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China Earns Plaudits Despite ‘Soft’ ETS Launch

China officially launched its long-awaited national carbon market this week amid intense international scrutiny, but signaled that the world would have to wait until around 2020 before seeing “actual monetary transactions” in the Chinese emissions trading scheme (ETS). The initial coverage of China’s ETS will extend only to the power generation sector, down from the eight sectors originally targeted or more recently rumored, three sectors, confirming expectations that Beijing has moderated its ambition after realizing the difficulties of preparing the entire country for carbon trading (NE Oct.12’17). While the token launch on Dec. 19 has been described as somewhat “underwhelming,” it means Beijing can claim it has delivered on President Xi Jinping’s promise in 2015 to start a nationwide carbon market in 2017. Meanwhile, by holding back on real trading, the country has bought time for laying the more solid groundwork needed for effective market operation, with the official *China Daily* reporting that “real transactions are expected to take place in 2020. But international reaction to the slightly fudged China ETS launch has still been fairly positive, recognizing that China should still be lauded for remaining committed to carbon pricing despite US President Donald Trump’s anti-climate stance (NE Jun.8’17). “China’s carbon pricing plan is a welcome sign that Washington’s hostility to climate action is not deterring other countries from following through on their climate commitments,” said a statement by the US-based nonprofit Center for Climate and Energy Solutions. However, “a number of uncertainties remain around the scheme, including concerns over data quality, and measuring, verification and reporting systems in many of the Chinese provinces,” Brussels-based advocacy group Carbon Market Watch noted.

Renewable Energy Price Parity

	Gas (\$/MMBtu)	CO ₂ (\$/ton)
Europe		
Market Price	7.89	8.88
Wind Onshore	8.58	21.41
Solar PV	4.64	0.00
US		
Market Price	2.69	0.00
Wind Onshore	6.23	64.43
Solar PV	3.27	10.28
Japan		
Market Price	7.77	0.00
Wind Onshore	16.05	150.78
Solar PV	10.24	44.24

Market prices Dec 19. Table indicates either gas or CO₂ price needed for new renewable energy to match profitability of new gas-fired power; without subsidies. High US carbon prices reflect low gas prices. Japan at parity so no carbon price needed. Source: Energy Intelligence

The country’s top economic planner, the National Development and Reform Commission (NDRC) held a press conference this week to mark “the completion of an overall design for a national ETS and its official start.” Officials at the launch revealed that of the nine regional experimental carbon exchanges set up earlier in various Chinese provinces and cities, Hubei and Shanghai have been selected to lead preparatory work in two vital aspects of the nationwide ETS. Hubei will take charge of setting up and maintaining the national carbon registry while Shanghai is responsible for getting the trading platform ready. With power a starting point, China will “perfect” the support systems and rules needed for effective ETS operation “as soon as possible,” said NDRC vice chairman Zhang Yong. “Then we will proceed with system testing, on the basis of which actual monetary transactions will begin,” Zhang added. The national ETS rollout would take place “steadily and in stages,” said Zhang, who did not specify any timeline. The official *China Daily* has reported “it will be another three years before an actual transaction takes

place,” citing information from a three-year ETS roadmap that had yet to be made publicly available at press time. “The government plans to spend a year to build a nationwide registration system covering all participants in the power generation sector, with another year to improve supervision schemes by allowing mock carbon trade in the sector,” said the official newspaper. “More sectors are expected to be added in 2020,” according to the roadmap seen by *China Daily*, which also reported that no financial products such as carbon futures will be available in the first two years.

A cautious start points to a more realistic approach by Beijing to go “one step at a time” to avoid any major blunders, Beijing-based Dimitri de Boer, team leader of the EU-China Environmental Governance Program, tells *EI New Energy*: “We can’t expect China to get everything right from day one but if it can do it without encountering the kind of issues faced by the EU carbon market, that would be a real achievement (NE Jun.29’17).” The amount of carbon permits that Beijing intends to hand out for free to emitters is among the factors affecting the effectiveness of Chinese ETS, de Boer notes. Initially, the allocation of carbon permits is likely to be “not particularly tight” so it would take “a period of time” for the ETS to “gradually” exert a positive influence on emitters’ carbon behavior, according to NDRC’s deputy head of climate change Jiang Zhaoli, who also spoke at the Tuesday press conference. Jiang had previously said China needed a carbon price of 200 yuan-300 yuan (\$30-\$45) per ton to motivate serious carbon cuts but the national ETS was more likely to start trading at only around 30 yuan (NE Jun.15’17). Even with initial coverage of just the power sector, China’s ETS would still be the world’s largest by far, with about 1,700 power generators having combined annual emissions of over 3 billion tons of carbon dioxide equivalent drafted into the scheme, according to NRDC data.

Kimfeng Wong, Singapore

Could a War on Plastics Hit Petrochemicals Hopes?

There are many good reasons why plastics’ future looks bright, not least their positive climate impact through the weight reductions they allow, with not many competitors to oil in their production — biomass-based routes, for example, only play a “marginal role” in the International Energy Agency’s (IEA) scenarios because of costs and energy consumption. Petrochemicals account for roughly half of 11 million barrels per day of expected growth in oil demand between now and 2040 in the agency’s base case, and would still grow under its greenest scenario where every other form of oil demand, including all modes of transportation, power, buildings and industries would decline (NE Dec.7’17). But could there be clouds on the horizon for plastics and the hopes Big Oil has pinned on the petrochemicals they are made from?

Transport was also considered a safe market until just a couple of years ago, however many experts now consider that light-duty vehicles are a lost cause for oil, and start to wonder how quickly road freight will electrify — with local pollution the main driver, rather than climate (NE Jul.27’17). Plastics pollution, especially in oceans, similarly emerged as a key topic at the recent UN Environment Assembly, with countries such as Norway calling for a legally binding treaty on plastic waste. Oil analyst Chris Wheaton even sees potential for a “war on plastic” targeting packaging, equivalent to the “war on diesel” that unfolded with little warning in the past couple of years (NE Aug.3’17).

Kenya, home of the UN Environment Program, this summer joined more than 40 other countries that have partly or fully banned or taxed single-use plastic bags. Bangladesh was the first country to ban plastic bags in 2002. Rwanda and China followed in 2008. In Europe, Italy was first to ban single use plastic bags in 2012, followed by France in 2016, while most other EU members apply fees or taxes on single-use bags. The European Commission also recently introduced a “circular economy” package including a 55% recycling target for plastic packaging — up from today’s 26%. In the US, the overall recycling rate is 34% with peaks at up to 70% in states with container deposit laws, or bans such as California’s on single-use plastic bags introduced after a 2016 statewide vote.

“Society’s perception of plastics is deteriorating and perhaps threatening the plastics industry’s license to operate,” according to the UK-based Ellen MacArthur Foundation, which in 2016 launched the New Plastic Economy initiative with partners including food giants Coca-Cola, Danone, Pepsico and Unilever. It is aiming to “build momentum towards a system in which plastics never become waste,” whereas today only 14% of global plastic packaging is collected for recycling, and only a fraction of that is actually recycled in applications where further recycling is

Oil Demand Scenarios

(million b/d)	2000-16		2016-40	
	Actual	BAU	Base	Sustainable
Petchem and industry	3.0	6.7	6.2	4.2
Aviation and navigation	2.7	6.9	4.7	-2.6
Road transport	10.6	12.0	3.3	-14.8
Buildings, power and other	0.9	-0.6	-3.1	-7.7
Total	17.2	25.0	11.1	-20.9

Actual and projected change in oil demand by sector, in million barrels per day. 2016-40 compares three IEA scenarios: business-as-usual (BAU), base case, and sustainable development case combining climate, energy access and pollution targets. Source: IEA

possible. The initiative calls for a “drastic reduction in the volume of plastic packaging used” while “decoupling plastics from fossil feedstocks,” particularly through better recycling. The IEA found for example that a combination of lighter products with an increase in plastics recycling rates to 33% could eliminate 1.5 million b/d of oil demand for petrochemicals by 2040 (NE Dec.1’16).

Another central part of the effort could be “the development of renewably-sourced materials” to provide virgin feedstock, the Ellen MacArthur Foundation said. Bioplastics are an option but are too expensive according to the IEA, notably in a carbon constrained world where biomass demand — and therefore prices — would be high due to competing applications in power generation and transport fuels, not to mention the overarching issue of food versus fuel (NE Aug.13’15). A more speculative, but perhaps more promising, route would be the conversion of captured greenhouse gases into chemicals, such as US start-up Newlight’s technology based on captured methane emissions from farms, water treatment plants, landfills and energy facilities to produce plastic materials.

Hydrogen is another possibility, German research institute Fraunhofer ISE’s Andreas Bett told *EI New Energy*. “Our models show that if we come to a certain level of renewables we’ll need to make hydrogen,” to absorb excess power generation, he said. That hydrogen could be reconverted into power during times of low generation, or used for mobility or as a building block for chemicals, he added (NE Aug.17’17). “We can do all [the needed petrochemical products] with hydrogen and carbon which is available from other processes,” he said. While “not in view at the moment,” this could potentially be “dangerous for the oil industry” later this century, he believes.

Competition should also increase within fossil fuels, the IEA says. While petrochemicals have traditionally been oil-based, with naphtha the main feedstock, natural gas is expected to gain market share following a wave of ethane cracker projects in the Mideast and in the US. With new capacity also in construction in Russia, ethane’s share in global petrochemicals could reach 30% by 2025, up from 22% in 2010, before plateauing and starting to fall back as ethane supply tightens and “waning gasoline demand” drags naphtha prices down, the IEA predicts. Meanwhile, coal could become a significant feedstock in countries such as China through a methanol-to-olefins route, despite its high carbon intensity.

Philippe Roos, Strasbourg

After Long Absence, BP Returning to Renewables

BP was an early leader in renewables, a strategy which reached a high point under former CEO Lord Browne’s “Beyond Petroleum” campaign, but scaled back its involvement in years following. The UK major has since lagged behind many of its European contemporaries, such as Royal Dutch Shell, Total and Statoil, which have in recent years been scaling up their renewable energy portfolios, seeing the merits of these investments as the low-carbon energy transition plays out. However there are signs that is changing. Now that BP is finally emerging from under the shadow of the 2010 Macondo disaster, with most of the \$60 billion in financial liabilities from the episode behind it, the firm seems intent on playing catch-up, having recently revealed a few new renewables investments.

Six years after BP shuttered its solar business, BP last week announced a \$200 million investment over three years to acquire a 43% stake in Lightsource, a European solar development company. Focused on the acquisition, development and long-term management of large-scale solar projects, the solar firm will be rebranded as Lightsource BP. Just a couple of weeks before, BP also revealed an alliance with Brazil’s Copersucar, the world’s largest sugar processing company, to jointly own and operate an ethanol storage terminal in the South American country. The facility, which was previously wholly owned by Copersucar, possesses 10 tanks boasting a total storage capacity of 180 million liters of ethanol. Financial details of that deal were not disclosed. BP Biofuels already produces around 800 million liters of ethanol equivalent per year from three sugarcane mills it operates in Brazil, which also generate low-carbon power for the country’s national grid. Another division, BP Wind, has interests in onshore wind energy across the US with total gross generating capacity of 2.3 gigawatts. BP hung onto these renewables businesses despite making massive divestments in the wake of Macondo and more recently due to the low oil price environment.

The company “has been committed to advancing lower-carbon energy for over 20 years and we’re excited to be coming back to solar, but in a new and very different way. While our history in the solar industry was centered on manufacturing panels, Lightsource BP will instead grow value through developing and managing major solar projects around the world,” said BP Chief Executive Bob Dudley in a statement. Global installed solar generating capacity more than tripled in the past four years and grew by over 30% in 2016 alone, according to BP’s *Statistical Review of World Energy*. BP’s long-term energy outlook analysis sees solar as likely to generate around a third of the world’s total renewable power and up to 10% of total global power by 2035.

Since it was founded in 2010, Lighthouse has grown to become “Europe’s largest developer and operator of utility-scale solar projects,” according to the BP statement. The company has commissioned 1.3 GW of solar capacity to date and manages approximately 2 GW of capacity under long-term operations and maintenance contracts. Lightsource BP will target the growing demand for large-scale solar projects worldwide with a focus on grid-connected plants and corporate power purchase agreements signed with private companies. The company will continue to develop and deliver Lightsource’s 6 GW growth pipeline, which is largely focused in the US, India, Europe and the Middle East, “bringing Lightsource’s solar development and management expertise together with BP’s global scale, relationships and trading capabilities to drive further growth,” BP added.

Still, while Europe’s oil majors are investing more in renewable and alternative energy technologies, these outlays represent only a small fraction of their overall capital expenditures. The vast majority of their capex is focused on core oil and gas operations, where they still expect the highest financial returns to be generated for decades to come. Indeed the benefits of gas as a cleaner burning fuel than coal was one of the main points emphasized at a recent gathering in London of the Oil and Gas Climate Initiative, of which BP was a founding member.

Ronan Kavanagh, London

Could Big Oil Be Sued for Climate Change?

Questions of climate responsibility have mostly focused on countries, but are starting to turn to Big Oil companies. Climate science researchers have become increasingly confident in linking increasing global temperatures to more frequent extreme weather events — like the heatwave that engulfed Southern Europe, flooding in Asia and the devastating hurricanes that hit the US and Caribbean this year. This is raising questions about who should pay for climate damages, which could lead to litigation against oil companies in the future, similar to the lawsuits that previously hit Big Tobacco (NE Sep.21’17).

Speaking at a side event on this topic at last month’s annual UN climate talks in Bonn, Germany, Peter Frumhoff, chief climate scientist at the Union of Concerned Scientists, noted that strides were being made in extreme weather attribution science, making it easier to quantify the contribution of man-made greenhouse gases, which in his view, could strengthen the case of fossil fuel firms’ liability (NE Sep.14’17). Heatwaves like that which hit Europe this year are one such example, with scientists suggesting that climate change has increased the likelihood of such events fourfold. While experts can’t directly link climate change to the causation of the hurricanes that battered the Caribbean, US Gulf Coast and Florida this year, climate scientists suggest that the warmer seas and air caused by climate change have increased their intensity. For example, with Hurricane Harvey, climate modeling indicates that the probability of the extreme rainfall which accompanied the storm and caused so much damage had increased from something that might happen once in 100 years to once in 15 or 16 years, Frumhoff noted.

“There is a narrative out there that we are all responsible for climate change, but evidence now shows there are some that are more responsible than others, and that what we have had for 20 years is delay on action on climate change by a group of actors that have benefited from nonaction, with legitimate questions to answer in court,” Sophie Marjanac, a law and policy consultant with environmental law activists ClientEarth, told the Bonn side event. While initial attempts over the last 15 years at climate litigation against oil companies proved unsuccessful, partly because courts maintained it was the responsibility of politicians to act on this topic, recent backtracking on climate regulations by US President Donald Trump “means courts [there] are more likely to take action and find that this is an area they can make decisions,” Marjanac suggested (NE Sep.28’17).

Some cases are starting to emerge in the US, including by Californian coastal counties — two in San Francisco and one in San Diego — which are claiming that a proportion of the costs they must

spend to fortify or strengthen their physical infrastructure against sea level rise, including roads, sea-walls and drainage systems, should be paid by “carbon majors,” such as Big Oil companies. Another country where such litigation has advanced a little bit further is Germany, with Julia Grimm from NGO Germanwatch, pointing, during COP23, to a suit against power producer RWE being brought by a Peruvian farmer whose land faces a risk of flooding from glacial lake above his property. Although rejected by a lower German court last year, in November this year, a higher district court decided that RWE did have a case to answer related to its contribution to global emissions. Grimm said this could set a legal precedent, potentially opening the door for others to take similar cases to Germany in future.

Ronan Kavanagh, London

US Tax Reforms Neither Help Nor Harm Clean Energy

The US Congress approved a major tax overhaul on Wednesday that generally does no harm to clean energy, but doesn't help much either. Some early versions of the bill that emerged in the House of Representatives had sought to cut the value of tax credits for wind and solar and end tax credits for electric cars. In a victory for clean energy, the final bill — a compromise reached between a joint House-Senate conference committee and later passed by both chambers — left those credits fully intact. Yet the package does little to level the playing field between different low-carbon technologies as some clean energy advocates had hoped. President Donald Trump is one of the main champions of the reforms and his signature is a virtual guarantee.

Broadly speaking, the tax bill is viewed as positive for US businesses and the country's investment climate since it drastically lowers the federal corporate tax rate from 35% at present to 21%. Under current laws, the rate climbs as high as 39% when state taxes are included, although companies have

whittled down their tax bills considerably below 35%-39% by claiming numerous federal write-offs — many of which are set to remain in effect under the Republican tax deal. The 35% rate is the highest among developed economies and bipartisan support has been mounting in recent years for a lighter, simpler and more transparent approach to corporate taxation.

But the devil is in the details, and where clean energy is concerned, the package does little to address a lopsided suite of tax credits that are generous for some technologies but nonexistent for others (NE Nov.9'17).

Various credits for alternative vehicle fueling infrastructure, fuel-cell vehicles, small wind, combined heat and power, and biodiesel expired at the end of 2016 and

weren't renewed in the tax package, whereas credits for large wind, solar and electric cars have stayed intact in recent years (see table; NE Dec.24'15). Republican leaders have said these items could be addressed in an upcoming tax extenders or budget package. “Such an effort could come early in 2018, but we are cautious about Congress' appetite or bandwidth to wade directly back into another complex tax,” said Ben Salisbury, energy policy analyst at investment bank Briley FBR.

Meanwhile, the American Council on Renewable Energy (Acore) trade coalition said it is concerned that renewable energy companies could be harmed by a new provision in the compromise bill — called the Base Erosion Anti-Abuse Tax (Beat) — that cracks down on a corporate practice of sending money overseas to lower their US tax burden. The House-Senate tax deal includes some partial protections for renewable energy under the Beat measure but Acore says it is still evaluating the potential impacts.

Despite a growing push for carbon taxation as a way to pay for the tax package — which also included tax relief for households — such a move did not gain serious consideration in the Republican-led negotiations (NE Apr.27'17). Congress instead chose to seek out revenues in other ways, notably by opening up drilling access in a portion of Alaska's Arctic National Wildlife Refuge and requiring a sale from the Strategic Petroleum Reserve.

Lauren Craft, Washington

US Green Energy Tax Credits

Source	Amount	Type	Expiration*
Solar power	30%, will begin phasing down after 2021	Investments	2021
Wind power	2.3¢/kWh in 2016, began phasing down in 2017	Production	2016-19
Other renewables	2.3¢/kWh	Production	2017
Second-generation biofuels	\$1.01/gallon	Production	2017
Biodiesel	\$1/gallon	Production	2016
Alternative refueling units	30%	Investments	2016
Fuel-cell vehicles	\$4,000-\$40,000	New car purchases	2016

Select green energy tax credits and their current expiration dates, which are left unaltered in the recent House-Senate tax deal. *Expiration dates are the end of year listed, e.g. 2016 = through Dec. 31, 2016. Source: US Congress

European Power Price Differentials

(\$/MWh)*	Spot Price
Germany (EEX)	31.56
France (Powernext)	84.13
Scandinavia (Norspool)	24.74
UK (APX)	81.55

*Dec. 12 wholesale price snapshot
Source: Exchanges

Interconnectors Key to Boosting EU Renewables

EU member states are considering scrapping a one-size-fits-all numerical target for how much electricity interconnector capacity they must build by 2030, over concerns that a rigid target isn't the right policy tool to meet the differing interconnector needs of individual countries. Back in 2002, when an original target of the equivalent of 10% of installed capacity by 2020 was adopted, coal and gas dominated the EU electricity mix. This interconnector goal was increased last year to 15% by 2030, after years of haggling, but industry experts say a more flexible approach is needed as renewables dislodge once-dominant large centralized power stations (WGI Mar.4'15; NE Oct.30'14). Renewables now account for 27.5% of the EU electricity mix, up from 2% in 2002, and member states acknowledge that interconnectors are integral if the EU is to meet long-term energy and climate objectives and the goal of a truly integrated European energy market, as they promote electricity trade and improve security of supply, while facilitating the integration of the rapidly growing share of renewable-generation electricity in the EU mix — yet many countries are set to miss the 2020 targets.

Opening up cross-border trade routes for renewable output is key to unlocking the true potential for the low-carbon energy transition — examples include exporting hydropower and geothermal power from Nordic countries, offshore wind off Northwest Europe, or onshore wind and solar photovoltaics from the Iberian Peninsula to demand hotspots (NE Feb.26'15). Interconnectors, depending on geographical location, often rely on “structural price differences, which creates the economic foundation for sound investments (NE Apr.2'15). This cannot necessarily be expressed in national interconnector targets,” Auke Lont, CEO of Norwegian transmission system operator Statnett, told *EI New Energy*.

An official from Estonia, which currently holds the EU's rotating presidency, stressed to *EI New Energy* that interconnector targets weren't on the agenda of energy ministers meeting earlier this week, nonetheless, the topic was discussed in between sessions, according to media reports. Last month, infrastructure energy experts published a report on behalf of the European Commission outlining fresh criteria which should replace existing rigid targets, suggesting a better way to assess the individual interconnector capacity needs of each member state. Christophe Gence-Creux, a member of the expert group and head of electricity at the Agency for the Cooperation of Energy Regulators, told *EI New Energy* that “one important message of the report is that a one-size-fits-all threshold does not make sense.”

The European Commission notes that electricity from renewables could reach 50% of EU supply by 2030, or higher if costs continue to decline and other sectors of the economy electrify, such as transport, heating and cooling. The EU “expert group” found the 2020 and 2030 targets had merit, but need to adapt to remain relevant. “Whilst recognizing there is no scientific consensus to measure the ‘interconnectivity’ of member states with diverse characteristics using a single formula, the expert group considers the 2030 interconnection target an important and useful policy tool to guide the development of trans-European electricity infrastructure,” its report states. “Interconnections are indeed necessary to further support renewables growth and trade. However, the need is not evenly spread across the EU,” expert group member Antonella Battaglini told *EI New Energy*, adding “the greatest need is at the peripheries, where geography intensifies physical bottlenecks.” Battaglini argues a flat target “will probably not be sufficient to address the challenges of countries like Spain, Portugal or Cyprus.”

The expert panel has recommended three main criteria to replace the existing rigid targets, with new interconnectors considered advantageous if at least one of three criteria are met: Firstly, interconnectors should minimize price differentials. The expert group recommends anything above €2 per megawatt hour (\$2.35/MWh) between relevant countries, regions or bidding zones as the indicative threshold to consider developing additional interconnectors; Next, member states should make sure that electricity demand, including through imports, can be met in all conditions. “In countries where the nominal transmission capacity of interconnectors is below 30% of their peak load, options for further interconnectors should be urgently investigated”, the report states; And lastly, there should not be any bottlenecks in terms of flowing excess renewable electricity around the EU. “In countries where the nominal transmission capacity of interconnectors is below 30% of their renewable installed generation capacity options for further interconnectors should urgently be investigated,” the expert group report noted. However, not all interested parties are in favor of scrapping the rigid targets. “We support the interconnector target and removing it would be a retrograde step,” lobby group SolarPower Europe told *EI New Energy*.

Jay Eden, London

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IN BRIEF

IEA Points to Coal Woes

Despite an expected rebound in 2017 led by China, India and the US, global coal demand will remain flat between now and 2022, resulting in a full decade of stagnation, the International Energy Agency (IEA) found in its new annual coal market report. Coal consumption will markedly decline in most OECD countries including the US, and more slowly in China, the IEA predicts. Meanwhile, growth is expected in India, Southeast Asia and a few other Asian countries such as Pakistan and Bangladesh. The IEA calls for “urgent action” to support carbon capture, utilization and storage (CCUS) technologies which, despite “real progress” made recently “still lags far behind” other low-carbon technologies. “CCUS can work but progress is very slow,” said the IEA’s director for energy markets and security Keisuke Sadamori. “Governments and companies need to step up their policy support and investments in that sector in order to meet global climate goals,” he insisted.

Dutch Offshore Wind Tender First
 Swedish utility Vattenfall has decided to tender for offshore projects in the Netherlands which are subsidy-free. The site, Hollandse Kust Zuid in the Dutch part of the North Sea, has exceptional wind conditions and is close enough for Vattenfall to use existing infrastructure at its nearby operational wind farm Egmond aan Zee. Vattenfall says the Dutch tender is the “first nonsubsidized tender in the world.” The deal does however include grid connection. If the wind farm gets built, the Netherlands will join Germany as the only countries where some offshore wind farms have been built without subsidies. Offshore wind is making traditional newbuild fossil fuel generation, alongside new nuclear, look very expensive and outdated as the world strives to combat climate change

and reduce pollution from coal- and gas-fired power stations. However, subsidy-free renewables bring their own set of challenges (NE Dec.14’17).

New US Clean Power Plan Sought

The US Environmental Protection Agency (EPA) has signaled that it will work up a more industry-friendly version of the Clean Power Plan (CPP), an Obama-era policy cracking down on carbon emissions in the electricity sector. In a regulatory schedule for 2018 published last week, the EPA said it will “solicit information on systems of emission reduction and provide notice of the agency’s interest in developing a rule similarly intended to reduce carbon dioxide emissions from existing fossil-fueled electric utility generating units.” That a process that could take up to two years, which some observers saying could be a delaying tactic to prevent any version of a CPP from going into force — or to allow more time for legal conflicts to be resolved. Previously, the Trump administration had planned to repeal the CPP outright, but some industry officials warned that would create more legal risk or make it easier for a future administration to adopt stricter rules (NE Sep.28’17).

Highest Biojet Blend Tested

Jet engine manufacturer GE Aviation has begun testing 100% renewable alcohol-to-jet fuel (ATJ) under US government-sponsored efforts to increase the proportion of alternative fuels used in commercial and military blends. ATJ producer Gevo, whose fuel is being tested, says its ATJ has the potential to improve performance by providing greater energy density — which translates into better mileage. The work is being done as part of the Federal Aviation Authority’s (FAA) efforts to accelerate the development of new aircraft and engine technologies, and to advance sustainable

alternative jet fuels, in conjunction with aviation industry stakeholders. “Efforts such as this one are expected to help accelerate the transition from petroleum-based fuels to more environmentally friendly ones,” Gurhan Andac, GE Aviation’s engineering leader for aviation fuels and additives, said in a statement (NE Dec.7’17).

China Targets Gas for Heating

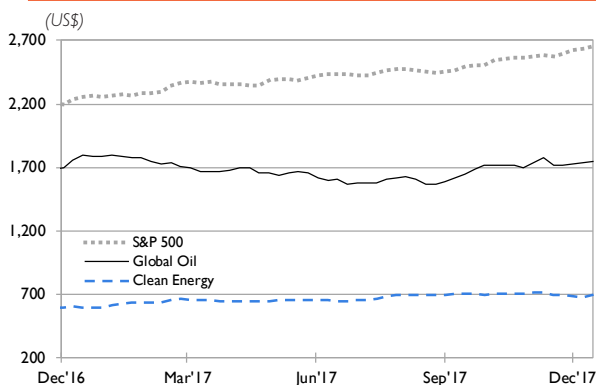
China has announced ambitious plans to switch more households in the country’s north to cleaner-burning natural gas from polluting coal by 2021 to heat their homes. Beijing is moving ahead with the plans even as the country is suffering its worst-ever natural gas supply shortage due to its aggressive coal-to-gas-switching policy that has forced many coal users to turn to gas-burning facilities (NE Dec.14’17). Under the plan, China’s central government is looking to boost gas imports to meet rising demand and has ordered a speeding up of construction of the eastern route of the Russia-China Gas Line and the building of LNG receiving terminals, as well as more gas storage.

EDF and Schneider Go Green

France’s EDF will convert its vehicle fleet to 100% electric by 2030 as part of the EV100 initiative, the utility announced last week during President Emmanuel Macron’s climate summit (NE Dec.14’17). The EV100 initiative aimed at “making electric transport the new normal,” was launched in September during the Climate Week NYC summit in New York. Other signatories include Deutsche Post DHL, utilities PG&E and Vattenfall, London’s Heathrow airport, HP, Ikea, Metro AG and Unilever. Meanwhile another French company, Schneider Electric, announced it will use 100% renewable electricity by 2030, under a similar RE100 initiative.

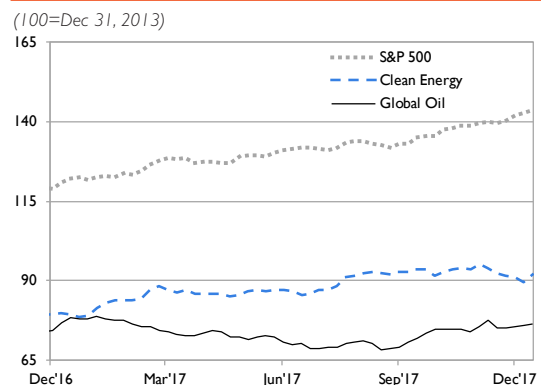
CLEAN ENERGY EQUITY MARKETS

Energy Equity Index Values



Source: Standard & Poor's

Energy Equity Class Performance



Source: Standard & Poor's

EI NEW ENERGY DATA

Energy Futures: Reference Prices

Carbon (€/ton)	Dec 19	Dec 12	Chg.
ECX EUA	7.50	7.14	+0.36
ECX CER	0.17	0.17	0.00
Crude oil (\$/bbl)			
Nymex light, sweet	57.56	57.14	+0.42
ICE Brent	63.80	63.34	+0.46
Natural gas (\$/MMBtu)			
Nymex Henry Hub	2.69	2.68	+0.01
ICE UK NBP	7.89	8.83	-0.94
Coal (\$/ton)			
Nymex Eastern Rail CSX*	64.85	64.85	0.00
ICE Rotterdam	94.85	95.30	-0.45

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

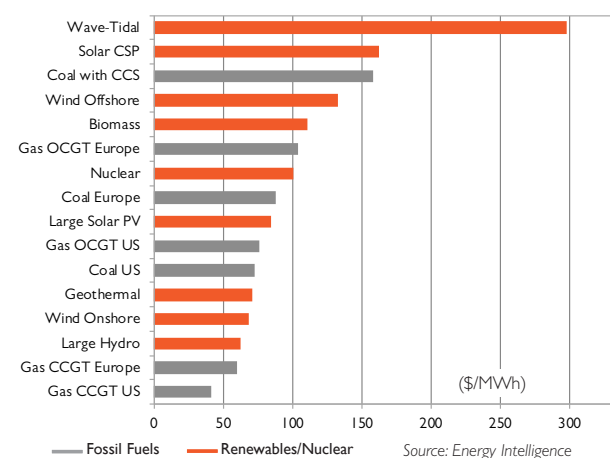
DATA: The complete set of *EI New Energy* data is available to web subscribers, including full levelized cost of energy (LCOE) calculations, fuel switching thresholds, electricity production by sector; ethanol and biodiesel fundamentals, carbon prices, methodologies and reader's guides. Historical data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

Global Carbon Prices

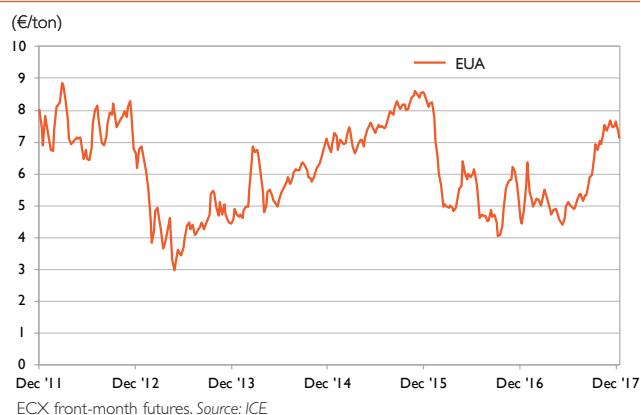
Europe (€/ton)	Dec 19	Dec 12	Chg.
EUA Dec '18	7.54	7.17	+0.37
US (\$/ton)			
CCA (Calif.) Dec '18	15.50	15.40	+0.10
RGGI (Northeast) Dec '18*	4.02	4.00	+0.02
New Zealand (NZ\$/ton)			
NZU (spot)	20.70	20.75	-0.05
Asia (\$/ton)	Dec 15	Dec 8	Chg.
China-Guangdong	2.08	2.07	+0.01
South Korea	20.04	20.61	-0.57

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

Newbuild Power Generation Costs



EU Carbon Futures Prices



Global Electricity Prices

Europe (\$/MWh)	Dec 19	Dec 12	Chg.
Germany (EEX)	73.19	31.56	+41.63
France (Powernext)	79.74	84.13	-4.39
Scandinavia (Nordpool)	38.68	34.74	+3.94
UK (APX)	75.88	76.43	-0.55
Italy (GME)	92.05	130.30	-38.25
Spain (Omel)	78.64	81.64	-3.00
North America			
New England	71.25	57.00	+14.25
Texas (Ercot)	19.40	17.86	+1.54
US Mid-Atlantic (PJM West)	27.32	39.97	-12.66
US Southwest (Palo Verde)	26.75	25.38	+1.38
Canada (Ontario)	3.82	8.72	-4.90
Other			
Australia (NSW)	75.54	65.98	+9.56
Brazil (SE-CW)	84.14	65.29	+18.85
India (IEX)	49.93	52.32	-2.39
Japan (JPEX)	114.80	112.37	+2.43
Russia (ATS)	19.97	19.67	+0.30
Singapore (USEP)	66.36	63.79	+2.57

Wholesale prices. Source: Exchanges

Key Biofuel Prices

US (\$/gallon)	Dec 19	Dec 12	Chg.
Futures			
CBOT Ethanol	1.2660	1.3030	-0.0370
RBOB Gasoline	1.6966	1.6976	-0.0010
Spot market			
Ethanol Midcont.	1.20	1.30	-0.10
Ethanol NY Harbor	1.40	1.39	+0.01
Ethanol US Gulf	1.38	1.37	+0.01
Europe (\$/ton)			
Futures			
ICE Gasoil	569.00	571.75	-2.75
Spot market			
Gasoline	593.00	611.00	-18.00
Diesel	571.00	571.50	-0.50
Biodiesel			
Fame 0	960.00	960.00	0.00
RME	785.00	785.00	0.00
SME	700.00	695.00	+5.00
PME	750.00	750.00	0.00

Source: Thomson Reuters, Exchanges

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