

"It's a sombre day," said Tim Moore, the plant's vice-president. "We watched emotionally as our reactor shut down for the very last time."[2]

"We're seeing the economic conditions regarding nuclear power plants erode," said Exelon spokesperson Dave Tillman.[2]

Oyster Creek was licensed to operate until 2029, but Exelon decided in 2010 to retire the plant early after revisions to New Jersey's water use rules would have required it to build new cooling towers at an estimated cost of more than US$800 million. Exelon announced in February this year that the plant, which was required to close by the end of 2019 under an agreement with the State of New Jersey, would cease operations at the end of its current operating cycle.[1]

400–500 staff were employed at Oyster Creek and about 300 will be retained to carry out decommissioning work.

Environmentalists had long sought the shutdown of Oyster Creek over the years, citing corrosion that dangerously thinned its reactor vessel, and the leak of radioactive tritium into groundwater on the plant site. Jeff Tittel, director of the New Jersey Sierra Club, called Oyster Creek "a disaster waiting to happen. By closing early, it will help protect both the environment and public safety. We've been fighting this plant for more than 15 years and this closure is long overdue."[2]

Oyster Creek is the seventh permanent reactor shutdown in the US in recent years (2013 – San Onofre 2 & 3, Crystal River, Kewaunee; 2014 – Vermont Yankee; 2016 – Fort Calhoun). Many others are slated for closure over the coming decade although state government bailouts are slowing that attrition.[3] A little over half of the 98 operational reactors in the US have been operating for 40 years or more[4] and the average age is 38 years.[5]

Exelon's senior vice president William Von Hoene said earlier this year: "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 ... They are too expensive to construct, relative to the world in which we now live."[6]

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