

Natural Resources PC

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Climate Change, ETS, Green Finance [M2013-17]

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References available upon request

Oct 23-30 '18

EU

Norton Rose 10-23 Oct '18

1. *Projects of Common Interest* – Oct 15 the EC opened a call for electricity projects to be submitted as candidates for the 4th EU 'Projects of Common Interest' [PCIs] list. Calls for PCI candidates in the priority corridors for gas, smart grids, cross-border CO₂ network, and oil will follow.
2. *Poland/ Energy infrastructure* – Oct 17 the EC announced that EUR 51 million from the European Regional Development Fund will support the construction of a gas pipeline between the towns of Tworóg and Tworzeń in the Śląskie region. The pipeline is part of the North-South Gas Corridor, a project of common interest for Trans-European Energy Infrastructure.
3. *Floating wind farm in Portugal* - Oct 19 it was announced the EIB will grant a EUR 60 million loan to the Portuguese company Windplus. The loan, which is supported by the EC under the Horizon 2020 research and innovation programme, will serve to install a first-of-its-kind offshore floating wind farm.

Time is up for Poland's coal, diversified and cleaner energy mix is on the go, Renewables Now, Oct 23 '18

Poland is running out of coal and, as extraction cannot cope with demand, the country is already importing some from Russia. In the past, building the Polish economy around coal might have made sense, but now Poland is facing a different future. According to data by Warsaw-based think tank Forum Energii, hard coal accounted for 47.7% of Poland's power generation and the share of lignite was 30.7% in 2017.

Time is up for Poland's coal, diversified/cleaner energy on the go,

China's powerful energy efficiency policies, p7

Green Climate Fund to support climate action projects with USD 1bn, p9

Pessimism as IMO pushes for reduced GHG emissions, p10

Electrification of UK railways sees CO₂ emissions fall, p13

Science can succeed on climate change where politics fails, p15

Joanna Pandera, head of Forum Energii, recently told journalists in Warsaw that the over 50 TWh of power generation from lignite would disappear around 2030 as the existing lignite mines in the country would be depleted in about 10 years. Which sources would fill the gap left by lignite is one of the many questions that the new energy policy, to be presented in the coming weeks, needs to answer.

EC OK's EUR-200m renewables support scheme for French self-suppliers, Renewables Now, Oct 23 '18

The EC on Monday gave the green light to France to support a EUR-200-million [USD 230m] scheme that aims to encourage the production of renewable electricity for self-consumption until 2020.

France is allocating the above-mentioned sum for the deployment of 490 MW of additional generation capacity, specifically for companies and individuals looking to install small systems of 100 kW to 500 kW for their own use. The selected projects will get support in the form of a 10-year premium on top of the market price. The beneficiaries will be chosen through tenders organised until 2020.

The EC said in a statement that the measure will further the EU's energy and climate goals without unduly distorting competition in France. There will be no overcompensation for the beneficiaries of the public support, it has determined.

EBRD receives GCF support to help cities in four SEE countries fight climate change, IENE Energy Weekly No 139, Oct 24 '18

The European Bank for Reconstruction and Development [EBRD] said it has received an 87 million euro [\$100.2 million] contribution approved by the Green Climate Fund's [GCF] board to help cities in nine countries, including four countries in Southeast Europe [SEE], address climate change. The GCF contribution is the first tranche towards the total of 228 million euro requested by EBRD.

The funding will support the EBRD's green cities facility for climate-focused sustainable urban development in Albania, FYROM, Serbia and Moldova, as well as in Armenia, Georgia, Jordan, Mongolia and Tunisia, the EBRD said in a press release on October 19. The GCF support will complement EBRD's financing through concessional lending, investment grants and support for technical assistance to cities in the nine target countries," the statement noted, adding that the initiative is part of the EBRD green cities framework that builds on the Bank's two decades of experience in investing in municipal and environmental infrastructure...The full facility will benefit an estimated 23 million people and lead to almost 12 million mt of CO₂ savings" the lender added.

Enel starts construction of 127 MW solar plants in Spain, Oct 24 '18

Spanish Endesa's renewable company Enel Green Power Espana started construction of three solar plants for an overall capacity of 126.6 MW in SW Spain, according to a statement released by Italy's Enel Group.

Located in the municipality of Logrosan, near Caceres, the Baylio, Dehesa de los Guadalupes and Furatena plants will involve a total investment of approximately €100 million, and each will have an installed capacity of over 42.2 MW, said Enel, which owns 70.1 pct of Endesa. According to the statement, the plants represent the company's first solar plants in the Extremadura region, which will be comprised of around 372,000 photovoltaic modules.

<https://www.aa.com.tr/en/energy/news-from-companies/enel-starts-construction-of-127-mw-solar-plants-in-spain-/22050>

Greek power utility PPC to make savings after government scraps RES-fundibg lignite charge, IENE Energy Weekly No 139M, Oct 24 '18

Greek utility Public Power Corp. [PPC], which is struggling with unpaid bills, will benefit from a government decision to scrap a "lignite related" which was used until recently charge to fund renewable energy, the country's energy minister said. George Stathakis told the semi-state Athens News Agency on October 22 that the government planned to introduce legislation soon to scrap the charge and that PPC, the country's biggest power utility, would make savings of at least 250 million euros [\$287 million] over the next two years. The utility is struggling to collect about 2.4 billion euros in unpaid bills and is selling part of its coal-fired capacity to open the market up to competition under EC pressure. The lignite charge was introduced a few years ago to fund renewable energy projects

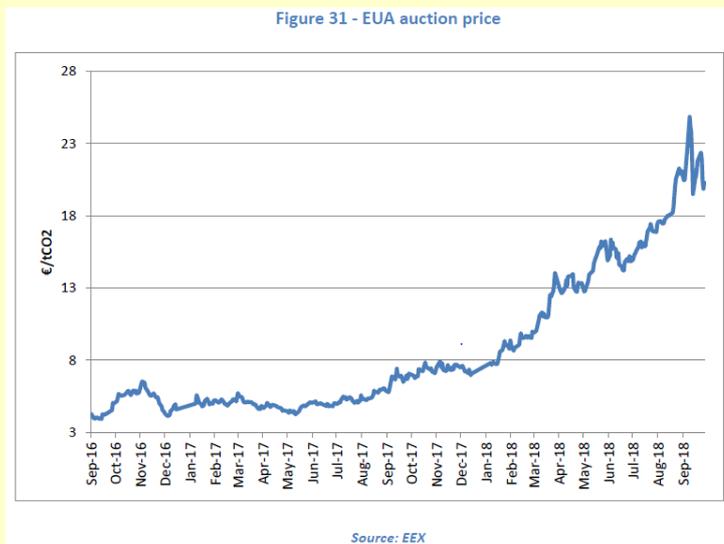
UK outlines carbon tax replacement for EU ETS under 'no deal' Brexit, Oct 29 '18

The UK plans to replace its participation in the EU ETS with a £16/mt [€18, \$20.50] domestic carbon tax under a 'no deal' Brexit scenario, charging it on top of its existing Carbon Price Support emissions levy, the government announced during its autumn budget on Monday. *<http://carbon-pulse.com/62039/>*

Carbon plunges 9% to 3-month low as bears take reins, Oct 29 '18

European carbon prices continued to plummet on Monday, crashing below more technical support levels to a three-month low below €17. *<http://carbon-pulse.com/62066/>*

Market Fundamentals No 270 [September-October 2018], Oct 29 '18



EU Transaction Log – Hungary

EU Transaction Log presents details of emission rights for all facilities participating in the EU ETS includes data for all countries and for all years from the start of the ETS]. The table below presents some Hungarian names, allowances and status for the Phase 3 [2013-2020] period for 2018.

Installation Name	Allowance Allocation *	Status
ALFEN Almásfüzítői Energetikai és Szolgáltató Kft.	0	Closed
DAM 2004 Acél- és Hengermu Ker. és Szolg. Kft.		Closed
Duna-Dráva Cement Kft. Váci Cementgyár	529387	Open
Duna-Dráva Cement Kft. Beremendi Cementgyár	503771	Open
Holcim Hun. Cementipari Rt. Lábatlani Cementgyár	0	Closed
Holcim Hun. Cementipari Rt.	0	Closed
Királyegyházi Cementgyár	496304	Open
Veolia Energia Magyarország Zrt. gázmotoros erőműv	3180	Open
EVONIK Agroferm Zrt. Energiaellátás	16736	Open
DUNAFIN Papírgyár	38556	Open
Higi Papír	7173	Open

*in current ETS period before last 30 April

USA

Tesla, United Power partner on largest battery, Oct 19 '18

United Power officials hope the largest lithium ion battery in Colorado — being installed now just east of Longmont — will pay big benefits to both company and household bottom lines, as well as help it harness renewable energy in a reliable and dependable manner. If it does, it could serve as a model for other

providers looking to increase the power they generate from non-fossil fuel sources.

The battery when it is brought onto the grid early next month could save United Power as much as \$1 million annually by storing energy that would otherwise go waste.

http://www.broomfielddenterprise.com/broomfield-news/ci_32218482/tesla-united-power-partner-largest-battery%20%C2%A0

US govt pays out US\$133.5m for military base’s solar-storage-gas resiliency measures, Oct 24 ‘18

‘Energy resilient infrastructure upgrades’ planned for a US military facility will involve the deployment of 20MW of solar PV, 4MW / 8MWh of battery storage and 4MW of gas-fired backup generation in a project worth US\$133.5 million.

As has been seen in several such projects recently, the US government’s Energy Savings Performance Contract [ESPC] provided upfront capital for the installation, for which the contract for delivery has been awarded to energy efficiency specialist company Ameresco.

The ESPC lends money to Federal agencies for energy efficiency projects that guarantee savings on energy costs, which are then used to pay back the loaned amount over time. Energy-Storage.news has reported on a few recent projects funded in this way, including the February announcement of a US\$40 million solar-plus-storage microgrid project at US Army Garrison Kwajalein in the Pacific’s Marshall Islands, followed by the August announcement of a 4.25MW / 8.5MWh battery energy storage system [BESS] to be supplied by Lockheed Martin at US Army Fort Carson in Colorado.

<https://www.energy-storage.news/news/us-govt-pays-out-us133.5m-for-military-bases-solar-storage-gas-resiliency-m>

American LNG to meet Europe’s future gas needs; IENE Energy Weekly No 139, Oct 25 ‘18

That the Nord Stream 2 pipeline will increase Europe’s dependence on Russian natural gas is a geographic and arithmetical fact, noted Financial Times in their latest Commodities Note. But buried in the heated rhetoric — now rising to US sanction threats — over how much that matters, is just how inexpensive it would be for Europe to purchase supply diversity with liquefied natural gas from the US.

Of course, gas-by-ship costs more than gas-by-pipe. But at today’s prices and the spread between gas from Russia’s Gazprom and US LNG, the EU’s total annual energy import bill would rise by less than 5 pct — or around \$20 per head of population annually — by purchasing a volume of US gas equal to both

the existing Nord Stream 1 and the planned second pipeline. Critically, Europe would also need to spend nothing to build LNG import terminals because the two-dozen that exist already are running, collectively, at barely one-fourth capacity.

World Energy to complete conversion of California petroleum refinery to renewable fuels; \$350M investment, 306M gallons per year, Oct 25 ‘18

World Energy announced a \$350-million investment over the next two years to complete the conversion of its Paramount, California facility into one of the cleanest fuel refineries in the world. The project will enable World Energy Paramount to process 306 million gallons annually. The conversion to renewable jet, diesel, gasoline and propane will reduce both refinery and fuel emissions while supporting more than 100 jobs.

<https://www.greencarcongress.com/2018/10/20181025-worldenergy.html>

Virginia board gives nod to revised cap-and-trade regulation, Oct 29 ‘18

A Virginia state board voted Monday to advance the Department of Environmental Quality’s [DEQ] revised carbon market regulation, an official said, marking an interim step towards approving the programme that would link with RGGI and begin in 2020. *<http://carbon-pulse.com/62045/>*

China

Trump-led trade war with China: energy dominance self-destructed? Sept 24 ‘18

Under particular US legal rationale, such as calling foreign imports a “national security threat”, President Donald Trump has started imposing tariffs and/or quotas and has launched national security investigations on a growing number of imported goods from US allies and others alike.

In March and June 2018, the US imposed tariffs or quotas on steel and aluminium on all trading partners, but Australia. In July and August 2018, the US began imposing tariffs on \$50 billion in Chinese industrial goods on the ground of unfair trade practices. As China has retaliated with tit-for-tat measures, President Trump has imposed tariffs on \$200 billion in Chinese goods from 24 September 2018 onwards, and in an unprecedented escalation of his trade war with China, he has also threatened to impose tariffs on an additional \$267 billion in Chinese goods. If eventually carried out, Trump’s latest threat could result in tariffs on all Chinese goods entering the US. China has retaliated and imposed tariffs on \$60 billion in US goods, including a 10% duty on LNG.

For the time being, trade tensions have had a limited impact on the energy market. But the new round of US tariffs and retaliation measures by China suggest that this is going to change.

The potential impact of the trade battles on the energy market is fourfold:

For oil and energy demand as the latest tariffs announced by President Trump could derail the global economy upswing and translate, in the medium term, into lower global crude oil and energy demand growth and thus exert downward pressure on prices.

An immediate impact through China's retaliatory measures targeting US energy products. Energy was not included in the first round of China's retaliatory measures. But in the second round [23 August 2018], China has started to impose tariffs on US energy products, although the selected products [e. g. coal] target key Trump supporters and should have limited impact on the global commodity markets. US crude oil, which was included in the initial list of products to be taxed from 23 August, has been removed from the list. However, China may have spared US crude oil for now to hit the fuel if tensions escalate. Chinese buyers of US energy commodities have already started to reconfigure purchases to avoid the tariffs, even for crude oil and LNG that were not subject to tariffs. The anticipation of tariffs on US crude has already impacted import volumes and trade flows with a sharp reduction in China's imports of US crude since July. China became the largest oil importing country in the world in 2017, but its imports from the US accounted for only a tiny share of its oil imports.

<https://www.ifri.org/en/publications/etudes-de-lifri/trump-led-trade-war-china-energy-dominance-self-destructed>

The power of China's energy efficiency policies, Sept '18

In just a few years, China has gained the status of an energy efficiency champion.--From 2010 to 2015, while China's GDP grew at a rate of 7.8%/yr on average, the energy intensity fell by 18.2% [exceeding the national goal of a -16% reduction] and dropped from 0.617 to 0.505 Million mt of oil equivalent [Mtoe] per unit of GDP [at 2010 constant price]. Such impressive results have led the International Energy Agency [IEA] to call China a "global efficiency heavyweight".

Over the past decades, energy efficiency in China has gained unique political momentum and has become a central part of the local political landscape. Energy efficiency was first included in the five-year plans, in the mid-2000s. It was a first sign of China's acceleration towards greener policies. In addition, energy efficiency has played a role in number of key Chinese economic policies: the market liberalisation and privatisations of the 1990s, the quest for energy security, economic development, the fight against climate change, and to a lesser extent the fight against pollution and the trade war with the US. It is also an important element of China's industrial policy, as industry consumes well over half of the 1,924 Mtoe of the country's overall energy used, according to

the IEA. This compares with an average of 20% in the rest of the world. Finally, energy efficiency has even managed to become a component of China's development diplomacy, as Beijing exports its expertise to developing countries as part of its aid [even if the country may also be using large infrastructure projects abroad to export its production overcapacities].

Various factors can explain all these successes:

- Very strong leadership: targets being defined at the highest level through complex consultation processes and then set as national priorities, with strong pressure on local officials to meet these targets;
- Clear objectives: Five-year plans include clear quantitative targets, to be met at a certain date;
- Adaptability: the national targets are adapted at the local level, taking into consideration local characteristics;
- A dynamic market for energy service companies, with 5,800 companies operating in 2016 with energy performance contracts worth of 15 billion USD;
- A progressive shift of the economic structure towards the service sector and less energy intensive industries.

<https://www.ifri.org/en/publications/etudes-de-lifri/power-chinas-energy-efficiency-policies>

Xi Jinping's institutional reforms: environment over energy? Oct 2 '18

During its two sessions in March 2018, the National People's Congress announced China's most important institutional reforms in the last 30 years. These changes occurred right after Xi Jinping consolidated his power and at a time when stakeholders working in the energy field were expecting more clarity on policy orientations.

Though reforms are in line with those initiated since the 2000s, the energy sector is likely to be deeply affected by the new institutional setting, which reflects China's energy policy path with a strong emphasis towards low-carbon technologies and a rise in importance of environmental issues, alongside Xi's institutional modernization through greater centralization and control. Nevertheless, it is too early though to judge whether this will effectively impact the balance of power with the fossil fuel related institutions and policies.

The day Environment became more important than energy: The environment sector is at the core of the reforms, which probably reflects the will to put environmental protection ahead of energy issues. The latest reforms established a Ministry of Ecology and Environment [MEE] which gathers climate and environment responsibilities, that used to be spread between a number of bodies. Unveiled in April, the MEE is now in charge of managing most environmental issues, and theoretically able to draft and empower regulations. In addition, it now represents China in international climate negotiations. In order to manage these new duties, MEE staff increased from 300 to 500.

<https://www.ifri.org/en/publications/editoriaux-de-lifri/edito-energie/xi-jinpings-institutional-reforms-environment-over>

Industrial Bank's outstanding green finance loans exceed 800 bln yuan, Oct 28 '18

The Industrial Bank [IB] had seen its outstanding loans of green finance reach over 800 billion yuan [about 115 billion USD] by the end of September. More than 16,000 enterprises had received over 1.6 trillion yuan of green finance from the bank by the end of last month, said IB's president Tao Yiping. Tao said the bank aims to have over 10,000 clients of green finance services by 2020, with outstanding loans exceeding one trillion yuan.

http://www.xinhuanet.com/english/2018-10/28/c_137564459.htm

Electric vehicles: Made-in-China Tesla is on its way, RWR, Oct 29 '18

In mid-October, Tesla successfully acquired 865k m² of land in Lingang, near Shanghai's free-trade zone for RMB 973M [US\$140M]. The land will be used for its new Gigafactory 3, which will be Tesla's first in China. The factory is planned to have initial capacity of 250k electric vehicles [EVs] and battery packs per year and will eventually target an annual capacity of 500k EVs. Tesla's first made-in-China vehicles are expected to come to the market in about three years.

Roskill view: As a result of the China-US trade war, tariffs on vehicle imports from the US increased to 40%, which then prompted Tesla to increase prices in China. The price adjustments have caused some negative impacts on sales volumes in China. On the other hand, the new tariffs are likely to have accelerated investment in Tesla's Shanghai factory.

Largely standardised policies have turned China into an important market for many large, foreign carmakers. In particular, China has removed foreign ownership restrictions for EVs from July 2018, and jv restrictions for foreign automakers will be phased out by 2022.

Elsewhere in the World

Green Climate Fund to support climate action projects with USD 1bn, Oct 22'18, Oct 21 '18

The 21st meeting of the Green Climate Fund [GCF] Board ended today in Bahrain, approving over one billion dollars of new projects and programmes to support climate action in developing countries, and formally launching the Fund's first replenishment.

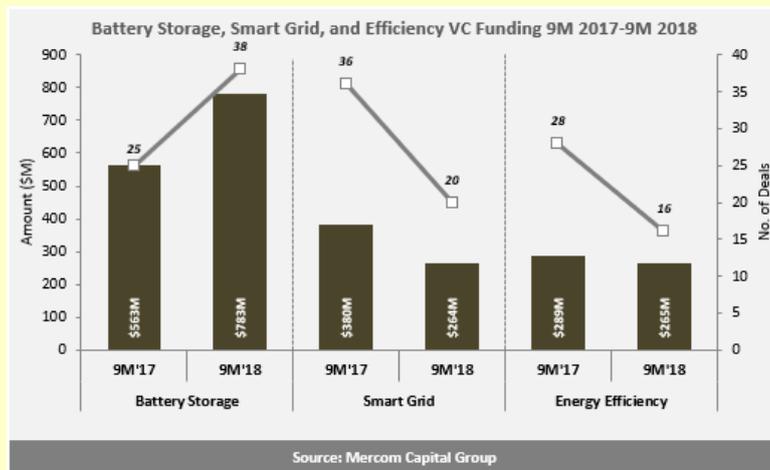
The 19 new projects amount to a total investment from GCF of USD 1,038 million, and including co-financing the projects will channel over USD 4,244 million of climate finance for low-emission, climate-resilient development. GCF now has a portfolio of 93 projects amounting to over USD 4,605 million of GCF resources.

<https://www.greenclimate.fund/-/green-climate-fund-invests-usd-1-billion-for-developing-country-climate-action-launches-first-replenishment>

Mercom: battery storage, smart grid, and efficiency companies raised \$1.3B+ in VC funding in 9M 2018, Oct 23 ‘18

Global VC funding [venture capital, private equity, and corporate venture capital] for Battery Storage, Smart Grid, and Efficiency companies in the first 9 months [9M] of 2018 was 8% higher at more than \$1.3 billion compared to the \$1.2 billion raised in 9M 2017, according to the latest Mercom Capital Group report on funding and mergers and acquisitions [M&A] activity for these sectors.

Total corporate funding [including venture capital funding, public market, and debt financing] in 9M 2018 was down with \$3.3 billion raised compared to \$3.7 billion raised in 9M 2017, an 11% decrease year-over-year [YoY]. The decline was due to lower funding activity in the Smart Grid and Efficiency categories as funding increased in Battery Storage.



<https://www.greencarcongress.com/2018/10/20181023-mercom.html>

Pessimism in the air as IMO pushes for reduced GHG emissions, IENE Energy Weekly No 139M, Oct 24 ‘18

The momentum behind efforts to curtail shipping’s GHG emissions appears to have come to a standstill, insiders have said as the IMO Maritime Environment Protection Committee [MEPC 73] meets in London this week. Environmental lobbyists had hoped that plans to reduce GHG emissions by 2023 would begin in

earnest now. IMO secretary general Kitack Lim said MEPC had approved a programme of follow-up action to the initial strategy agreed in April. “The programme sets a clear signal on how to further progress the matter of reduction of GHG emissions from ships up to 2023,” said Mr Lim. “I am convinced, in redoubling your efforts and with support from working arrangements, you’ll be able to deliver and accelerate the pace of actions and tackle this immense, global challenge.” However, according to a Loadstar source at MEPC, Brazil, Saudi Arabia and the US have renewed efforts to quash attempts to reduce emissions on an industry-wide level ahead of 2023.

“Going into the talks that began last week, ahead of MEPC, there had been expectations on getting the general strategy goals set out in April down into concrete steps,” the source told The Loadstar. “However, after a week of discussions the document drafted does not discuss any of the measures in specific detail, nor was there any talk on setting a date for when these would be discussed.” In April, the IMO’s adoption of an initial strategy stated that by 2023 it would implement measures to cut 2008 levels of GHG emissions [GHGs] by at least 50% by 2050. The source suggested that the wording of the initial strategy had caused a division among IMO members, with one side interpreting it to mean they did not need to act until 2023. “This has resulted in a great deal of pessimism among those members that believe in climate change and want to take immediate action to address shipping’s impact,” the source continued. “For those climate change deniers, this ambiguity within the initial strategy has created a great deal of happiness.” April’s initial strategy refers to a range of candidate short-, mid- and long-term measures to be considered by IMO. Short-term measures could be finalised and agreed between 2018 and 2023; mid-term measures, between 2023 and 2030; and long-term measures, beyond 2030.

Argentina

300 MW of RenovAr solar power contracts signed, Renewables Now, Oct 23 ‘18

Argentina has signed contracts with three of the solar power projects that were selected in round 2 of the RenovAr renewable energy auction programme. The La Pirka, Ullum X and Verano Capital Solar One photovoltaic [PV] projects, each with an installed capacity of 100 MW, have signed their power purchase agreements [PPAs], developer - Verano Capital, announced last week.

Australia

ARENA commissions 30-MW energy storage system in Victoria, Renewables Now, Oct 23 ‘18

The Australian Renewable Energy Agency [ARENA] has officially commissioned today a 30-MW/30-MWh grid scale battery storage system in

Victoria state. The Ballarat Battery Energy Storage System [BESS], currently in the final testing phase, is the first facility of its kind in the state. Owned by AusNet Services and operated by EnergyAustralia, the facility is capable of powering more than 20,000 homes for an hour of critical peak demand before being recharged. It is located at AusNet Services' Ballarat terminal substation.

Canada

Ontario replacement climate plan coming in November –minister, Oct 29 '18

The Ontario government's emissions reduction plan to replace its cancelled cap-and-trade programme is due next month, the province's environment minister said Monday, with lawmakers considering approaches such as Australia's reverse auction format. <http://carbon-pulse.com/62065/>

Japan

Hydrogen strategy and its economic and geopolitical implications, Oct 8 '18

With the Basic Hydrogen Strategy released Dec 26 '17, Japan reiterated its commitment to pioneer the world's first "Hydrogen Society". The Strategy primarily aims to achieve the cost parity of hydrogen with competing fuels, such as gasoline in transport and LNG in power generation.

The retail price of hydrogen is currently around 100 yen/Nm³ [90 USD cents/Nm³] and the target is to reduce it to 30 yen/Nm³ by 2030 and to 20 yen/Nm³ [17 cents/Nm³] in the long-term. Toward this end, over the past six years, the Japanese government has dedicated approximately \$1.5 billion to technology R&D and subsidies in support of:

- Achieving low cost, zero-emission hydrogen production from overseas fossil fuels + Carbon Capture and Storage [CCS], or from renewable energy electrolysis;
- Developing infrastructure for import and domestic distribution of hydrogen;
- Scaling up hydrogen use across various sectors, such as mobility, residential Combined Heat and Power [CHP], and power generation.

<https://www.ifri.org/en/publications/etudes-de-lifri/japans-hydrogen-strategy-and-its-economic-and-geopolitical-implications>

Singapore

Dyson to build electric cars rivaling Tesla, Oct 23 '18

Dyson, famous for making vacuum cleaners, has picked Singapore to manufacture its first electric car, pushing ahead with plans to challenge Tesla in the hottest sector of the automotive market.

The closely-held British manufacturer, also known for hand dryers and air purifiers, said on Tuesday it would complete the factory by 2020 and stuck to a goal of rolling out its first model by 2021 as part of a £2 billion [\$3.7 billion] effort to expand into automobiles.

The choice of Singapore - which doesn't have a single car-manufacturing plant and is one of the costliest places in the world to buy an automobile - comes as Tesla moves closer to establishing a factory in China.

<https://www.afr.com/news/world/asia/dyson-picks-singapore-to-build-electric-cars-rivaling-tesla-20181023-h170s6>

New Technology

Electrification of UK railways sees CO₂ emissions fall, Oct 22 '18

CO₂ emissions from passenger rail has fallen in the last year as a result of the use of greener energy sources as part of electrifying the UK railway, new statistics from the Office of Rail and Road [ORR] have shown.

Overall CO₂ emissions have decreased by 6.6% for passenger services and 2.9% for freight, continuing the trend of falling emissions per passenger km since 2005-06.

The report says that in 2017-18 passenger trains consumed 3,645m kWh of electricity, a 3.5% increase from 2016-17, and 496m litres of diesel, a 1.1% decrease. These services still produced 2,765 KT of CO₂ emissions, 40.8g CO₂ per passenger km, which is down 6.9% from 2016-17.

The report said that there was a total of 5,766km of electrified route by the end of 2017-18, which has increased by 2% or 392km compared to the previous year. A total of 36% of UK rail is now equipped with electric infrastructure, with Network rail's electrification scheme currently on-going in areas in London, Scotland and on western routes.

The government has a legally binding Fifth Carbon Budget which says emissions must be reduced by 57% by 2032 compared to emission levels in 1990, and an 80% reduction by 2050.

The ORR's report says that the fall in CO₂ emissions is despite rises in the number of passengers and rises in energy usage.

<http://www.railtechnologymagazine.com/rail-news/electrification-of-railways-sees-co2-emissions-fall>

Fast-charging EV stations could be a reality in three years, Oct 26 '18

Electric vehicles are becoming more popular. According to InsideEVs.com, through September of this year, 234,635 were sold, up from 142,226 vehicles at this same time last year—a nearly 65% increase. In fact, this year's numbers surpassed the 199,826 that were sold in all of 2017.

Last year at this time we reported on the need for an extensive charging infrastructure for electric vehicles. But once we have the complete infrastructure in place, how long will it take to actually charge an EV at a charging station when we're miles from home?

Depending on variables such as the model of the car, type of battery, and how much juice is remaining in the battery, it can take at least 30 minutes—and that's the quickest time to completely charge an EV battery. That duration is enough for a quick meal stop or a long break at a rest area. But maybe you don't have time to stop on the way to your destination. Or what if your charge doesn't carry you through to your final destination? The latter concern is called "range anxiety" and is one of several reasons preventing consumers from purchasing electric vehicles.

But there is hope on the horizon. A collaboration between researchers from Missouri S&T and three companies—Ameren, LG Chem Michigan, and Bitrode could result in a solution that would shave as much as 20 minutes off that charging time. "The big problem with electric vehicles is range, and it's not so much range as range anxiety," professor of electrical and computer engineering Jonathan Kimball explains in a Missouri S&T news release. "People are nervous about not being able to get where they're going. With a conventional vehicle, you pull up, get gas, and in 10 minutes you're back on the road." The researchers, led by Kimball, will spend the next three years developing a system that quickly charges EVs—specifically, in less than 10 minutes, the average time it typically takes you to fill up your gas-powered car.

<https://ceramics.org/ceramic-tech-today/Energy-1/fast-charging-ev-stations-could-be-a-reality-in-three-years>

Could hydrogen trains be the future of rail? Oct 27 '18

With increasing concerns about climate change and harm from diesel emissions, greener transport is now a political imperative.

In February the transport minister Jo Johnson called on the rail industry to provide a vision of how it will decarbonise. He stated that he wished to see "all diesel-only trains off the track by 2040" and viewed "alternative-fuel trains powered entirely by hydrogen" as a prize on the horizon. But, seven months previously, transport secretary Chris Grayling announced the cancellation of three electrification schemes, necessitating extra diesel trains. The week

beforehand, Grayling stated that the government intended to halt petrol and diesel car production by 2040.

Notwithstanding these apparent contradictions, Johnson is right to stress the need to decarbonise the rail industry. Although trains offer great environmental benefits, the industry cannot rest on its laurels.

A train's power ranges from 450kW for a two-coach local train to 6MW for a 125mph 11-coach electric inter-city train. The respective power-to-weight ratios of these trains are 5.7 and 10.5kW per mt. Commuter trains do not necessarily travel at high speed but require high power for the acceleration needed to operate a passenger service with frequent stops to an acceptable timetable. An electric multiple unit [EMU] typically has twice the acceleration of a diesel multiple unit...

Hydrogen is the most abundant element in the universe but is so chemically active that it does not occur naturally and must be produced. Almost all hydrogen production uses reforming to extract it from organic feedstock, usually methane, which produces CO₂.

Electrolysis uses a DC current to split water into hydrogen and oxygen. This can cost 50% more than steam reforming but is a zero-carbon process if the electricity used is generated by renewables. Fuel cells reverse this process, using a catalyst to combine hydrogen with oxygen in the air. This produces electricity and water, the only waste product

<http://www.imeche.org/news/news-article/could-hydrogen-trains-be-the-future-of-rail>

Science can succeed on climate change where politics fails, FT, Oct 29 '18

...The Paris conference in 2015 brought people together and collected a range of loose promises from almost every country in the world. Those promises in aggregate were inadequate, and some have already been forgotten as regimes have changed, not least in the US. Many countries are taking action to mitigate climate change, but these actions don't add up to an answer. Potential global solutions such as a universal carbon tax remain off the agenda.

There has been some progress. The production of renewable energy has become cheaper, thanks mainly to the Chinese, and energy is being used more efficiently. But the advances have been slow. The result is that hydrocarbons continue to provide 80 pct of global energy supplies and will still be supplying some 74 pct in 2040, according to the International Energy Agency.

Meanwhile, emissions continue to rise and the latest estimates from the International Energy Agency predict they will rise again this year. As the latest report from the Intergovernmental Panel on Climate Change reminds us, the clock is ticking and we are getting ever closer to the moment when the

concentration of carbon in the atmosphere reaches a level likely, in the view of the scientists, to produce fundamental changes in the world's climate.

In these circumstances we need a different approach. We cannot afford to wait for an age of collective rationality to dawn and for the sceptics in world governments to change their minds. What is the alternative? The best hope for limiting emissions comes from the application of science to the energy market. That means finding sources of energy that can be made available to all the world's citizens, at a price they can afford, enabling them to switch away from the carbon-intensive fuels such as coal that are the main source of the problem. If politics cannot solve climate change, perhaps science and economics can do better. New techniques to store renewable electricity would be a great advance making sustainable power available worldwide. Dramatic gains in the efficiency of energy consumption may also be within reach. And there could be other answers to be found if we looked.

EU Emissions allowances

EUA primary market auction Oct 23-30 '18

Date	Contract	Median €/mtCO ₂	Auction volume mtCO ₂	Most active country
23/10/2018	EUA 3. Phase	18,3	4213000	IT: 12894500
24/10/2018	EUA 3. Phase	18,97	3547000	NA
25/10/2018	EUA 3. Phase	18,47	4213000	IT: 13047840
26/10/2018	EUA 3. Phase	18,74	4360000	NA
29/10/2018	EUA 3. Phase	17,95	4213000	IT: 12483270
30/10/2018	EUAA 3. Phase	16,83	4213000	IT: 11758390

EU emissions allowances Oct 23-30 '18: Primary market auction



EU emissions allowances Oct 23-30 '18: Secondary market auction



Source: European Energy Exchange



Natural Resources PC