

EI NEW ENERGY

Vol. III, No. 34



August 21, 2014

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South Korea Resists Delaying Giant Carbon Market

The scheduled launch of South Korea's emissions trading scheme (ETS) this January is encountering fresh uncertainties as industrial groups, concerned about possible increases in energy costs, mount a new round of resistance against the Ministry of Environment's ambitions. Signs of division are also showing up within the government as of late, with the Ministry of Strategy and Finance — under newly appointed pro-growth Minister Choi Kyung-hwan — apparently advocating on behalf of industrial interests for either a postponement of the trading scheme's start date or a loosening of the emissions cap. A ministerial meeting last week ended with a compromise: The ETS, which has legislative backing, is to proceed as planned next year but with modifications to ease the burden on industry. With an estimated size of roughly 550 million tons of carbon dioxide equivalent per year, the South Korean carbon market promises to eclipse both California's carbon scheme and China's largest pilot exchange in Guangdong.

The emissions cap imposed on liable emitters is under review to "reduce the intensity" of the ETS, an environment ministry official tells *EI New Energy*. Affected South Korean industries, which include energy, steel, cement and petrochemicals producers, have requested a recalculation of the business-as-usual (BAU) emissions amount, from which the country has committed to cut by 30% in 2020. The review is expected to result in an increase in emissions allowances, although the official says the incremental amount has not been decided yet. Some media reports citing government sources have suggested a 1%-3% raising of the current cap announced in May, which was set at 1.64 billion tons of carbon dioxide equivalent over 2015-17 (NE Jun.12'14). The industrial sector has claimed the existing cap could entail some 28 trillion won (\$27 billion) over the three years in compliance costs, based on an estimated 275 million ton permit shortfall and a penalty set at 100,000 won (\$98) per ton.

The South Korean ETS design does not allow the use of overseas carbon credits until 2021 at the earliest, which rules out turning to cheap offsets like the UN approved certified emission reductions. Emitters may meet up to 10% of their obligations through offset credits generated domestically from low-carbon sources, but these are in short supply due to insufficient investments in green energy projects (NE Mar.21'13). Power producers are already having difficulties meeting a mandatory minimum renewable-to-total power output ratio set at 2% in 2012 and originally scheduled to rise to 3.5% in 2015 and 10% in 2022, prompting the government to relax the ratios and timelines in June (NE Jun.19'14).

Renewable Energy Break-Even Prices

	Coal	Gas
Developing Asia		
Market Price	3.07	15.41
Wind Onshore	4.20	3.71
Solar PV	8.80	6.76
Solar CSP	16.95	22.43
Mideast		
Market Price	100.40	9.62
Wind Onshore	17.40	4.15
Solar PV	32.21	7.16
Solar CSP	92.63	24.13

Market prices Aug 19. Coal and Gas in \$/MMBtu, Oil in \$/bbl.
Table indicates fuel price above which renewable energy is more profitable than new coal-, gas- or oil-fired power, without subsidies. Source: Energy Intelligence

The ministry official insists there would be no delay to the scheme's Jan. 1, 2015, launch despite uncertainty about the length of the emissions cap review. Many companies are also already prepared to comply in 2015, although they prefer a postponement, says an official with steelmaker Posco. A separate tax on high-emissions vehicles to fund the promotion of low-carbon cars in the country is also due to be implemented in January 2015, but this is now up in the air, too. Finance Minister Choi, who took the position only last month, has warned that South Korea's economy might possibly spiral into a Japan-style stagnation and he is sympathetic to local car manufacturers' protests about losing competitiveness to European auto makers, which are more established in hybrid-electric and all-electric vehicle production.

South Korea's Emission Targets

(million tons CO ₂)	2014	2015	2016	2017	2018	2019	2020
BAU	694.5	709.0	720.8	733.4	747.1	761.4	776.1
National Cap	659.1	637.8	621.2	614.3	604.4	585.4	543.0
Reduction	5.1%	10.0%	13.8%	16.2%	19.1%	23.1%	30.0%
Cap on Liable Businesses	589.0	558.6	547.7	536.7	NA	NA	NA

Source: Presidential Green Growth Committee, Ernst & Young, Ministry of Environment

South Korea does not have any numerical emissions cuts to deliver to the international community under the Kyoto Protocol, and the industry therefore questions the government's climate zealotry because of the potential impacts of the carbon scheme on the nation's economy. But some politicians view carbon trading as an opportunity to stay ahead of the curve. Former President Lee Myung-bak pioneered the country's energy policy in 2008-09 with a vision of propelling South Korea into

a leading position in the green energy business. Similarly, the current administration under President Park Geun-hye recently identified six new-energy sectors for grooming: energy saving solutions, energy management technology, independent micro-grids, solar PV rental, electric vehicle support services and power plant waste heat usage (NE Jul.24'14).

Kimfeng Wong, Singapore

'Dark' Money Intensifies US Environmental Politics

Money's deep influence in American politics is nothing new, but the current battle royale between hedge fund manager and environmentalist Tom Steyer and fossil fuel defenders Charles and David Koch is turning out to be one for the ages because of its focus on climate change and energy. For years, the environmental community has hoped for the appearance of a "white knight" that could fight back against the billionaire Koch brothers, who have poured hundreds of millions of dollars into Republican campaigns and climate change skepticism since the 1990s. The movement may finally have found its paladin in San Francisco-based Steyer, who is worth roughly \$1.6 billion and has moved aggressively into the US political maelstrom over the past four years.

In February, Steyer promised to spend \$50 million of his own money and another \$50 million through his NextGen organization to support Democrats in congressional and governors' races to be decided in 2014, particularly those in which climate change is a dividing line between the leading candidates. These include races in states like Iowa, Colorado, Michigan and Florida, and often involve hard-edged negative advertisements — such as one accusing Florida's Republican Governor Rick Scott of taking political donations from unnamed companies allegedly seeking to drill for oil near the Everglades.

Steyer has also become one of the most important sponsors behind the campaign to stop construction of TransCanada's proposed Keystone XL crude oil pipeline and the movement on US college campuses to divest from fossil fuel industries (NE Aug.8'13). His rise to political prominence has been hastened by a major January 2010 US Supreme Court decision, *Citizens United v. Federal Election Commission*, which overturned many of the existing limits set on political spending and donations not directly tied to a specific political race.

The 2014 mid-term elections, which take place Nov. 4, have seen an enormous growth in such independent expenditures, often in the form of negative advertising, according to the Brennan Center, a New York-based nonprofit public policy and law institute. As of Aug. 18, with three months still left in the campaign season, the nine most competitive Senate races have been injected with \$72 million in spending by independent groups. By comparison, in the 2010 election, non-party outside spending reached \$97 million during the entire campaign for all 37 Senate races.

Although the *Citizens United* case freed up individuals like Steyer to spend huge sums of undisclosed "dark money" more easily on politics, the path to political influence via vast wealth was first trail-blazed by the Kochs. Together, the Kansas- and New York-based brothers

are worth an astounding \$80 billion, thanks to their co-ownership of oil refining and mid-stream giant Koch Industries. They have built up a complex campaign finance machine over the past two decades that raises much of its money through a slew of tax-exempt groups that offers very little transparency about the origins of their money.

With both the US congressional and gubernatorial elections less than 100 days away, Steyer and the Kochs will be funding each other's opponents in dozens of races nationwide — with the Kochs arguably at an advantage. “Steyer is a newbie, while the Koch brothers have had lots of experience over the years,” said Robert Healy, a former senior vice president with the Washington lobbying firm of Wexler Walker and author of a textbook on corporate political behavior. “The Koch brothers have a replenishment machine that is their company, and they have shown a willingness to spend.”

But such fervor, even when backed by big money, doesn't guarantee success, as shown by the Koch brothers' failure to defeat President Barack Obama in 2012 despite spending perhaps \$400 million to do so, according to the Center for Responsive Politics — and even after Charles Koch declared the 2012 contest a battle “for the life or death of this country.” Steyer's NextGen organization is also running into difficulties raising the \$50 million he promised in February. According to the *Politico* newspaper, NextGen had only raised \$1.2 million through the end of July, which will force Steyer to either dig more deeply into his own pockets or spend less.

Bill Murray, Washington

Drought, Politics Explain Colombia's Move Beyond Hydro

Already rich in conventional fossil fuels and hydropower resources, Colombia has taken a big step toward diversifying its electric generating capacity to include more renewable energies. The government has officially launched Law 1715, which seeks to incentivize investment in renewable energy generation — mainly solar, wind, biomass and geothermal — through various tax exemptions and financing mechanisms. The new law, approved in May and put into effect this month, is viewed as a necessary and significant first step toward putting Colombia on a similar path as other South American countries in promoting renewable sources other than hydropower. But the advantages of conventional power supplies for now still appear too strong to result in any significant changes to the electricity mix.

Like many of its South American peers, Colombia relies heavily on hydropower for its electricity needs, with large hydro projects typically generating about 65% of the country's power. Natural gas provides around 20%, while coal, oil, diesel and other renewable sources make up the remainder at a roughly even split. But industry experts say that there is an increasing desire by the government to diversify. One reason is because the country has been going through a prolonged drought which has heightened national awareness about the sensitivity of hydro supplies. Colombia is no stranger to drought as one of the main countries to experience the El Nino effect, in which a period warming of the Pacific Ocean raises surface temperatures in eastern Pacific countries. Additionally, large hydro projects have encountered increased opposition from the country's indigenous communities. Recent protests have been staged at all three of Colombia's largest hydro power projects under development — Ituango, Sogamoso and El Quimbo — which together combine for 3.2 gigawatts of new capacity. There is “a whole new audience that wants the government to promote other energy sources and incentivize their penetration into the national energy matrix,” says Oliver Wack, a Bogota-based analyst with consultancy Control Risks.

The new law responds to these concerns by calling for new investment in non-conventional renewable energy sources. It covers tax incentives for new power projects and eases import restrictions for renewable energy equipment. But as an initial framework, it represents mainly a show of political commitment at this stage, with much still riding on the details of the final implementation plan due out in May 2015. The specific rules over tax exemptions, local content requirements and incentives for domestic power generation will ultimately determine the law's attractiveness and the competitiveness of Colombia's push toward renewable energy.

Still, no framework dedicated to promoting renewable energy on this scale had previously existed. Colombia has typically lagged behind its Latin American peers in attracting renewable energy investment despite its status as the region's third largest economy. According to data compiled by Bloomberg, Colombia attracted \$1.2 billion in clean energy capital from 2006-12, compared to the \$2 billion committed to renewable energy assets in Chile in 2012 alone.

However, circumstances differ based on national resource endowments. Chile, for example, has pushed renewable energy because it lacks substantial conventional fuels for power generation, whereas Colombia is able to export large volumes of coal and natural gas.

Indeed, the lack of diversity in Colombia's energy matrix to date stems in part from its experience in fossil energy. Since the country's last energy crisis from an El Nino-induced drought over 20 years ago, Colombia has installed additional surplus generating capacity from thermal electric plants. The added buffer means that Colombia is well prepared to handle dry periods, and during times of drought, natural gas and diesel can supply up to 50% of the country's power needs. Neighboring Brazil is also prone to seasonal drought but the country is currently grappling with the costly side-effects of thermal-generated gas to replace dwindling hydro supplies (NE Feb.20'14). The difference, however, is in Colombia's advantage as a net gas exporter. Unlike Brazil, Colombia can rely on domestic supplies for backup power and avoid costly import bills.

Yet it's still too early to declare any major policy shift in favor of renewables. Solar and wind investors are awaiting the law's final regulations next year. So too are biomass developers, including state-controlled oil company Ecopetrol, which is expanding its footprint in the ethanol industry (NE Jan.30'14). Experts also say that the government's unspoken policy is to avoid holding renewable power auctions for solar and wind. This is partly based on remaining confidence that domestic fossil fuels can sufficiently backup baseload hydro power, and partly based on an effort to deploy a market-driven approach in which all forms of renewables compete on an equal footing.

Naki B. Mendoza, Washington

US Carbon Rule: A Lifeline for Nuclear Reactors?

Although the US Environmental Protection Agency's (EPA's) rule for cutting carbon emissions from the power sector remains stuck in the proposal stage until next summer, it has already helped change the tune that US nuclear power operator Exelon is singing about the economics of its reactors. Six months ago, Exelon Chief Executive Chris Crane and other company officials were warning that tough economics faced by a handful of reactors could prompt them to shut down some of the units — sources of large, baseload and carbon-free electricity. But near-term changes in the structure of regional electricity market auctions and a court-ordered prohibition against federal fees for a permanent nuclear waste repository have eased the immediate pressure on the reactors in the fleets of Exelon and others.

The EPA rule has only sweetened the story by offering renewed confidence that government policies designed to slash carbon emissions could offer long-term financial boost for reactors. In a recent study, the US Department of Energy estimated that, under existing policies, carbon emissions will rise to 2.2 million metric tons in 2025. But if 30% of the existing nuclear reactor fleet goes off line because of age, economics or other issues, the increase would be closer to 2.3 million metric tons.

Exelon now appears confident that Illinois, responding to a federal mandate for lower carbon emissions, will enact legislation that lends support for its nuclear units in the state, with between three and five units considered financially vulnerable. Meanwhile, the utility agreed to postpone a decision on shutting down any of its Illinois reactors until mid-2015, six months later than originally planned. The specific reforms are still unclear, but Crane mentioned the possibility that the state could enact its own clean energy standard or join the Regional Greenhouse Gas Initiative (RGGI) carbon market (NE Jun.12'14).

RGGI currently has nine member states in the US Northeast and mid-Atlantic, but carbon market analysts predict that others will seriously consider membership as a way to comply with the EPA's proposed emissions cuts. Crane's statements hint that Illinois is doing just that, although Dave Kolata with Illinois-based advocacy group Citizens Utility Board said several options are on the table, including the state setting up its own exchange or establishing a clean energy standard for the power sector. "The RGGI structure seems to us to be the one that might be better able to handle consumer issues," such as impacts on household energy costs, Kolata said, referring to the flexible, tradable nature of RGGI credits. However, he acknowledged that both structures "can be designed well and both can be designed poorly."

Several other factors have surfaced over the last several months that are easing pressure on nuclear operators. The most immediate change comes from a federal court ruling last November which determined that the US Department of Energy should stop collecting fees from utilities for

the construction of a permanent nuclear waste repository, since the DOE has no solid plans to develop one (NIW Nov.22'13). Exelon now cites the lack of a nuclear fee as the primary driver of a \$50 million increase in its second-quarter 2014 gross margins. Fellow utility Entergy, which is less optimistic about the implications of the EPA rule, also said that the elimination of the waste fee was supportive. In second-quarter earnings results, Entergy officials pointed out that recent regulatory changes in the ISO New England transmission organization — where many of its units are based — should help keep reactors on line. Federal regulators in June approved changes to ISO's auction process that are seen as favorable to nuclear generators because of their high capacity factors.

Emily Meredith and Lauren Craft, Washington

Skepticism Mounts Over Indonesia's First-Generation Biofuels

Indonesia continues to face deep skepticism about the sustainability and environmental attributes of its palm oil, used as feedstock for first-generation biofuels, even as an end-2014 deadline looms for all plantations to prove compliance under the Indonesia Sustainable Palm Oil (ISPO) standard (JFI Aug.4'14). The government introduced the mandatory domestic certification scheme in 2011 — but only around 40 plantations have obtained certification out of the 150 that filed an application, an ISPO official says. The shortfall is alarming given that the total number of plantations in the country is put at some 2,500 by local media, and has prompted calls from the domestic industry to delay the compliance deadline.

The ISPO is one of several government measures, which also include a 2011 moratorium on new logging and plantation concessions, to address international doubts about how Indonesia produces its palm oil. The local industry is critical to achieving the country's own biofuel goals: Mandatory blending requirements were raised last August to require 10% biofuel concentrations in diesel for transportation, from 2%-7.5% previously, while the ratio for biodiesel used in power generation was lifted to 20% from 3%, but progress has been well behind schedule (NE Mar.20'14).

Land use and deforestation issues are the major obstacles to more widespread ISPO certification in Indonesia. Despite the forest-clearing moratorium, the environmental situation is worsening in the world's largest palm oil producer, according to a study published in June by researchers from the University of Maryland and the World Resources Institute (WRI). Indonesia has surpassed Brazil in deforestation, losing almost twice as much primary forest as Brazil in 2012. Some 40% of the loss is occurring within national parks, protected forests and even areas earmarked under the moratorium, according to the study.

From 2000 to 2012, Indonesia lost more than 6 million hectares of primary forest — an area equal to half the size of England. Meanwhile international pressure continues to mount, with US-based agribusiness Cargill announcing a new policy last month to ensure that it does not purchase or use palm oil linked to deforestation.

Indonesia's Biodiesel Targets 2014

	Mandatory Blend	Targeted Vol. Liters	Targeted Vol. Bbl	Actual (Jan-May) Liters	Actual (Jan-May) Bbl
Subsidized Transport Fuel	10%	1.5 bn	9.2 mn	447 mn	2.8 mn
Non-Subsidized Transport Fuel	10	1.6	9.8	NA	NA
Power Generation	23%	0.9 bn	5.8 mn	68 mn	428,000

Source: Energy ministry, Jakarta Post

Apart from lax enforcement, the effectiveness of Indonesia's deforestation moratorium is also affected by inconsistent mapping of concessions and protected areas under different government bodies, which has resulted in confusion. "The country's national, state, and local governments must investigate where illicit forest clearing is occurring and hold the responsible parties accountable," said the WRI in a blog on the Indonesia forest study. The institute also urged Indonesia to ensure better coordination between ministries and agencies, as well as between national, provincial and district governments, to make sure all forest stakeholders are aligned on goals, action plans and execution.

The deforestation does not bode well for Indonesia's drive to boost its biodiesel industry, which has already been hit by anti-dumping tariffs in the crucial European market (NE Jul.10'14). The ISPO scheme is legally binding and therefore theoretically has more clout than external measures in compelling plantation owners to clean up their act. However, the scheme faces credibility issues due to a generally low degree of trust in the government's enforcement. Indonesian exporters eyeing Europe's biofuel market will also need to comply with EU standards such as the voluntary Roundtable on Sustainable Palm Oil-Renewable Energy Directive (RSPO-RED) scheme, said RSPO's communications manager, Stefano Savi. Even if Indonesian biofuel producers are certified under the domestic scheme, they might not meet EU standards.

Kimfeng Wong, Singapore

Tidal Lagoons Pushed in UK as Cost-Competitive Green Power

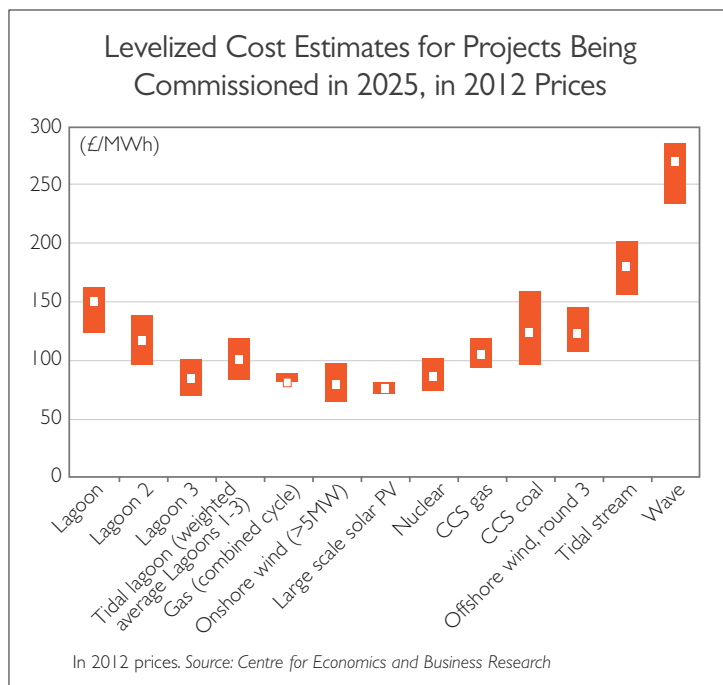
Power generated from tidal lagoons was, until recently, dismissed as a concept too expensive to develop, yet fresh cost analysis shows that several planned projects in the UK would be comparable in cost with onshore wind, new nuclear reactors and even gas-fired power. Lagoons offer a more environmentally friendly form of electricity generation than tidal barrages, using a rock-walled impoundment to trap and flow tide water through turbines to generate electricity. Significantly cheaper than other forms of marine energy, they also potentially offer large-scale deployment.

Tidal Lagoon Power (TLP) is planning six tidal lagoons in the UK, with the first, a 240-320 megawatt scheme at Swansea Bay in south Wales, costing an estimated £1 billion (\$1.7 billion). The lifetime cost of generated power, known as the levelized cost of electricity, would be a relatively modest £150 (\$255) per megawatt hour, TLP said in July. "As you build bigger lagoons, this can come down to around £90 MWh," a company spokesman says. A final investment decision should be made this year and site construction would start in the first half of 2015, with first electricity fed into the grid during the second half of 2018.

A March 2014 study from consultancy Poyry bears out these lower-than-expected costs. It said the Swansea Bay project would need a contract-for-difference (CFD) — or guaranteed price for the sale of electricity produced — of £168 (\$285) per megawatt hour for 35 years, but that subsequent projects would need much lower support levels, of £130 (\$221) and £92 (\$156). On a volume-weighted average basis, that would work out to £111/MWh for the first three lagoons planned by TLP. By comparison, a new nuclear power station at Hinkley Point in Somerset has been offered a £92.50/MWh CFD for 35 years, backed up by loan guarantees to soften the capital costs.

As recently as last year, the UK Department of Energy and Climate Change (Decc) said marine power would need a CFD price of up to £305/MWh (\$518) to get projects going — twice the level now projected by TLP. "The levelized costs previously estimated by Decc were far above what we now know to be correct," says Colm Sheehy, a senior economist at the Centre for Economic and Business Research (CEBR), who has conducted cost analyses on TLP's proposed lagoons dotted along the west coast. "They now have good evidence to show how the economics is favorable relative to other technologies."

Decc issued CFD "strike prices," or guaranteed levels, last December: Onshore wind was given £90-£95/MWh over 2014-19, offshore wind £140-£155, and large-scale solar PV £100-£120. While wave and tidal stream power were assigned a strike price of £305/MWh, Decc said it would determine CFD levels for tidal lagoon projects on a case-by-case basis. This mirrors the approach taken for new nuclear and carbon capture and storage projects, given the wide range of individual project cost estimates. In a report published last month on behalf of TLP, CEBR said tidal lagoon power makes economic sense and could provide predictable output for up to 14 hours per day if built around the UK to catch tidal ranges. In all, TLP has proposed a total of six lagoons that would cost some £35.3 billion (\$60.3 billion) and provide 15.9 gigawatts of new installed capacity and 30 terawatt hours of electricity per year — potentially meeting roughly 8% of the total electricity supplied in the UK in 2027.



Globally, CEBR pegs realistic tidal lagoon potential at 80 GW, with a theoretical potential of 313 GW — with much of this in Russian Arctic waters. Russia, Canada, the UK, Australia and China are the top five countries. Several tidal lagoon projects already operate around the globe, with the largest markets in South Korea (254 MW) and France (240 MW). France tendered for more capacity last year (NE Oct.10'13).

Jay Eden, London

IN BRIEF

Renewables Growing Faster in China

Of the 36.7 GW of newly added power generation capacity in China during the first half of 2014, 60% came from nonfossil fuel sources, according to the latest data from the China Electricity Council (CEC). Hydro capacity grew the most — by 13 GW — followed by wind at 4.43 GW, nuclear at 3.29 GW and solar at 940 MW. Thermal plant capacity, mostly coal-fired, increased by 15.03 GW, which was 820 MW less than the growth seen last year during the same period. In all, China is expected to add 96 GW of new generation capacity throughout 2014, with nonfossil plants accounting for 56 GW (NE May 8'14). Total installed capacity is estimated to reach 1.35 TW at the end of this year, with 34% coming from non-fossil sources, said the CEC.

UK Sets New Wind Power Record

The UK continues to set new records for wind-fired electricity. Wind represented 22% of the country's total power generation — or 5,797 MW — on Sunday Aug. 17, surpassing a previous 24-hour record of 21% set earlier this month. Prior to that, the record had stood at 20% since Dec. 20, 2013, according to statistics from the national grid. Trade association RenewableUK noted that wind has become “an absolutely fundamental component of the country's energy mix” by generating this past Sunday a greater proportion of the UK's electricity needs than coal (13%), solar (3%), biomass (3%) and hydro (1%) (NE Jul. 3'14). Nuclear generated 24% and gas 26%. High levels of wind power generation throughout August also demonstrated “that wind is a dependable and reliable source of power in every month of year — including high summer,” the trade group said.

Guangdong Raises Emissions Cap

The Guangdong emissions trading scheme — one of seven pilot carbon markets in China — has announced a 2014 permit allocation of 408 million tons, which include 38 million tons in reserves. The new allocation is 5% more than the 2013 volume, which was already deemed ample (NE Aug. 7'14). The number of entities drafted into the 2014 compliance period is reduced to 193, from 202 in 2013. No explanation was provided for the higher allowance of permits, although a Reuters report citing a Guangdong carbon exchange source suggested that it could be due to a change in the composition of the liable entities, which now include larger emitters. Another change involves the distribution of permits — liable entities will be able to get 95%-97% of their 2014 emissions permits for free without first having to purchase a minimum ratio, set at 3% in 2013, through auctions held by the exchange. The Guangdong exchange will hold four auctions over September 2014 to June 2015 to sell 800 million tons of 2014 permits.

US Ranks Second in Wind

The US now ranks second in installed wind capacity in the world, and wind can meet nearly 4.5% of the country's electricity demand in an average year, the US Department of Energy (DOE) said in a pair of reports released this week. Cumulative installed capacity in the US stood at 61 GW at the end of 2013, representing a year-on-year growth rate of just 2% — and just 8% of the capacity additions seen in 2012, a record-breaking year for growth. On the manufacturing front, the domestic supply chain is encountering growing pains, and future growth will pale in comparison with the significant growth over the last decade. Meanwhile, wind

energy prices, especially in the central US, are historically low, making wind attractive to utilities, the DOE said. Distributed applications, which surpassed 80% of wind turbines installed in 2013, now have a cumulative installed capacity of more than 842 MW.

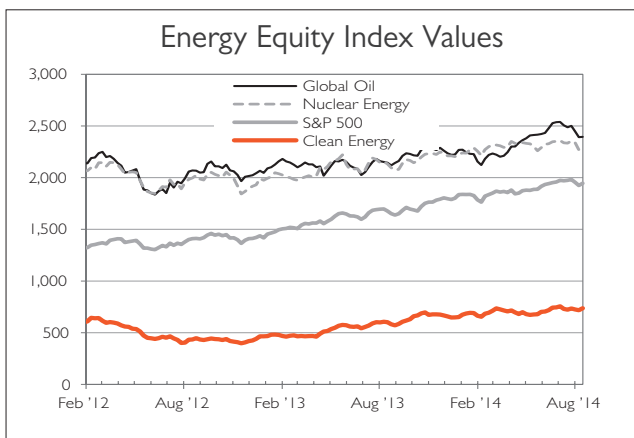
Finnish Ethanol Plant to Use Sawdust

Finland's St1 Biofuels last week announced the go-ahead for a planned sawdust-to-ethanol plant, which is to be built in Kajaani, an important center for the country's lumber and paper industries. The overall cost of the 10 million liter per year plant will be €40 million (\$53 million), of which the Finnish government has agreed to cover 30% in the form of an investment subsidy. Sawdust and other wood-waste sources are seen as a particularly strong potential source of biofuels feedstock in Finland, which has a goal to meet 20% of its transport fuel requirements from renewable sources by 2020 (NE Apr. 17'14). Similar plants could in the future be scaled up to an annual output of as much as 100 million liters/yr, said St1.

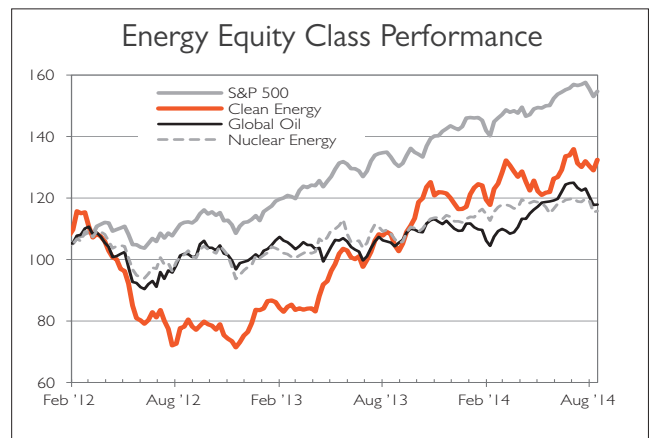
Scotland Biomass Plans Get UK Bond

The UK Treasury confirmed this week that it will guarantee bonds worth up to £48.5 million (\$80.7 million) for the Speyside Biomass Power project located in Moray, Scotland — the latest project to be supported by a scheme where the government will act as a loan guarantor to major infrastructure investments (NE Dec. 19'13). The biomass power station is expected to produce up to 15 MW of electricity to power more than 20,000 homes and provide green energy for one of Scotland's most iconic whiskey distilleries, Macallan. The total funding required is £74 million, with the balance provided by John Laing and the Green Investment Bank.

CLEAN ENERGY EQUITY MARKETS



Source: Standard & Poor's



Source: Standard & Poor's

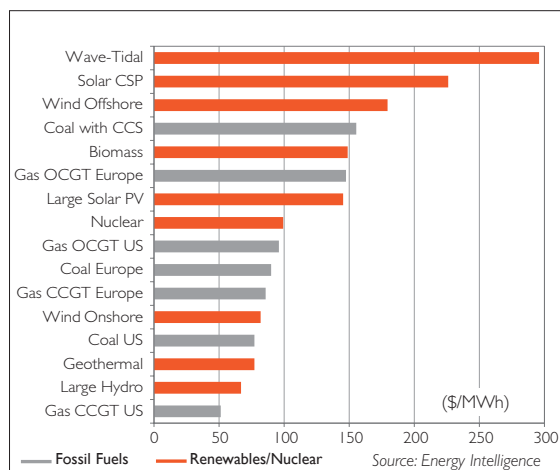
EI NEW ENERGY DATA

Energy Futures: Reference Prices

Carbon (€/ton)	Aug 19	Aug 12	Chg.
ECX EUA	6.43	6.09	+0.34
ECX CER	0.17	0.18	-0.01
Crude oil (\$/bbl)			
Nymex light, sweet	94.48	97.37	-2.89
ICE Brent	101.56	103.02	-1.46
Natural gas (\$/MMBtu)			
Nymex Henry Hub	3.88	3.97	-0.10
ICE UK NBP	7.07	6.89	+0.18
Coal (\$/ton)			
Nymex Capp*	59.88	60.03	-0.15
ICE Rotterdam	76.85	77.40	-0.55

All prices are front month. EUA = EU Allowances; CER = Certified Emission Reductions under UN CDM. ICE UK gas converted from p/therm. *Short tons. Source: Exchanges

Newbuild Power Generation Costs

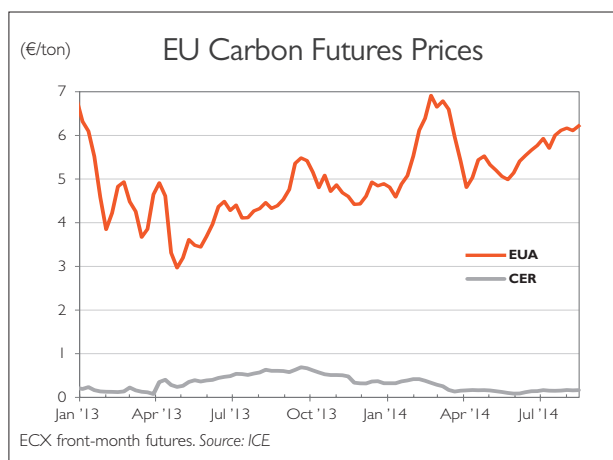


DATA: The complete set of *EI New Energy* data is available to web subscribers, including full levelized cost of energy (LCOE) calculations, fuel switching thresholds, electricity production by sector; ethanol and biodiesel fundamentals, carbon prices, methodologies and reader's guides. Historical data is available as a premium Data Source product.

Global Carbon Prices

Europe (€/ton)	Aug 19	Aug 12	Chg.
EUA Dec '14	6.46	6.13	+0.33
CER Dec '14	0.17	0.17	0.00
US (\$/ton)			
CCA (Calif.) Dec '14	11.80	11.85	-0.05
RGGI (Northeast) Dec '14*	4.98	4.98	0.00
New Zealand (NZ\$/ton)			
NZU (spot)	3.80	3.85	-0.05

Benchmark months. *Short tons; all others metric tons. Source: ICE, OMF



Global Electricity Prices

Europe (\$/MWh)	Aug 19	Aug 12	Chg.
Germany (EEX)	41.33	47.61	-6.28
France (Powernext)	41.35	20.77	+20.58
Scandinavia (Nordpool)	43.58	43.50	+0.08
UK (APX)	65.64	62.63	+3.01
Italy (GME)	60.08	64.52	-4.43
Spain (Omel)	72.15	59.49	+12.66
North America			
New England	35.67	35.39	+0.28
Texas (ERCOT)	33.41	41.88	-8.47
US Mid-Atlantic (PJM West)	35.72	32.17	+3.55
US Southwest (Palo Verde)	39.88	41.62	-1.74
Canada (Ontario)	19.66	27.25	-7.59
Other			
Australia (NSW)	40.92	37.03	+3.89
Brazil (SE-CW)	312.58	289.23	+23.35
India (IEX)	65.92	59.32	+6.60
Japan (JPX)	151.30	121.06	+30.24
Russia (ATS)	32.62	35.09	-2.47
Singapore (USEP)	115.22	105.32	+9.90

Wholesale prices. Source: Exchanges

Key Biofuel Prices

US (\$/gallon)	Aug 19	Aug 12	Chg.
Futures			
CBOT Ethanol	2.1190	2.0710	+0.0480
RBOB Gasoline	2.6954	2.7345	-0.0391
Spot market			
Ethanol Midcont.	2.32	2.20	+0.12
Ethanol NY Harbor	2.31	2.21	+0.10
Ethanol US Gulf	2.26	2.19	+0.07
Europe (\$/ton)			
Futures			
ICE Gasoil	855.75	883.75	-28.00
Spot market			
Gasoline	931.00	955.00	-24.00
Diesel	874.50	883.00	-8.50
Biodiesel			
Fame 0	990.75	1,003.75	-13.00
RME	1,000.75	1,013.75	-13.00
SME	990.75	1,003.75	-13.00
PME	973.25	988.75	-15.50

Source: Thomson Reuters, ICAP, Exchanges

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