

EUROPEAN ENERGY REVIEW

EER MONTHLY | FEBRUARY 2013

A complete monthly survey of our new publications

**FOR
PREMIUM
MEMBERS
ONLY**



PATTERNS ON THE WALL

By Karel Beckman - editor-in-chief

Anyone who has followed the energy news over the past month, can see the patterns.

These were some of the headlines:

- “South Australia on course for a shale boom” –
- “US gas boom opens LNG doors, Shell says” –
- “EU energy proposals frustrate Russia” –
- “Gazprom bill puts strain on Ukraine finances” –
- “BP eyes stake in Turkish gas pipeline” –
- “Shell bets big on Ukrainian shale gas” –
- “Baghdad oil disputes with Kurds deepen” –
- “Algerian energy sector faces risky future”

- “Berlin wants to cap renewables subsidies” –
- “Carbon price drop deemed wake-up call”.

So what are the patterns? Clearly it's the unconventional that are shaking up the markets, as I pointed out in our [“New Year’s article”](#) of 7 January. The shale gas revolution is spilling over into Europe, directly, with US LNG exports getting ready to go, as we pointed out [back in November](#). And indirectly, putting huge pressure on the incumbents in the European gas market, as Catrinus Jepma and Santiago Katz explain [in this analysis](#), and particularly

on Gazprom – as Andrej Tibold points out [in this article](#). In the meantime, the diversification of European gas supplies is continuing apace: first of all in the [Southern Corridor](#), but also now through the development of shale gas in Eastern Europe, in which Shell is betting big on Ukraine (and against Moscow?). That’s two strikes for the EU against Russia, but North African gas supplies [have become a lot more uncertain](#), although [Brussels is still manfully pursuing initiatives to support energy market structures in this region](#). Then, Iraq may

TOP STORY

New nuclear power in Europe - will Finland show the way?

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be a new source of supplies – [or rather, the Kurdistan region in Iraq](#). As to the EU itself, the news coming out of Brussels and Berlin is, unfortunately, bureaucratic and uninspiring. Carbon market woes – [but we knew that](#) – spiraling costs of renewable subsidies – [we knew that too](#) – unilateralism galore – and that [we knew too](#). Despite [some pleas here and there](#) for policymakers to get their act together. So the patterns are all there in the headlines – and spelled out here in this EER Monthly. I hope you find it useful.

New nuclear power in Europe - will Finland show the way?



With the news in December that EDF's flagship nuclear reactor at Flamanville, France, is going to cost an extra €2 billion to build, ratcheting up costs to €8.5 billion from an initial cost estimate of €3.3bn - you would be forgiven for wondering whether Europe is ever going to get a new nuclear reactor off the ground. But some people still believe it can happen. Hopeful eyes are turned now to Finland, where another European Pressurized Reactor (EPR) is under construction. But this project too is late, over budget and unfinished. Nevertheless, the Finns are confident that they will get their nuclear power plant running -and will solve the nuclear waste storage problem in the process. EER's Brussels correspondent Sonja van Renssen travelled north to learn about the Finnish way.

| *By Sonja van Renssen*

Four hundred and twenty metres underground at "Onkalo" - which means "cave" in Finnish - it's not hard to be impressed. This is supposed to become the world's first permanent storage site for nuclear waste. At the bottom of the long, winding tunnel, several deep pits are ready, waiting for their filling of copper canister-encased nuclear waste. Some 9000 tonnes of it are set to be stored here for the next 100,000 years, explains Reijo Sundell, our guide and President of Posiva, the company aiming to secure a construction license for Onkalo on the Olkiluoto Peninsula.

"After that, it's only bad for you if you eat it," he jokes.

The goal is to start storing nuclear waste here in 2020. It would be a world first. Waste would keep being added until 2110, when the site would be sealed off for good and liability turned over to the government. But apart from requiring a construction license to move beyond the current research stage, Onkalo requires, in the first instance, nuclear waste. Will there really be that much to store? With a ban on importing and exporting such waste, it will all have to come from inside Finland. So what are Finland's nuclear ambitions?

“In the 2020s we want to be self-sufficient in electricity”

European firsts

Finland currently has four nuclear units in operation, which together produce some 28% of the country’s electricity. According to official EU Statistics, Finland’s total electricity production was 80.7 TWh in 2010, of which 22.8 TWh was supplied by nuclear power and the rest mainly by hydropower, coal, gas and peat. Net imports stood at 2.1 TWh. Total domestic generation capacity was about 18,500 MW, of which 2,700 MW was nuclear.

Of the four existing nuclear units, two are at Loviisa in the southeast of the country and the other two at Olkiluoto in the southwest. The Olkiluoto units are bigger (880MW vs. 496MW for the Loviisa units) and it is at Olkiluoto too that Finland has plans for two new units: Olkiluoto 3 (under construction: to be 1600MW) and Olkiluoto 4 (still at design stage).

All these projects are run by two companies: Fortum, which owns Loviisa, and TVO, which owns the Olkiluoto units. Fortum also has a 25% stake in TVO, and TVO and Fortum together own Posiva,

the company behind the final waste repository (60% TVO, 40% Fortum). It’s a small club.

Yet in 2007, a new company called Fennovoima entered the scene. Three years later, Fennovoima got the green light to build a nuclear reactor of its own - Hanhikivi 1 - at a green-field site in northern Finland. At the same time, TVO won government approval for Olkiluoto 4 (Olkiluoto 3 had been approved in 2002). Fortum’s bid for a third reactor at Loviisa was turned down. To sum up, there are therefore four operational reactors (two at Loviisa, two at Olkiluoto), one under construction (Olkiluoto 3) and two planned (Olkiluoto 4 and Fennovoima).

These different projects include a few European firsts. Olkiluoto 3 was the first of a new generation of nuclear reactors, developed by Areva, EDF and Siemens - the European Pressurized Reactor (EPR). It went into construction back in 2005. EDF’s Flamanville reactor in France followed in 2007. Onkalo, situated next to Olkiluoto, is the most developed long-

term nuclear storage project in the world. And Fennovoima is the only green-field nuclear construction project in Europe underway today.

Like Flamanville, Olkiluoto 3 is over budget and delayed - possibly because the same French company (Areva) and technology (EPR) are behind both. Like Flamanville, Olkiluoto 3 is now also expected to cost some 8.5bn (vs. 3bn originally planned) and it will enter into service at 2015 at the earliest, six years late. But it is one step ahead of the French project, both in terms of timing for going operational and



in having a well-developed final waste disposal solution (Onkalo) so close at hand. Understanding how Finland has got so far - and what stands between it and the finishing line - could contain lessons for moving forward elsewhere in Europe.

Case for nuclear: mankala

The case for nuclear power in Finland is based on three classic arguments: energy security, affordability and sustainability. Finland imports most of its energy from Russia, 70% of the total and 10-15% of electricity (although its net imports of electricity are very small). But the Finns feel that when it comes to electricity, Russia is “not so reliable anymore”, says Jorma Aurela, Chief Engineer for Energy at the Ministry of Employment and the Economy. “In the 2020s we want to be self-sufficient in electricity,” he explains. If Finland sees through its current plans, it would reach this goal, he says. In 2020, nuclear could provide 60% of Finland’s power demand and renewables the rest.

The second big driver is affordability and here Finland has a unique approach: the “mankala” business model. TVO is

Some of the 400 participants wore suits and ties, while others sported thick beards and blue jeans

a *mankala*, which means it is run like a cooperative. All participating companies, call them shareholders, are entitled to a share of the power output proportional to their share in the *mankala* (and therefore contribution to production costs). Shares don't equal dividends and instead of turning a profit, the purpose of a *mankala* like TVO is to produce affordable energy for its owners. This is tax-free power at producer prices, i.e. much cheaper than buying it on the open market. Participating companies can use the power directly or sell it.

There are no figures available on exactly how much of a financial advantage the *mankala* offers, but observers agree that Finnish companies are hard-pressed to join one or they will find themselves at a competitive disadvantage. Fennovoima, owned by a consortium of

power companies (including Eon) and industrial manufacturers, was founded for this very reason, says its International Communications Manager Tiina Tigerstedt. "It was established in 2007 by Finnish companies in need of reliably supplied CO₂-free electricity production. These companies did not have access to nuclear power - they did not get shares in TVO or they were shareholders but needed more electricity - so their only choice to gain stronger access to nuclear power and thus strengthen their competitiveness was to establish Fennovoima."

The *mankala* model was created decades ago when Finnish forest industry companies joined up to develop power supplies for their pulp and paper mills. They consumed a lot of electricity but didn't have the capacity to make large power plant investments on their own. Today, the *mankala* model is the default option for the power sector in Finland, although it remains relatively unknown outside the country. One of its advantages is that it protects Finnish companies from energy price spikes, in dry periods

for example, when Finnish hydropower production levels off.

Greenpeace Nordic energy campaigner Jehki Härkönen, based in Helsinki, does not share the same vision of nuclear power as Finnish industry but he recognizes the success of the *mankala* model: "It has had a big effect. If some companies have access to tax-free electricity, others need to have it too. The *mankala* model can make otherwise not commercially viable projects viable."

And so it has been for nuclear. A *mankala* is typically owned by many different companies, each of which could itself be a *mankala*. TVO has six shareholders, the largest of which is Pohjolan Voima Oy (PVO), another *mankala*. The latter's largest shareholder is paper company UPM. Overall, TVO is made up of 44% industrial companies, 30% local energy companies (65 in total, owned by around 140 municipalities) and the rest is Fortum. Fennovoima too is about two-thirds owned by a *mankala*. The remaining 34% is, until spring, owned by German energy giant Eon.

Worrying blow

For Fennovoima, Eon's imminent departure, announced in October, leaves dark clouds hanging over the project. Even if this is simply part of Eon leaving Finland altogether - as Tigerstedt points out - the fact remains that the *mankala*'s biggest financial backer and source of nuclear expertise is leaving. "In the early stage of the project, when we applied for a decision-in-principle and got the political green light, Eon's expertise had a significant role," counters Tigerstedt. "But since then Fennovoima has continuously and systematically strengthened its own project organisation and we are fully confident that sufficient expertise will be in place throughout the project." Also, Eon's expertise remains available, she adds.

In October however, Fennovoima Chairman Pekka Ottavainen told news agency Bloomberg: "We weren't expecting it. Eon's decision to withdraw means next spring when we ask for more funding to take the project to the next stage, we need to resolve the question of who will replace Eon." Bloomberg suggested that declining

European energy prices threatened the viability of the project and prompted Eon's departure.

Tigerstedt says Fennovoima is now actually "back to its roots" as the company was started by Finnish companies. Outokumpu, a steelmaker that consumes 2% of all Finnish electricity is one of the "founding fathers" and the biggest shareholder in Fennovoima today (10%). Yet Fennovoima has lost Finnish owners too, Härkönen of Greenpeace says: "At the moment Fennovoima seems about to collapse - they lost 40% of their shareholders this fall [that includes Eon] and couldn't replace any of them." Tigerstedt says Fennovoima is proceeding as planned despite the changes in shareholders.

Waste disposal problem

There is a second challenge facing Fennovoima: what to do with its waste. Posiva says that Onkalo has no room for Fennovoima's waste: it can only handle its owners' spent fuel i.e. that of TVO and Fortum. Posiva says this is down to a lack of physical capacity, not politics. What will

happen to Fennovoima's waste is "the most interesting question in Finnish nuclear policy [today]", believes Aurela from the Ministry for Employment and Economy. The government will not force the different companies to work together and indeed Aurela says: "If nuclear is really here for good, this Onkalo is not sufficient [anyway]."

But Fennovoima said in its decision-in-principle application that it would prefer to share Onkalo. Tigerstedt notes that what is essential is cooperation: "Fennovoima is confident that through cooperation a solution that is beneficial to all can be reached and is looking forward to continuing taking further steps towards cooperation.

In this regard all eyes will be fixed on the publication of a new report on the option of cooperation at Onkalo, expected to be published on 10 January. It is the final product of a specially created government committee with representatives from TVO, Fortum, Fennovoima, Posiva, and the Ministry of Employment and the Economy. The final deadline for Fennovoima to



fix a solution for its waste is 2016: this is stipulated in its permit to go ahead in the first place (usually the green light is only given if there is a waste disposal solution - in this case Fennovoima got six years to sort one out).

Olkiluoto's challenges

The budgetary and deadline problems at Olkiluoto have led Areva to sue TVO and TVO to countersue Areva. This is passing through the International Chamber of Commerce Arbitration right now. Since 2009, TVO's owners have had to buy electricity that should have been coming from Olkiluoto on the open market.

Presumably some of the court wrangling relates to compensation for this.

The current biggest challenge for the project is that "the supplier [Areva] needs to show that all the automated systems are not too much linked to one another," says Anna Lehtiranta, Senior Vice President for

"We found nothing post-Fukushima that we would need to make big additional investments for"

Corporate Relations at TVO. Härkönen says the Olkiluoto 3 systems were designed to be entirely computer-run, but the Finnish authorities want analogue back-up in case of a cyber attack. Safety is paramount for nuclear power, especially in the aftermath of Fukushima. But the Finnish nuclear industry is confident it has nothing to worry about. "We found nothing post-Fukushima that we would need to make big additional investments for," says

Lehtiranta. “We have nothing to fear,” concurs another industry source. “Finnish standards are the highest in the world.”

TVO does not expect to have to make big changes in light of the EU’s recently completed “stress tests” on the disaster resilience of existing reactors. Finland is the only country in the world to have adapted old Soviet-style reactors to withstand a full core meltdown, says the industry, and Olkiluoto 3 features many safety requirements being built for the first time. Higher safety correlates with higher production, one industry representative said.

The big test for Olkiluoto 1 and 2 will come in 2018, when their operating licenses are up for renewal. TVO is confident that its constant upgrading of Olkiluoto 1 and 2 will win them a new 20-year run. In the meantime, the fourth reactor is still awaiting bids. TVO expects five in total. “What kind of plant, what kind of supplier and what kind of contract are all still to be decided,” says Lehtiranta. For Olkiluoto 3, TVO has a fixed price, turn-key contract with Areva, but it will

not necessarily conclude the same kind of deal for the fourth reactor, she says. Lessons learned to date include the need to work more with suppliers up front and carry out construction feasibility studies. Fennovoima received its two bids - from Areva and Toshiba - last January and is still considering them. First official cost estimates will follow supplier selection. After the delays at Olkiluoto 3, some wonder how likely it is that Areva will win any of these new contracts. Others, like Greenpeace’s Härkönen, question whether Olkiluoto 4 will happen at all. “With 4 I’m quite skeptical it will go forward. They are still building 3 and it’s not yet entirely clear if it’s going to come online at all.”

Storage debate

The regulatory process for developing a final waste repository is pretty much the same as for building a new reactor in Finland. Onkalo too still has a few hurdles to cross. Posiva submitted its application for a construction license to the government on 28 December, only just meeting an end-of-2012 deadline. This keeps it in line however, with a timetable

“Storage is a political problem, not a technical problem”

that was launched in 1983 with a decision that permanent storage would begin in 2020. The site was chosen, as planned, in 2000, and a construction license is next on the list.

Finland says that Onkala has “solved” the waste problem. A very similar project in Sweden however - which shares the same Ice Age bedrock so suited to storage - kicked off earlier but is now only due to start storing waste in 2027. It has encountered various problems, including a finding by researchers that the copper storage canisters might corrode much faster than they thought. The biggest safety hazard of storage is groundwater contamination. In Finland, unlike Sweden, Onkalo has triggered relatively little debate so far, but it may be waiting just around the corner. The Finnish nuclear industry says all

costs relating to storage are covered. Environmental campaigners often warn that decommissioning and waste treatment costs could ratchet up future energy costs. But the Finnish industry is well-prepared, with a special waste fund already containing 2bn of the 6bn estimated to be needed for the four existing units plus Olkiluoto 3 (remember Fennovoima has no agreed storage site yet). Most of this money will go to long-term storage, the rest to decommissioning, and short- and medium-term storage. “Less than 5% of the cost of nuclear electricity is waste management,” says Lehtiranta. “And it’s always taken into account [so] there should be no increase in electricity prices in future [due to this].”

“Storage is a political problem, not a technical problem,” believes Reijo Sundell from Posiva. “You must get public acceptance.” The copper corrosion story may well make that more difficult. Yet for Finns in the business, nuclear is a clean, safe, reliable, affordable base load energy source. There’s not even any need for subsidies (although suppliers like

“In Finland, nuclear power is an “open hands” issue like alcohol, where members of parliament are free to vote according to their own conscience”

Areva are clearly backed by the French government).

Public engagement

What does the public think? There is conflicting information. Fennovoima points to a poll, for example, showing that local support for its project has been steadily rising since 2008 to about two-thirds in favour today. TVO has one showing that the public’s general attitude to nuclear power has steadily improved from 1982 onwards, with more detractors than supporters only during Chernobyl. Meanwhile Greenpeace says Finland was “slightly pronuclear” back in 2002 but the tide had turned by 2010 and people are even less supportive today because they have seen the problems at Olkiluoto 3. Whom to believe?

Perhaps it’s easier to return to our original question: how has Finland got to where it has? It has certainly been helped by the country’s highly respected nuclear regulator STUK, independent from both industry and policymakers, which has lent credibility to projects. A strong safety record, stable

political framework, the mankala model and a final disposal solution apparently within reach are other oft-quoted reasons for nuclear’s success in Finland. The stable political framework manifests itself for example, in the fact that the Parliament cannot appeal a government decision on nuclear - although it can appeal every other kind of decision.

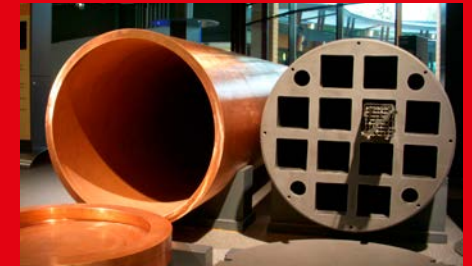
Stakeholders also cite extensive information sharing and engagement. “Post-Fukushima almost nothing changed because we have strong bottom-up involvement,” says Aurela from the Employment and Economy Ministry. “People here know a little more than in other countries.” Engagement is encouraged by the Finns’ pragmatic, egalitarian nature, and the clear democratic processes for decision-making, said another. (Greenpeace would question that transparency claim.)

On a more practical note, nuclear projects can create local value: “You don’t move a nuclear power plant to China,” one person said. In any case, local authorities always maintain a veto right. In addition to being

a direct source of growth and jobs, in combination with the mankala model, nuclear plants can also help maintain industrial competitiveness by keeping energy prices manageable.

All of this does not mean that support for nuclear power is unanimous in Finland. Far from it. Every Finnish political party is split on the issue except for the Greens (who are against). In Finland, nuclear power is an “open hands” issue like alcohol, explains Aurela, where members of parliament are free to vote according to their own conscience, even if this goes against the party line. MPs tend to vote for particular projects, not for or against nuclear in general.

So will Finland build the reactors it needs for energy independence in 2020? “Yes, providing we want to stick to our CO₂ reduction commitments,” answers TVO’s Lehtiranta. A nuclear reactor has three lives, she says: technological, economic and political. It will have to survive all three to become a reality. For some, such as Greenpeace’s Härkönen, this is a lot to ask.



No decision yet on Fennovoima’s participation in Posiva

On 10 January a working group of the Finnish government came out with a long-awaited advice on whether Fennovoima should be allowed to use the long-term underground nuclear waste storage site Posiva developed by TVO. However, it appears that the government has not made a final decision yet. In essence the working group recommends that the companies “continue negotiating in order to arrive at a solution”. The working group says that “the number of final disposal facilities – one or two – does not play a key role”.

file

Geopolitics

January was certainly “geopolitics month”, with violence raging in North Africa and the Middle East. EER covered a number of very crucial developments in global energy markets.

28/01 Algerian attack signals dwindling prospects of North African oil and gas production

How worried should Europe be about the security of its oil and gas supplies from North Africa in the wake of the In Amenas horror? David Drury, Managing Consultant with Gas Strategies and former General Manager of BP Algeria, reflects on the immediate and longer-term implications of the In Amenas attack.

[Read the full story →](#)

28/01 Why international oil companies are turning their back on Baghdad

Iraqi Kurdistan has fairly suddenly become a magnet for international oil companies (IOCs), who are increasingly turning their back on the central government in Baghdad. The reasons for this change have to do with Baghdad’s inability to create a reliable investment framework, but they are also geopolitical in nature, writes Olgu Okumus.

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24/01 The uncertain future of Gazprom: the moment of truth is approaching

The Russian government is pushing Gazprom into huge investments that the company can ill afford and demanding much better results. If the company does not deliver, it might lose its export monopoly and be broken up into a production and supply unit and an infrastructure unit, say two leading experts on Russia’s gas industry.

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EU Energy Policy

Maria van der Hoeven, Executive Director of the International Energy Agency (IEA), weighed in on the internal energy market debate in Europe with an op-ed for EER. Dietmar Nietan, member of the German Bundestag, sent a letter about how to improve German-Polish energy relations. We also published an important analysis on how regulators and policymakers should regulate the European gas market in view of the rapid changes occurring here. And there was news on the CCS dossier from Brussels..

24/01 Europe should address the “coal renaissance” by reforming its gas market

Coal consumption in Europe is going up, leading to higher carbon emissions. The way to address this problem, argues Maria van der Hoeven, Executive Director of the International Energy Agency (IEA), is not to reform the EU Emission Trading Scheme (ETS) merely to push up the price of coal relative to gas, as many people are now suggesting, but to reform the European gas market.

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21/01 Reassessing “market relevance”: why national boundaries are increasingly irrelevant in measuring competition in gas spot markets in Northwest Europe

The ‘relevant market’ for gas spot sales in Europe is currently being determined by most regulators along national boundaries. Catrinus Jepma and Santiago Katz of the Energy Delta Institute argue that such an approach does not do justice anymore to the reality of the gas market in North West Europe.

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14/01 Transforming energy systems in Europe: towards a German-Polish model

Dietmar Nietan, Member of the German Bundestag for the SDP and Chairman of the German-Polish Association, issues a plea for Germany and Poland to engage in an energy partnership that could be a model for the rest of Europe.

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14/01 EU sets out to save CCS: emission performance standard or mandatory certificates?

The European Commission remains committed to carbon capture and storage (CCS) in Europe, despite acknowledging that CCS policy so far has failed in living up to its goals. This appears from a still unpublished draft policy paper on CCS that European Energy Review has seen.

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- “Regulatory lag threatens to slow down the stormy growth of the European gas market”

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Renewable energy

We had two important additions to our Renewable Energy files, from our correspondents in Milan and Berlin.

21/01

Interview: Benjamin Gallèpe of the Mediterranean Energy Regulators (MEDREG)
Clearing regulatory hurdles to exploit renewable energy in North Africa

According to Benjamin Gallèpe, Director of the Permanent Secretariat of the Mediterranean Energy Regulators (MEDREG), more must be done to make the EU-sponsored Mediterranean Solar Plan, the flagship initiative of the Union for the Mediterranean to promote renewable energy in North Africa, a success.

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14/01

Biofuels under attack - Germany's Best Practice Certification to the rescue

Germany has two advanced certification schemes in place that set stringent sustainability standards for the bio-energy sector. They could prove the saviour for a controversial industry that is simultaneously surging and under attack. Paul Hockenos reports from Berlin.

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- Interview: EU Energy Commissioner Günther Oettinger on renewable energy targets and emission trading - "Four instruments may be too much"

file

National Markets

All eyes of European policymakers are turned to Germany of course, but also to the UK, which has embarked on an equally ambitious energy transformation. Robert Hensgens wrote an interesting analysis of what is going on in the UK.

17/01 Why the UK's new energy master plan sets an example for the rest of Europe

The UK is being criticised for turning back the clock on liberalisation and returning to considerable state intervention in the energy market. But according to Robert Hensgens, the UK government deserves credit for its ambitions and the way it faces up to the twin challenges of transition and security of supply.

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file

Energy perspectives

Perspectives is what we at EER are supposed to specialize in. We had three additions to this file which we hope will provide you with the necessary food for thought.

07/01 How unconventional oil and gas are turning 2013 into the Year of (Even More) Uncertainty

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Like it or not, but the revolution in unconventional gas that is set to spread across the world from the US, and which is now likely to be followed by a revolution in unconventional oil, is making the global energy world look very different - and a lot more uncertain - than a few years ago.

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file

Nuclear Energy

Nuclear power has disappeared from many radar screens since Fukushima, but it would be a mistake to think that it has gone away. Far from it. In Europe, Finland is leading the way – but other countries are not far behind. Our top story this month came from our Brussels correspondent Sonja van Renssen who went to Finland to find out what the latest news is on the famous EPR that is being built there. She came back with a fascinating story.

10/01 New nuclear power in Europe - will Finland show the way?

Coal consumption in Europe is going up, leading to higher carbon emissions. The way to address this problem, argues Maria van der Hoeven, Executive Director of the International Energy Agency (IEA), is not to reform the EU Emission Trading Scheme (ETS) merely to push up the price of coal relative to gas, as many people are now suggesting, but to reform the European gas market.

See [page 2](#) of this Monthly.

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European Energy Review publishes original reports, interviews, analyses, viewpoints and debates, written by correspondents and energy professionals across Europe. We publish an email newsletter twice a week in which we announce our new articles and comment on the energy news. To register to our newsletter please visit www.europeanenergyreview.eu.

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