

EI NEW ENERGY

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US, China Edge Toward Climate Cooperation

The US and China have reached two seemingly small breakthroughs in climate change cooperation in the last month, with a deal to curb a type of greenhouse gas known as hydrofluorocarbons (HFCs) and then incremental progress by the US-China Climate Change Working Group last week, with a view to unveiling a more detailed plan for curbing emissions in October. Although minor in scale, the actions signal that the two countries are serious about tackling emissions — and at the same time — without letting fierce disagreements on clean energy business and broader commerce get in the way (p3). The two countries signed a 10-year framework on energy and environment cooperation in June 2008, which in turn led to “EcoPartnership” programs that promote joint ventures between local governments, private enterprise, nongovernmental organizations and academia. Since that time, 24 partnerships between US and Chinese organizations have been signed, on topics ranging from groundwater protection to landfill gas-to-liquids technologies. After diplomatic gatherings in Washington last week, Chinese politician Yang Jiechi said the EcoPartnerships have been forged with recognition that the US and China “share many challenges, extensive interests, and a broad foundation of cooperation.”

Although the HFC agreement announced in June lacked a binding target, it was pivotal for China in particular — HFC curbs were mainly championed by the US, Canada and Mexico in the past (NE Jun.13’13). “HFCs are pound-for-pound some of the most potent greenhouse gases, and controlling them will be an essential short-term piece of solving the climate change puzzle,” said Derek Walker of the Environmental Defense Fund’s climate and energy program. Then on Jul. 10, the US-China Climate Change Working Group announced a list of areas in which it will cooperate — with a big emphasis on carbon capture, utilization and storage (CCUS), given the important role of coal in both countries. “The US and China will undertake a three-tiered effort to identify integrated project sites, develop joint scientific and technical monitoring programs to manage information and lessons learned from the projects, and explore business-to-business joint cooperation for scaling up CCUS deployment,” the working group said. Other areas of planned cooperation include heavy-duty vehicles, smart grids, energy efficiency and greenhouse gas data collection.

The recent progress is potentially significant, given past divisions between the US and China in climate negotiations and the problems facing climate policy in Europe (p4). The EU — responsible for 14% of

Regional Power Generation Costs

(\$/MWh)	US	Europe	Japan
Gas (CCGT)	47	91	120
Gas (OCGT)	93	158	201
Coal	75	91	87
Wind Onshore	77	77	77
Solar PV	163	163	163
Wind Offshore	170	170	170
Solar CSP	224	224	224

Levelized cost of energy, or cost of generating electricity over lifetime, including capital, operating, fuel and carbon expenditure. Based on 12-month average gas, coal and carbon prices in US, Europe and Japan. Renewable costs are standard as no fuel cost variability.

Source: Energy Intelligence

global carbon dioxide emissions, and third in output after the US and China — has long considered itself a leader on the issue. But the US and China are together responsible for around 42% of global emissions — at 23.5% and 18.3%, respectively, according to UN data — and their cooperation is arguably more important for a pact to replace the Kyoto Protocol, which is supposed to be agreed by 2015. The US Energy Information Administration expects US CO₂ emissions to be 9% below 2005 levels by 2020. China's emissions are expected to continue expanding for the foreseeable future, but Beijing has adopted a raft of policies to restrain the rate of growth, with a focus on carbon intensity, or emissions per GDP unit. The US remains the largest greenhouse gas emitter per capita and a huge contributor to historical emissions (NE Apr.11'13).

The California Air Resources Board (Carb) also last month signed a memorandum of understanding (MOU) with Shenzhen's pilot carbon market in southern China (NE Jun.20'13). Cooperation will focus on “building effective systems for data gathering, emissions verification, market monitoring, compliance and enforcement,” Carb said. The MOU is unlikely to lead to a trading linkage anytime soon due to various complications, but the two markets are well-suited to cooperation — both got going this year, with California launching in January and Shenzhen in June.

Lauren Craft and Bill Murray, Washington

Tunisia Eyes Renewables, Efficiency as Gas Output Declines

Following France's example, Tunisia last month launched a “national debate” to address energy challenges, with a view to developing a more diversified energy mix. Modest oil and gas production allowed the North African nation to be a net exporter until 2000, but imports have been increasing dramatically since 2010. That trend is “unsustainable” for the country of 11 million people, Nidhal Ouerfelli, the state secretary in charge of energy and mines, told *EI New Energy* in an interview. Tunisia will give increased attention to renewables as its energy deficit grows from 1 million tons of oil equivalent (toe) in 2011 to almost 2 million toe in 2013 and, despite energy efficiency efforts, a projected 3.5 million toe by 2020.

While a marginal energy player, Tunisia's situation offers some insight into challenges likely to be faced in the future by larger producers such as Algeria. Tunisia now produces about 265 million cubic feet per day of gas, down from a peak of 290 MMcf/d in 2010, and 65,000 barrels per day of oil, down from 77,000 b/d. Tunisia's hydrocarbon production will continue its “natural decline,” Ouerfelli said, while demand is set to grow by 3% per year, combining 5% GDP growth with a 2% reduction in energy intensity, or energy consumption per unit of GDP. Power generation, with 4,144 megawatts of installed capacity, is almost entirely based on natural gas, which in 2012 was sourced 53% domestically and 47% from Algeria, either as a transit fee on exports to Italy or as straightforward imports. Renewable generation from 62 MW in small hydro plants and two wind projects totaling 170 MW, all belonging to state-owned utility Steg, accounted for less than 2% of Tunisia's power supply.

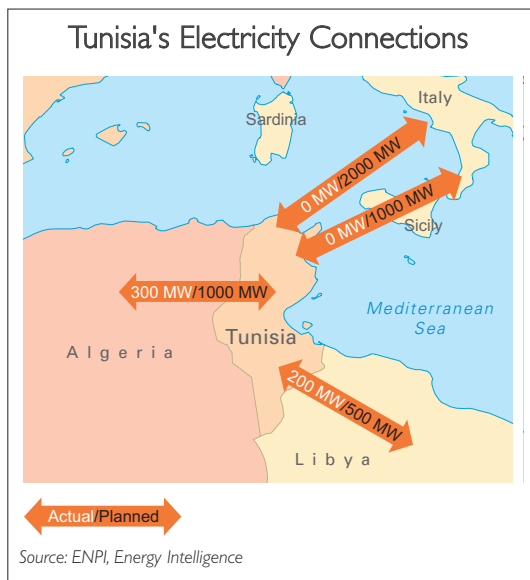
Although Tunisia's relations with Algeria are cordial — unlike those between Morocco and Algeria, which are soured by the Western Sahara dispute — the country is reluctant to rely too much on a single country for energy imports, for political and economic reasons. And while the nuclear and coal options remain open, Ouerfelli said they would need to overcome huge financial, technical and acceptability obstacles. The country's main resource is energy efficiency, he argued, but barriers to renewable energy will be lifted, to help reach a targeted 4,300 MW, or 30%, renewable generation by 2030, comprising 15% wind, 10% solar photovoltaic (PV) and 5% concentrated solar power (CSP). A pumped hydro station of about 500 MW is also being considered. A new law under preparation will encourage private sector involvement, with yearly targets and feed-in tariffs by technology. An independent energy regulator will also be created. Renewable investment is expensive, but fossil fuel subsidies are increasingly costly and Tunisia needs to make an energy transition, Ouerfelli said — energy subsidies currently amount to 11% of the state budget and 4% of national GDP, according to official data.

As renewable capacity develops in North Africa, grid reinforcement and interconnections with neighboring countries will become more important to ensure reliability. Tunisia just signed a first electricity trade contract with Libya and wants to relaunch the Elmed project, a proposed

Tunisia: Energy Facts

Oil and Gas	2011	2012
Supply:		
Oil Production*	66.1	65.3
LPG Production*	2.5	3.2
Gas Production†	275.3	266.0
Fee Gas†	101.7	104.5
Gas Imports†	79.0	129.3
Demand:		
Oil Products*	74.1	76.4
Gas†	456.1	499.8
Electricity Generation‡		
Gas	15,047	16,464
Hydro	54	110
Wind	109	198
Oil, other	72	56
Total	15,282	16,828

*in '000 b/d †in MMcf/d ‡in GWh. Note: Oil and gas converted from tons of oil equivalent. Source: Tunisian government, Energy Intelligence



subsea power link with Sicily that could be used in either direction — with North Africa sending intermittent solar and wind power to Europe while importing baseload electricity through the Tunisian hub.

Tunisia is also welcoming export-only projects such as TuNur, a partnership between London-based developer Nur Energie and a group of Tunisian investors, aiming at developing 2,000 MW of CSP capacity in several tranches and a dedicated interconnection with mainland Italy. An agreement is currently being finalized with the government, Ouerfelli said, while TuNur is looking for equity investors in Europe, Asia and the Mideast, Chief Executive Kevin Sara told *El New Energy*. Debt finance is expected from European and international development institutions, and potential offtakers are being approached, notably in Switzerland and the UK. TuNur says it is focusing on CSP because Europe already has plenty of solar PV and would value CSP's ability to provide firm capacity, with thermal storage. Nur Energie is holding discussions with technology suppliers including the US' BrightSource, Spain's Abengoa and Chinese new entrants, Sara said, adding that Tunisia's strong industrial sector would be able to supply many components and services — including flat mirrors, steel structures, towers and electrical equipment — and eventually export them across the region.

Philippe Roos, Brussels

US-China Tariffs Miss Mark on Jobs, Market Impact

One year after the US levied heavy import tariffs on Chinese-manufactured solar cells, experts say the move has missed the mark in terms of stimulating jobs or leveling the market. Beginning with a case initiated by SolarWorld, a German company with a manufacturing plant in Oregon, the US Department of Commerce imposed tariffs of 24% to 255% on Chinese solar cells after determining that China was selling modules for less than production cost and providing illegal subsidies (NE May24'12). The tariffs were finalized in October 2012 despite protests from the sizable downstream sector of the US industry, which depends on low-cost imports. "If the policy was really designed to stimulate job growth in the US, it really did not accomplish much," says Andy Klump, chief executive of Shanghai-based Clean Energy Associates. "If anything, it hurt job growth on the downstream side of the industry."

The US' downstream solar business, comprising installers, contractors and developers, accounts for about half of the industry's 119,000 jobs, according to an April 2013 report by the Solar Foundation, a Washington think tank. The installation sector added 8,500 jobs last year, and project developers 8,000 jobs, together driving most of the employment growth. But these are also the areas feeling the impact of the tariffs — and by propping up prices, the tariffs effectively limit some of the job potential, Klump says. US solar manufacturing, which accounts for about a quarter of industry employment, lost 8,200 jobs in 2012, and is projected to regain only 2,600 in 2013. SolarWorld itself cut jobs at its Oregon plant and is currently in financial difficulties.

Further complicating matters, the US still imports Chinese modules. The tariffs only apply to solar cells, which are one component of a multistep manufacturing process. This has allowed Chinese companies to outsource their cell production to countries such as Taiwan, ship the cells to China for assembly into modules, and then export these to the US. This increases costs by 15%-20%, but the end product is still cheaper than modules from other countries. In fact, some Chinese solar manufacturers are increasing their sales to the US. Yingli Green Energy, now deemed the largest Chinese producer after Suntech went bankrupt, expanded its ratio of US sales during the first quarter of 2013 to 14%, compared with 4% in the fourth quarter of 2012. Yingli is projecting continued strong US sales for the rest of 2013. This is not to say Chinese companies are happy with this workaround. "Everyone has been very inconvenienced, especially our customers," says Nigel Cockroft, head of the US branch of JinkoSolar, one of China's major solar producers. "It leads to a shortage of material in the US, it leads to higher prices, with nobody making any more profit except the Taiwanese cell manufacturers." Cockroft claims the tariffs have had the "unintended consequence" of affecting the US solar industry more than Chinese suppliers.

Although the US case is considered closed, with little likelihood of a trade war escalating, China is currently battling a move by Europe to impose similar tariffs. The European Union — a far more important market for Chinese solar exporters — recently imposed a preliminary 11.8% tariff on Chinese solar products, including wafers, cells and modules, with a steep increase to 47% due in August. Many European countries oppose the move, however, and talks are under way on a possible deal (NE Jul.11'13).

Rosa Lin, Washington

EU Biofuels Hang in Balance Amid Complex, Divisive Debate

The future of the EU's biofuels industry continues to hang in the balance, as divisions in Brussels over energy and climate policy goals overshadow the sector (NE Oct.18'12). With a proposed revision of current EU biofuels policy headed for a key vote in the European Parliament in September, the debate seems more polarized than ever (NE Jul.5'12).

Facing criticism over the impact of biofuels on agriculture, the European Commission last year proposed a cap of 5% for crop-based biofuels in the transport fuel market, compared with an existing 10% renewable transport target for 2020, as well as the partial introduction of controversial "indirect land use change [Iluc]" factors in assessing their environmental footprint. This would take account of whether biofuel production in Europe displaces food crops, leads to deforestation and generates additional greenhouse gases (NE Oct.18'12). However, as part of the decision-making process, parliament's energy and industry committee recently proposed relaxing the crop-based cap to 6.5% while dropping Iluc factors entirely, whereas the environment committee has proposed a 5.5% cap, but a full introduction of Iluc measurements. Lawmakers are due to make up their minds in a full plenary vote on Sep. 11, before the policy proposal goes for approval by member states in the European Council.

While campaigners against biofuels, such as lobby group Transport and Environment, maintain that Iluc represents "the most robust science available today," the industry says differently. "The science of Iluc is too uncertain and cannot be used to justify calling into question major investments in our jobs and our industry," Clare Wenner, head of the UK's Renewable Energy Association, said in a statement. In particular, biofuel proponents claim Iluc calculations are based on unverified calculations and hypothetical assumptions — and complain that no other industry is being subjected to such rules. European farm lobby group Copa-Cogeca argues that the whole Iluc debate is being conducted in the wrong way, in that it ignores the realities of biofuel production, with co-products a major source of animal feed. If Europe produced less bioethanol and biodiesel, this could lead to more imports of feed, such as soyabean meal from South America, it says.

Beyond the environmental impact, opponents of biofuels cite food-versus-fuel competition, making an already-emotive issue more complicated. Simply capping biofuels and introducing Iluc accounting does not go far enough, argues Friends of the Earth: "We need to end biofuels competing with food production by phasing out this misguided use of food for fuel altogether." The European Biodiesel Board says that limiting production "will neither solve hunger nor ... prevent deforestation." The UK's National Farmers Union says the certainty provided by this additional demand stream gives farmers the certainty needed to invest in increased yields. Biofuel producers also suggest that a far more pressing issue to address is the 40% or more of global food production that is wasted each year.

European policymakers hope to counter the negative impact of the reform by including extra incentives for advanced biofuels, made from nonfood sources such as agricultural waste (NE Mar.21'13). But this has failed to inspire developers. Novozymes, a leader in the field, says the "complex and ineffective" policy package will have the opposite effect, with the proposed multiple counting of advanced biofuels an ineffective spur to development that would deliver targets only on paper. Limiting conventional biofuels would undermine the entire sector, the Danish firm argues, as investment in advanced biofuels needs a long-term, stable policy framework. Novozymes has urged EU parliament members to reject the environment committee's stance and take the more cautious approach recommended by the energy and industry committee, which is also supported by the agriculture,

international trade and transport committees. Concerns about jobs and the economy are high on the agenda of these committees — and, increasingly, of member states. Such factors were evident in recent deliberations over the EU's carbon market and automobile emission standards (NE Jul.11'13).

Ronan Kavanagh, London

Fuel Pricing Policy Hits Brazil Ethanol Investment

Brazil's ethanol producers, undermined by years of government interference in fuel prices, see themselves at a key inflection point, even as their industry celebrates a major milestone. Sometime this month, automakers in Brazil will roll out the country's 20 millionth flex-fuel vehicle — 10 years after they first hit Brazil's streets, giving drivers the option to fill their tanks entirely with either gasoline or ethanol. Leading industry voices emphasize that, unlike the national ethanol program in the 1970s, the initiative to launch flex-fuel vehicles was carried out entirely by private industry, without government support. Yet the consensus at the recent annual gathering of Unica, Brazil's principal ethanol lobby, in Sao Paulo was that continuous government intervention in fuel pricing is now stifling long-term ethanol production, clouding investment certainty.

Since the launch of the Volkswagon Gol 1.6 Total Flex in March 2003, flex-fuel cars and light commercial vehicles in Brazil have ballooned to over 170 models today and account for 60% of the country's total auto fleet. That figure is projected to climb to 80% within five years. But the ethanol option is being hampered by government-capped fuel prices and tax breaks for gasoline distributors that have made gasoline the preferred choice at the pump. Unica estimates those tax breaks — aimed at curbing inflation — have amounted to 28¢ per liter from 2005 to 2012, exceeding the recent 12¢/liter production tax breaks given to ethanol (NE May16'13). Considering the superior mileage of gasoline, ethanol must generally be at least 30% cheaper to compete. The price difference had shrunk to as little as 20% before a 6.6% gasoline price hike announced by the government at the start of the year.

Combined with the global recession and poor weather-related harvests, the government's fuel pricing policy has seen investment in new ethanol production units dry up to almost zero over the past four years, says Unica President Elizabeth Farina. Disbursements to the sugarcane ethanol industry by Brazil's national development bank BNDES, which finances domestic industries, dropped by 40% from 2011 to 2012. Financing for agricultural projects has remained constant since 2008 — around the time that the government began controlling prices at the pump. But tellingly, the greatest blows over that period involved disbursements for industrial production, which fell from \$2.6 billion in 2008 to \$1.2 billion last year. While investment has not stopped altogether, the bulk in recent years has been directed to expanding gains and efficiencies from existing sugarcane production, electricity cogeneration from sugarcane biogas, and transport of ethanol and sugar. “The government's fuel policy is creating the greatest destruction of value that I've seen in the past 35 years,” said one Sao Paulo-based energy consultant. Indeed, with ethanol exports totaling 3.5 billion liters last year, as state-owned Petrobras racked up \$11 billion in losses from fuel imports that are then sold at a discount domestically, talk at the Unica gathering invoked the notion of Brazil as an “energy poor” nation.

In the short term, Brazilian ethanol production has had some recent bright spots. Aided by the tax breaks, a rise in the minimum blending requirement and a favorable harvest season, Unica projects that ethanol production this year will total 25.4 billion liters, up 9.5% from last year. BNDES also says it is on pace to disburse \$2.4 billion among all sugarcane ethanol activities this year, 14% higher than 2012. Yet the ethanol industry sees no end in sight for the underlying problem of government-suppressed fuel prices, particularly in light of recent protests that have swept the country. At their root the street demonstrations have called for structural changes to the country's economy, Farina notes. But in an inflation-prone economy and amid social unrest provoked by a 9¢ rise in bus fares, “there is no chance whatsoever of gasoline prices going up at this time,” she adds.

Naki B. Mendoza, Sao Paulo

China's Oil Giants Focus on Gas, Efficiency in Carbon Strategy

China's government may be pushing to reposition the country's economy along a low-carbon development path, but for state companies heavily vested in fossil fuels, the scope for radical change is limited and strategies are instead heavily geared toward energy conservation and natural gas. In their low-carbon manifestos, both China National Petroleum Corp. (CNPC) and Sinopec pledge to offer a cleaner product slate for China's coal-dominated energy mix by raising gas output through the exploitation of unconventional resources such as shale gas, tight gas and even coal gasification (NE Jan.10'13). China National Offshore Oil Corp. (CNOOC), which has fewer such resources, says it will accelerate LNG development and "proactively explore alternative energies" (EC Jun.14'13).

CNPC has an edge in the fuel-switching race, as its 80 billion cubic meters (7.7 billion cubic feet per day) of gas production last year accounted for 70% of domestic gas supply. It is aggressively pushing gas in the transportation sector, with a target of having 200,000 LNG vehicles and 1,000 dual-fuel oil and LNG ships in operation by end-2015, supported by 1,500 LNG filling stations and 22 small liquefaction plants. With a less-entrenched position in oil and gas acreage, Sinopec's unconventional gas push is slanted toward coal gasification. It aims to invest 70 billion yuan (\$11 billion) in two coal mines and an 8 billion cubic meter per year coal gasification facility at Zhudong in the remote northwestern Xinjiang region, for completion by mid-2017. The gas would be delivered along a new 4,859 kilometer, 30 Bcm/yr trunk line. Both companies are also studying carbon capture and storage (CCS), including use of carbon dioxide in enhanced oil recovery (EOR). Sinopec is the lead contractor for the Texas Clean Energy Project in the US, which features coal gasification combined with CCS (NE Sep.20'12). CNPC is using its Jilin oil field in northern China as a test bed for CCS and EOR.

Biofuel production, too, is seen as having synergy with Sinopec and PetroChina's existing downstream businesses. Sinopec claims to be China's largest ethanol-gasoline blend supplier with sales of about 9 million tons (210,000 barrels per day) in 2011, covering over 50% of the market, while CNPC's flagship 540,000 ton per year corn-based Jilin Ethanol Fuel Co. opened in 2003 as China's first commercial-scale biofuel plant. The two firms are also competing to be first to commercially produce biofuel for China's domestic aviation market, which is expected to consume 466,000 b/d of fuel this year, rising to 880,000 b/d in 2020. PetroChina is aiming to complete a 60,000 ton/yr (1,300 b/d) biojet plant in Sichuan province by 2013-14, using Honeywell's UOP technology to process jatropa (NE May9'13). Sinopec, which now controls roughly 75% of the domestic jet fuel market, is betting on in-house technology to convert used cooking oil into biojet.

CNOOC has smaller upstream operations than its onshore rivals, but a head start in LNG imports and gas-fired generation. Two of its LNG-fired power plants have received carbon credits under the UN Clean Development Mechanism. But with LNG expansion limited by high international prices, and competition from PetroChina and Sinopec intensifying, CNOOC has taken a more than token interest in alternative energy (NE Aug.9'12). It has installed more than 400 megawatts of wind capacity and acquired a controlling share in lithium-ion battery producer Lishen, which it claims is among the top five manufacturers globally. Beijing's official planners see lithium-ion batteries playing a key role in China's push for a leading position in the world's nascent electric car industry (NE Jun.6'13).

Kimfeng Wong, Singapore



Oil & Money
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Join us in congratulating **Iberdrola** on winning the **2013 Award for Leadership in New Energy** at the Oil & Money Conference on October 1-2.





IN BRIEF

Australia Confirms Carbon Reform

Australia's ruling Labor Party, under new leader and Prime Minister Kevin Rudd, confirmed that it would bring forward by a year the implementation of a market-based carbon emissions trading scheme to replace the current fixed carbon tax, which, at A\$24.15 (US\$22) per ton, is six times higher than levels trading on the EU's carbon market. The move to introduce a carbon market in 2014 — seen as the best means of bolstering Labor's chances in upcoming elections — is expected to burn a hole of A\$3.8 billion (US\$3.5 billion) in the country's budget (NE Jul.4'13). Under the carbon scheme introduced by predecessor Julia Gillard, emitters must pay a fixed rate that started at A\$23 in 2012 and rises by 5% annually until the previously scheduled transition in July 2015 to a market linked to the EU. The opposition coalition, which was leading in polls, has vowed to scrap carbon pricing. Since the Jun. 26 Labor leadership coup, the party's popularity has jumped and it now ties with the opposition.

China Boosts Solar Target

Beijing has made official a new 2015 target of 35 GW for installed solar power capacity to replace the previous goal of 21 GW, according to a State Council document released this week. A government official had flagged the plan to increase the target at the beginning of this year (NE Jan.31'13). The State Council statement said China should aim for annual solar installations of around 10 GW in 2013-15, in order to attain the target by end-2015. Expanding the domestic market has become crucial as Chinese solar manufacturers face anti-dumping tariffs in major export markets in Europe and the US (NE Jul.11'13). China's massively overbuilt solar manufacturing industry should also hasten its restructuring and merger and

acquisition process to weed out laggards, making way for the emergence of leading companies strong in R&D and global competitiveness, said the State Council.

Spain Cuts Renewables Again

The Spanish renewable power industry was dealt yet another blow last week, with Madrid proposing to impose a 7.5% "reasonable profitability" limit for payments to renewable generators. The measure could be retroactively backdated to 2001 and last until 2026, according to the government proposals which constitute part of a bigger reform package designed to reduce the country's so-called "tariff deficit" — an accumulated deficit amassed due to the difference between generation costs and government-set regulated electricity prices, which has ballooned to €26 billion (\$34 billion). Comments from solar and wind associations in Spain suggest they will consider legal action against Madrid over the latest retroactive measures.

World Bank Sets New Strategy

The World Bank approved a new energy strategy confirming its focus on expanding affordable access, along with supporting energy efficiency and renewables. Following heated controversies over fossil fuel lending, the bank said it will support coal-fired power generation projects "only in rare circumstances," following considerations such as "meeting basic energy needs in countries with no feasible alternatives." This could qualify South Africa or India, although no new coal operation has been considered by the bank anywhere since 2010. The World Bank also said it would scale up its engagement in natural gas, and continue supporting "sustainable" hydropower. Last month, EU Climate Commissioner Connie Hedegaard urged

international financial institutions to join the EU and OECD "to take a lead role in eliminating public support for fossil fuels."

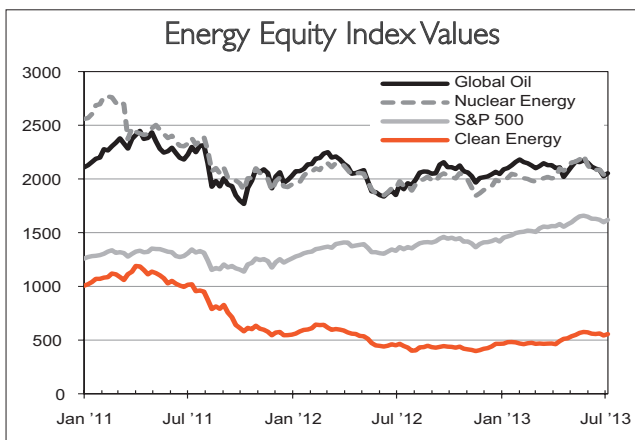
Coal Tops 50% in Germany

Poor output volumes from gas-fired power stations, nuclear plants and wind turbines in Germany pushed coal use to 52% of the electricity mix during the first half of the year. The Fraunhofer Institute said coal use climbed 5% year-on-year, while gas use slid by some 17%. Clean spark spreads — the profit margin from burning gas — versus clean dark spreads, the coal equivalent, have frequently turned negative in Germany this year (WGI Jul.8'13). Wind power dropped 10% to 22.4 terawatt hours, while solar photovoltaic output remained largely unchanged year-on-year at 14.3 TWh. Coal, including lignite, output jumped to 130.3 TWh.

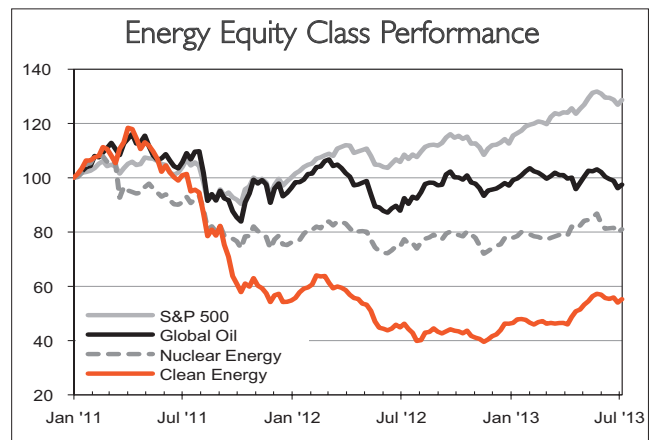
UK in Low-Carbon Vehicle Push

The UK government and automotive industry announced a plan to invest £500 million (\$760 million) each over the next 10 years in a £1 billion Advanced Propulsion Centre to research, develop and commercialize technologies for low-carbon vehicles. Backed by 27 companies in the sector — including Bentley, BMW, BP, Caterpillar, Ford, JCB, Lotus, McLaren, Nissan and Tata Motors — the investment forms part of a strategy for growth and sustainability in the country's automotive sector, which aims to ensure that the UK — the fourth-largest vehicle producer in Europe — plays a decisive role in developing and manufacturing low and ultra-low emission vehicles and technologies. By 2040, almost none of Europe's new cars will be powered solely by traditional gasoline or diesel engines, the government predicts (NE Jul.4'13).

CLEAN ENERGY EQUITY MARKETS



Source: Standard & Poor's



Source: Standard & Poor's

EI NEW ENERGY DATA

Energy Futures: Reference Prices

Carbon (€/ton)	Jul 16	Jul 9	Chg.
ECX EUA	4.10	4.14	-0.04
ECX CER	0.51	0.50	+0.01
Crude oil (\$/bbl)			
Nymex light, sweet	106.00	103.53	+2.47
ICE Brent	109.40	107.81	+1.59
Natural gas (\$/MMBtu)			
Nymex Henry Hub	3.68	3.66	+0.02
ICE UK NBP	9.90	9.77	+0.13
Coal (\$/ton)			
Nymex Capp*	55.34	54.37	+0.97
ICE Rotterdam	75.10	74.85	+0.25

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

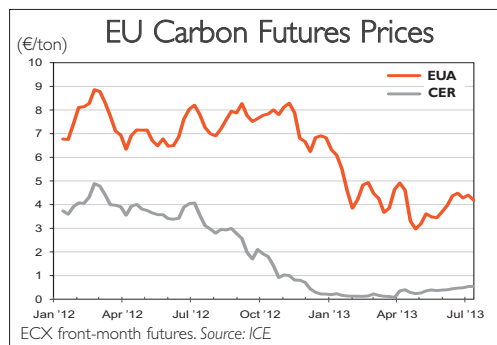
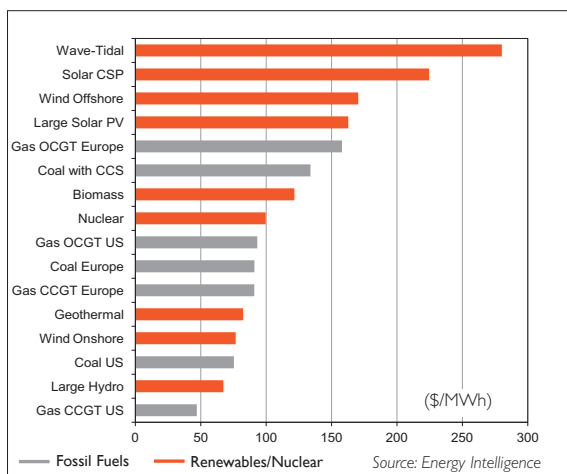
DATA: The complete set of EI New Energy data is available to web subscribers, including full leveled cost of energy (LCOE) calculations, fuel switching thresholds, electricity production by sector, ethanol and biodiesel fundamentals, carbon prices, methodologies and reader's guides. Historical data is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

Global Carbon Prices

Europe (€/ton)	Jul 16	Jul 9	Chg.
EUA Dec '13	4.13	4.17	-0.04
CER Dec '13	0.52	0.51	+0.01
US (\$/ton)			
CCA (Calif.) Dec '13	14.35	14.25	+0.10
RGGI (Northeast) Dec '13*	3.40	3.35	+0.05
New Zealand (NZ\$/ton)			
NZU (spot)	1.93	2.00	-0.07

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

Newbuild Power Generation Costs



Global Electricity Prices

Europe (\$/MWh)	Jul 16	Jul 9	Chg.
Germany (EEX)	61.68	42.26	+19.42
France (Powernext)	60.14	37.73	+22.41
Scandinavia (Nordpool)	47.45	39.80	+7.65
UK (APX)	74.27	73.59	+0.68
Italy (GME)	86.80	87.77	-0.97
Spain (Omel)	73.37	64.13	+9.24
North America			
New England	137.50	56.50	+81.00
Texas (Ercot)	24.65	29.76	-5.11
US Mid-Atlantic (PJM West)	90.83	45.22	+45.61
US Southwest (Palo Verde)	38.50	46.00	-7.50
Canada (Ontario)	42.63	26.48	+16.15
Other			
Australia (NSW)	61.00	69.74	-8.74
Brazil (SE-CW)	56.37	48.02	+8.35
India (IEX)	37.36	49.51	-12.15
Japan (JPEX)	157.77	163.15	-5.38
Russia (ATS)	37.92	36.75	+1.17
Singapore (USEP)	124.74	120.46	+4.28

Wholesale prices. Source: Exchanges

Key Biofuel Prices

US (\$/gallon)	Jul 16	Jul 9	Chg.
Futures			
CBOT Ethanol	2.5570	2.4260	+0.1310
RBOB Gasoline	3.1343	2.9260	+0.2083
Spot market:			
Ethanol Midcont.	2.52	2.41	+0.11
Ethanol NY Harbor	2.59	2.51	+0.08
Ethanol US Gulf	2.59	2.46	+0.13
Europe			
Futures			
ICE Gasoil (\$/ton)	919.75	909.25	+10.50
Spot market			
Gasoline (\$/ton)	1052.50	999.00	+53.50
Diesel (\$/ton)	938.50	928.50	+10.00
Ethanol T1 (\$/m3)	790.00	790.00	0.00
Ethanol T1 (\$/ton)	1000.75	1,000.75	0.00
Ethanol T2 (€/m3)	650.00	650.00	0.00
Ethanol T2 (\$/ton)	1084.00	1,052.50	+31.50
Biodiesel (\$/ton)			
Fame 0°C	1,116.00	1,127.00	-11.00
Fame -10°C	1,165.00	1,210.00	-45.00
SME	1,280.00	1,280.00	0.00
PME	1,090.00	1,100.00	-10.00
RME	1,176.00	1,219.00	-43.00

All Europe spot prices fob ARA. Spot ethanol and biodiesel are latest available quotes. Source: Thomson Reuters

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