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Dear readers of the WISE/NIRS Nuclear Monitor,

Most of the articles in this issue of the Monitor concern the deepening nuclear power crisis:

- The first three articles concern the latest crises affecting Toshiba (which now acknowledges “substantial doubt” about its ability to continue as a going concern), and its subsidiary Westinghouse (which filed for bankruptcy protection on March 29).
- David Lowry writes about the scandalous mismanagement of a decommissioning program in the UK, which has led the UK government to agree to a £100 million (US\$125m) out-of-court settlement.
- Shaun Burnie from Greenpeace writes about the Japanese government’s efforts to keep TEPCO afloat, and summarizes a new study that estimates that the costs of the Fukushima disaster could range from US\$449–628 billion.
- Pete Roche writes about the French nuclear scandal at Areva’s Creusot Forge.
- Jan Haverkamp summarizes nuclear power issues across Europe, with an emphasis on Eastern Europe.

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.

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Nuclear power crisis deepens, broadens

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NM841.4631 The nuclear power crisis escalated dramatically on March 29 with the announcement that US nuclear giant Westinghouse, a subsidiary of Japanese conglomerate Toshiba, had filed for bankruptcy protection.¹ The Chapter 11 filing took place in the US Bankruptcy Court for the Southern District of New York, and marks the start of lengthy and complex negotiations with creditors and customers and the US and Japanese governments.

The companies are in crisis because of massive cost overruns building four AP1000 nuclear power reactors in the southern US states of Georgia and South Carolina. The combined cost overruns for the four reactors amount to about US\$11.2 billion and counting.²



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The crisis escalated again on April 11 when Toshiba released partial, unaudited financial figures. Toshiba’s statement said there is “substantial doubt about the Company’s ability to continue as a going concern”.³ Toshiba reported a net loss of ¥647.8 billion (US\$5.9bn) for the Oct.–Dec. 2016 quarter, mainly because of a US\$6.3bn writedown on Westinghouse. Shareholder equity stood at negative ¥225.6 billion (US\$2.05bn) as of Dec. 31³ and Toshiba expects equity of negative ¥620 billion (US\$5.67bn) as of March 31.⁴

Adding to the drama, auditor PricewaterhouseCoopers did not endorse the April 11 financial statement and instead submitted a statement emphasizing the risks to Toshiba’s future.⁵ An ongoing inquiry is

investigating allegations of excessive pressure by senior Westinghouse management on company staff to understate losses from the AP1000 projects in the US⁶ and PricewaterhouseCoopers is concerned that Toshiba may not have appropriately reflected those issues in its accounts. *Nikkei Asian Review* reported on April 4 that with appropriate accounting, Toshiba's liabilities may be found to have exceeded its assets for the second consecutive year, which is the Tokyo Stock Exchange's standard for delisting shares.⁷

"Toshiba has done everything in its power to gain the understanding of the auditors," chief executive officer Satoshi Tsunakawa said at an April 11 press conference attended by about 200 reporters in Tokyo.⁵ Toshiba has already twice delayed release of its financial figures, and released unaudited figures on April 11 in the hope of avoiding a stock exchange delisting that would worsen the crisis engulfing the firm, increasing financing costs and exposing it to further lawsuits from shareholders.

But all that can be said about the partial release of hideous figures, accompanied by a disclaimer from the auditor, is that it was the least-worst of Toshiba's options. The company still risks being delisted, with its shares previously designated "securities on alert" due to a profit-padding accounting scandal from 2008–2014 that was revealed in 2015.⁸ Miwa Aonuma, a spokesperson for Japan Exchange Group, which runs the Tokyo Stock Exchange, said: "The disclaimer of opinion by the auditor is an additional item that we must evaluate and consider."⁵

In addition to a potential stock market delisting, Toshiba noted that its special construction license needed for its energy and social infrastructure businesses is at risk because current regulations require companies with such licenses to be financially stable. The company has to renew the permit by the end of December and said that if it fails to "meet the criteria and to renew the license, there will be an extremely negative impact on its business execution."⁸

Financial figures for the March 2016 – March 2017 fiscal year will not be released until mid-May. Toshiba said on March 29, and again on April 11, that it could end up with a net loss of just over ¥1 trillion (US\$9.1bn) for the fiscal year, well over double the estimate of ¥390 billion provided just a month earlier.⁹ "Every time they put out an estimate, the loss gets bigger and bigger," said Zuhair Khan, an analyst at Jefferies in Tokyo. "I don't think this is the last cockroach we have seen coming out of Toshiba."¹⁰

In the meantime, Toshiba is seeking additional bank loans, offering stock holdings and real estate as collateral to lenders.⁵

Toshiba will still be liable for the existing cost overruns with the four AP1000 reactors in the US but the bankruptcy filing may limit its liability for future cost overruns. Thus Toshiba has somewhat reduced the likelihood of facing bankruptcy itself. However the decision bodes poorly for Westinghouse and the AP1000 projects in Georgia and South Carolina – the future of the company and its reactor projects are in doubt. Ironically, the bankruptcy filing will inevitably lead to further delays and cost overruns with the AP1000 reactor projects – a critical situation has been made worse.

Even if Toshiba and Westinghouse survive the unfolding crisis, some of their reactor projects and plans will not. Four AP1000 reactors under construction in China will very likely be completed, but plans for more AP1000 reactors in China seem unlikely to progress, and plans for 6–12 AP1000 reactors in India will likely be shelved.

Meanwhile, French company Engie has exercised its right to sell its 40% stake in NuGen to Toshiba. Thus Toshiba will be left with 100% of NuGen, the consortium which hoped to build three AP1000 reactors at Moorside, near Sellafield, in the UK. Toshiba wanted to sell its 60% stake in NuGen, and now wants to sell its 100% stake.

The bankruptcy filing and its impact on the future of Toshiba, Westinghouse, and AP1000 reactor projects are detailed in the following articles in this issue of *Nuclear Monitor*.

A big chill

Beyond the direct impact of the bankruptcy filing on numerous reactor projects around the world, the most important impact of the unfolding crisis is the chilling effect it will have – and is already having – on the nuclear power industry. The AP1000 fiasco in the US – and the even larger cost overruns with French EPR reactors under construction in France and Finland – demonstrate that industry giants can be brought to their knees by cost overruns on just a few reactors.

Governments, energy utilities and companies, banks, and investors will be considerably less likely to gamble on nuclear power in light of recent events. Not many energy utilities and companies are as large, and as capable of absorbing debt, as Toshiba and Westinghouse. Or as experienced: Toshiba has built 20 reactors in Japan (some in joint ventures), and Westinghouse has built 91 reactors globally.² Yet cost overruns on four reactors have brought these industry giants to their knees. Plans for new reactors are already being reconsidered and abandoned and that will play out for months and years to come.

Nuclear lobbyists freaking out

The French *Liberation* newspaper said on March 29 that the Toshiba/Westinghouse crisis, and the huge problems facing French utilities EDF and Areva, forebode a lasting "nuclear winter".¹¹

A February 15 piece in the *Financial Times* said: "Hopes of a nuclear renaissance have largely disappeared. For many suppliers, not least Toshiba, simply avoiding a nuclear dark ages would be achievement enough."¹²

Nuclear advocate Rod Adams wrote in *Forbes* on March 27: "Outside of Asia and Russia, prospects for nuclear power plants in the extra-large size range seem to be dimming by the week. It has been several decades since the last project made it through the full distance marathon required to design, site, license, construct and complete a new nuclear power plant [in the U.S.]. The Watts Bar units that are the most recently completed plants in the U.S. were designed, sited and licensed while I was still in grade school – and I am a semi-retired grandfather of six."¹³

Ted Norhaus from the Breakthrough Institute wrote on March 27 – before Westinghouse’s bankruptcy filing – about his prescriptions to forge “a globally competitive advanced nuclear sector ... from the ashes of today’s dying industry”.¹⁴ His innovative, ecomodernist proposal is to take more of your money and give it to the nuclear industry, combined with some vague ideas about “radically reorganizing the nuclear sector” to facilitate “bottom-up innovation, led by start-ups, not large incumbents”.

Following the bankruptcy filing, the Breakthrough Institute’s Michael Shellenberger said: “I’m freaked out, honestly. If we were building nuclear plants, I wouldn’t be so worried. But if nuclear is dying, I’m alarmed.”¹⁵

Recent articles from the Breakthrough Institute and other nuclear lobby groups have warned of nuclear power’s “rapidly accelerating crisis”, a “crisis that threatens the death of nuclear energy in the West”, “the crisis that the nuclear industry is presently facing in developed countries”, and noted that “the industry is on life support in the United States and other developed economies”.

Of course those nuclear lobbyists are dramatizing the situation to highlight the importance and urgency of giving more of your money to the nuclear industry. If the nuclear power industry is dying, or if it is dying in the West, that will take some decades to play out. Nonetheless, nuclear power growth can be confidently ruled out in the US, Japan, across EU countries combined, and in numerous other countries and regions for the foreseeable future.

The industry is downsizing and the recent Toshiba/Westinghouse crisis is the sort of convulsion that necessarily attends downsizing. Smart money has already jumped ship: the UK Nuclear Free Local Authorities noted on April 4 that seven energy utilities and companies have abandoned plans to build new reactors in the UK over the past decade.¹⁶

Problems heaped upon problems

If the problems with the AP1000 reactor design were largely responsible for the catastrophic cost overruns in the US, the industry might at least console itself that ditching AP1000 technology in favour of a simpler, cheaper design would provide a path forward. But there’s nothing intrinsic to AP1000 technology that in any way explains the problems – there’s nothing new or complicated about the AP1000 design (whereas the French EPR design has been described as being so complicated as to be “unconstructable”¹⁷).

The problems lie not with the AP1000 design but with the huge up-front capital costs of nuclear reactors, long pay-back periods and high risks, compounded by a lack of experience managing nuclear construction projects after a long period with few new plants.¹⁸

Perhaps the strongest reason for nuclear lobbyists to freak out is that the long period with few new plants is about to get longer in major nuclear countries ... and the lack of skills and experience could go from bad to worse to unrecoverable. A *Reuters* special report in 2010 warned about the skills crisis associated with an aging nuclear workforce – a ‘silver tsunami’ – and the problem is worsening.¹⁹

Add to those problems the growing incongruity between gigawatt-sized power plants and dynamic energy markets more amenable to smaller plants that can be built more quickly and at cheaper cost. A recent article on *McKinsey.com* discusses the proliferation of new energy sources and the fragmentation of energy markets – dynamics that undermine established interests, especially those with gigawatt-scale products.²⁰

And add to all those obstacles the extraordinary costs of nuclear accidents. The Japanese government’s official estimate of Fukushima clean-up and compensation costs stands at ¥21.5 trillion (US\$195 billion) – four times greater than estimates provided in 2011/12. As Shaun Burnie notes in this issue of *Nuclear Monitor*, a new assessment from the Japan Institute for Economic Research estimates that total costs for decommissioning, decontamination and compensation could be far greater, ranging from ¥50–70 trillion (US\$454–635 billion). Costs associated with the Chernobyl disaster have been estimated at a similar figure of US\$700 billion.²¹

Meanwhile, the safety scandal involving Areva’s Creusot Forge has escalated with the publication of a damning report by French nuclear regulator ASN – see Pete Roche’s article in this issue of *Nuclear Monitor*. Also in this issue of the *Monitor*, David Lowry writes about the scandalous mismanagement of a decommissioning program in the UK, which has led the UK government to agree to a £100 million (US\$125m) out-of-court settlement.

The nuclear industry may or may not be dying, but it is certainly punch-drunk and in deep trouble. We’ve previously suggested in the *Monitor* that, after a growth spurt followed by 20 years of stagnation, nuclear power is approaching a new era, the Era of Nuclear Decommissioning (END). Recent events tend to confirm that the industry is at the beginning of the END.

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Will Westinghouse and Toshiba survive?

Author: *Jim Green – Nuclear Monitor editor*

NM841.4632 On March 29, the day that Westinghouse filed for Chapter 11 bankruptcy protection in New York, *Bloomberg* noted: "Westinghouse Electric Co., once synonymous with America's industrial might, wagered its future on nuclear power – and lost."¹

Whether Westinghouse will survive is an open question. Toshiba said on March 29 that Westinghouse has debts totalling US\$9.8 billion and the bankruptcy filing is a clear indication that the company's viability is in doubt.²

Toshiba would sell Westinghouse if it could find a buyer, but it can't. Toshiba has tried but failed to sell Westinghouse several times already.³ Incredibly, Toshiba chief executive Satoshi Tsunakawa said in mid-March that Toshiba might have to pay a buyer to take Westinghouse off its hands.⁴ Presumably a utility or company willing to accept Westinghouse (along with a payment) would also be taking on a debt load as well as future risks associated with Westinghouse's nuclear business.

The *Financial Times* reported on March 5: "Mitsubishi this month ruled out rescuing the US company, citing its partnership with Areva, the troubled French reactor designer. Hitachi, which makes reactors with GE, also said it would not invest in Westinghouse, highlighting technology differences. GE is also thought to be highly unlikely to have any interest in Westinghouse. GE declined to comment. EDF, the French power company that is planning to buy a controlling stake in Areva's reactor business, is not expected to pursue Westinghouse. An EDF spokesperson said buying Westinghouse was "not in our plan"."³

South Korea's Kepco is seen as a possible buyer of Westinghouse, or parts of Westinghouse, and Kepco is also seen as a possible saviour of Toshiba's NuGen reactor project at Moorside in the UK. George Borovas from law firm Shearman & Sterling said: "It is therefore

possible that some kind of 'package deal' could be structured for a strategic Korean investment into Westinghouse and NuGen at the same time."³

But Suh Kyun-ryul, professor of atomic engineering at Seoul National University, asked: "Why should [Kepco] take such big financial risks by taking over a troubled business amid the gloomy industry outlook?"³ And Kepco president Cho Hwan-eik was unequivocal in his comments on March 22: "We have no plan to acquire Toshiba's stake [in Westinghouse]... there is no role for us there".⁵

There is speculation that Chinese utilities might be interested in buying Westinghouse ... if only because just about every other possibility has been ruled out.⁶ None of the speculation about a Chinese buy-out addresses the point that Chinese interests are no more likely to be interested in a bankrupt company than anyone else. Speculation about a Chinese buy-out has been laced with warnings about the 'need' to keep Westinghouse out of Chinese hands for various non-descript 'national interest' and 'national security' reasons.⁷

Bloomberg reports that Westinghouse has been a repeated target of Chinese espionage.⁷ Five Chinese military officials were indicted in absentia in 2014 for allegedly stealing trade secrets from Westinghouse through computer hacks, and China General Nuclear Power Corp. was indicted in 2016 for conspiring to steal restricted nuclear technology from Westinghouse.⁷

US officials are reportedly examining three options to keep Westinghouse out of Chinese hands: blocking a sale to a Chinese buyer (assuming there is a Chinese buyer ... which seems to be the elephant in the room ... at the moment there isn't a buyer); encouraging a bid from US investors or US-allied foreign investors; or direct US government investment in Westinghouse in return for an equity stake.⁷

A carve-up of Westinghouse is possible with profitable operations sold off to lessen existing debts. Jose Emeterio Gutierrez, interim president and CEO of Westinghouse, said in early April: "It's a reality that we have this problem with the construction of the US AP1000 projects, but it's also true that the rest of the company is in good shape. It's a healthy business. We don't have significant problems."⁸

But Westinghouse may have to sell profitable operations to stave off bankruptcy and may be left with little or nothing left other than the high-risk, heavily-indebted AP1000 reactor projects in the US. George Borovas from law firm Shearman & Sterling said: "Any sale would likely be preceded by a restructuring of Westinghouse so that the 'new Westinghouse' being sold would be free of any liabilities arising from the current new build projects that Westinghouse is constructing."⁶

Toshiba itself is already in precisely that situation: reluctantly selling profitable parts of its business to stave off bankruptcy and being left holding an unwanted atomic bomb.

Currently, Toshiba is being forced to increase its 87% stake in Westinghouse. Japanese company IHI Corporation is exercising its put option to sell its stake of Westinghouse to Toshiba for US\$157 million.⁹ KazAtomProm owns the remaining 10% of Westinghouse and may also exercise its right to sell its stake to Toshiba on or after 1 October 2017.¹⁰

On a brighter note, Jose Emeterio Gutierrez, interim president and CEO of Westinghouse, recently told staff that the company's decommissioning business currently brings in almost US\$100 million a year and could easily double or triple in the next few years.⁸ He pointed to plants at risk of early closure in the US and fleets in countries like Germany that are phasing out nuclear power altogether after the Fukushima disaster. "The market is huge. Also, it's not a market that is short term," he said.⁸

Will Toshiba survive?

Toshiba said in February that it expects to book a US\$6.3 billion writedown on Westinghouse¹¹, on top of a US\$2.3bn writedown in April 2016.¹² The losses exceed the US\$5.4 billion Toshiba paid when it bought a majority stake in Westinghouse in 2006.¹¹

Now Toshiba says there is "substantial doubt about the Company's ability to continue as a going concern".¹³

Toshiba's demise is a crushing blow to Japan's nuclear industry ... which was already crushed by the Fukushima disaster. *Nikkei Asian Review* commented on April 10:¹⁴

"Japan's nuclear power industry is at the most critical juncture in its history. Demand for new reactors has dried up at home following the Fukushima nuclear disaster and dismal prospects for export are dual menaces threatening the fate of the country's nuclear technology. No domestic construction on a new reactor has begun for the past eight years. The catastrophic accident at the Fukushima Daiichi nuclear power plant in 2011 blew a hole in the industry's plans. The picture for exports of Japanese nuclear power technology looks just as gloomy. Japanese reactor manufacturers and

suppliers of key components are now facing the possible loss of their technological viability."

Toshiba's decision to have its subsidiary Westinghouse file for bankruptcy protection may put some boundaries around future liabilities and losses, particularly those associated with the US AP1000 projects. But Toshiba will still be responsible for guaranteeing roughly ¥650 billion (US\$5.9bn) worth of Westinghouse debt if the nuclear projects are delayed due to the bankruptcy filing, and Toshiba also needs to set aside about ¥170 billion (US\$1.54bn) in loan-loss provisions in case loans to Westinghouse prove unrecoverable.¹⁵

The US government is also on the hook due to its US\$8.3 billion loan guarantee for the two AP1000 reactors under construction in Georgia.¹⁶ A Department of Energy spokesperson said the agency is "keenly interested" in Westinghouse's bankruptcy proceedings and that the administration expects all companies to "honor their commitments" to finish the project.¹⁶ If Westinghouse cannot complete the reactors, repayment of the loans will likely be delayed, in which case the government would take on the debt. *Nikkei Asian Review* reported on March 11: "It remains unclear how Washington and Toshiba would split the costs in this case. But the possibility that American taxpayers could bear some of the burden has spurred negotiations involving the U.S. and Japanese governments to settle the matter."¹⁷

The BBC noted on March 29 that Toshiba's share-price has been in freefall, losing more than 60% since the company first unveiled the massive cost overruns with US reactor projects in December 2016.¹⁸

Standard & Poor's cut its credit rating on Toshiba on March 17, down two notches to CCC-, pushing it further into junk status after previous downgrades in December and January.¹⁹

Toshiba is selling profitable businesses to stave off bankruptcy, including its highly-profitable memory chip business. Toshiba will need to earn about ¥1 trillion (US\$9.1bn) from the sale to bring its net worth out of the red.¹⁵

Toshiba, Hitachi and Mitsubishi Heavy Industries were planning an integration of their nuclear fuel operations due to the protracted weakness of Japan's nuclear industry – but that has stalled due to Toshiba's current crisis.²⁰

A broader integration between the three companies would make sense according to Tom O'Sullivan from energy consultancy Mathyos Japan. "It would make sense. There's no point in having three companies chasing a dying market in Japan," he said.²¹ But Mitsubishi president and chief executive Shunichi Miyanaga ruled out a merger in mid-February²² and a Hitachi spokesperson said there are no discussions on merging the companies' overall nuclear operations.²¹ Nevertheless, the Japanese government might use whatever leverage it has to force a tie-up between the three companies.

There are conflicting reports as to whether Tokyo might use government funds to rescue Toshiba. Most of the statements from the government suggest that there will

not be a government bail-out.²³ But *Nikkei Asian Review* reported on March 18 that the Toshiba/Westinghouse crisis was discussed at a meeting between Japan's minister of economy, trade and industry and the US commerce secretary and energy secretary, and speculated that the two governments "seem to be softening on their previous stance that the company's restructuring is a private-sector matter."²⁴

In February, Toshiba said it plans to exit the reactor construction business and focus its nuclear business on

design, equipment supply and engineering services.²⁵ That probably remains the plan, but comments by Toshiba chief executive Satoshi Tsunakawa on March 29 suggest a more complete withdrawal from the nuclear industry outside of Japan. "This is a de facto withdrawal from the overseas nuclear business for us. Therefore, we don't see any more risk," he said.

Whatever Toshiba does, it is still on the hook for multi-billion dollar liabilities associated with the AP1000 projects in the US.

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Will AP1000 reactor projects be completed and will more be built?

Author: Jim Green – Nuclear Monitor editor

NM841.4633 Eight AP1000 reactors are under construction around the world: four in China and four in the US. All of them, in both China and the US, are about three years behind schedule.

A Chinese nuclear engineer told nuclear lobbyist Michael Shellenberger in 2015: “People felt we paid full price for a half-completed design.” The result, Shellenberger writes, was three years of delay, higher costs, and a deteriorating relationship between China and Westinghouse.¹ Likewise, the 2016 World Nuclear Industry Status Report noted that the AP1000 projects in China have suffered construction delays and cost overruns, design changes and equipment failure.²

Nonetheless, the four AP1000 reactors in China will very likely be completed.

Whether the four AP1000 reactors in Georgia and South Carolina will be completed is now subject to a 30-day “assessment period” according to Westinghouse.³ Work is continuing during the assessment period.

Costs to complete the four reactors could amount to approximately US\$8.5 billion.⁴ The combined cost overruns for the four reactors amount to about US\$11.2 billion and counting.⁵

Stephen Byrd from Morgan Stanley anticipates that the total costs of the plants in Georgia and South Carolina, if completed, will be about twice Westinghouse’s original estimate.⁶

An April 2 article from the World Nuclear Industry Status Report website summarizes the situation:⁷

“The outcome for the U.S. AP1000 projects is more dire, and abandonment is an explicit option. In the case of the Vogtle project in Georgia, Stan Wise, chairman of the state’s Public Service Commission, pointed out that it is “possible ... that Plant Vogtle just doesn’t get finished at all. It’s a real hit and a real blow to something that we felt like was going to be the very best possible energy choice for Georgia maybe even into the next century”. But he also went on to talking about the changes in the energy landscape since the Vogtle plan was initially approved, “with natural gas getting very cheap, and technologies like solar power and batteries improving” and declaring: “If I’d known any of this a decade ago we would have gone a different way”.

“[South Carolina’s] SCANA chief executive Kevin Marsh, on the other hand, was more bullish: “Our commitment is still to try to finish these plants. That would be my preferred option. The least preferred option, I think realistically, is abandonment”. But he has also said that SCANA will evaluate various options during the coming 30 days, including:

- continuing with the construction of both new units;

- focusing on the construction of one unit, and delaying the construction of the other;
- continuing with the construction of one and abandoning the other; and
- abandoning both units.

“Independent analysts have pointed out that not abandoning the project right away could result in “the chaos of bankruptcy and reorganization [leading] to a long period of project restructuring uncertainly and more spiraling costs”.

“If either of those projects are abandoned, they would join the ranks of the forty nuclear new-build projects – including 12 Westinghouse reactors – that were abandoned in the United States between 1977 and 1989 at various stages of construction (see Global Nuclear Power Database for details⁸). At the time, several utilities went bankrupt.”

No other reactors are under construction in the US and there is no likelihood of any new reactors in the foreseeable future. The US reactor fleet is one of the oldest in the world – 44 out of 99 reactors have been operating for 40 years or more – so nuclear decline is certain.

Will any other AP1000 reactors be built around the world?

In 2015, then Westinghouse chair Danny Roderick said he was “pretty confident” in achieving Westinghouse’s goal of winning orders to construct 64 AP1000 reactors worldwide over the next 15 years.⁹ As recently as November 2016, Westinghouse said it had plans to build 30 AP1000 reactors around the world, and Roderick said the company was “very much in the running ... to get up near 50 units over the next 15 to 20 years in China.”¹⁰

Those expectations have gone up in smoke.

China

An April 2 article from the World Nuclear Industry Status Report website states: “The idea that Westinghouse might get any more contracts to build nuclear reactors in China seems doubtful, to say the least. As Lin Boqiang, director at the China Center for Energy Economics Research at Xiamen University told *Bloomberg News*: “The only way Westinghouse can win contracts in China is to demonstrate they can build reactors quicker and cheaper than anyone else in China’s market and win hearts with actions, not words. Westinghouse so far hasn’t demonstrated such abilities.””¹¹

UK

Toshiba received notice from French company Engie on April 3 that it had exercised its right under a joint agreement to require Toshiba to purchase Engie’s 40%

stake in the NuGeneration (NuGen) consortium that planned to build three AP1000 reactors at Moorside in the UK.¹² NuGen is “facing some significant challenges”, Engie said. Engie anticipates payment of approximately ¥15.3 billion (US\$137.5 million) from Toshiba for its stake in NuGen.¹²

Once the transaction is completed, Toshiba will be left with a 100% stake in NuGen. Toshiba noted that Westinghouse’s Chapter 11 bankruptcy filing met the definition of an ‘event of default’ under the terms of its agreement with Engie. That gave Engie the option to sell its stake in NuGen to Toshiba, or to acquire Toshiba’s stake, and Engie chose the first option.¹²

Toshiba was hoping to sell its 60% stake in NuGen and is now seeking to sell its 100% stake.

Ironically, just as the Moorside project took a giant leap towards being abandoned, UK regulators announced on March 30 that the AP1000 had successfully completed the Generic Design Assessment process.¹²

Engie is the seventh international energy utility to give up on UK new nuclear build over the past decade, the others being Toshiba, E-on (Wylfa), RWE Npower (Wylfa), Iberdrola (Moorside), SSE (Moorside), and Centrica (Hinkley Point).¹³

While South Korea’s Kepco has shown no interest in acquiring a stake in Westinghouse, the utility is interested in acquiring a stake in NuGen.¹⁴ Whether that interest is affected by Engie’s withdrawal remains to be seen. Kepco might seek to deploy its APR1400 reactor technology instead of AP1000 reactors, in which case development would be delayed by a further 4–5 years while the APR1400 is put through a Generic Design Assessment by UK regulators.

In 2015, Toshiba estimated a total cost of ¥1.5 trillion yen (US\$13.6bn) for the NuGen project but analysts now believe the cost could be roughly double that amount due to higher labor costs and revised safety standards.⁵

Of course, the cost could be brought down by weakening safety standards and one way to do that would be to abandon AP1000 technology in favour of South Korea’s APR1400 design. The APR1400 lacks safety features of AP1000 and EPR designs such as aircraft crash protection.¹⁵

India

Danny Roderick from Westinghouse said in November 2016 that the company was on track to build six AP1000 reactors in India’s southern state of Andhra Pradesh and expected a final engineering, procurement, and construction agreement before the end of 2017.¹⁰

But funding had not been secured, India’s nuclear liability law remained an obstacle, and the project faced stiff public opposition ... and that was all before the Toshiba / Westinghouse financial crisis began to surface late last year. The project is unlikely to proceed – it is almost impossible according to three industry sources contacted by *Reuters* in early February.¹⁶ Likewise, a separate, less-developed plan for an additional six AP1000 reactors in India has little chance of progressing.

Toshiba said in mid-February that India’s liability legislation – which provides some recourse to sue vendors in the event of an accident – would have to be changed to promote reactor projects in India.¹⁷

Former World Nuclear Association executive Steve Kidd noted in an April 7 article: “India is clearly not set to follow China into a rapid nuclear growth phase. Its targets announced for nuclear generation in the early 2030s look even more unachievable than before, and the Indian industry is becoming inward-looking once again. Its tie-up with Russia on reactors appears sound, but proposed cooperation with Areva, Westinghouse and GE now looks dead in the water after their recent financial disasters.”¹⁸

A senior Indian government official reportedly said in early April that the “atomic meltdown” of Toshiba and Westinghouse “is a blessing in disguise”, and the *Economic Times of India* reported that “many in the Indian atomic establishment are silently celebrating this premature death of suitors who were wooing to put tens of atomic plants in India”.¹⁹ The argument is that the ‘Indian atomic establishment’ can take up the slack with new reactors in India and the atomic meltdown “could also provide an opportunity to the country to become a hub for low cost suppliers of nuclear technology”.

But in all likelihood, despite the opportunities afforded by the meltdown of its competitors, the Indian atomic establishment will probably continue doing what it does best: building bombs, taking an axe to the global non-proliferation and safeguards regime, and failing to meet its nuclear power targets by orders of magnitude.

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UK nuclear clean-up contract chaos: a tale of collusion and calumny

Author: David Lowry – independent research consultant, former director of the European Proliferation Information Centre.

NM841.4634 Adam Vaughan, energy editor of the British daily newspaper, *The Guardian*, last month reported on the very expensive consequences of what he characterized as the “flawed tendering process for dismantling old reactors at 12 sites”.¹ Vaughan quotes my research colleague, Stephen Thomas, emeritus professor of energy policy at the University of Greenwich, as branding the Nuclear Decommissioning Authority’s (NDA) handling of the contract as “an immense screw-up.”

I fear it is much worse than that. From my detailed experience of a previous failed management contract agreed by the NDA, also placed with a US company-led consortium, Nuclear Management Partners (NMP), which also led to the early cancelling of the contract, there could well be dubious collusion between the NDA and the then responsible government department (energy and climate change, DECC) under a Labour Government, at the expense of the long-fleeced taxpayers.

The investigator appointed by business secretary Greg Clark to look into this scandal, Steve Holliday, needs to revisit this earlier Sellafield scandal to assess why the public procurement lessons – especially the need for candour and transparency – that should have been learned, were not.

Dr Clark’s written statement, made on March 27 – under the surprisingly opaque headline “BEIS Non-Departmental Public Bodies” – revealed that the NDA had decided to terminate its contract with Cavendish Fluor Partnership (CFP) for the management and decommissioning of 12 redundant Magnox sites (including two research sites) which, together with the Calder Hall reactor on the Sellafield site, formed the UK’s first fleet of nuclear power stations.

The NDA ran a £6.1 billion tender process from April 2012 which resulted in a 14-year contract being awarded in September 2014 to CFP – a joint venture between the British firm Cavendish Nuclear, a subsidiary of Babcock

International, and the US company Fluor Inc.

Clark added that “This decision was approved by the then Department for Energy and Climate Change and HM Treasury (Finance ministry).”

CFP started work on the Magnox estate on 1 September 2014, after which, according to Clark’s statement, “started a process to ensure that the scope of the contract assumed in the 2012 tender matched the actual status of the decommissioning to be done on each site – a process known as consolidation.”

The statement continued:

“It has become clear to the NDA through this consolidation process that there is a significant mismatch between the work that was specified in the contract as tendered in 2012 and awarded in 2014, and the work that actually needs to be done.”

“The scale of the additional work is such that the NDA Board considers that it would amount to a material change to the specification on which bidders were invited in 2012 to tender. In the light of this, the NDA Board, headed by a new Chair and Chief Executive, has concluded that it should exercise its right to terminate the contract on two years’ notice. The contract will be terminated in September 2019, after 5 years rather than its full term of 14 years. This termination is made with the agreement of CFP.”

The NDA is now expected to establish arrangements for a replacement contracting structure to be put in place when the current contract ends, under the NDA’s new Chief Executive, David Peattie.

Clark also revealed that the cost to the British taxpayers would be nearly £100 million, saying:

“In addition I can announce today that the NDA has settled outstanding litigation claims against it by Energy Solutions and Bechtel, in relation to the 2014 Magnox contract award.

“The NDA was found by the High Court in its judgment of 29 July 2016 to have wrongly decided the outcome of the procurement process.

“As part of the settlements, NDA has withdrawn its appeal against the judgment. While these settlements were made without admission of liability on either side, it is clear that this 2012 tender process, which was for a value of up to £6.1 billion, was flawed. The NDA has agreed settlement payments with Energy Solutions of £76.5m, plus £8.5m of costs, and with Bechtel of \$14.8m, plus costs of around £462,000 – approximately £12.5m in total.

“These are very substantial costs and had the potential to rise much further if the case had proceeded to trial.

“Taxpayers must be able to be confident that public bodies are operating effectively and securing value for money. Where this has not been achieved such bodies should be subject to rigorous scrutiny.

“I am therefore establishing today an independent Inquiry into the conduct of the 2012 procurement process and the reasons why the 2014 contract proved unsustainable. These are separate issues but both need to be examined thoroughly by an authoritative and independent expert. ...

“This was a defective procurement, with significant financial consequences, and I am determined that the reasons for it should be exposed and understood; that those responsible should properly be held to account; and that it should never happen again.”

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Fukushima Bill

Author: *Shaun Burnie – senior nuclear specialist with Greenpeace Germany, Tokyo.*

NM841.4635 Six years after Japan's Fukushima nuclear accident, three global nuclear corporations are fighting for their very survival. The bankruptcy filing by Westinghouse Electric Co. and its parent company Toshiba Corp. preparing to post losses of ¥1 trillion (US\$9 billion), is a defining moment in the global decline of the nuclear power industry.

However, whereas the final financial meltdown of Westinghouse and Toshiba will likely be measured in a few tens of billions of dollars, those losses are but a fraction of what Tokyo Electric Power Co. (Tepco) is looking at as a result of the Fukushima nuclear disaster.

If the latest estimates for the cost of cleaning up the Fukushima plant prove accurate, Tepco faces the

Earlier contracts

The earlier contracts with the US consortium Nuclear Management Partners (NMP) were awarded in a way that ministers and departmental officials demonstrably tried to circumvent Parliamentary oversight. A Parliamentary debate led by Labour MP Paul Flynn held on 19 November 2008 exposed how the Public Accounts Committee (then under a Conservative chairman) effectively colluded in the deal.³

Flynn was denounced by the then energy minister, Mike O'Brien, for traducing ministers with allegations of “some sort of cover-up.” Actually, Mr Flynn's allegations turned out to be under-estimations of calumny.

The Public Accounts Committee only later properly probed the procurement scandal in October 2013, using documents I secured from the NDA – via long-running freedom of information applications – comprising a hitherto secret internal KPMG audit of Sellafield's operations.

The full sorry story is told in a January 2015 article in *The Ecologist*.⁴

An absurd footnote on the contempt with which these US-led consortia hold the British taxpayers who have funded their so-called management contracts for clean-up and Sellafield remediation comes with the revelation in expenses receipts sent to the NDA by departing NMP executives. A Canadian researcher FOI'd NDA for the expenses claims and obtained the details of how one NMP executive billed £714 for his cat to be transported by taxi cab from Sellafield to Heathrow, en route to the US.

You just could not make it up!

equivalent of a Toshiba meltdown every year until 2087. In November 2016, the Japanese Government announced a revised estimate for the Fukushima nuclear accident (decommissioning, decontamination, waste management and compensation) of ¥21.5 trillion (US\$193 billion) – a doubling of their estimate in 2013.

But the credibility of the government's numbers has been questioned all along, given that the actual 'decommissioning' of the Fukushima plant and its three melted reactors is entering into an engineering unknown.

This questioning was borne out by the November doubling of cost estimates after only several years into the accident, when there is every prospect Tepco will be cleaning up Fukushima well into next century.

And sure enough, a new assessment published in early March from the Japan Institute for Economic Research, estimates that total costs for decommissioning, decontamination and compensation as a result of the Fukushima atomic disaster could range between ¥50–70 trillion (US\$449–628 billion).

If confirmed over the coming years, it will be the most expensive industrial accident in history with even greater implications for the people and energy future of Japan.

Rather than admit that the Fukushima accident is effectively the end of Tepco as a nuclear generating company, the outline of a restructuring plan was announced in late March.

Tepco Holdings, the entity established to manage the destroyed nuclear site, and the Nuclear Damage Compensation and Decommissioning Facilitation Corporation (NDF) are seeking ways to sustain the utility in the years ahead, confronted as they are with escalating Fukushima costs and electricity market reform.

The NDF, originally established by the Government in 2011 to oversee compensation payments and to secure electricity supply, had its scope broadened in 2014 to oversee decommissioning of the Fukushima Daiichi plant on the Pacific Ocean coast north of Tokyo.

The latest restructuring plan is intended to find a way forward for Tepco by securing a future for its nuclear, transmission and distribution businesses. If possible in combination with other energy companies in Japan.

But the plan, already received less than warmly by other utilities rightly concerned at being burdened with Tepco's liabilities, is premised on Fukushima cost estimates of ¥21.5 trillion, not ¥50–70 trillion.

To date Tepco's Fukushima costs have been covered by interest-free government loans, with ¥6 trillion (US\$57 billion) already paid out. Since 2012 Tepco's electricity ratepayers have paid ¥2.4 trillion to cover nuclear-related costs, including the Fukushima accident site.

That is nothing compared to the costs looming over future decades and beyond and it comes at a time when Tepco and other electric utilities are under commercial pressure as never before. The commercial pressure comes from electricity market reform that since April 2016 allowed consumers to switch from the monopoly utilities to independent power providers. In the ten months to February 2017, the main electric utilities lost 2.5 million customers, with Tepco alone losing more than 1.44 million. Hence, profits have fallen off a cliff.

Prior to the deregulation of the retail electricity market, Tepco had 22 million customers. As the Tepco president observed late last year: "The number (of customers leaving Tepco) is changing every day as the liberalization continues ... We will of course need to think of ways to counter that competition."

Countering that competition shouldn't mean rigging the market, yet Tepco and the other utilities intend to try and retain their decades long dominance of electricity by retaining control over access to the grid. This is a concerted push back against the growth of renewable energy.

Current plans to open the grid to competition in 2020, so called legal unbundling, are essential to wrest control from the big utilities. The message of unbundling and independence, however, doesn't seem to have reached the Ministry of Economy, Trade and Industry (METI) that oversees the electricity industry.

Current plans would allow Tepco to establish separate legal entities: Tepco Fuel & Power (thermal power generation), Tepco Energy Partner (power distribution) and Tepco Power Grid (power transmission). Tepco Holdings will retain their stock and control their management, meaning the same monopoly will retain control of the grid. Where Tepco leads, the other nine electric utilities aim to follow.

Leaving the grid effectively still under the control of the traditional utilities will throw up a major obstacle to large scale expansion of renewable energy sources from new companies. Such businesses will be 'curtailed' or stopped from supplying electricity to the grid when the large utilities decide it's necessary, justified for example to maintain the stability of the grid.

The fact that 'curtailment' will be permitted in many regions without financial compensation piles further pain onto new entrants to the electricity market, and by extension consumers.

Further, METI plans to spread the escalating costs of Fukushima so that other utilities and new power companies pay a proportion of compensation costs. METI's justification for charging customers of new energy companies is that they benefited from nuclear power before the market opened up.

The need to find someone else to pay for Tepco's mess is underscored by the breakdown of the Fukushima disaster cost estimate in November.

When put at an estimated ¥22 trillion, ¥16 trillion is supposed to be covered by Tepco. The Ministry of Finance is to offer ¥2 trillion for decontamination, and the remaining ¥4 trillion is to be provided by other power companies and new electricity providers.

The question is how does Tepco cover its share of the costs when it's losing customers and its only remaining nuclear plant in Japan, Kashiwazaki Kariwa (the world's largest), has no prospect of restarting operation due to local opposition?

What happens when Fukushima costs rise to the levels projected of ¥50–70 trillion?

The policy measures being put in place by Tepco, other utilities and the government suggests that they know what is coming and their solution for paying for the world's most costly industrial accident will be sticking both hands into the public purse.

Reprinted from Asia Times, 31 March 2017, www.atimes.com/article/tepcos-fukushima-expensive-industrial-accident-history/

French nuclear scandal

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NM841.4636 EDF, Areva and the French nuclear regulator ASN have known since at least 2005 that Areva's Creusot Forge factory was not capable of producing nuclear safety compliant components. Yet the factory has been allowed to continue manufacturing components which have now been found to contain anomalies, including the bottom and lid for the reactor pressure vessel (RPV) for the EPR at Flamanville.¹

France Inter, the French Radio Station which broke the news commented that: "Never before has the French nuclear industry suffered such a scandal. And this case challenges the entire chain of control of a sector already shaken by the Fukushima disaster."²

The Creusot Forge is under investigation by ASN after it was discovered to have produced potentially defective parts and substandard safety reports for reactors around the world. But the letters from 2005 and 2006 – obtained by *France Inter* – show that EDF and Areva were told by the ASN about "numerous incidents" at the facility, including "discrepancies during inspections". This will raise serious concerns about EDF and Areva's new nuclear project at Hinkley Point.³

In December 2005, ASN sent a letter to EDF alerting it to the deplorable condition of the Le Creusot plant, which was experiencing major malfunctions. Yet the lid and bottom for the RPV for the Flamanville EPR were manufactured by the Creusot Forge, in Burgundy, between September 2006 and December 2007. In August 2006 ASN asked Areva to demonstrate that the steel for these two parts was homogeneous. For seven years, letters were exchanged between ASN and Areva, but no analysis was carried out. On 24 January 2014 the RPV arrived at Flamanville, and was placed in the reactor building. Nine months later Areva finally did some tests and discovered that the bottom and the lid had abnormalities.

"The steel should normally contain 0.2% carbon," explains Yves Marignac, of WISE Paris, but the concentration was 0.3%, enough to modify the mechanical properties of the steel and, in particular, to influence the temperature at which it becomes less supple and more brittle.⁴

The regulator – ASN – has been seriously at fault, according to the Observatoire du Nucleaire, since it has said nothing for many years about the criminal practices at Le Creusot. It says ASN is no less guilty than Areva and EDF because, although it was fully aware of the serious problems, it authorized EDF to install the pressure vessel in the EPR at Flamanville in December

2013. It is clear, says the Observatoire du Nucleaire website, that ASN is not able to withstand pressure from EDF and politicians who accuse them of seriously harming the industry if they enforce safety regulations.⁵

Following the discovery of manufacturing irregularities and the falsification of documents at Areva's Creusot Forge foundry last year, French nuclear regulator ASN and several other international regulators inspected the site in early December. ASN said Le Creusot is not up to the job and did not have the right equipment to produce the parts for the nuclear reactors. "Creusot Forge is at the limit of its technical capacity," ASN said. "The tools at its disposal are not adequate to manufacture such huge components. In such a situation, errors are made."⁶

EDF's oversight of Areva, which will supply the Hinkley Point C reactors, was questioned in an internal document by the UK Office for Nuclear Regulation (ONR). In an ONR report about the visit dated 16th December 2016, disclosed under a Freedom of Information request, ONR said the nuclear safety culture at Creusot fell short of expectations and warned about the implications for Hinkley Point C. ONR said it has since decided to implement a series of additional inspections of EDF and its supply chain to ensure all components are manufactured to the required standard.

The ONR report said after an inspection in late 2016, that an international team from France, Canada, the United States, China, Finland and Britain had concluded that the nuclear safety culture at Le Creusot Forge foundry fell short of what regulators expect from a major supplier of nuclear equipment. It added that improvement measures ordered by ASN were not yet effective and said despite the prohibition of the use of correction fluid on documents at the foundry, the inspectors found evidence of its continued use.⁷

EDF Energy Chief Executive Vincent de Rivaz says there will be "no impact" on Hinkley Point C from issues at Le Creusot. He said the RPV would be made "at the right place and right time", declining to give further details.⁸ A spokesman for EDF said: "Steel forgings for Hinkley Point C will be manufactured to the most stringent nuclear standards which are reviewed and assessed by ONR. EDF Energy also has its own inspection and quality assurance programme to provide the required confidence that the components manufactured by Areva for Hinkley Point C meet those exacting standards."⁹

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Nuclear Europe roundup

Author: Jan Haverkamp – WISE Netherlands campaigner on safety and lifetime extension issues for European reactors.

Hungary – Paks II

NM841.4637 The Hungarian nuclear regulator issued the site approval for the Paks II nuclear power plant. The preliminary approval of the environmental permit has been sent to some foreign participants in the EIA procedure (e.g. the organisation Calla in the Czech Republic and Terra Mileniul III in Romania) but only in Hungarian. The responsible authority claims no translation is required under Hungarian law. A court case from Hungarian NGOs, among others Energia Klub and Greenpeace Hungary, against the approval of the environmental permit is pending.

The Hungarian government passed law changes in December 2016, including the possibility for the government, the *de facto* operator of the Paks II project, which is run from the Prime Minister's office, to divert per decree from licensing conditions for the construction of new nuclear capacity and nuclear waste management. The European Commission is currently investigating this under the allegation of breach of the independence of the nuclear regulator as defined under the Euratom Nuclear Safety Directive. Also, the 7th Review Conference of the Convention on Nuclear Safety at the IAEA in Vienna is discussing the matter.

Finland – Hanhikivi

The Finnish nuclear regulator STUK is currently scrutinising the construction documentation for the Hanhikivi nuclear project of the Finnish-Russian conglomerate Fennovoima. STUK criticised Fennovoima, constructor Rosatom and sub-contractors for having too little capacity to deliver the necessary documentation.

Russia – the floating reactors of the “Akademik Lomonosov”

Rosatom is preparing to load two 35 MW power reactors on board the non-propelled barge “Akademik Lomonosov”, which is moored at the Baltic Shipyard in the centre of St. Petersburg, 3.5 km from the Hermitage and 2.5 km from the St. Isaac Cathedral.

Greenpeace Russia, the Yablokov Party and Greenpeace Nordic are urging for a transboundary environmental impact assessment to be made before loading, testing and transport of the barge to its final destination in Chukotka. The transport will lead the barge through the exclusive economic zones and/or territorial waters of most countries around the Baltic Sea.

Slovakia – Mochovce 3,4

The shareholders of Slovenské elektrarne – the Slovak state, Italian utility ENEL and the Czech energy holding EPH – have officially increased the budget for the construction of Mochovce 3,4 with €800 million during their Annual General Meeting in late March 2017. Mochovce 3,4 consists of two Rosatom designed VVER440/213 reactors of the second generation that are not equipped with a secondary containment. The total budget is now €5.4

billion or €5620/kWe capacity, which is comparable to the construction costs of the French designed EPR reactors in Olkiluoto, Finland and Flamanville, France. It is unclear who has to finance these extra costs.

Spain – Santa Maria de Garoña

The Spanish government would like to have the EU's oldest nuclear reactor, the Fukushima type GE Mark 1 reactor at Santa Maria de Garoña, restarted. The reactor was shut down in 2015, when its operator Nuclenor (Endesa / ENEL and Iberdrola) did not see an economic future any longer after necessary upgrades. Political pressure on Nuclenor from the side of the Spanish conservative government has been mounting, however.

On the other side, resistance against a restart in the neighbouring Basque Country is growing. During a session of the Basque Parliament on 5 April 2017, legal steps, among others against the lack of public participation, environmental considerations and comparison with viable alternatives, were prepared with parliament-wide support.

Iberdrola has already made clear that it would rather not restart the aging reactor. Endesa and its owner ENEL have yet to react.

Belgium – Tihange and Doel

On 11 March, around 1,000 people demonstrated in Antwerp against the life-time extension of the Doel 1 and 2 and Tihange 1 reactors, for closure of the crack-ridden Doel 3 and Tihange 2 reactors, and phase-out of the remaining two reactors Doel 4 and Tihange 3 in 2025.

The lack of public participation and environmental impact assessment for the life-time extension of Doel 1,2 and Tihange 1 is currently pending before the Council of State as well as civil court on complaints from Greenpeace. The city of Aachen (Germany) and the State of North Rhine – Westphalia (Germany) have started legal proceedings in Belgium against the operation of Doel 3 and Tihange 2.

On 25 June, a human chain from Tihange to Aachen is to follow the protests from March 11.

Belarus – Astravet

The government of Lithuania has stepped up its attempts to prevent the construction of the Belarussian-Russian Astravet nuclear power station just 40 km from the Lithuanian capital Vilnius. Belarus has promised to submit the Astravet project to a nuclear stress test under supervision of the European Commission and the European Nuclear Safety Regulators Group (ENSREG), in the framework of the European post-Fukushima nuclear stress tests. The watchdog group Nuclear Transparency Watch has asked the European Commission to also facilitate input from civil society in that exercise, as happened during the European stress tests and similar stress tests with European support in Taiwan.

Netherlands – Borssele

The Aarhus Convention Compliance Committee is receiving answers on its last question regarding the lack of proper public participation concerning environmental issues in the decisions leading to the 20-year life-time extension of the Borssele nuclear reactor in 2013. The Committee is expected to finalise its findings in April and submit them to the Meeting of Parties of the Aarhus Convention in September.

In the meantime, the owner of Borssele, EPZ, has sold its grid distribution and water businesses for €900 million. It now has to decide whether this one-off income will be used to operate Borssele with a loss until possibly improved electricity prices might turn a profit in the early 2020s, or to use it to close down the aging reactor.

Decommissioning costs are budgeted at €500 million, but the decommissioning fund currently faces a shortage of over €200 million.

The largest two parties coming out of the Dutch parliamentary elections in March 2017, VVD and PVV, want to continue operation of Borssele. Potential government candidates D66 and GroenLinks want it closed. The other negotiating party, the christian-democrat CDA, did not mention Borssele in its election programme, whereas another potential government coalition candidate, the Christian Union (CU), would like to see closure.

Czech Republic – Dukovany and Temelín

The Dukovany nuclear power station is gradually receiving permission for 20 years' life-time extension. Austrian NGOs including among others Global2000, ÖkoBüro Wien and the ÖkolInstitut in Vienna have started procedures under the Espoo and Aarhus Conventions against the lack of transboundary EIA with public participation.

A conference of anti-nuclear groups in Germany and the Czech Republic in Munich in March 2017 continued investigations into alleged problems during primary circuit welding work in the Temelín unit 1 in 1993. Greens Fichtelgebirge organiser Brigitte Artmann announced the next steps to allow access for German experts to vital documentation and stated: "As long as we are alive and this issue has not been resolved, it is not closed."

UK – Hinkley Point C, Wylfa and Moorside

The Espoo Convention Implementation Committee found the UK in non-compliance with the Espoo Convention for not notifying other countries of its intention to build the Hinkley Point C nuclear reactors. The UK reacted with a notification to all Espoo Convention parties, and currently, at least the Netherlands, Norway and Germany asked for a transboundary EIA.

The Netherlands and Austria also informed WISE they had been notified by the UK of the intention to build new nuclear capacity at Wylfa in Wales and are awaiting the start of a transboundary EIA procedure. With this, legal complaints from the Friends of the Irish Environment, An Taisce (the Irish Trust), the German member of the Bundestag Greens Sylvia Kötting-Uhl and German citizen Brigitte Artmann, have been successful. The Espoo Implementation Committee even went a step further by calling on the UK to halt construction work at Hinkley Point C until the transboundary EIA has been finalised. Construction work at Hinkley Point has, however, continued with the pouring of the first safety-relevant concrete.

Finland – Olkiluoto 1,2

The aging reactors 1 and 2 at Olkiluoto have received a life-time extension without public participation or an EIA during the decision-making procedures. NGOs are considering legal options.

Espoo Convention – Meeting of Parties

During the Espoo Convention Meeting of Parties 13–16 May 2017 in Minsk, Belarus, nuclear issues will receive prominent attention. Lithuania and Belarus are involved in an ingrained battle over the quality of the Astravets EIA (see above). The NGO CEE Bankwatch is organising a side-event to highlight the lack of environmental impact assessment before decisions on life-time extension of nuclear projects in Ukraine, Netherlands, Belgium, Spain, Czech Republic and elsewhere. A special commission is to come with best practices around nuclear decisions, though draft documents do not address life-time extensions.

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

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