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A PUBLICATION OF WORLD INFORMATION SERVICE ON ENERGY (WISE) AND THE NUCLEAR INFORMATION &RESOURCE SERVICE (NIRS)

Dear readers of the WISE/NIRS Nuclear Monitor,

In this issue of the Monitor:

- Editor Jim Green writes about Ukraine's troubled nuclear power program.
- Tim Judson writes about the astronomical cost of proposed subsidies for old reactors in the US.
- Vladimir Slivyak reports on changes at the head of Russia's nuclear agency Rosatom.
- Ken Bossong compares the growth of renewables in the US with the Watts Bar 2 reactor, which is set to become the country's first new reactor in 20 years.
- Phil Johnstone summarizes a new report that argues that the perceived need to maintain a nuclear technological base to support nuclear submarines partly explains the decision to go ahead with new power reactors in the UK.

The Nuclear News section has reports on reactor lifespan extensions in Japan; a new coalition aiming to improve nuclear waste policy in the Czech Republic; a new book on Germany's renewable energy transition; and a new book on nuclear power's waste legacy

Feel free to contact us if you have feedback on this issue of the Monitor, or if there are topics you would like to see covered in future issues.

Regards from the editorial team.

Email: monitor@wiseinternational.org

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Ukraine's nuclear power program going from bad to worse

Author: *Jim Green – Nuclear Monitor editor*

NM832.4590 Ukraine's nuclear regulator, the State Nuclear Regulatory Inspectorate Council, has approved further reactor lifespan extensions despite the country's failure to implement safety-related requirements under international conventions and safety-related obligations attached to loan funding.[1]

The 30-year-old Zaporizhye-1 reactor was taken offline when it reached its design lifespan in December 2015, but restarted following approval of an extension in September 2016. Then in October 2016, the Zaporizhye-2 reactor, shut down when it reached its 30-year lifespan in February 2016, received approval for a 10-year extension.

This is the latest chapter in a long-running saga. Iryna Holovko from Bankwatch / National Ecological Centre of Ukraine takes up the story:[2]

"Here's how this atomic debacle unfolded so far. In December 2010 the Ukrainian authorities approved the first lifetime extension. Unit 1 in the Rivne power plant, working since three decades, was allowed to continue operations for 20 more years. Barely a month later an accident happened, and the reactor's output had to be reduced by half.

"Unit 2 in the Rivne power plant was also granted a 20 years lifetime extension. Activists and civil society

The Zaporizhye nuclear power plant in Ukraine.

organisations criticised the decision-making process allowing these nuclear reactors' expiry dates to be rewritten. In March 2013, the Espoo Convention's Implementation Committee ruled the decision indeed was in breach of the treaty, since Ukraine did not carry out assessments of the impacts the project can have on people and the environment in neighbouring countries.

"But this did not deter the Ukrainian government. In December 2013 it approved another lifetime extension, this time for unit 1 in the South Ukraine power station. Energoatom, Ukraine's national energy operator, conducted technical checks of the nuclear reactor prior to the decision, but these might not have been thorough enough. An independent expert assessment[3] released in March 2015 criticised the re-licensing process that led to the approval of the lifetime extension, and warned that the reactor is suffering critical vulnerabilities.

"South Ukraine's unit 2 was suspended in May 2015 when it reached its original expiry date. But this was only temporary, to allow necessary safety improvements. Seven months later, in December 2015, Ukraine's nuclear regulator decided the reactor can be brought back online and continue working for ten more years, even though 11 safety measures[4] of the highest priority had not been implemented."

And now two Zaporizhye reactors have been granted lifespan extensions, bringing the total number of extensions to six. Kiev plans another six lifespan extensions.[5] Until the extension program kicked in, 12 out of Ukraine's 15 power reactors were scheduled for permanent shut-down by the end of this decade.

Espoo and Aarhus Conventions

Disputes remain unresolved regarding Ukraine's compliance (or non-compliance) with both the Espoo Convention (the UN Convention on Environmental Impact Assessment in a Transboundary Context) and the Aarhus Convention (the Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters) yet Kiev continues to approve reactor lifespan extensions.

In 2013, Ukraine was found to have breached the Espoo Convention for failing to adequately assess the potential impacts of lifespan extensions of the Rivne 1 and 2 reactors on neighboring countries, failing to consult neighboring countries, and failing to conduct an Environmental Impact Assessment.[6]

Ukraine's neighbours – Romania, Slovakia, Hungary and Austria – have sent multiple questions for clarification and requests for participation in trans-boundary consultations regarding Ukraine's reactor lifespan extension program. But Kiev, in response, has denied its obligation to conduct any such consultations.[2]

The Espoo Convention's Implementation Committee is the only body with the power to rule on violations of the Convention. The Committee is currently preparing a report, for the June 2017 Meeting of the Parties, on Ukraine's adherence to (or violation of) the Convention.[7]

Obligations attached to European funding

Numerous European institutions are involved in this complex saga. In March 2013, the European Bank for Reconstruction & Development (EBRD) announced a €300 million loan for reactor safety upgrading in Ukraine, matching €300 million from Euratom. That €600 million (US$660m) amounts to one-quarter of the total EU support to Ukraine's energy sector between 2007-2014.[8]

Funding for safety upgrades is welcome – but the program is badly undermined by Ukraine's failure to abide by safety-related obligations attached to the funding.

Earlier this year, Bankwatch approached the European Commission requesting documents related to Euratom's loans to Ukraine. Bankwatch believes that Ukraine has not met the loan conditions, that it is violating the Espoo and Aarhus Conventions, and that the Espoo Committee's 2013 ruling regarding Ukraine's non-compliance should be considered a precedent applicable to similar cases. Following an inadequate response from the European Commission, Bankwatch took the case to the European Court of Justice. That case is still pending – yet reactor lifespan extension decisions are still being made in Ukraine.[7]

In addition to obligations arising under the Espoo and Aarhus Conventions, each of the two €300 million loans for safety upgrades is conditional on full compliance with international environmental law, include the Espoo Convention. The European Commission has reiterated this obligation on several occasions.[7]

Iryna Holovko from Bankwatch / National Ecological Centre of Ukraine said: "Ukrainian authorities need a clear message from the European Commission that disrespect for international obligations comes with consequences. No respect for conventions, no money."[1]

Energy Community

Ukraine is also under scrutiny by the Energy Community (established by an international treaty in 2005) for its failure to implement the EU's Environmental Impact Assessment Directive, one of the obligations tied to the safety upgrade funding.[9]

Ukraine was required to transpose the Energy Community's Environmental Impact Assessment Directive into national law by 1 January 2013 but still hasn't done so. Issues of concern include, in the Energy Community's words, "provisions on transboundary environmental impact assessment and the improper or incomplete transposition of the provisions on the projects to be covered by an environmental impact assessment, on the information to be included in the impact assessment report and on public participation."[9]

In a 6 September 2016 statement, the Energy Community gave Ukraine two months to "react to the allegation of non-compliance with Energy Community law".[9]

Growing accident rate at Ukrainian nuclear plants

Nuclear Engineering International reported in August 2016:[10]

"[T]here is growing concern about the condition of Ukraine's NPPs. Former Chernobyl NPP director Mikhail Umanets told a recent press conference in Kiev that he is concerned by the growing number of emergency situations being reported at the plants. He warned that the possibility of an accident at one of Ukraine's four operating NPPs nuclear power plants is increasing.

"The Ukrainian nuclear industry has faced several high-profile incidents recently. In July, a unit at Khmelnitsky NPP was disconnected from the grid following a steam generator leak. In late May, unit 2 at the South Ukraine NPP was forced to stop operations, after operators tripped the station's safety systems. In April, energy production at the Zaporozhye and Rovno plants stopped while faults were investigated. In the spring, all the reactors were at risk of being closed, after Energoatom's foreign currency accounts were frozen and there were no funds to pay for nuclear fuel.

"Umanets noted out that 15 violations were recorded at the plants in 2015, based on the International Nuclear and Radiological Events Scale (INES), which documents both minor incidents and major accidents. That is 1.5 times more than the number of recorded in 2014. In 2016, he added, the INES has already recorded seven violations, double the amount reported during the same period in 2015.

""We run the risk of a serious incident. Since 16 October 2014, Ukraine has not had a chief inspector for nuclear and radiation safety. The position was eliminated, and no self-respecting professional would agree to take it after the cabinet proposed a bill to Ukraine's parliament which stated that 'the inspector's decisions may be cancelled by the head of the state regulator or his designated representative'," he said."

Build them on Mars

Any number of scenarios could potentially develop from the simmering Ukrainian–Russian conflict and the broader geopolitical conflicts surrounding the regional conflict – attacks or accidental strikes on nuclear plants by sub-national groups or nation-states, regional conflict sparking conflict between nuclear-armed superpowers, cyberattacks[11], insider attacks[12], the possibility that Ukraine's small atomic bomb lobby will grow in strength, etc. Most of those scenarios are low probability but potentially very high impact.

Nuclear waste is another concern. Poorly shielded spent fuel casks, lacking a secondary containment system, at the Zaporizhye plant – the closest of Ukraine's nuclear plants to the conflict in eastern Ukraine – are potential targets of a deliberate attack or a stray missile. The Guardian reported in May 2015 that more than 3,000 spent fuel rods are kept inside metal casks and concrete containers in an open-air yard close to the perimeter fence at Zaporizhye. Gustav Gressel from the European Council of Foreign Relations said "the Russians use a large amount of multiple rocket-propelled systems that are not entirely precise, and they don't really care where they land." Around 770,000 people live in the city of Zaporizhye.[13]

There was nothing reassuring in the comments of Sergiy Bozhko, chair of the State Nuclear Regulatory Inspectorate of Ukraine, to The Guardian in May 2015: "Given the current state of warfare, I cannot say what could be done to completely protect installations from attack, except to build them on Mars."[13]

Numerous security incidents have been reported since 2014. For example, in May 2014, the Zaporizhye nuclear plant was the backdrop to an armed confrontation between men from Right Sector (a pro-Ukrainian paramilitary force), security guards from the plant and police. The Right Sector men said they had come to remove pro-Russian agitators who, they claimed, had been operating inside the plant. The Right Sector men were eventually disarmed.[14]

But it's near-impossible to accurately gauge the scale of the nuclear security problem over the past 2.5 years – too much of the available 'information' is colored by the Ukrainian and Russian governments' attempts to downplay or exaggerate risks and problems.

And while much of the discussion focuses on sub-national groups threatening nuclear plants, nation-states also need to be considered. Bennett Ramberg, a former policy analyst with the US State Department, wrote in an April 2014 article:[15]

"History offers little guidance as to whether warring countries would avoid damaging nuclear sites. With the exception of the 1990s' Balkan conflict, wars have not been fought against or within countries with nuclear reactors. In the case of the Balkans, Serbian military jets overflew Slovenia's Krško nuclear power plant in a threatening gesture early in the conflict, while radical Serbian nationalists called for attacks to release the radioactive contents. Serbia itself later issued a plea to Nato not to bomb its large research reactor in Belgrade. Fortunately, the war ended with both reactors untouched.

"While that case provides some assurance that military and political leaders will think twice about attacking nuclear reactors, the sheer scale of Ukraine's nuclear enterprise calls for far greater global concern. ... Concentrated in four locations, Ukraine's pressurized water reactors differ from the less stable Chernobyl RBMK design, yet still remain capable of releasing radioactive contents should safeguards fail. Given that Russia, too, suffered serious consequences from the Chernobyl accident, it is to be hoped that the Kremlin would recoil at the idea of bombing the plants intentionally. But warfare is rife with accidents and human error, and such an event involving a nuclear plant could cause a meltdown.

"A loss of off-site power, for example, could be an issue of serious concern. Although nuclear plants are copious producers of electricity, they also require electrical power from other sources to operate. Without incoming energy, cooling pumps will cease functioning and the flow of water that carries heat away from the reactor core – required even when the reactor is in shutdown mode – will stop.

"To meet that risk, nuclear plants maintain large emergency diesel generators, which can operate for days – until their fuel runs out. The reactor meltdowns at Japan's Fukushima Daiichi power station in 2011 demonstrated what happens when primary and emergency operating power are cut.

"Such vulnerabilities raise troubling questions in the event of a war. Fighting could disrupt off-site power plants or transmission lines servicing the reactor, and could also prevent diesel fuel from reaching the plant to replenish standby generators. Operators could abandon their posts should violence encroach.

"Moreover, combatants could invade nuclear plants and threaten sabotage to release radioactive elements to intimidate their opponents. Others might take refuge there, creating a dangerous standoff. A failure of military command and control or the fog of war could bring plants under bombardment.

"Serious radiological contamination could result in each of these scenarios. And, though no one stands to gain from a radioactive release, if war breaks out, we must anticipate the unexpected.

"In Ukraine, nuclear emissions could exceed both Chernobyl and Fukushima. Wartime conditions would prevent emergency crews from getting to an affected plant to contain radiological releases should reactor containments fail. And, with government services shut down in the midst of fighting, civilians attempting to escape radioactive contamination would not know what to do or where to go to protect themselves."

Clean energy solutions

Clean energy solutions – renewables and energy efficiency and conservation – offer a way to reduce the myriad risks associated with Ukraine's nuclear power program. Ukraine is highly energy inefficient due to decades of subsidies that artificially reduce energy costs to the public and frequent failure to even collect on the energy bills that are charged to consumers and institutions.[16] So there's plenty of low-hanging fruit in the fields of energy efficiency and conservation.

And there's plenty of untapped renewable energy potential. Jan Haverkamp and Iryna Holovko wrote in an April 2016 paper: "Ukraine could cover its entire energy demand in 2050 with wind, solar and water and a 32% decrease in primary energy need. A move towards clean, renewable energy sources (such as wind, water, sun, biomass and geothermal) would seem a logical route, especially given the potential savings in health costs and increase in energy independence. Here, in these countries most afflicted by Chernobyl, economic realities make this switch to a clean energy future inevitable: the old centralised energy economy is collapsing, slowly but surely, and an awareness movement is growing."[17]

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The astronomical cost of new subsidies for old reactors in the U.S.

Author: *Tim Judson – Executive Director, Nuclear Information & Resource Service*

NM832.4591 The Nuclear Information & Resource Service (NIRS) has covered the unfolding story of the US nuclear power industry's clamor for new subsidies and bailouts since it started in 2014. Purely as a spectator sport, it might have been entertaining to watch the country's largest utilities go from proclaiming a "Nuclear Renaissance" a decade ago to peddling the message that "Nuclear Matters".[1]

But there is just too much at stake to treat it like a game. The utility industry's ramped-up efforts to block renewable energy and horde billions of our clean energy dollars to prop up old nukes risks both climate and nuclear disaster.[2] Most of these proposals have been failing, thanks to the dogged persistence of grassroots activists and clean energy groups – and the outrageous sticker price of subsidies the industry needs. In fact, earlier this month, the two-year saga of FirstEnergy's US$8 billion nuclear-plus-coal bailout plan seems to have ended, with what amounts to a consolation gift to a couple FirstEnergy utility companies.[3] Still an outrageous corporate giveaway, but no subsidies for nuclear or coal, even after it seemed like a done deal a few months ago.

But New York Governor Cuomo's decision in August to award a 12-year, US$7.6 billion subsidy package to four aging reactors – including reversing Entergy's decision to close the FitzPatrick reactor in January 2017 – has put wind into the industry's sails.[4] Even that chapter isn't over, with lawsuits already being filed and several more expected.[5] And environmental groups last week launched a new campaign to get Governor Cuomo to smell the coffee and cancel what will not only be the largest corporate give-away in the state's history, but relegate clean energy to second-class status behind old nukes.[6]

The lingering uncertainty hasn't stopped the industry PR and lobbying machines, though – after all, billions of dollars in free money is at stake! Exelon, FirstEnergy, and other companies touted New York as a national model, and began urging states from Connecticut to Illinois to follow suit. Having to get each state to line up is going to be a tall order. In addition to FirstEnergy's failed Ohio bailout, Exelon hasn't been able to sell a much smaller five-year, US$1.5 billion subsidy in Illinois. And nukes in Connecticut and New Jersey are still making millions in profits each year, without heaping billions more in subsidies onto ratepayers' utility bills.[7]

So the industry has started pushing for a national bailout.[8] NIRS thought we should take a look at what that might cost. Later this month, we will publish a report showing that a federal nuclear subsidy based on the EPA's estimate of the social cost of carbon would be massively expensive: up to US$280 billion (€255bn) by 2030. Even if it were only applied to reactors that are already becoming unprofitable – more than half of the nukes in the country, according to a recent report[9] – it would total at least US$160 billion.

Please sign the NIRS petition

NIRS is launching a petition to the next President urging the new administration to say no to a national nuclear bailout, and to end subsidies for nuclear and fossil fuels. We hope you'll sign the petition and help us get to our goal of 100,000 signatures. Whoever wins the election in November needs to know that another nuclear bailout isn't going to fly with the American people. To sign the petition please visit www.tinyurl.com/nirs-petition

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Russian government appoints new head of Rosatom

Author: *Vladimir Slivyak – deputy chair of Ecodefence*

NM832.4592 After 10 years as head of Rosatom, Sergey Kirienko is now deputy head of Russia's Presidential Administration. What will he bring to the job?

In 2005, when Kirienko was put in charge of Russia's Federal Atomic Energy Agency (renamed Rosatom in 2007), he'd never had any experience of the nuclear power sector.

Later to make headlines as Russia's youngest prime minister, Kirienko's political career began in 1997, when he became deputy minister of fuel and energy. In 1998, he served as prime minister under Boris Yeltsin for several months before resigning over the financial crisis that led to the devaluing of the rouble and Russia defaulting on its debts. Now Kirienko is once again at the hub of power, looking after internal political matters.

Kirienko's successor at Rosatom is Alexei Likhachev, Russia's first deputy minister of economic development since 2010. Likhachev would seem to be a natural choice for the job – he was born in Arzamas-16, now Sarov, the Russian centre for nuclear research and still a closed city.

Likhachev has known Kirienko for many years and was probably recommended by him. His work at the ministry of economic development centred on international relations, and he took part in negotiations on Russia's membership of the World Trade Organisation in 2010 – useful experience at a time when building nuclear power plants in other countries is Rosatom's main priority.

Information and secrecy

News of these two appointments came out rather oddly. Prior to September 24, when RBC broke the story of Kirienko's appointment, there had been no rumours at all about Kirienko's move, and another two weeks passed before he was officially given his new job.

During that time speculation mounted about his successor at Rosatom, and it was not a question of specific names, but of where he or she might come from – the FSB, the nuclear industry, the presidential administration. But all these rumours turned out to be groundless.

This fact illustrates the effectiveness of Kirienko's PR team: all of Rosatom's information channels are hermetically sealed, and if any important news appears, it is only by the grace of the residents of the agency's enormous headquarters building on Moscow's Bolshaya Ordynka street. There has been the odd information leak, but usually involving foreign media, which Rosatom has little control over.

The way Kirienko's appointment has developed as a story demonstrates the level of openness, or rather lack of it, which Kirienko's team has created in recent years. If a major accident had occurred at a nuclear power plant in Russia during Kirienko's time at Rosatom, it is unlikely that anyone would have heard about it for some time. Instead, there would have been a scenario reminiscent of 1986, when the Soviet government tried to hush up the scale of the Chernobyl disaster for as long as possible.

This lack of transparency is dangerous precisely because in the case of another nuclear accident, it could be a matter of life and death. And this is not a question of official secrets or nuclear weapons. Rosatom is funded by Russia's taxpayers and has to be accountable to them.

Paper power plants

Kirienko's legacy at Rosatom is a separate issue. Given this recent appointment, he is, it seems, highly regarded by the Kremlin.

There may have been two to three times fewer nuclear power plants built on his watch than were planned. There may have been plenty of corruption scandals involving the arrest of senior staff, including Kirienko's deputies, on embezzlement charges. But the corporation's "portfolio" for power plants to be built abroad is worth an astronomical US$100 billion (€91bn). And for the Kremlin, which periodically uses energy supply threats to put pressure on countries it is displeased with, nuclear power is not just a question of prestige and money.

To assess Kirienko's effectiveness as a manager, however, we need to look inside Rosatom's commission portfolio. These "orders" are not contracts specifying delivery dates, costs and a clear timescale for loan repayments (in most cases the money lent by Russia for power plant construction comes with a repayment date). Eighty to ninety per cent of these reported arrangements are agreements in principle that are vague on details, and in the overwhelming majority of cases the contracts aren't worth the paper they're printed on.

Russian media frequently give the impression that Rosatom is building reactors all over the world. It is true that there have been orders from over 20 countries, but they are actually being built in only three places – China, India and Belarus. And in the case of the first two, international cooperation began long before Kirienko joined the nuclear energy sector.

So it is clear that Kirienko's team has been excellent at drawing up and signing non-binding nuclear agreements, and providing an information blockade for the industry. Actually building nuclear plants seems to be beyond them.

The situation in Russia itself is quite different. It has 35 working reactors, which supply around 18% of its energy needs.

Two thirds of these reactors are pretty old and will need to be prepared for decommissioning in the near future. There is as yet no tried and tested technology for doing this, and decommissioning and dismantling will be costly.

This will very probably be a key issue for Likhachev, who faces an unenviable task if he plans to stay at Rosatom for any length of time. He is unlikely to achieve the economic indicators achieved by his predecessor. But Kirienko had unlimited access to public funds, whereas Likhachev may need to start decommissioning reactors, which not only doesn't bring in any money, but involves astronomical costs.

With Russia's "crisis" in full swing, Likhachev can only dream of getting the same generous funding as Kirienko.

Making friends with the environmentalists (for a while)

But this isn't Kirienko's only legacy. His PR team worked not only with Russia's journalists, but environmental organizations, too. For Rosatom, criticism of nuclear energy on environmental grounds is a serious risk factor, especially on the international level. When Rosatom was in the process of being set up, the agency's head would send deputations to us at *Ecodefence* to ask for our "help", promising they would find a way to "thank us". Our organization refused, but there were those that didn't.

These organizations were paid pretty well for their "loyalty". Rosatom's public council would regularly donate cash to NGOs. The list of groups receiving financial help was initially published on a special website, until the council decided not to give out any information about its beneficiaries. Rosatom's most valuable and loyal partners were even awarded medals.

These organizations are evidently invisible to Russia's ministry of justice, which has been trying to force Russian NGOs to register as "foreign agents" for over two years now. Almost every group that has ever criticised the corporation has been added to the register.

It is symbolic, for instance, that my organisation Ecodefence was the first environmental organization to be registered as a "foreign agent". We were officially accused by the justice ministry of "campaigning against the construction of the Baltic Nuclear Power Plant" in Kaliningrad. Work on this new plant began in 2009, but was put on ice in 2013, a month after activists published letters from several European banks refusing to finance the project.

Russian media tell us that Kirienko and his PR team are off to the Kremlin to prepare Putin's next election campaign. Looking at Kirienko's 11 years as head of Russia's nuclear power industry, we can say that in terms of spending and achievements on paper, Rosatom's former head has few equals. Kirienko's team are experts at working with the media, putting pressure on dissenters and forging loyalty.

More information: 'Russia's Ecodefense ignores Russian foreign agent law, refuses to pay fines', https://safeenergy.org/2015/07/23/russias-ecodefense-ignores-russian/

Watts Bar 2: Winning a battle while losing the war

Author: *Ken Bossong – SUN DAY Campaign (www.sun-day-campaign.org)*

Ken Bossong puts the start-up of the first U.S. nuclear reactor in 20 years in perspective. To say that renewables are growing faster than nuclear is an understatement. Yet the nuclear industry is likely to trumpet Watts Bar 2 coming online as a big triumph. That is, once the reactor gets past the series of equipment failures that has repeatedly delayed the start-up since June. The Tennessee Valley Authority has spent nine years and more than US$4 billion to bring a 43-year old nuclear construction project to completion, when it could have used that time and money more productively on developing renewables and energy efficiency.

NM832.4593 As it nears commercial operation, Watts Bar 2, the first "new" nuclear power plant in the United States in more than a generation, is proof that nuclear power has lost the race with safer, cleaner, and more economical renewable energy sources – particularly solar and wind.

New electrical generation expected to be provided to the nation's grid by Watts Bar 2 during its first year of operating at full capacity has already been eclipsed several times over by new electrical generation provided by renewables.

For example, in just one year's time (i.e., July 1, 2015 to June 30, 2016) as Watts Bar 2 prepared for commercial operation, solar and wind alone increased their contribution to the nation's total electrical generation by an amount three to five times greater than that expected from a year's worth of Watts Bar 2 generation (detailed supporting calculations are posted on the GreenWorld website[1)].

If one adds in the net increase in generation from other renewable energy sources (i.e., hydropower, geothermal, and biomass) during the past year, the ratio of new renewables generation to that of Watts Bar 2 is even greater.

Looking ahead, the U.S. Energy Information Administration (EIA) is projecting 9.5% growth in electrical consumption from renewable sources during 2016 with further increases in the years to follow.[2] Thus, the ratio of new renewable electricity capacity and generation vs. that from Watts Bar is likely to be even greater in the coming year and beyond.

Additionally, the very limited contribution to be made by Watts Bar-2 to the nation's electrical generating capacity hardly seems to have been worth the wait. Construction of Watts Bar-2 originally began in 1973, but was halted in 1985. The project was restarted in October 2007 and finally completed in summer 2016. Thus, not including the period while the plant construction was suspended, it took roughly 22 years to bring Watts Bar 2 online.[3]

During the eight-year period (2007-2015) required to build Watts Bar 2 following the resumption of construction, the reactor obviously produced no electricity. At the same time, however, new wind and solar plants – which typically require only one or two years to construct and often less[4] – were coming online at an increasing pace and contributing to the nation's electricity supply. In fact, during the 2007–2015 period, wind and solar produced about 15 times more electricity than is projected to come from Watts Bar 2 in the coming year.[1]

Moreover, since the resumption of construction of Watts Bar 2 in 2007, actual annual electrical generation by wind and solar has mushroomed. Today, those renewable sources are providing over 21 times more electricity each year than that expected annually from Watts Bar-2 ... and growing rapidly.[1]

Finally, when construction resumed on Watts Bar Unit 2 in 2007, TVA assumed the cost would be US$2.5 billion to complete. Upon completion, though, the actual costs totaled US$4.7 billion. This translates into a cost of approximately US$4.1 million per MW of capacity.[5]

While nuclear construction costs – as represented by those for Watts Bar 2 – have risen dramatically, those for solar and wind have plunged by 60–70% over the same time period.

For example, in a November 2015 study, the New York investment bank Lazard reported current electricity production costs of nuclear power to be US$97–136 per MWh. In comparison, the best large-scale photovoltaic power plants can now produce electricity at US$50 per MWh while onshore wind turbines can do so for US$32–77 per MWh.[6]

Thus, as illustrated by Watts Bar 2, the pace at which new renewable capacity and actual electrical generation – particularly wind and solar – are exceeding that of nuclear, the long construction times to bring new nuclear reactors on line, and nuclear power's rapidly rising costs (compared to the dramatically declining costs for renewable sources) all underscore that the nuclear era is over. Watts Bar 2 is proof that nuclear power has lost the race against renewable energy.

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Submarines a crucial missing piece in the British nuclear power jigsaw

Author: *Phil Johnstone – University of Sussex*

Why has Hinkley Point C been approved, despite huge costs and public outcry? Dr Phil Johnstone summarizes a new report, 'Understanding the Intensity of UK Policy Commitments to Nuclear Power,' raising questions about British transparency and democracy.

NM832.4594 As Hinkley Point C received the green light to go ahead, research published by the Science Policy Research Unit at the University of Sussex shows how intense British Government attachments to nuclear submarines help drive a strong bias in UK energy policy in favour of nuclear power.

This is despite nuclear power being recognised in the Government's own detailed analyses to be expensive and otherwise "unattractive" compared to other low carbon options.

The report – 'Understanding the Intensity of UK Policy Commitments to Nuclear Power' – documents strongly-held views in UK defence policy, that nuclear-propelled submarines form a crucial military capability. Yet these are arguably the most complex engineered artefacts in the world, not easy for a country with a declining manufacturing base to build and maintain.

On the military side, we found strong fears that without continued commitment to civil nuclear power, the UK would be unable to sustain the industrial capabilities necessary to build nuclear submarines.

"We systematically examined a range of different possible reasons for official UK attachments to nuclear power", said report co-author Emily Cox. "None of these are satisfactory to explain the intensity of support for nuclear power maintained by a variety of UK Governments. It seems that pressures to continue to build nuclear submarines form a crucial missing piece in the jigsaw."

"The Government's own data shows the UK to be blessed with abundant, secure and competitive renewable energy resources", said report co-author Professor Andy Stirling, "in a world turning much more to renewables than nuclear power, Britain might be expected to be taking a lead in these new technologies".

Yet a greater priority in UK policy making appears to lie in maintaining 'nuclear submarine capabilities'. Parliamentary Select Committee Reports and many other policy documents on the military side reveal intense pressures for strong Government support for skills and training, design and manufacturing and research and regulatory capabilities linking with the civil nuclear industry.

The report shows that these military pressures reached a peak in the crucial period 2003-2006 – with many new policy measures following on since then spanning civil and military sectors. During that same period, UK energy policy underwent a dramatic U-turn that has remained unexplained until now – from a view of nuclear power as "unattractive", to a commitment to a "nuclear renaissance".

What this research suggests is that British low carbon energy strategies are more expensive than they need to be, in order to maintain UK military nuclear infrastructures. And without assuming the continuation of an extremely expensive UK civil nuclear industry, it is possible that the costs of Trident would be significantly greater.

The report illuminates many important cross-overs between UK submarine and civil nuclear supply chains. One defence policy document even considers the possibility to 'mask' some of the costs of nuclear submarine capabilities, behind spending on civil nuclear power.

"What is remarkable about this pressure for a nuclear bias", said Andy Stirling, "is that it is well documented on the military side, yet remains completely unacknowledged anywhere in official UK energy policy documentation. This raises serious questions about the transparency and accountability of decision making in this area – and the quality of British democracy in this regard".

The report –'Understanding the Intensity of UK Policy Commitments to Nuclear Power' – is posted at www.sussex.ac.uk/spru/newsandevents/2016/publications/submarines or direct download: https://www.sussex.ac.uk/webteam/gateway/file.php?name=2016-16-swps-cox-et-al.pdf&site=25

This article was originally published on the University of Sussex website.

NUCLEAR NEWS

Japan's nuclear regulator caves in to industry interests again

Japan's Nuclear Regulation Authority (NRA) has again exposed itself as industry-captured by giving the 39-year-old Mihama-3 reactor owned by Kansai Electric Power Company (KEPCO) a green light to operate beyond its 40-year design life – even before the regulator has completed its aging-related safety review.

The Mihama-3 reactor has already had a fatal accident, when in August 2004 a high-pressure pipe rupture in a building housing turbines for the reactor killed five workers.

Mihama-3 went offline in May 2011 for a scheduled inspection and has remained offline since then. Despite the NRA's recent green light, further approval from the NRA will be required before operation recommences concerning details of equipment design and other issues. According to Nuclear Engineering International, Mihama-3 is not expected to restart before 2020 to allow time to complete all the required safety measures, and KEPCO plans to spend about 165 billion yen (US$1.6bn) on upgrades to meet the new regulations.

The Mihama-3 reactor is located in the seismically-active Wakasa Bay region. Concerns over inadequate seismic assessments for KEPCO's Ohi reactors – also located in Wakasa Bay – pushed former NRA commissioner and seismologist Kunihiko Shimazaki to challenge the regulator directly. Although the NRA dismissed his concerns, the agency admitted that they could not reproduce the figures submitted by KEPCO in their assessment and so could not independently verify their accuracy. The same potentially faulty seismic assessment method was applied to Mihama-3.

The restart of Mihama-3 is currently being challenged in court as a part of an umbrella lawsuit against all Fukui reactors. Greenpeace staff are plaintiffs in a case against KEPCO's aging Takahama 1 & 2 reactors, also in Wakasa Bay.

Mihama-3 is the third reactor to have secured approval to operate beyond the 40-year design lifespan. The other two are KEPCO's Takahama 1 and 2 reactors, also in Fukui.

KEPCO's Mihama 1 and 2 reactors are among the aging reactors which have been permanently shut down, along with four others: Kyushu Electric's Genkai-1, Shikoku's Ikata-1, JAPC's Tsuruga-1, and Chugoku's Shimane-1.

Meanwhile, Kyushu's Sendai-1 reactor in Kagoshima Prefecture was taken offline on October 4 for a scheduled three-month refuelling and maintenance outage. In September, Kyushu refused governor Satoshi Mitazono's demand to immediately shut down the reactors over safety concerns, but agreed to what it called "special inspections" in addition to regular maintenance work.

That leaves Japan with just two operating reactors – Kyushu's Sendai-2 and Shikoku's Ikata-3 in Ehime prefecture. Sendai-2 is expected to be shut down for a scheduled outage on December 16, so Japan will likely enter the new year with just one operating reactor.

The October 16 election of an anti-nuclear governor, Ryuichi Yoneyama, in Niigata Prefecture is a set-back for TEPCO's hopes of restarting the 7-reactor Kashiwazaki-Kariwa nuclear plant. Niigata voters opposed restarting the plant by 73% to 27% according to an NHK exit poll on the day of the election. Yoneyama won on a promise of preventing a Kashiwazaki-Kariwa restart unless TEPCO provides a fuller explanation of the Fukushima disaster. Reuters reported that TEPCO's share-price fell 7.9% in the wake of the election.

Yoneyama is the second prefectural governor elected this year on an anti-nuclear platform, following the election in July of Satoshi Mitazono as the governor of Kagoshima Prefecture.

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Czech Republic: 'Platform Against Geological Disposal'

Municipalities and NGOs effected by the siting process

for a high-level nuclear waste dump have founded the Platform Against Geological Disposal as a non-profit organization. The aim of the Platform is to enforce a way of finding a solution to nuclear waste management which would be open, transparent and guarantee municipalities and the public the right to consent to or reject a dump.

At a meeting held in Božejovice on October 4, Platform members elected spokespeople, whose function will rotate among them every six months. Currently, the Platform has 25 organisational members (14 Municipalities and 11 NGOs) and others are expected to join.

Members of the Platform have agreed on the following principles:

- Thorough consideration of all options for nuclear waste management, as opposed to the focus on irretrievable, deep disposal.
- Stopping current geological surveys under way and reassessment of the current siting process schedule (seven sites are being targeted).
- Transparency – all relevant documents must be publicly available, and subject to expert scrutiny and public debate.
- The adoption of laws which ensure that the public can effectively defend their legitimate rights in the siting process, including the right to say 'no'.

A final decision on the proposed dump's location is due to be made by the government by 2025 and it is due to be built by 2065. Last year, municipalities from five of the seven targeted areas sued the government over the environment minister's decision to dismiss their objection to the permit for geological prospecting.

www.platformaprotiulozisti.cz/

www.calla.cz

http://praguemonitor.com/2016/10/05/czechs-protest-against-planned-nuclear-waste-repository

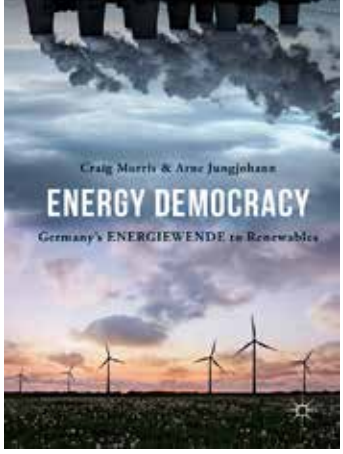
Thousands protest against nuclear power in northern France

Several thousand people demonstrated against the construction of nuclear reactors near the northern French town of Flamanville on October 1. British opponents of the planned reactor at Hinkley Point joined European opponents of nuclear power. The protesters gathered at Siouville-Hague, between a nuclear waste treatment centre at La Hague and the site of a third nuclear reactor at Flamanville, which is currently under construction.

http://en.rfi.fr/environment/20161001-thousands-protest-against-nuclear-power-northern-france

Germany's renewable energy transition

The fossil fuel and nuclear industries – and their supporters – go to extraordinary lengths to undermine Germany's transition to renewable energy. A number of credible experts regularly publish information and myth-busting regarding Germany's energiewende and much of this is freely available – see for example http://energytransition.de, http://energytransition.de/blog, and http://arnejungjohann.de/en



While it isn't free, a new book by Craig Morris (an American living in Freiburg, Germany's solar capital near the French border) and Arne Jungjohann (a German who lived in Washington DC until 2013), is an important addition to the literature.

Energy Democracy: Germany's energiewende to renewables traces the origins of the *energiewende* movement in Germany from protests against the industrialisation of rural communities in the 1970s to the Power Rebels of Schönau and German Chancellor Angela Merkel's shutdown of eight nuclear power plants following the 2011 Fukushima nuclear accident.

The authors explore how community groups became key actors in the bottom-up fight against climate change. Individually, citizens might install solar panels on their roofs, but citizen groups can do much more: community wind farms, local heat supply, walkable cities and more. Energy Democracy offers evidence that the transition to renewables is a one-time opportunity to strengthen communities and democratize the energy sector – in Germany and around the world.

Arne Jungjohann writes: "Following the nuclear phaseout in 2011, the Energiewende drew a lot of attention around the world: either for being a panic reaction to the nuclear accident in Fukushima or for being allegedly exceptional with its rapid move to wind and solar. We both were struck by these awkward interpretations. The Energiewende, with its roots in the 1970s and 1980s, is the opposite of panicking. Yet, Germany and its energy transition is not exceptional; other countries are actually faster transitioning to renewables. But the Energiewende is nonetheless exceptional in one way too often overlooked: Germany is (apart from Denmark and maybe Scotland) the only country in the world where the switch to renewables is a switch to energy democracy. Once we realized how this uniqueness was being overlooked, we wanted to get the word out. So back in September 2014, we decided to write a book: a history of Germany's energy transition – its Energiewende."

The book comes with an accompanying website – http://energiewendebook.de – where you can order the book or just individual chapters, and find useful graphics and videos.

Energy Democracy:
Germany's energiewende to renewables

Craig Morris and Arne Jungjohann

August 2016

Palgrave Macmillan

http://energiewendebook.de/

https://www.palgrave.com/de/book/9783319318905

https://books.google.com.au/books?id=6jsEDQAAQBAJ

Nuclear power's waste legacy

In his new book, The Legacy of Nuclear Power, Andrew

Blowers, Emeritus Professor of Social Sciences at the Open University, analyzes the nuclear waste problem by drawing on detailed studies of four sites: Hanford (USA) where the plutonium for the first atomic bombs was made; Sellafield, where the UK's nuclear legacy is concentrated and controversial; La Hague, the heart of the French nuclear industry; and Gorleben, the focal point of nuclear resistance in Germany.

The case studies are considered through a theoretical framework focused on the concept of 'peripheral communities'. The places covered in this book are all, in their different ways, nuclear oases, peripheral places with distinctive identities.

In a short article that previews the book, Blowers writes:

"These four places, Hanford, Sellafield, La Hague/Bure and Gorleben with their different histories exemplify and explain the physical imprint and social conditions that are the continuing legacy of nuclear power. They constitute what may be defined as peripheral communities, places where hazardous activities are located and which are, as it were, physically and socially set apart from the mainstream.

"They tend to be geographically remote. They may be located at the edge whether of a country, as at La Hague, in relatively inaccessible sub-regions as at Sellafield or in areas of sparse population as Hanford was before the war and as Bure is today. They may be areas with a distinctive (real or invented) cultural identity or isolation like Gorleben, in the self-declared Wendland once on the border with Eastern Germany. Peripheral communities tend also to be economically marginal, monocultural and dependent on government investment and subsidy or state owned companies.

"Peripheral communities tend also to be politically powerless. Although nuclear industries tend to have a dominant position in their dependent communities, strategic decisions are taken elsewhere by governmental and corporate institutions. Key political decisions affecting peripheral communities are vested in national governments to which local governments, even in federal systems like the USA and Germany, are subordinated in terms of nuclear decision making.

"These nuclear peripheral communities also express distinctive cultural characteristics. Although it is difficult to pin down the complex, ambiguous and sometimes contradictory values and attitudes encountered in these places, there does seem to be a particular 'nuclear culture', that is both defensive and aggressive. This may be summarised in three distinguishing and complementary cultural features – realism, resignation and pragmatism – which combine to convey a resilience that provides the flexibility and resolution necessary for cultural survival.

"Nuclear communities fulfil a fundamental social role in that they take on (or more usually have to accept) the radioactive legacy of nuclear power. They bear the burden of cost, risk and effort necessary to manage the legacy on behalf of the wider society, a responsibility extending into the far future. This social role enables places like Sellafield, La Hague and Hanford to exercise some economic and political leverage.

"Economically they are relatively secure for, once production ceases, there remain decades of clean up activity often sustaining a large workforce with continuing and open ended commitment from the state. Politically they are able, with varying success, to gain compensation, investment and diversification. By contrast, there are those communities which have mobilised resources of power sufficient to prevent or halt the progress of nuclear power. The story of the Gorleben movement provides a compelling example of the power of resistance."

The full article is posted at: www.routledge.com/posts/10360

The Legacy of Nuclear Power
Andrew Blowers, 2017, Routledge
www.routledge.com/The-Legacy-of-Nuclear-Power/Blowers/p/book/9780415869997

WISE/NIRS Nuclear Monitor

The World Information Service on Energy (WISE) was founded in 1978 and is based in Amsterdam, the Netherlands.

The Nuclear Information & Resource Service (NIRS) was set up in the same year and is based in Washington D.C., US.

WISE and NIRS joined forces in the year 2000, creating a worldwide network of information and resource centers for citizens and environmental organizations concerned about nuclear power, radioactive waste, proliferation, uranium, and sustainable energy issues.

The WISE / NIRS Nuclear Monitor publishes information in English 20 times a year. The magazine can be obtained both on paper and as an email (pdf format) version. Old issues are (after 2 months) available through the WISE homepage: www.wiseinternational.org

Subscriptions:

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Contact us via:

WISE International
PO Box 59636, 1040 LC Amsterdam, The Netherlands
Web: www.wiseinternational.org
Email: info@wiseinternational.org
Phone: +31 20 6126368
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