

# 1. Climate rate research banned as ‘unhelpful’

BEN WEBSTER  
THE TIMES  
MAY 17, 2014 12:00AM

<http://www.theaustralian.com.au/news/world/climate-rate-research-banned-as-unhelpful/story-fnb64oi6-1226920701895#>

**RESEARCH heaping doubt on the rate of global warming was deliberately suppressed by scientists because it was “less than helpful” to their cause, The Times has learnt.**

In an echo of the infamous Climategate scandal at England’s University of East Anglia, one of the world’s top academic journals rejected the work of five experts after a reviewer privately denounced it as “harmful”.

Lennart Bengtsson, a research fellow at the University of Reading in England and one of the authors of the study, said he suspected intolerance of dissenting views on climate science was preventing his paper from being published.

“The problem we now have in the climate community is that some scientists are mixing up their scientific role with that of a climate activist,” he said.

Professor Bengtsson’s paper challenged the finding of

the UN's Intergovernmental Panel on Climate Change that the global average temperature would rise by up to 4.5C if greenhouse gases in the atmosphere were -allowed to double.

It suggested that the climate might be much less sensitive to greenhouse gases than had been claimed by the IPCC in its report last September, and recommended more work be carried out “to reduce the underlying uncertainty”.

The five contributing scientists, from the US and Sweden, submitted the paper to *Environmental Research Letters*, one of the most highly regarded journals, at the end of last year, but were told in February that it had been rejected.

A scientist asked by the journal to assess the paper under the peer-review process wrote that he strongly advised against publishing it because it was “less than helpful”.

The unnamed scientist concluded: “Actually, it is harmful as it opens the door for oversimplified claims of ‘errors’ and worse from the climate sceptics media side.”

Professor Bengtsson resigned from the advisory board of a -climate sceptic think tank this week after being subjected to what he described as McCarthy-style pressure from fellow -academics.

Lord Lawson, the former Conservative chancellor who heads the think tank, said the pressure exerted by

other -climate scientists had been -appalling and the comparison with McCarthyism was “fully warranted”.

The claims are a stark -reminder of events at the University of East Anglia in 2009. Scientists there were accused of manipulating data and suppressing critics of global warming predictions in the run-up to the crucial Copenhagen climate change conference.

## 2. Subsidy scam hurt the energy sector

ALAN MORAN  
THE AUSTRALIAN  
MAY 19, 2014 12:00AM

<http://www.theaustralian.com.au/business/subsidy-scam-hurt-the-energy-sector/story-e6frg8zx-1226921944377#>

**IN addressing climate change spending and regulatory costs, the government has made some impressive first steps. Few of these are in the wrong direction.**

Labor went to last year’s election with more than \$5 billion a year in budget outlays for its climate change programs. This included more than \$2bn a year to be spent by the Clean Energy Corporation.

In addition, Labor’s carbon tax would be raising \$13bn by next year (though Kevin Rudd had

foreshadowed reducing this) and its renewable energy target would be raising electricity bills — by \$5bn a year by 2020.

In all, Labor’s planned spending on reducing greenhouse gas emissions was ramping up to \$23bn a year, similar to the entire defence budget or twice the annual spending planned by the present government on transport and communications, which house its signature infrastructure areas.

In its first move to cut back the climate change impositions, the Coalition put beyond doubt any question of keeping the carbon tax.

The budget reinforces this by curtailing many other programs, though painfully slowly in some cases.

There have been backward steps. Among these is the creation of the Green Army, a sort of “young pioneer” corps of the unemployed doing landcare repair to prepare themselves for future taxpayer-funded environmental jobs. The program’s objectives avoid mentioning climate change but, starting at \$48 million this year, spending is ostensibly hurtling towards \$230m annually. This is an expensive attempt to deflect green dudgeon.

We have also seen the first spending step of the Direct Action program. Limited to \$75m in the current year, this is planned to increase but remains a far cry from the \$1bn-a-year spending the Coalition once proposed. “One million roofs”, once flaunted as a

\$100m program, has been dropped.

Outweighing these new spending measures are many program cuts within the environment and industry departments.

These include savage cuts to the adaptation and international negotiation spend — no more of those 114-delegation team visits such as the one that accompanied Rudd to Copenhagen in 2009.

The budget abolishes the Australian Renewable Energy Agency (ARENA), saving \$1.3bn. However, ARENA's chairman, the World Wildlife Fund's Greg Bourne, like his counterpart at the Clean Energy Finance Corp, said he would continue “delivering funding to worthy projects” until the agency's bank account was closed.

Also to be terminated, with a saving of \$460m, is the scandalously wasteful carbon capture and storage program, though its commitments might mean it soldiers on to 2017.

Similarly, the government has closed the \$17m “clean coal” initiative and axed the \$20m a year Clean Technology Innovation program. Also gone is the Green Car Innovation Fund, which became redundant as a result of labour laws and regulatory-induced increases in energy prices that made motor vehicle manufacturing unprofitable in Australia.

Ever so gingerly, Joe Hockey has begun paring back the profligate scam that is ethanol subsidies, grabbing

back \$120m a year.

The government's own published estimate of aggregate climate change expenditure is that it falls from \$5.75bn this year to \$500m two years hence. This includes spending by the Clean Energy Finance Corp.

But it excludes some spending, such as that of the CSIRO, which, when it saw its interest was in being active on climate matters, claimed that about 50 per cent of its budget was being spent in these directions. CSIRO can count itself lucky to have escaped with a mere \$33m haircut, less than 5 per cent of its direct budget.

Outside the budget is the renewable energy target, presently under review by a panel headed by Dick Warburton.

Renewable energy from wind and solar, the two major subsidised supply types, remains non-commercial. It is three times the cost of electricity sourced from coal.

Renewable energy lobbyists have done wonders in getting governments to force consumers and other producers to pay \$18.5bn on worthless assets.

Even with the carbon tax repealed, according to the electricity market regulator, next year will have renewable subsidies and associated schemes bringing about a 75 per cent increase in the wholesale electricity price.

Those arguing for the retention of the subsidies on renewables nonsensically claim that they reduce overall electricity prices.

In fact, the privileged position of renewables, if left untouched, would entail bankrupting the commercial providers, leaving a legacy of much higher prices and less reliable supply.

It is also claimed that early termination of the renewables program would introduce an element of sovereign risk into Australia's investment environment.

This is untrue. The withdrawal of a privilege does not constitute a government seizure of property which would undermine investor confidence.

Nobody suggested compensating the motor-vehicle assemblers for the billion or so dollars they have written down as a result of losing government supports.

Nor has Spain suffered from reputational loss since it wound down its previously agreed wind and solar subsidies.

Wind and other renewables should be left to stand on their own feet commercially. Their ongoing subsidisation severely weakens the national economy and should be terminated immediately.

The cuts to Australia's energy subsidies will force the entrepreneurs who have been so successful in

grabbing government favours to make their fortunes elsewhere.

This is a gain to Australia and ways should be explored to allow earlier terminations of wasteful schemes that have been put in place.

*Alan Moran is director, deregulation, at the Institute of Public Affairs*

### 3. Fusion Stellarator Starts Up

Alternate design to ITER might ultimately be better for generating electricity

By Alexander Hellemans  
Posted 21 May 2014 | 19:44 GMT

<http://spectrum.ieee.org/energy/nuclear/fusion-stellarator-starts-up>

The construction of ITER, the 23 000-metric-ton tokamak-style fusion reactor is under way now in France. But a smaller reactor of a different design might be the key to its success. That reactor, the US \$1.45 billion Wendelstein 7-X, was inaugurated yesterday, and researchers expect that it will ignite its first plasma a year from now.

Housed at the Max Planck Institute for Plasma

Physics, in Greifswald, Germany, Wendelstein 7-X is a “stellarator,” a term coined in the 1950s by the Princeton astrophysicist Lyman Spitzer, who designed the first such machine for exploring the fusion reactions in stars. It’s a design that predates the tokamaks in use today but one that had fallen out of favor because the computers of the day weren’t able to properly model the 3-D magnetic field confining the plasma.

“The W7-X is the first large stellarator designed to get the physics right,” says Allen Boozer, an applied physicist at Columbia University, in New York City.

Although many view fusion power with skepticism, many others hope that one day we will harness the fusion of hydrogen atoms into helium atoms to produce electricity. The helium atoms have a slightly lower mass than the two hydrogen atoms that form them, and this difference in mass is released as energy, according to Einstein’s famous principle  $E=mc^2$ . It is this reaction that powers the sun and, in an uncontrolled fashion, hydrogen bombs. However, for hydrogen atoms to fuse into helium atoms, they have to smash together with extremely high energies, corresponding to temperatures of at least 100 million °C. At these temperatures, electrons are entirely separated from the atomic nuclei and the gas becomes a plasma, but if the plasma touches a metal wall of the reactor, it immediately cools off, stopping any fusion reactions. Therefore, it has to be trapped in a “magnetic bottle,” a magnetic field created by electromagnets arranged in such a way that the

plasma doesn't touch the reactor vessel.

From the 1950s to the 1970s, these magnetic bottles were stellarators, based on Spitzer's original design of a contorted-torus-shaped reactor vessel with toroidal coils surrounding it and a separate helical coil surrounding the torus. This helical coil was wound in such a way that it produced a magnetic field component perpendicular to that of the toroidal coils. The combination created the "helicoidal" magnetic field needed to confine the plasma. During the 1950s, Russian scientists developed what became a more successful design for magnetic confinement: the tokamak. It consisted of a torus-shaped vessel surrounded by toroidal magnets. Instead of the stellarator's helical coil, however, a circular current through the plasma created the component of the magnetic field required to confine the plasma. The tokamak worked better than the stellarators of the time, and fusion researchers switched to the Russian design, demonstrating sustained fusion reactions with the Joint European Torus (JET), in Culham, England, in 1991. (Until ITER—the International Thermonuclear Experimental Reactor—is complete, JET remains the world's largest magnetic fusion device. Its torus has an inner radius of 0.9 meters and an outer radius of 3 meters, which can confine a plasma with a volume of 100 m<sup>3</sup>.) But the required circular current through the plasma makes it prone to instabilities, resulting in stoppages called disruptions.

Stellarators don't have this problem. Their difficulty

was that the design of the machine required intensive 3-D simulation for determining the optimal shape of the magnetic field and the shapes of the helical and toroidal coils that created it. In the 1980s, supercomputers could do the job. At that time, the researchers in Greifswald decided on a new “bottom-up” approach, modeling the field using the fundamental equations of magnetohydrodynamics, says Thomas Klinger, who heads the W7-X project.

Although Wendelstein 7-X is not designed for actual fusion reactions, the experience of building and operating it will likely contribute valuable insights to the construction of ITER, which requires similar technology. The magnetic field in the machine will be created by superconducting magnets, cooled to a temperature of  $-269\text{ }^{\circ}\text{C}$ , and carry a current of 18 200 amperes. The ITER design also calls for superconducting coils, and experience with this cryogenic technology will be important, says Klinger. “The fact that you have a cryogenic machine drives the quality requirements to a much higher level,” he says. “You have to meet high-level industrial standards as they exist in aviation or space science, and there we are contributing to ITER.”

What about a possible follow-up machine? Klinger says it’s too early. “First we have to gain experience running this machine. We have very good evidence that the W7-X is already very, very close to the design we need for a power station,” he says. “We first need success with our project. It has to prove to

be fully competitive with the tokamak, and it has to be able to run steady state.” Steady-state operation is best for power generation, in part because you avoid thermal cycling and material fatigue. But it’s difficult to achieve in a tokamak.

Indeed, David Anderson, who directs research with the Helically Symmetric Experiment stellarator at the University of Wisconsin–Madison, believes that stellarators might be better suited for electricity generation. “They are much easier to operate than tokamaks,” he says.

That’s not to say stellarators are necessarily the way to go, according to Larry Grisham, a physicist who was with the Princeton Plasma Physics Laboratory until he recently became director of strategic development at the magnetometer firm Twinleaf, in Princeton, N.J. “The major disadvantage of a stellarator relative to a tokamak is that, for a given size, it is much more complicated to fabricate and assemble, and would presumably be even more complicated than a tokamak to repair in a radioactive environment,” Grisham says.

It will, of course, be many years before one design or the other can really prove its worth as a power generator.

## About the Author

Alexander Hellemans covers science and technology in Europe. With Bryan Bunch, he is author of *The History of Science and Technology: A Browser’s*

*Guide to the Great Discoveries, Inventions, and the People Who Made Them from the Dawn of Time to Today* (Houghton-Mifflin, 2004). In the May 2013 issue he reported on how nanowire transistors could save Moore's Law.

#### 4. Test rig for world's biggest experimental fusion reactor

distributed by noodles on 20/05/2014 18:06

<http://www.noodles.com/viewNoodl/23185180/thyssenkrupp-ag-/test-rig-for-world8217s-biggest-experimental-fusion-react>

Trade press release, May 20, 2014 - 11:00 AM (CEST) Materials Services

##### **Service and tailored special steel from ThyssenKrupp Schulte**

ThyssenKrupp Schulte is helping drive forward one of the world's most significant scientific projects: the construction of the world's biggest experimental nuclear fusion reactor ITER (International Thermonuclear Experimental Reactor).

The experimental nuclear fusion reactor is a multi-billion euro joint project: Seven members of an international research initiative are directly involved in building the reactor in Saint-Paul-lès-Durance in southern France. The mega project is being funded by the European Union, China, India, Japan, Russia, South Korea and the USA. ITER is intended to provide information on the generation of energy from nuclear fusion.

Manufacture of a custom test rig ThyssenKrupp Schulte has made a major contribution to the project: Its Munich branch designed a unique test rig to help gather information on the load capacity and mechanical stability of the moving supports for the ITER vacuum vessel. "The vacuum vessel, which weighs around 10,000 tons, is one of the most important components of the nuclear fusion reactor," says Andreas Kellermann, manager of the Munich branch. To enable the vessel to expand during the fusion process and absorb the magnetic forces generated, it rests on nine moving steel supports which have to withstand a weight comparable with that of the Eiffel Tower.

The order was placed by KRP-Mechatec Engineering, the company responsible for the design of the test rig and the mechanical stability of the supports. Due to the highly complex nature of the test rig, the engineers requested ThyssenKrupp Schulte to manufacture the components on an individual basis. The selected material had to display high tensile strength and toughness. ThyssenKrupp Schulte advised its customer on the feasibility of each process step, in particular with regard to manufacturing tolerances. In addition, the materials experts made corrections to the engineering drawings based on their own measurements, and in cross-border collaboration with ThyssenKrupp Materials Austria were able to support all process steps.

More than nine tons of heat-treated steel was eventually used. The rig, measuring 2,265 x 2,125 x 1,400 millimeters, resembles a gigantic vice. The support mock-up

developed by KRP-Mechatec Engineering was clamped in the structure and tested for stability using hydraulic equipment. This resulted in a custom design in line with individual requirements. "The challenge for us as service provider lay in providing tailored advice," says sales staff member Diana Löhner: "Our expertise helped us find the ideal solution for all our customer's requirements."

Test passed Finally, stability of the support was tested in the finished test rig at Munich University of Technology. Strain gauges were used to monitor the rig during three days of load testing and to test the mobility of the cylinder bearings. The results were impressive: The support passed the test. The findings will feed into the construction of the nuclear fusion reactor.

High-resolution images are available to download

at: <http://picturepool.thyssenkrupp.info/?c=2769&k=c30e5d0509>

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## **5. Toshiba Wins a Contract for ITER's Superconducting Coils**

**- Begins manufacturing at its Keihin Product Operations and Toshiba IHI Power Systems Corporation in Yokohama -**

20 May, 2014

[http://www.toshiba.co.jp/about/press/2014\\_05/pr2001.htm](http://www.toshiba.co.jp/about/press/2014_05/pr2001.htm)

TOKYO—Toshiba Corporation (Tokyo: 6502) today announced that it has concluded a contract with the Japan Atomic Energy Agency (JAEA) for the manufacture of toroidal field coils for the International Thermonuclear Experimental Reactor (ITER) being constructed in Cadarache, France. Keihin Product Operations and Toshiba IHI Power Systems Corporation will begin manufacturing the coils the end of this month. The ITER facility will have a total of 18 coils and initiate plasma experiments in

2020.

Toshiba has been commissioned to manufacture four toroidal field coils and six containers to hold the coils, and will start deliveries in 2017. Toroidal field coils are used to produce strong magnetic fields that confine the high-temperature plasma necessary for nuclear fusion to occur.

The ITER project aims to demonstrate nuclear fusion as a viable future energy source. The project is funded and run by seven member entities: Japan, the European Union, the United States, Russia, China, South Korea and India. Thermonuclear fusion occurs in high temperature deuterium-tritium plasma at the order of 100 million degrees Centigrade, and the heat produced by the fusion reaction is used to generate electricity. Because the source of nuclear fusion fuel is abundant in nature, thermonuclear fusion, once proven, is expected to become a perpetual source of energy.

Toshiba has long been involved in the research and development of nuclear fusion technology, participating in design activities and supply of equipment. Toshiba has manufactured equipment, such as coils and power supply systems, for the JAEA Naka Fusion Institute's JT-60, the National Institute of Fusion Science's Large Helical Device and for other institutes in Japan and overseas. In March 2014, Toshiba delivered sectors of the vacuum vessel for JT-60SA, a successor to JT-60. Toshiba will continue to leverage its technologies to contribute to the research and development of leading-edge technologies.

## 6. **Fire and ice: Melting Antarctic poses risk of volcanic activity, study shows**

Date  
May 20, 2014

<http://www.smh.com.au/environment/fire-and-ice-melting-antarctic-poses-risk-of-volcanic-activity-study-shows-20140520-zri06.html>

New research on the effects of ice sheet melt in the Antarctic shows climate change is deforming the Earth's crust, potentially prompting volcanic activity that could cause global sea-levels to rise much more than predicted. Scientists led by Newcastle University in the UK studied the impact of the collapse of the giant Larsen B ice shelf in 2002, using Global Positioning System (GPS) stations to gauge how the Earth's mantle responded to the relatively sudden loss of billions of tonnes of ice as glaciers accelerated. As expected, the bedrock rose without the weight but at a pace – as much as 5 centimetres a year in places – that was about five times the rate that could be attributed by the loss of ice mass alone, said Matt King, now at the University of Tasmania (UTAS), who oversaw the work.

“It's like the earth in 2002 was prodded by a stick, a very big stick, and we've been able to watch how it responded,” Professor King said. “We see the earth as being tremendously dynamic and always changing, responding to the forces.”

Such dynamism - involving rocks hundreds of kilometres below the surface moving “like honey” - could have implications for volcanoes in the region, Professor King said.

“It's one of the big unknowns: If something starts to happen with one of those volcanoes, our estimates of what sea levels might be like in the future may have a significant revision”, he said, adding “fire and ice generally don't go well together”.

“It's a big ‘if’ - but if a volcano erupted from underneath the ice sheet, it would dramatically accelerate the ice melt and the flows into the oceans.”

The latest Intergovernmental Panel on Climate Change report in 2013 estimated global sea levels could rise between about 0.5 and 1 metre by 2100, based on high rates of greenhouse gas emissions. However, a rapid collapse of the Antarctic ice sheets, particularly in the continent's west, could see much higher sea-level rises.

The new study, published this month in the *Earth and Planetary Science Letters*, may also have implications for regions with a similar geology, such as Alaska.

“The (Alaskan) glaciers are melting and the upper mantle is slightly runnier as well,” Professor King said, adding that there is already “the expectation of a very large earthquake” in the region as tectonic plates meet.

Australian researchers now want to extend the study to the remnant of Larsen B, which is holding back two glaciers and may prompt a southward spread of the uplifting effect if it collapses.

“That ice sheet is increasingly fractured and looks like it's going to break up as well,” Professor King said. “When it does, we'd expect the glaciers to accelerate and lose ice mass.”

However, the ability of Australian scientists to conduct the work remains unclear in the wake of last week's federal budget.

While UTAS, CSIRO and Antarctic Division received \$24 million more over coming years for Antarctic research, the Australian Research Council and

other parts of CSIRO lost funding, Professor King said. The extra funding should be used for new science, not plugging the gaps caused by other cuts, he said.

7.

## BMT continues to develop its nuclear capability

<http://www.thejournalofindustryandtechnology.biz/page782.html>

BMT Hi-Q Sigma Ltd (BMT), a subsidiary of BMT Group, has been awarded a second contract by Fusion for Energy (F4E) which will see the consultancy provide configuration management and system engineering support over the next four years, as part of a €2.2m Euros framework agreement. **F4E provides Europe's contribution to ITER**, the world's largest scientific partnership, which aims to demonstrate fusion as a viable and sustainable source of energy. ITER brings together seven parties that represent half of the world's population - the EU, Russia, Japan, China, India, South Korea and the United States, in order to build the world's largest experimental Tokamak nuclear fusion reactor at the Cadarache facility in the south of France.

BMT will work closely with F4E throughout the four year framework to deliver Configuration Management and System Engineering Support ensuring goals can be realised and the environment created to make information Services including best practice and optimisation techniques. BMT will complement and support F4E's work implementation project with configuration management, Project Documentation, Requirements Management and Verification activities to help ensure successful delivery. **Graham Jefferies at BMT Hi-Q Sigma comments:** "Our second framework agreement with F4E demonstrates our commitment to the development of the new sustainable energy market, utilising BMT's skills signed with Japan and prepares for the construction of demonstration fusion experience and knowledge to help deliver a technology first. We are

delighted to be able to establish support April 2007 for a period of 35 years. Its offices are cost effective services as required."

**BMT Hi-Q Sigma in profile** BMT Hi-Q Sigma helps clients to deliver complex projects through the integration of programme management, investment appraisal and systems engineering, ensuring goals can be realised and the environment created to make informed decisions. The company brings clarity through: strategic guidance in the establishment and management of programmes; optimisation of existing programmes; intelligent resourcing and knowledge transfer, building complete confidence. **For further information, view website:** [www.bmt-hqs.com](http://www.bmt-hqs.com) **BMT Group in profile**

BMT is an international design, engineering and risk management consultancy, working principally in the defence, energy and environment, marine risk and insurance, maritime transport and ports and logistics sectors. **BMT invests significantly in research.** Its customers are served through a network of international subsidiary companies. The group's assets are held in beneficial ownership for its staff. **For further information, view website:** [www.bmt.org](http://www.bmt.org) **Fusion for Energy in profile** Fusion for Energy (F4E) is the European Union's organisation for Europe's contribution to ITER. One of the main tasks of F4E is to work together with European industry, SMEs and research organisations to develop and provide a wide range of high technology components together with engineering, maintenance and support services for the ITER project. **F4E supports fusion R&D initiatives through the Broader Approach Agreement signed with Japan and prepares for the construction of demonstration fusion reactors (DEMO).** **F4E was created by a decision of the Council of the European Union as an independent legal entity and was established in April 2007 for a period of 35 years.** Its offices are in Barcelona, Spain.

## 8. Monster Machines: An Overdue Reactor That Could Be The Key To Our Fusion Revolution

ANDREW TARANTOLA

30 MAY 2014 6:00 PM

<http://www.gizmodo.com.au/2014/05/monster-machines-an-overdue-reactor-that-could-be-the-key-to-our-fusion-revolution/>

Even with the recent advancements in renewable energy technologies, it's going to be tough to satisfy the electrical needs of our booming human population in the coming years. However, if this international nuclear reactor can ever come online, we may see fusion-driven, utility-scale power grids within our lifetimes.

The International Thermonuclear Experimental Reactor (ITER) is an experimental tokamak nuclear fusion reactor located at the Cadarache scientific research facility in the south of France and grew out of earlier work around plasma physics. It's being built as part of an international effort — involving the US, China, the EU, India, Japan, Russia and South Korea — to harness and recreate the immensely potent energy production capabilities of our Sun. The ITER is, simply, a miniaturised sun serving as a proof of concept. If this reactor proves successful, safe, and stable, the lessons researchers learn and the data they collect will be leveraged to create a commercial-scale reactor.

Even as a proof of concept, the ITER is enormous. It's twice as big and 16 times as heavy as any other tokamak reactor ever built. The 830 cubic metre doughnut-shaped vacuum chamber, where a mix of deuterium and tritium isotopes are heated to 150 million degrees Celsius to form plasma, which is then confined and controlled via powerful superconducting magnetic coils, is 19.5m in diameter. These coils are necessary to keep the plasma from burning clear through the containment wall. The structure as a whole will be well over 30m tall, weigh 4641 tonnes — double that of the Eiffel Tower — and produce 500MW throughout its 20-year operational life.

When that operational life starts, however, is still up for debate. Crews first broke ground in 2007 with hopes of completing in 2016, but a seemingly endless string of delays and budget overruns have pushed the ribbon-cutting back more than a decade, to 2019 at the earliest. And though it is expected to start running in 2020, it likely won't be running *at full power* until 2027. Given the current political situations among the seven participatory states that seems a rather optimistic timetable, still if it does prove successful, it could substantially alleviate — if not entirely eliminate — global energy demand.

[[ITER](#) - Wiki]

## 9. Obama unveils historic rules to reduce coal pollution by 30%

- New EPA rules spur prospects for deal to end climate

change · Climate groups welcome 'momentous development' · Coal lobbyists say plans will create new US energy crisis

<http://www.theguardian.com/environment/2014/jun/02/obama-rules-coal-climate-change>

The Obama administration unveiled historic environment rules cutting carbon pollution from power plants by 30% on Monday, spurring prospects for a global deal to end climate change but setting up an epic battle over the environment in this year's mid-term elections.

The new rules, formally announced by the Environmental Protection Agency, represent the first time Barack Obama, or any other president, has moved to regulate carbon pollution from power plants – the largest single source of carbon dioxide emissions that cause climate change.

The EPA said the regulations, which would cut carbon pollution from power plants 30% from 2005 levels by 2030, would “fight climate change while supplying America with reliable and affordable power”.

The EPA administrator, Gina McCarthy, said the new rules would be critical to Obama's efforts to deliver on his promise – to Americans and the international community – to fight climate change.

"The EPA is delivering on a vital piece of President Obama's climate action plan by proposing a clean power plan that will cut harmful carbon pollution from our largest source – power plants," she said in a statement.

“This is not just about disappearing polar bears and melting ice caps,” McCarthy said in a speech at EPA headquarters. “This is about protecting our health and protecting our homes. This is about protecting local economies and this is about protecting jobs.”

The new rules were not as ambitious as some environmental groups had hoped. America is already a third of the way towards meeting the national average of a 30% cut in emissions. Some states, especially those in the north-east, have already exceeded the standard.

Even so, reaction from environmental groups to the new power plant rules ranged from “momentous” to “historic”. Al Gore said the new rules were “the most important step taken to combat the climate crisis in our country's history”.

Michael Brune, executive director of the Sierra Club, said "today, the president made good on his promise to American families that his administration would tackle the climate crisis, and clean up and modernize the way we power our country."

In an initiative organised by Ceres, the green investor network, 128 companies and 49 investors managing \$800 billion in assets, sent letters to the White House and leaders of both parties in Congress [supporting the new rules](#) as "a critical step" to dealing with climate change.

But a lobby group for the coal industry – which will be hit hardest by the new rules – said the regulations would hurt the economy and lead to power outages. “If these rules are allowed to go into effect, the administration, for all intents and purposes, is creating America's next energy crisis,” the American Coalition for Clean Coal Electricity said.

Obama had initially sought to deal with climate change through Congress. But after that effort collapsed, and with Republicans in Congress uniformly opposed to cutting carbon emissions – or even acknowledging climate change was occurring – Obama decided last year to use his executive authority to cut carbon pollution.

In her announcement on Monday, McCarthy hit back at criticism from industry and conservative groups that the rules will lead to power outages or higher electricity prices. “Critics say that their energy bills will skyrocket. Well, they're wrong,” she said.

McCarthy said the new rules would result in pollution savings that amount to "double what every power plant in America generated in the way of pollution in 2012."

The result, she said, would be lower medical bills and fewer trips to the emergency rooms, especially for kids with asthma, the elderly and infirm.

McCarthy says the plan "is also about environmental justice" because "lower-income families and communities of color are

hardest-hit."

## **Emissions creeping up again**

Power plants are the largest single source of carbon pollution, accounting for nearly 40% of the emissions that cause climate change.

Obama, in his weekly radio address on Saturday, said it was past time to set national limits on carbon dioxide emissions – just as the EPA has done for years with arsenic, mercury and other toxins.

“Right now, there are no national limits to the amount of carbon pollution that existing plants can pump into the air we breathe. None,” he said. “They can dump unlimited amounts of carbon pollution into the air. It's not smart, it's not safe, and it doesn't make sense.”

Carbon dioxide emissions from power plants had been falling since 2005, because of the economic downturn and because of the switch from coal to cheaper natural gas.

Ethan Zindler of Bloomberg New Energy Finance said the power industry was already about a third of the way towards the 30% goal.

But emissions crept up last year and again in the first months of 2014, and the regulations would put America on course for long term and lasting cuts to carbon pollution.

Andrew Steer, the chief executive of the World Resources Institute, said it was a “momentous development” for America's efforts to deal with climate change.

“It's the most important action available to cut US emissions – and the Obama administration has seized the opportunity,” he said. “These new standards send a powerful message around the world that it's time to face the global threat of climate change.”

The rules could affect 1,600 power plants. About 600 of these operate on coal, including many that are nearly 50 years old and will have the most difficulty meeting the new standards.

Under the rule, states and power companies will have a range of options to meet the new standards: switching from coal to cleaner-

burning natural gas; forming cap-and-trade markets; expanding renewables such as wind and solar power; or encouraging customers to use less energy by moving to more efficient heating and cooling systems and appliances.

That's a departure for the EPA, which generally has focused on curbing emissions from specific smoke stacks.

But the Natural Resources Defense Council, which produced models that helped guide the EPA, said a system-wide approach would make it easier and cheaper for power companies to reach the new standard.

The 30% national target will not be applied uniformly across the country. The EPA will set individual reductions targets for each state, taking into account their energy mix, according to those briefed on the plan.

States have until 2016 to come up with a strategy for meeting the targets. However, the EPA rules will not come into force in all states until 2020, according to one individual briefed on the plan.

"They are not going to spread it out smoothly all over the place like creamy peanut butter," said Vicki Arroyo, who heads the climate centre at the Georgetown University law school. "It's going to be more lumpy than that. Some states will have less ambitious targets, and some states will have more."

The idea is to take account of the available energy sources in each state, as well as the measures some states have already undertaken to cut carbon pollution. North-eastern states have already cut their power plant emissions by 40% compared with 2005.

McCarthy said Monday the plan is tailored for the states. "The glue that holds this plan together ... is that each state's goal is tailored to their own circumstances ... each state's different, so each goal, and each path, can be different," she said.

Arroyo said it was possible the rule could bring about the same level of reductions in carbon pollution as a climate change bill that was defeated by Congress five years ago.

The new EPA rule bypasses Congress, relying on Obama's executive authority and supreme court decisions, to propose new

rules under the Clean Air Act.

The Chamber of Commerce, the country's biggest business lobby, said last week the new rules would cost the economy \$51bn and put 224,000 people out of work.

Coal-mining companies, some power companies and Republican state officials have accused the EPA of overstepping its authority, and will be studying the bill closely for possible legal challenges.

In their rebuttal to Obama's radio address, the Republicans said the new standards would "kill coal" and lead to power outages.

"We'll all be paying a lot more money for electricity – if we can get it," said Wyoming senator Mike Enzi.

But Obama has been marshalling his own supporters. Environmental and public health groups have been pushing hard for the new rules.

Researchers from Harvard and Syracuse universities put out a study last week saying that curbs on carbon pollution would also reduce smog and soot, avoiding premature deaths from heart attacks and lung disease.

That campaign effort is due to pick up again on Monday. Obama is scheduled to hold a conference call with the American Lung Association and other public health groups on Monday afternoon.

White House officials spent Sunday briefing governors and business leaders about the new rule.

## 10. **Earth scientists split on climate change statement**

THE AUSTRALIAN  
JUNE 04, 2014 12:00AM

<http://www.theaustralian.com.au/news/health-science/earth-scientists-split-on-climate-change-statement/story-e6frg8y6-1226942126322#>

**AUSTRALIA’S peak body of earth scientists has declared itself unable to publish a position statement on climate change due to the deep divisions within its membership on the issue.**

After more than five years of debate and two false starts, Geological Society of Australia president Laurie Hutton said a statement on climate change was too difficult to achieve.

Mr Hutton said the issue “had the potential to be too divisive and would not serve the best interests of the society as a whole.”

The backdown, published in the GSA quarterly newsletter, is the culmination of two rejected position statements and years of furious correspondence among members. Some members believe the failure to make a strong statement on climate change is an embarrassment that puts Australian earth scientists at odds with their international peers.

It undermines the often cited stance that there is near unanimity among climate scientists on the issue.

GSA represents more than 2000 Australian earth scientists from academe, industry, government and research organisations.

A position statement published in 2009 said the society was concerned about the potentially harmful effects of carbon dioxide emissions and favoured “strong action to substantially reduce current levels”.

“Of particular concern are the well-documented loading of carbon dioxide to the atmosphere, which has been linked unequivocally to burning of fossil fuels, and the corresponding increase in average global temperature,” it said.

“Risks associated with these large-scale perturbations of the Earth’s fundamental life-support systems include rising sea level, harmful shifts in the acid balance of the oceans and long-term changes in local and regional climate and extreme weather events.”

Publication of the position statement caused an uproar among members and led to a revised statement, after wide consultation. The revised statement said:

“Geological evidence clearly demonstrates that Earth’s climate system is inherently and naturally variable over timescales from decades to millions of years.

“Regardless of whether climate change is from natural or anthropogenic causes, or a combination of both, human societies would benefit from knowing what to expect in the future and to plan how best to respond.

“The GSA makes no predictions or public policy recommendations for action on climate beyond the generally agreed need for prudent preparations in response to potential hazards, including climate change.”

The revised statement was criticised as being too vague.

In a short statement published in the latest edition of the society newsletter, Mr Hutton says: “After a long and extensive and extended consultation with society members, the GSC executive committee has decided not to proceed with a climate change position statement.”

“As evidenced by recent letters to the editor ... society members have diverse opinions on the human impact on climate change. However, diversity of opinion can also be divisive, especially when such views are strongly held.

“The executive committee has therefore concluded that a climate change position statement has the potential to be far too divisive and would not serve the best interests of the society as a whole ,” the statement says.

11.

## **Will Obama's carbon plan survive 2**

**BY KATE GALBRAITH**

Foreign Policy June 5, 2014

<http://www.bradenton.com/2014/06/05/5188442/will-obamas-carbon-plan-survive.html>

No wonder U.S. President Barack Obama hopped on a flight to Europe this week. On June 2, when his environmental chief rolled out a massive proposed rule that would force power plants to cut carbon dioxide emissions 30 percent by 2030 (relative to 2005 levels), Republicans vied to lambaste the plan, which House Speaker John Boehner dismissed simply as "nuts."

In Europe, Obama can expect a kinder reception. The European Union climate chief, Connie Hedegaard, hailed the proposal as the "strongest action ever taken by the U.S. government to fight

climate change" -- even as she urged every country, the United States included, to do "even more."

But amid the hullabaloo, everyone is forgetting a key detail: Actions by the executive branch are only as strong as the next presidential election. The regulations, which target coal plants in particular, can always be rolled back by a new administration.

Just ask Australia and British Columbia, where, at this very moment, politicians are rejiggering their predecessors' strong carbon policies.

And as U.S. environmental rules go, the carbon one may be especially easy to knock down because of its late implementation schedule -- this week's proposal, from the Environmental Protection Agency (EPA), calls on states to have a plan for implementation in place by 2016, with actual emissions reductions not required until 2020.

"Even if the Obama administration is able to adopt stringent new rules, and such rules survive court challenge, they could be vulnerable to revision by future administrations," said Jonathan Adler, who directs Case Western Reserve University's Center for Business Law & Regulation.

Rolling back the power plant measure wouldn't be a snap, because it would require time-consuming steps like a public comment period. But a future administration wanting to void it in a hurry will have a clear precedent, Adler said: The Obama administration's expanded use of executive-branch discretion.

"If a Republican president were to build upon these precedents, that president would (have) a far-reaching authority to, in effect, waive existing regulatory requirements while building support for regulatory or legislative changes," he said.

In other words, Obama's eagerness to use executive authority -- the implementation of Obamacare being a classic example -- could come back to haunt him, if a Republican takes over.

And make no mistake, Republicans will run on the issue, even as

environmentalists are gearing up to champion climate change action in the hopes of wooing the general public.

The likes of Sen. Rand Paul, Ky., and Texas Gov. Rick Perry are probably thinking up campaign zingers even now, to rouse the electorate against higher electric power prices and federal overreach.

So the risk is that carbon policies can be politically fickle, and in the arena of global climate change regulations, there is precedent. Australia and British Columbia both adopted aggressive carbon regulations years ago, only to see a change of government, and new economic considerations, prompt a rethink.

In the United States, Democrats know all too well that environmental measures can be reversed. The classic case is the U.S. stance toward the Kyoto Protocol, the global treaty to cut carbon emissions.

Bill Clinton signed Kyoto shortly before leaving office, and incoming President George Bush promptly renounced it.

On a smaller scale, the Ohio legislature just rolled back renewable energy requirements put in place seven years ago, to environmentalists' dismay.

American environmentalists hope that climate action will take on the aura of inevitability, as it tackles one of the defining issues of our time. Perhaps that is how things will unfold, and the country will indeed get on board, especially as the administration emphasizes how cutting coal-plant pollution can clean the air and improve health.

But in the shorter term, there is no doubt that conservatives will use the EPA action as a cudgel in the 2016 election.

After all, Mitt Romney came within four points of winning in 2012, and he was rolling out commercials with lines like: "We have 250 years of coal. Why wouldn't we use it?"

Hillary Clinton, if she runs, will presumably be bound to the EPA's

carbon-cutting because of her service in the Obama administration and because her husband signed Kyoto.

Not until the rule makes it through the courts -- and the 2016 election -- will it really be time for environmentalists to celebrate.

Kate Galbraith, is a San Francisco-based journalist who writes about energy and climate issues. Her work has appeared in the Texas Tribune, the New York Times and the Economist, and she is co-author of "The Great Texas Wind Rush."

## 12. **Nuclear China to hurt coal exports**

THE AUSTRALIAN  
JUNE 06, 2014 12:00AM

<http://www.theaustralian.com.au/business/nuclear-china-to-hurt-coal-exports/story-e6frg8zx-1226944985508#>

**AUSTRALIAN thermal coal producers have been warned a global supply glut is looming in the next few years, as China increases its capacity and reduces its reliance on fossil fuels in a bid to fix the current pollution crisis.**

A major report published yesterday by the Association for Sustainable and Responsible Investment in Asia and Carbon Tracker, a British research firm, found Australian and Indonesian coal companies would be the hardest hit by the changing energy market in China.

It forecast China's thermal coal demand will peak between 2015 and 2030 as the nation's economic growth starts to moderate and its energy sources -diversify.

The Chinese government has ordered one of the most ambitious nuclear power generation programs in the world, to help reduce high levels of pollution.

Environmental Protection vice-minister Li Ganjie this week said China would press ahead with a plan to increase nuclear generation from 58 gigawatts of installed nuclear capacity by 2020, up from 15.69 GW now.

China currently has 19 operating nuclear power units and 29 more under construction, which Mr Li said was the largest nuclear program in the world.

The report found Chinese coal companies spent \$US21 billion last year in exploration and development of future reserves.

It estimated the current reserves could fuel China's thermal coal demand for the next 40 years. That would have a major impact on Australia and Indonesia, which supply about 80 per cent of its total coal imports.

“The changing dynamics of China's power sector is going to pose a risk to international coal exporters betting on China's insatiable demand for coal continuing into the future,” the report said.

“The combination of slowing growth of China's thermal coal sector, coupled with their efforts to increase supply, suggest China's import demand could decrease rapidly leaving exporters needing to find another end market for excess supply or be left

with stranded assets.

“This risk is of notable interest to Australian and Indonesian exporters.”

A recent study by the Bureau of Resource and Energy Economics and Westpac found the thermal coal price has slipped, as domestic capacity starts to rise and demand weakens.

The average price in the March quarter was \$US105.40 a tonne, down from \$US153.80 in December 2011.

Carbon Tracker senior researcher Luke Sussams said Australian producers should start to reduce their reliance on Chinese customers in the next few years.

“Investors in Australian and Indonesian coal exporters must factor in lower Chinese demand into their demand and price forecasts,” he said.

“If China becomes a zero imports market, which is possible, there is a noticeable lack of any viable alternative growth market for seaborne traded coal.”

### **13. Contract for Iter remote handling system**

06 June 2014

**A contract has been awarded for the supply of a remote handling system for installing, maintaining and recovering components of the international Iter fusion project's Tokamak during its operational life.**

<http://www.world-nuclear-news.org/NN-Contract-for-Iter-remote-handling-system-0606144.html>

Iter's European domestic agency, Fusion for Energy (F4E), awarded the contract for the divertor remote handling system to a consortium led by French engineering consultancy Assystem. Its partners include the UK's Culham Centre of Fusion Energy and Soil Machine Dynamics Ltd, as well as Finland's Technical research Centre (VTT) and the Tampere University of Technology (TUT). The divertor - a key component of the Iter machine - is located at the bottom of the vacuum vessel and extracts impurities from the superhot plasma. It consists of 54 removable cassettes, each measuring 3.4m long, 1.2m wide and 0.6m thick and weighing 10 tonnes. The remote handling equipment will be used to manipulate and transport these cassettes, which are expected to be replaced three times during the Iter machine's lifetime.

The design, manufacture, delivery, installation and commissioning of Iter's divertor handling system will be covered through the contract, as well as the manufacture of two multifunctional movers and two toroidal movers. The contract - worth around €40 million (\$55 million) - is expected to run for up to seven years.

A divertor test platform - a full-scale model of the divertor - was built at VTT's facilities in Tampere, Finland, for the development and testing of the remote maintenance system. The test platform measures some 20m in length and weighs 65 tonnes.

F4E director Henrik Bindslev said, "This contract is a turning point for Iter's remote handling system because it will lead us to production mode."

The Iter project - under construction at Cadarache in southern France - is meant to take nuclear fusion research to a new level with the largest ever Tokamak unit, which should be capable of sustaining plasmas that produce 500 MWt for as long as seven minutes. The EU is funding half of the cost while the remainder comes in equal parts from the other partners: China, Japan, India, Russia, South Korea and the USA.

Construction work on Iter began in 2010 and is expected to come to an end in 2019. A commissioning phase will follow that will ensure all systems operate together and prepare the machine for the achievement of first plasma in November 2020. Iter's operational phase is expected to last for 20 years.

*Researched and written by World Nuclear News*

## 14. **First concrete for second Belarus unit**

03 June 2014

**Construction of unit 2 at the Ostrovets plant in Belarus is underway following the pouring of first concrete for the reactor's basemat. Both units should be in operation by 2020.**

<http://www.world-nuclear-news.org/NN-First-concrete-for-second-Belarus-unit-0306144.html>

Some 4500 cubic metres of concrete was poured for unit 2's foundation in a 20-hour operation, the State Entity Nuclear Power Plant Construction Directorate (Belarus AEC) reported.

Belarus AEC deputy director general for capital projects Andrei Barkun was cited by the *Belta* news agency as saying, "The foundation pit has been dug and concrete bedding has been fulfilled. Work is now in progress to build the foundation for the building of the second power-generating unit." He added, "The construction of the reactor compartment has advanced far. The work is in full swing."

The Ostrovets plant will comprise two 1200 MWe AES-2006 model VVER reactors, developed by the Saint Petersburg AtomEnergoproekt. The main construction contract was awarded to AtomStroyExport in October 2011, while a \$10 billion turnkey contract was finalised between Belarus and Russian state nuclear enterprise Rosatom in July 2012 for the supply of the two reactors. First concrete was poured for the basement of unit 1 in November 2013. The construction time for the first unit is expected to be 60 months, with the beginning of the physical start-up and commissioning of the unit due in November 2018. Commissioning of the second unit is set for July 2020.

Rosatom head Sergei Kiriyenko yesterday informed Russian prime minister Dmitry Medvedev that construction of the Ostrovets plant is progressing well. "The first block is on schedule, even perhaps a month ahead of schedule, while the second block there is four or five months ahead."

*Researched and written by World Nuclear News*

## 15. **Fukushima ice wall under construction**

02 June 2014

**Construction has started of a wall of frozen soil at the Fukushima Daiichi nuclear power plant to prevent groundwater entering the reactor buildings. The ice wall is expected to take nine months to complete.**

<http://www.world-nuclear-news.org/RS-Fukushima-ice-wall-under-construction-0206144.html>

Tokyo Electric Power Company (Tepco) began work to build the underground ice wall today, having received approval last week from Japan's Nuclear Regulation Authority to proceed.

Ice wall technology is already widely used in civil engineering projects, such as the construction of tunnels near waterways. Small-scale tests using the technology have already been

completed at the Fukushima Daiichi site. However, the full-scale use of the technology at Fukushima will see the largest ground freezing operation in the world.

Tepco plans to drill holes some 30-35 metres into the ground and insert pipes through which refrigerant will be then be pumped. This cooling will freeze the soil surrounding the pumps creating an impenetrable barrier around the reactor buildings. In total, some 1550 pipes will be placed in the ground to create a 1.5km-long ice wall around units 1 to 4.

A Tepco official was cited by media sources as saying, "We plan to end all construction work in March 2015 before starting trial operations."

The construction of the ice wall is estimated to cost some ¥32 billion (\$313 million). It was mandated by the government as part of a concerted effort to bring the contaminated water situation at Fukushima Daiichi under control.

### **Controlling groundwater**

Reducing the amount of contaminated water that it must deal with is a priority for Tepco. Groundwater naturally seeps from land to sea, but at the Fukushima Daiichi site it must negotiate the basements of reactors buildings. It is thought that more than 400 tonnes of groundwater enters the basements each day through cable and pipe penetrations as well as small cracks, mixing with the heavily contaminated water previously used to cool the damaged reactor cores.

Tepco recently started diverting groundwater around the reactor buildings at Fukushima Daiichi by pumping it out of the ground before it reaches the plant and then releasing it into the sea. The groundwater bypass system could reduce the ingress of water to the basements by 100 tonnes per day and therefore reduce the total volume of water Tepco must decontaminate. As well as the bypass, an impermeable underground wall has also been built between the reactors and the sea. Together with the ice wall, these measures should virtually eliminate the movement of groundwater.

*Researched and written by World Nuclear News*

## **16. Atucha 2 nearing startup**

02 June 2014

**Argentina's newest nuclear power reactor, Atucha 2, is expected to reach criticality and be connected to the grid within sixty days.**

<http://www.world-nuclear-news.org/NN-Atucha-2-nearing-startup-0206147.html>

The issuance of a licence by the *Autoridad Regulatoria Nuclear* allowing nuclear operations to begin at the unit was

announced in a video conference by Argentinian president Cristina Fernández de Kirchner and minister of planning Julio de Vido. De Vido ceremonially launched the process to fill the 745 MWe pressurized heavy water reactor (PHWR) with borated heavy water. The neutron-absorbing boron will be gradually extracted from the heavy water until a controlled nuclear chain reaction occurs and the reactor reaches its first criticality. Grid connection is expected to follow soon after.

The program to build Atucha 2, originally a Siemens-designed PHWR, was suspended in 1994 after 13 years of construction work. The project was revived after a 2006 government decision to complete the plant as part of a \$3.5 billion strategic plan for the country's nuclear power sector, and the reactor design is unique to Argentina.

Fuel loading began in December 2012, with owner and operator Nucleoeléctrica Argentina SA carrying out commissioning tests through 2013.

Atucha 2 is Argentina's third nuclear power plant, joining the 335 MWe Atucha 1 PHWR, which has been in operation since 1974, and the 660 MWe Embalse PHWR, operating since 1983. Construction began earlier this year on CAREM-25, a prototype of a domestically-designed and developed 25 MWe small pressurized water reactor, on a site adjacent to the Atucha plant.

*Researched and written by World Nuclear News*

## 17. **Europe looks to boost energy security**

29 May 2014

**Nuclear power enhances energy security and should be expanded with support from a variety of fuel suppliers, said a European Commission (EC) study.**

<http://www.world-nuclear-news.org/NP-Europe-looks-to-boost-energy-security-2905141.html>

The EC has responded to the tensions in Ukraine in the context of previous gas supply disruptions that followed disputes between that country and Russia, which supplies 39% of the EU's gas and over 30% of its oil.

A study on the EU-wide energy security status of all energy forms and from all suppliers was released yesterday and will be discussed by the heads of EU governments in June. Written by EC staff, it calls for a common European energy policy and for the EU to communicate on energy with 'one voice'. It suggests the EC observe major fuel import deals made by one member state that could affect another.

The study recommended completing various existing projects such

as the internal energy market and some 33 infrastructure developments, mainly upgrades to gas and electricity grids to improve flows.

Increasing the use of nuclear power was recommended, as was continued growth in renewables and the production of fossil fuels where this can be done sustainably.

### **Nuclear fuel diversity**

Some 131 reactors operate in 14 EU countries and these were noted as a reliable source for 27% of electricity. Although 95% of uranium is imported, and the services of conversion and enrichment are carried out globally, there is a wide spread of suppliers for these as well as a high level of European equity in those enterprises. In addition, the Euratom Supply Agency exists to ensure a reliable supply of uranium for EU needs.

The study noted that nuclear operators can use more than one supplier for the manufacturing process of forming enriched uranium pellets into finished nuclear fuel assemblies that can be loaded into a reactor. The only exception are the ten VVER-440 reactors in Bulgaria, Finland, Hungary and Slovakia which have only been able to purchase fuel assemblies from Rosatom subsidiary TVEL since a Westinghouse production line was closed down in 2008.

The EC said, "Ideally, diversification of [VVER] fuel assembly manufacturing should also take place, but this would require some technological efforts because of the different reactor designs (VVER-440 and VVER-1000)." While TVEL is the only supplier for VVER-440 fuel manufacturing, it is joined in VVER-1000 fuel manufacturing by Westinghouse. TVEL is a Rosatom subsidiary based in Russia and manufacturing there, while US-based Westinghouse is Japanese-owned and has production facilities there as well as in Sweden and the UK.

The study said "an overall diversified portfolio of fuel supply is needed for all plant operators," but went further on new reactors. It suggested that "the possibility of fuel diversification needs to be a condition for any new investment" and said the Euratom Supply Agency could be in charge of ensuring this. This potential condition appears to apply only to the VVER-1200 unit planned by Fennovoima for Hanhikivi in Finland, as the two VVER-440 units being completed in Slovakia were granted approval several years ago.

The leaders of the EU's 28 member states will discuss the report in a European Council meeting in June.

*Researched and written by World Nuclear News*

## **18. Federal funding agreed for NuScale**

29 May 2014

**NuScale will receive up to \$217 million in funding over five years to develop its small modular reactor (SMR) under an agreement finalised with the US Department of Energy (DoE).**

<http://www.world-nuclear-news.org/NN-Federal-funding-agreed-for-NuScale-2905144.html>

In December, DoE selected NuScale under a second SMR funding opportunity which will see the DoE invest up to half of the cost of developing, licensing and commercialising the reactor.

The DoE and NuScale have now officially signed a contract agreement for the funding, which calls for NuScale to receive up to \$217 million in matching funds over five years. The funds will come from the DoE's total pot of \$452 million earmarked for technical support of SMR licensing. Industrial partners will be expected to at least match the DoE's investment.

NuScale said that it will use the funds to perform engineering and testing needed to proceed through the Nuclear Regulatory Commission's (NRC's) design certification process. It expects to submit its application for this in the second half of 2016. NuScale believes that its first planned project in Idaho, in partnership with Energy Northwest and Utah Associated Municipal Power Systems, could begin commercial operation by 2023.

US energy and power company Fluor is NuScale's majority investor. Fluor's executive vice president for business development and strategy Dave Dunning commented, "After the competitive progress to receive the award and ultimate signing, DoE's significant investment in the technology is helping us show the value of NuScale's SMR to investors, manufacturers and other supply chain partners so that we can build the future of nuclear power."

NuScale's SMR is a 45 MWe self-contained pressurized water reactor and generator set, which would be factory made and shipped for deployment in sets of up to 12 to make scalable nuclear power plants with capacities from 45 MWe to 540 MWe. Using conventional fuel assemblies, the core would be cooled by natural circulation, requiring fewer components and safety systems than conventional reactors.

A first round of DoE SMR funding was awarded in November 2012 to Babcock & Wilcox (B&W) for its mPower design - a 180 MWe integral pressurized water reactor. However, having failed to find customers or investors, last month B&W announced it was slashing its spending on mPower from \$150 million per year to a maximum of \$15 million per year.

Various different SMR concepts are being developed around the world. At up to 300 MWe, they are around one-quarter of the size of conventional nuclear power plants and as well as enhanced safety and ease of manufacturing and construction their compact, scalable

designs offer potential benefits over larger reactors in various circumstances, for example in remote locations.

*Researched and written by World Nuclear News*

## 19. **Barakah 1 reactor vessel delivered**

30 May 2014

**The reactor vessel for the initial unit of the United Arab Emirates' (UAE's) first nuclear power plant has been delivered to the construction site at Barakah.**

<http://www.world-nuclear-news.org/NN-Barakah-1-reactor-vessel-delivered-3005144.html>

The component - measuring 12 meters in height and 6 meters in diameter and weighing over 400 tonnes - left on a ship from the South Korean port of Masan on 17 March and arrived at the Barakah construction site on 30 April.

A ceremony was held on 20 May at Barakah to mark the arrival of the vessel. It was attended by dignitaries, including South Korean president Park Geun-hye and UAE deputy prime minister Sheikh Mansour bin Zayed Al Nahyan.

After signing the side of the reactor vessel, Park said, "The construction of the Barakah power plant is more than just the construction of a nuclear power plant. It is a key project that brings the two countries' partnership forward over the next 100 years and thus is very symbolic."

Emirates Nuclear Energy Corporation (Enec) CEO Mohamed Al Hammadi noted, "With the arrival of our first reactor vessel, Enec and Kepco remain on track to deliver the country's first nuclear energy reactor, Barakah unit 1, in 2017."

In a \$20 billion deal announced in December 2009, Enec selected a consortium led by Korea Electric Power Corporation (Kepco) to build four APR-1400 reactors. First concrete for Barakah 1 was poured in July 2012, while that for unit 2 was poured in May 2013. All four units at Barakah are scheduled to begin operating by 2020.

### **Cooperation agreements**

Three nuclear energy-related memorandums of understanding (MoUs) were signed during Park's visit to the UAE.

The first - signed between Enec and the South Korean ministry of trade, industry and energy - is for cooperation in developing a direct employment program in nuclear energy for Korean graduates.

The second MoU, between Enec, Kepco and the South Korean Nuclear Association for International Cooperation, will help develop internship programs and job opportunities in the nuclear energy sector for students from both countries. The third agreement will see Enec, Kepco and its subsidiaries work together to develop a

nuclear plant services industry in the UAE.

*Researched and written by World Nuclear News*

## 20. **Fuel loading at Fuqing 1**

05 June 2014

**The loading of fuel assemblies into the reactor core of unit 1 at the Fuqing plant in China's Fujian province is underway in preparation for startup.**

<http://www.world-nuclear-news.org/NN-Fuel-loading-at-Fuqing-1-0506145.html>

The first fuel assemblies were loaded into the reactor on 31 May, the day after approval had been given by the National Nuclear Safety Administration.

A total of 157 fuel assemblies will be loaded into the CPR-1000, a process expected to take seven days to complete.

Hot testing of Fuqing 1's nuclear island was successfully completed on 5 March. These tests aimed to simulate the temperatures and pressures which the reactor's systems will be subjected to during normal operation. This important phase ensured coolant circuits and nuclear safety systems are functioning properly before fuel was loaded.

Construction of Fuqing 1 started in November 2008. Unit 2, construction of which began in June 2009, is expected to start up in September.

China National Nuclear Corporation's (CNNC's) Fuqing plant in Fujian province will eventually house six Chinese-designed pressurized water reactors. It is the company's first plant based on the CPR-1000 design. Ground was broken for Fuqing unit 3 and 4 in June 2009. Those reactors should begin operation in mid-2015 and mid-2016, respectively.

*Researched and written by World Nuclear News*

## 21. **Cost Skyrockets for United States' Share of ITER Fusion Project**

By Adrian Cho Thursday, April 10, 2014 - 6:30pm

<http://news.sciencemag.org/funding/2014/04/cost-skyrockets-united-states-share-iter-fusion-project>

ITER, the international fusion experiment under construction in Cadarache, France, aims to prove that nuclear fusion is a viable power source by creating a "burning plasma" that produces more energy than the machine itself consumes. Although that goal is at least 20 years away, ITER is already burning through money at a prodigious pace. The United States is only a minor partner in the project, which began construction in 2008. But the U.S. contribution to ITER will total \$3.9 billion—roughly four times as much as originally estimated—according to a new cost estimate released yesterday. That is about \$1.4 billion higher than a 2011 cost estimate, and the numbers are likely to intensify doubts among some members of Congress about continuing the U.S. involvement in the project.

The United States and ITER share a complicated history. The project was first proposed in 1985 as a joint venture with the Soviet Union and Japan. The United States backed out of that effort in 1998, citing concerns over cost and feasibility—only to jump in again in 2003. At the time, ITER was envisioned to

cost roughly \$5 billion. That estimate had grown to \$12 billion by 2006, when the European Union, China, India, Japan, Russia, South Korea, and United States signed a formal agreement to build the device. The United States agreed, essentially, to build 9% of the parts for the reactor, at whatever price was necessary.

ITER was supposed to start running by 2016. Since then, however, the project has been plagued by delays, cost increases, and management problem. ITER is now expected to cost at least \$21 billion and won't turn on until 2020 at the earliest. And a recent review [slammed ITER's management](#).

The cost of the U.S. contribution has increased, too, although by how much has been unclear. Officials with U.S. ITER had not released an updated cost profile for several years, until Ned Sauthoff, project manager for U.S. ITER at Oak Ridge National Laboratory in Tennessee, did so yesterday. Speaking to a meeting of the Department of Energy's (DOE's) Fusion Energy Sciences Advisory Committee in Rockville, Maryland, Sauthoff reported that the total cost of the U.S. contribution would be \$3.9 billion by

the time the project is done in 2034. The schedule assumes that ITER won't start running until 2024 or 2025. In comparison, an April 2011 funding profile pegged the cost of U.S. ITER at \$2.5 billion.

The reason for the difference lies mainly in the timing. The 2011 cost profile would have seen spending on U.S. ITER plateau at \$350 million per year from 2014 through 2016. However, in 2013, DOE officials decided (as part of their budget request for the following year) to cap spending on ITER at \$225 million per year to prevent the project from consuming the entire budget of DOE's fusion energy sciences program. Stretching out the budget invariably increases costs, researchers say. This year, the fusion program has a total budget of \$505 million, including the \$200 million Congress ultimately decided to spend on ITER. Sauthoff stresses that ITER researchers are making concrete progress in construction. "There is very strong progress in the fabrication of components around the world," he said in an e-mail after the meeting. "US components needed for the construction sequence are being completed for delivery in 2014 and 2015."

The new numbers appear to be giving some members

of Congress heartburn. In a separate hearing yesterday on the proposed 2015 budget for DOE, Senator Dianne Feinstein (D-CA), the chair of Energy and Water Development Subcommittee of the Senate Committee on Appropriations, said that a review by DOE officials suggested that the cost of U.S. ITER could rise as high as \$6 billion—more, if the concerns over ITER management are not addressed. "I'm really beginning to believe that our involvement in ITER is not practical, that we will not gain what we hope to gain from it, and instead this money could be much better be spent elsewhere," Feinstein said.

Could the United States really back out of ITER? The Obama administration conceives of the U.S. commitment to ITER as being on a par with a treaty agreement, one Washington insider says, so the administration simply cannot walk away from that commitment. But one Senate staffer who works for the Democratic majority says that's only the administration's position. In fact, the staffer says, the administration seems to be split, with officials at the State Department arguing that the U.S. commitment to ITER is inviolable and officials at DOE indicating that they'd be just as happy without the project on

their hands. The staffer suggests that the conflict explains why the administration requested only \$150 million for ITER next year instead of the supposed maximum of \$225 million it had set earlier.

The Senate staffer suggests that if administration officials can't make up their minds about ITER, Congress could do it for them in the next several months, as they write annual spending bills. "Our intention is make a decision for ourselves in our markup [of the 2015] budget," the staffer says. "They won't have a choice."

## 22. **Doubts on climate consensus**

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**CLAIMS of a 97 per cent consensus on human-induced climate change were exaggerated, an analysis of a popular but controversial paper on the subject has found.**

British economist and former Intergovernmental Panel on Climate Change author Richard Tol said the results of the original research by John Cook of a 97 per cent consensus were probably inflated by "self selection".

"Reported results are inconsistent and biased," Dr Tol

said in a paper published in *Energy -Review*. “The sample is not representative and contains many irrelevant papers.”

Dr Tol said most of the papers analysed in the Cook paper were not on causes of climate change.

Dr Tol said he accepted a scientific consensus did exist on the issue of human-induced climate change but proper analysis of the data used in the Cook survey would put it closer to 90 per cent than 97 per cent.