

Low Carbon Pulse - Edition 14

GLOBAL DEVELOPMENTS IN PROGRESS TOWARDS NET-ZERO EMISSIONS



Welcome to Edition 14 of Low Carbon Pulse – sharing significant current news on the progress towards net-zero emissions globally. This Edition covers the period from April 5, 2021 to April 18, 2021. It is likely that Edition 15 will be published early next week to pick-up news arising from the Leaders' Summit on April 22 and 23, 2021.

Please click [here](#) for the previous edition of Low Carbon Pulse. To access the first two articles in the **Shift to Hydrogen (S2H2): Elemental Change** series click [here](#) and [here](#).

GHGs concentrations increased in 2020:

In [Edition 5](#) of Low Carbon Pulse it was reported that it was predicted that there would be a decrease of 7% in GHG emissions arising in 2020. As a result of this decrease, many may have expected that the concentration of GHG in the atmosphere would decrease. As we noted in Edition 5 of Low Carbon Pulse, a reduction in GHG emissions arising does not result in a reduction in the concentration of GHG emissions in the atmosphere immediately. On the basis of [research](#) released by the US National Oceanic and Atmospheric Administration (**NOAA**), both carbon dioxide (CO₂) and methane (CH₄) levels are now at record high levels.

See: [Atmospheric CO₂ and methane levels soar to record highs despite pandemic](#)

CH₄ versus CO₂:

The increased concentration of CH₄ may be regarded as the continuation of a trend that started in the mid-2000s. The global warming potential of CH₄ is greater than that of CO₂: over a 20-year period, one tonne of CH₄ has global warming potential 80 times that of one tonne of CO₂. As noted in the second article in the **Shift to Hydrogen Series (S2H2): Elemental Change** series, **What needs to be decarbonised? And what role can hydrogen play?**, the majority of anthropogenic CH₄ emissions arise from the agricultural activity, including raising livestock and the production of rice, and fugitive emissions arising from the mining and production of hydrocarbons for energy use. The focus on CH₄ arising from these activities is important, as is the means to their reduction. While the purpose of Low Carbon Pulse is not to delve into the science of anthropogenic, and naturally, arising CH₄ emissions, the following links [here](#) and [here](#) are to recent articles that provide overviews.

Face to face meetings ahead of virtual Leaders' Summit:

Edition 13 of Low Carbon Pulse reported on the Leaders' Summit convened by US President, Joe Biden to be held on April 22 and 23, 2021. Ahead of the virtual Leaders' Summit, US Special Climate Envoy, Mr John Kerry has been meeting with a number of leaders.

Mr Kerry has met with Indian Prime Minister, Mr Mahendra Modi to discuss the prospective commitment of India to net-zero GHG emissions by 2050. As noted in Edition 13, the Ashurst Global Towards Net-Zero Emissions team considers that in an ideal world, developed countries will commit to supporting India (and other countries) to achieve net-zero GHG emissions. It is reported that Prime Minister Modi has commented on the benefit of cooperation between India and the US in the area of innovation and faster roll-out of green technologies, including the financing necessary to achieve these. It is reported that Special Climate Envoy Mr. Kerry has tabled the provision of concessionary finance for these purposes.

In addition to meeting with Prime Minister Modi, Mr Kerry met with the PRC Climate Envoy, Mr Xie Zhenhua, in Shanghai. Clearly, given the commitment of the PRC and the energy transition already underway in the PRC (see Edition 13 of Low Carbon Pulse), this meeting focussed on the roles of the PRC and the US leading on the global response to climate change.

Also ahead of the Leaders' Summit, Brazil's Environment Minister, Mr Ricardo Salles has indicated that to achieve net-zero GHG emissions by 2050, Brazil needs USD 10 billion in aid annually from developed countries.

See: [India's Modi reaffirms Paris accord pledge in meeting with Kerry](#); [China and US pledge climate change commitment](#); and [Brazil needs \\$10bn a year in aid for carbon neutrality by 2050](#)

Agriculture, forestry and land use:

It may be expected that the Leaders' Summit will consider all human activities giving rise to anthropogenic GHG emissions, including those arising from agriculture, forestry and land use (and waste).

It is becoming increasingly clear that one policy setting that is emerging is to ensure that areas of land are to be preserved completely from any land use. This fits with the basic premise of any policy setting – do no harm. It is understood that in the EU and US policy settings are being considered to ensure that at least 30% of their respective land-masses remain free of land use for human activities, or land is returned to non-use, free from human activities.

To add to the many "30 by 30" targets (the US's 30 GW of off-shore wind by 2030 being the most recent – see Edition 13 of Low Carbon Pulse), California intends to preserve 30% of its land mass from use for human activities by 2030. Some commentators and climate modelers have suggested the preservation of up to 50% of land-mass as a preferred outcome. One of the consequences of the preservation of land-mass from land use will be increasing urbanisation, and more intensive means of agriculture and forestry.

By 2030, it is estimated that there will be 43 cities globally with populations of more than 10 million. Amongst other things, with urbanisation comes waste heat. Ideally urban areas should be designed so as to become heat sinks. This involves the greening of the urban environment. These themes will be covered in more detailed in future Ashurst features and publications.

Japan flagging change to its NDC:

On April 13, 2021 it was reported from a number of news feeds that Japanese Prime Minister, Mr Yoshihide Suga is to announce an increase in the Nationally Determined Contribution (**NDC**) of Japan under the Paris Agreement before, or at, the Leaders' Summit: the suggestion is that the new **NDC** will be to reduce GHG emissions to 50% of 2013 levels by 2030. This is something of a change given previous reports suggesting an increasing in the **NDC** from 26% to 45%.

On April 17, 2021 The Japan Times reported that in an interview on April 16, 2021, Environment Minister, Mr Shinjiro Koizumi said: "It's obvious that the target will be raised from the current level... The use of renewable energy sources is the most important key" to the reduction of GHG emissions. In

this context, Mr Koizumi indicated that mandatory use of solar panels for homes in Japan was a possible policy setting.

South Korea continues to maximise renewable energy:

Recently it has been reported that the South Korean government is launching initiatives to deploy solar photovoltaic projects along, and on, rail infrastructure (including embankments, tracks and on train stations) and road infrastructure so as to maximise renewable electrical energy generation in close proximity to built infrastructure.

These built infrastructure environment solar projects will be developed under 20 year concessions.

For a country with land-constraints, the maximisation of renewable electrical energy derived from close to built infrastructure and from floating photovoltaic sources allows preservation of land for agriculture, forestry and other land use initiatives. It is to be expected that other countries will launch similar initiatives.

See: [South Korea wants to build large-scale PV along highways](#)

EHB updates its vision for the European Hydrogen back bone

On April 13, 2021 the European Hydrogen Backbone (**EHB**) group released a [press release](#) detailing the "version of its vision for a dedicated hydrogen transport infrastructure network across Europe".

The initial version of the EHB vision was released in July 2020. The *EHB* comprises 12 European gas transmission system operators from 11 countries. The *EHB* initiative proposes a hydrogen network of 39,700 km by 2040, with a grid connecting 21 countries.

Northern European Green Industrial Revolution continues:

Edition 12 of Low Carbon Pulse outlined the *HH-Win* network and Edition 13 outlined the *Clean Hydrogen Coastline* initiatives.

In addition, the GET H2 consortium (comprising bp, Evonik, OGE, RWE, Salzgitter Flachstahl and Thyssengas) is developing a complete hydrogen supply chain across Northern Europe, including based on current and planned hydrogen production and use projects.

To add to these (and other initiatives), it has been announced that Engie and INEOS plan to develop the first hydrogen cogeneration plant (being a power station that generates both electrical energy and heat energy).

See: [Belgium's first commercial-scale hydrogen cogeneration plant](#)

Germany plans to use gas grid to carry hydrogen:

On April 6, 2021 it was announced that a Hydrogen Power Storage and Solutions East Germany (**HYPOS**) is being developed. While relatively early, it is apparent that HYPOS is more than hypothetical.

The purpose of *HYPOS* is to determine how best to augment or to develop infrastructure across Germany to transport hydrogen, and whether it is possible to use existing infrastructure to deliver both hydrogen and natural gas across the existing gas grid using membrane technology that will keep the gas streams separate.

To date, thinking has tended to focus on the blending of hydrogen and natural gas. If the membrane technology works, it will have profound implications for the transportation of hydrogen using existing infrastructure, and as such the cost of progressing towards a hydrogen economy.

See: [Germany's 511,000km gas grid set to integrate hydrogen](#)

The UK in lock-step with Northern Europe:

It has been announced that Equinor and SSE plc plan to build two firsts-of-a-kind power stations: one power station will capture CO₂ and store that CO₂ under the North Sea and other power station will use clean hydrogen as fuel.

The carbon capture power station is reported as likely to capture up to 15% of the UK's intended carbon capture target (of 10 mtpa of CO₂ by 2030) and the clean hydrogen power station use 33% of the UK's targeted production of clean hydrogen (of 5 GW of hydrogen production capacity by 2030). These targets are contained in the UK's Ten Point Plan for a Green Industrial Revolution. The two projects are to be located in the Humber region of England, regarded as a cluster of industrial activity.

See: [SSE Thermal and Equinor join forces on plans for first-of-a-kind hydrogen and carbon capture projects in the Humber](#)

Second round solar tender in the Kingdom of Saudi Arabia sees world record low:

The KAS has recently celebrated the development of the 300 MW photovoltaic solar Sakaka IPP, with its second renewable electrical energy project, the Dumat Al-Jandal wind project, approaching completion. The Sakaka IPP was awarded to ACWA and Gihaz on the basis of a then record low bid price.

During the inauguration for the Sakaka IPP on April 8, 2021, Crown Prince Mohammad bin Salman bin Abdulaziz announced the results of the tenders for seven large-scale solar capacity projects under Round 2 of the National Renewable Energy Program (**NREP**).

The seven new projects are to be located in Jeddah, Madinah, Quarayyat, Rafha, Rebig, Al Shuaiba and Sudair. The 600 MW Al Shuaiba photovoltaic project is reported as being awarded on the basis of a world record low bid price for electrical energy of USD 0.0104 kWh (a little over 1 cent per kWh, or USD 10.40 per MWh). The Sudair photovoltaic project was awarded with the second lowest bid price of USD 0.01239 (1.239 cents per kWh or USD 12.39 MWh). On development, the Sudair photovoltaic project it will be the Kingdom's largest solar project, comprising around 1.5 GW of installed capacity.

Approximately 3.6 GW of energy has been contracted under Rounds 1 and 2 of the **NREP**. It is anticipated that the Kingdom will continue to develop renewable energy resources, including for the purposes of the production of Green Hydrogen and Green Ammonia.

The KAS has recently announced plans to plant 50 billion trees (**50 BTs**) as one of a range of initiatives to reduce net greenhouse gas emissions. The **50 BTs** initiative (the Middle East Green Initiative) involves planting 10 billion trees in the Kingdom itself, and 40 billion trees across other Middle Eastern countries.

The **50 BTs** initiative may be regarded as symbolising a tree for each tonne of GHG emissions currently arising globally. The **50 BTs** project should not however be regarded as symbolic, it provides a negative CO₂ emissions initiative that if repeated on a proportionate basis globally would have a lasting and marked impact on CO₂ emissions.

See: [Saudi Arabia's second PV tender draws world record low bid of \\$0.0104/kWh](#) and [Abu Dhabi receives world's lowest tariff for mega solar farm project](#)

Another Hydrogen Valley and 10,000 new micro-grids:

- On April 7, 2021 it was reported that the New India H2 Alliance intends to develop a cluster allowing for the connection of producers and users of hydrogen to facilitate and to spur the development of a hydrogen industry and the broader hydrogen economy in India. The plan is to cluster around Difficult to Decarbonise industries, including cement, chemical and petrochemical (including for the production of ammonia / fertilizer), iron and steel and refining. Blue Hydrogen and Green Hydrogen would be used, and their use will be promoted by the transport sector providing freight haulage services to these Difficult to Decarbonise industries.

The New India H2 alliance plans to work with the Government of India to develop a national hydrogen policy and roadmap for 2021-2030, to establish a national hydrogen task force, to identify large-scale hydrogen demonstration plants, to create a national hydrogen fund for India, and to create capacity for the production, storage, distribution and transportation and use of hydrogen.

As is the case in other countries, there is a clear recognition of the need for the private and the public sectors to work together for the purposes of developing the supply and demand side for the hydrogen industry on a coordinated basis.

- On April 15, 2021 plans were announced by the Government of India to develop 10,000 solar powered micro-grids and water pumps across the country. This is to be achieved through a partnership between government entity CSC and Tata Power.

See: [Energy giant Reliance Industries leads alliance pioneering Indian 'hydrogen valley'](#) and [Reliance, other energy majors form hydrogen coalition](#)

A world first in New Zealand:

New Zealand is the first country in the world to introduce legislation requiring banks, insurers and investment managers to report on the effects on their businesses on climate change. The legislation is titled Financial Sector (Climate related Disclosure and Other Matters), and its stated purpose is: to ensure that the effects of climate change are routinely considered in business, investment, lending, and insurance underwriting decisions; to help reporting entities demonstrate better responsibility and foresight in their consideration of climate issues; and to lead to smarter, more efficient allocation of capital, and help smooth the transition to a more sustainable, low-emissions economy.

Under the legislation the reporting requirements apply to banks with more than NZ\$ 1 billion (around USD 700 million) in assets and to insurers with more than NZ\$ 1 billion of assets under management.

It is expected that this legislative move in New Zealand will be followed at an increasing pace by other countries: committing to and projecting net-zero GHG emissions is one step, the ongoing monitoring and verification of GHG emissions arising is critical to ensuring that net-zero GHG emissions are in fact achieved, and transparency through reporting across the entire economies is required for this purpose.

Time to act under a Hydrogen Act:

On April 7, 2021 Hydrogen Europe published a [Hydrogen Act \(H2A\)](#). Hydrogen Europe represents around 220 industry participants and 26 national associations. The H2A is best described as an outline of what is required to allow a hydrogen industry to develop and to be integrated into the EU economy and the infrastructure of the EU economy.

The H2A may be regarded as describing the next steps on the road to the development of the legal and regulatory framework that will allow the EU to implement its Hydrogen Strategy (*A hydrogen strategy for a climate-neutral Europe – July 8, 2020*), critically during what Hydrogen Europe describes as the Ramp-up phase (2025 to 2035).

BlackRock and Temasek partner to decarbonize:

BlackRock and Temasek, two of the world's largest and most influential and respected investment houses, have announced the establishment of the Decarbonisation Partnership. The Decarbonisation Partnership contemplates an initial USD 600 million capital commitment to invest in companies and proven technologies that will reduce, and potentially eliminate, GHG emissions.

Chairman and CEO of BlackRock, Mr Larry Fink said: "The world cannot meet its net-zero ambitions without transformational innovation. For decarbonisation solutions and technologies to transform our economy, they need to be scaled. To do that, they need patient, well-managed capital to support their vital goals. This decarbonisation partnership will help define climate solutions as a standalone asset class that is both essential to our collective mission and an historic opportunity created by the net-zero transition."

The bed rock of the Decarbonisation Partnership is an understanding that the world carbon budget requires the reduction of 1.7 billion tonnes of GHG emissions each year to achieve net-zero by 2050. As many countries and corporations have realised around the world, the move towards net-zero emissions offers opportunities for investors.

It has been a busy period for BlackRock. In addition to the Decarbonisation Partnership: on April 8, 2021 BlackRock is reported to have closed its third global renewable energy fund at USD 4.8 billion, Global Renewable Power Fund III, and on April 7, 2021 BlackRock is reported to have agreed terms for a USD 4.4 billion borrowing facility that provides lower borrowing costs if BlackRock achieves diversity targets and broader sustainable business goals.

See: [Temasek and BlackRock launch decarbonization investment partnership](#) and [Decarbonization partners](#)

Energy efficiency first principle will inform policy settings, and guide their application in EU:

As noted in a number of editions of Low Carbon Pulse, and the second article in the **Shift to Hydrogen (S2H2): Elemental Change** series, entitled [What needs to be decarbonised? And what role can hydrogen play](#), policy makers are concerned to ensure that efficiency is optimised across all renewables, including the use of energy carriers produced using renewable feedstocks and renewable electrical energy.

It is recognised that the EU requires a massive increase in the development and deployment of new renewable electrical energy capacity to enable it to satisfy its GHG reduction targets, both to produce electrical energy as electricity and to power electrolyzers to produce Green Hydrogen.

On April 13, 2021, Ms Paula Pinho, from the Directorate General Energy, at the European Commission, noted that achievement of targets must be supported by the energy efficiency first principle: "We believe that, first and foremost, we need to continue to apply the energy efficiency first principle, ensuring that really we make the most of out of our limited resources".

The facts and statistics that explain the need for adherence to the energy efficiency first principle are: if the EU is to achieve net-zero GHG emissions by 2050, its electrical energy use must double, with 53% of total energy consumption in the EU to be from renewable sources and nuclear sources, with 47% of total energy consumption, to be sourced from clean or cleaner future fuels, including hydrogen.

See: [Energy efficiency must apply across all renewables, EU Commission says](#)

Open letter supports the higher sustainability standards in EU Taxonomy:

In Edition 13 of Low Carbon Pulse the work of the European Commission was highlighted, critically the meaning of *sustainable* for the purposes of EU policy settings, including funding under the European Green Deal.

On April 13, 2021 a number of leading companies and organisations penned an [open letter](#) to the European Commission to express "extreme concern" about proposals to lessen the emissions thresholds in respect of the production of clean hydrogen.

Signatories to the open letter include Acciona, akuo, Altenex Energy, Enel, European Energy, everoze, First Solar, Fronius, GCL, Iberdrola, nel, Orsted, Renewable Hydrogen Coalition, Smart Energy, SolarPower Europe, Soltec and sunfire.

Solar round-up:

In addition to the news from the Kingdom of Saudi Arabia, solar activity continues, including:

BloombergNEF has released conclusions from research in respect of the comparative costs of Green Hydrogen in comparison to Blue Hydrogen and natural gas. The key headline from the research is that the costs of the production of Green Hydrogen will decrease by 85% to under USD 1, allowing Green Hydrogen to compete on a like for like basis with the Blue Hydrogen and natural gas. A key contributor to the decrease in the cost of production of Green Hydrogen is the projected continued reduction in the cost of solar sourced electrical energy, with the lower costs of solar electrical energy resulting in cost savings across the entire solar chain, including improved efficiency in manufacture costs, improved efficiency in solar cells themselves, and greater yields from solar cells, and lower renewable electrical energy costs per kg as a result.

See: [Hydrogen Economy Outlook: Key messages](#)

- In Edition 13 of Low Carbon Pulse it was reported that Sunseap Group has commenced operations of its floating photovoltaic solar farm in the Strait of Johor. On April 7, 2021 it was reported that Krakatau Steel plans to develop a 40 MW photovoltaic floating solar farm off the island of Banten, Indonesia. It is to be expected that the straits and seas around Singapore and Indonesia will offer increasing opportunities for the development of floating solar.

See: [Krakatau Steel to build 40MW floating solar power station](#)

- On April 17, 2021 it was reported that Trungham Group has commenced operation of the Nihn Thuan Province on-shore wind farm, Vietnam's largest to date. The 151 MW wind farm is combined

with a 204 MW solar farm, with the combined 355 MW of installed capacity making it the largest solar-wind farm in South East Asia.

See: [Vietnam's largest wind power plant enters operation](#)

- On April 15, 2021 a [report](#) was released that modelled that as much as 76% of global electrical energy load could be matched by renewable electrical energy generated from photovoltaic solar power stations.

The report, prepared by researchers at Lappeenranta University of Technology, Finland, contains what its authors regard as: "the only known cost-neutral energy system transition scenario that meets the 1.5°C climate target [Stretch Goal] set in the Paris ... [A]greement".

Critically, it is understood that the model contained in the report provides for the achievement of the Stretch Goal without any increase in unit energy costs, and without the need for negative GHG emissions initiatives.

See: [Solar could deliver 76 per cent of global energy needs, new study says](#)

Wind round-up:

- On April 6, 2021 it was reported that Vattenfall plans to commence construction of the 1.5 GW Hollandse Kust Zuid (**HKZ**) off-shore wind field in June. The timing of the construction illustrates one of the challenges of off-shore construction, especially in the North Sea – only the summer months provide reasonably consistent conditions to allow construction.

See: [Offshore construction on Dutch trailblazer to start in June](#)

- On April 7, 2021 it was announced that the Norwegian Government Pension Fund (Norway's Sovereign Wealth Fund) is to pay a purchase price equivalent to USD 1.63 billion for a 50% stake in the Orsted 752 MW off-shore wind field Borssele 1 & 2 (**B1/B2**) project. The B1/B2 project comprises 94 wind turbines, located 23 kms off-shore of the Dutch coast, and is currently the world's second largest installed off-shore wind project. As noted in previous editions of Low Carbon Pulse, Orsted is adept at developing renewable assets and then recycle capital from them.

See: [Norway's huge oil-backed wealth fund invests in an offshore wind farm](#)

- In [Edition 8](#) of Low Carbon Pulse it was reported that the Offshore Act had entered into force in Poland, providing for the approval of development of up to 10.9 GW of off-shore wind capacity by 2027. It was understood that 5.9 GW would be auctioned by the end of June 2021, with two further tranches of 2.5 GW to be auctioned by 2025 and 2027.

On April 8, 2021 it was announced that the Energy Regulatory Office (**ERO**) in Poland awarded a contract for differences for the 1.5 GW Baltica 2 and 1 GW Baltrica 3 off-shore wind projects. The two off-shore wind projects are being developed by Orsted and PGE under a 50 / 50 joint venture. Final investment decisions have yet to be taken, but are expected, with Baltica 3 to commence operation in 2026, and Baltica 2 before 2030. The strike price for the contract for differences is reported to be equivalent to €67.93.

In addition to Baltica 2 and 3, the 350 MW FEW Baltic II off-shore wind project is to be developed, located 50 km off shore on the north side of the Slupsk Bank in the Polish sector of Baltic Sea.

Low Carbon Pulse will report on further awards in the lead up to the end June 2021.

See: [Poland awards 2.5GW Baltica 2&3 with contract for difference](#)

- On April 9 2021, it was announced that NoordzeeWind has appointed Vestas and OutSmart (a Dutch German company) to operate and to maintain its Egmond aan Zee (**EaZ**) wind project in the Dutch sector of the North Sea. The EaZ wind project (100% owned by Shell, after Shell completed the purchase of Vattenfall's interest in the project in March 2021), is the first off-shore wind field project in the Dutch sector of the North Sea, comprising 36 MW wind turbines, located 18 kms off-shore of the Dutch coast.

See: [Vestas and OutSmart to Run First Dutch Offshore Wind Farm](#)

- On April 11 2021, The Irish Times reported that state-owned Electricity Supply Board (**ESB**) is to increase the scale of its renewables business and to realise its Green Atlantic @ Moneypoint program to align with Ireland's GHG emissions targets, i.e., net-zero GHG emissions by 2050.

The plans of *ESB* include: **1.** upgrading the grid to allow connection of renewable electrical, **2** the development of a 1.4 GW floating off-shore wind field off the coast of Clare and Kerry with Equinor, to be developed in two stages, with the first electrical energy in 2028 (see [Edition 13](#) of Low Carbon Pulse for the description of the success of Equinor's Hywind floating off-shore wind field off Aberdeen in the north of Scotland), and **3** the repurposing of the Moneypoint coal-fired power station, and the use of the repurposed power station to produce Green Hydrogen.

See: [ESB ready for green pivot with Moneypoint renewable energy hub](#)

- On April 12, 2021 it was announced that the world's largest inland fresh water wind farm has started to produce electrical energy: the 383 MW Windpark Fryslan wind field is located in Ijsselmeer Lake in The Netherlands.

See: [First Power Flows from Windpark Fryslân](#)

- On April 13, 2021 it was reported that WA Offshore Windfarm Pty Ltd (a wholly owned subsidiary of UK developer Australis Energy) has submitted an application for environmental approval of the development of an AU\$ 1 billion, 300 MW offshore wind field, 140 kms south of Perth in Western Australia. It is anticipated that the off-shore wind field will generate renewable electrical energy by 2026.

While Australia has some of the best on-shore wind (and solar) resources globally, in particular in the north of Australia, Australia also has some of world's best near to nearer off-shore resources in the southern half of the country.

In Edition 13 of Low Carbon Pulse the landfall for Australia's first offshore wind farm, the 2 GW Star of the South Project (off Victoria), was described. As noted in Edition 13, the location of the landfall site is critical for any off-shore project, including for the purposes of the connection to the grid.

See: [UK developer proposes \\$1 billion offshore wind farm for Western Australia waters](#)

- On April 14, 2021 it was announced that the Government of Azerbaijan (Ministry of Energy) has signed a memorandum of understanding (**MOU**) with the International Finance Corporation (**IFC**) for the purposes of a providing a framework to cooperate in the development of off-shore wind fields in the Caspian Sea.

The activities contemplated by the *MOU* come within the Offshore Wind Development Program, funded by the World Bank's Energy Sector Management Assistance Program.

It is estimated that the Caspian Sea may realise up to 135 GW of renewable electrical energy from off-shore field development, 35 GW from fixed-bottom capacity and 122 GW from floating wind.

See: [Azerbaijan's Energy Ministry Signs Offshore Wind MoU with IFC](#)

- On April 14, 2021 it was announced that US oil major, Chevron (**CVX**), and Norwegian corporation Moreld Ocean Wind (**MOW**) are to invest in off-shore floating wind technology. It is reported that CVX is the first US oil major to enter the off-shore wind market.

See: [US Oil Major Chevron Enters Offshore Wind Market](#)

- On April 16, 2021 it was announced that Orsted (the Danish renewable energy giant) has agreed to purchase of 100% of Brookfield Renewable's Irish and UK on-shore wind businesses. For Orsted this is a case of back-to-the future in Europe: in 2014 DONG Energy (now Orsted) sold its on-shore wind farm interests in Europe to concentrate on off-shore wind field developments.

It is reported that the Brookfield Irish and UK portfolio agreed to be purchased by Orsted has 389 MW of on-shore wind in operation and under construction, and has a development pipeline of over 1 GW. Outside Europe Orsted has around 4 GW of on shore wind in operation and under construction in the US.

See: [Danish energy giant Orsted is pivoting to onshore wind in new \\$684 million deal](#)

Wind scales-up:

Technological innovation, scale and scalability, are key in moving towards net-zero GHG emissions. These concepts are as long as they are broad and deep, but in the renewable energy wind industry, it is clear that the scale of turbines used in the off-shore industry is playing a role in reducing the unit cost of electrical energy production. While fixed bottom and floating off-shore wind fields are the most

expensive sources of renewable energy from wind-power, off-shore wind is highly prospective, and is required if GHG reduction targets are to be achieved.

A new [paper](#) (in Nature Energy) has concluded that the contemplated increase in the scale of turbines may result in increasing electrical energy generating capacity three-fold (at asset level), with a resulting reduction in the unit cost of renewable electrical energy. The report estimates that the unit cost of renewable electrical energy from off-shore wind fields may reduce by up to 50%. Also the report estimates that up to 25% of off-shore wind fields are likely to be floating by 2035 as technology is honed and scale increased.

See: [Giant offshore turbines set to drive plummeting cost of wind power](#)

Scotland Near to Zero Hero:

- On April 8, 2021 it was reported that during 2020 a little over 97% of the electrical load (demand for electrical energy) across Scotland was matched with renewable electrical energy supply. With the development of further off-shore wind capacity in the offing, Scotland will produce more electrical energy from renewable sources that it will be using, thereby contributing ever more to the net-zero commitments of the United Kingdom.

See: [Scotland's renewable record cements its place as UK's onshore wind hub](#)

- On April 12, 2021 it was reported that ScottishPower, whose parent company is Spanish renewable giant Iberdrola, intends to develop a Green Hydrogen production facility in the hinterland of Scotland's largest city, Glasgow. The 20 MW electrolyser is to be located next to the largest on-shore wind farm in the UK, the 539 MW Whitelee Wind-farm. The 20 MW electrolyser is to use excess / surplus electrical energy from the Whitelee Wind-farm (i.e., lower to low cost electrical energy because it is not dispatched), and renewable electrical energy from a 40 MW solar farm to be developed close by, and a 50 MW BESS. As noted in previous editions of Low Carbon Pulse, in addition to electrolyser efficiency, electrolyser utilisation and surge capacity (to take advantage of lower or low renewable electrical energy prices) are key to the economics of electrolyser projects, wherever they are located.

See: [ScottishPower plans UK's biggest green hydrogen plant in Glasgow](#)

In the UK On Easter Monday the sun shone and the wind blew:

On Easter Monday, the UK had its "greenest of green days": it has been reported that 60% of electricity load across the UK was matched with renewable electrical energy. This produced the lowest level of electrical energy carbon intensity recorded in the UK since records began in 1935.

See: [Great Britain's electricity system has greenest day ever over Easter](#)

In Australia the sun shines and the wind blows and new report on progress to renewable energy:

- On Sunday April 11, 2021 the National Electricity Market in Australia reached a record level of dispatch of renewable electrical energy (55.9%), and a record level of dispatch for solar and wind (53.4%).

It remains the case that the National Electricity Market continues to rely on fossil fuel powered electrical energy generation capacity, with the peaks of renewable electrical energy dispatch tending to arise at times of lower demand. Australia is however continuing to progress net-zero capability: in 2020 around 4 GW of renewable energy capacity was installed, and in 2021 a further 4 GW of renewable capacity, and 4 GW of roof-top solar, is expected to be installed.

- A new [report](#) from the Grattan Institute provided a keen perspective on the need for the continued development of renewable electrical energy while at the same time ensuring continued energy security.

See: [Australia's main grid hits record renewables high of 56 per cent on Sunday](#)

BESS on-grid and off-grid:

- **California to accelerate BESS installation:** On April 5, 2021 it was reported that California is to install 1.7 GW of battery electrical storage systems (**BESS**) by August 2021. It is expected that installation of BESS will continue in 2022, with 1.4 GW, and 2023 with 1.2 GW.

See: [California to install 1.7GW of battery storage in 2021 to boost grid supply](#)

- **Australian Gas and Light and Wartsila:** On April 13, 2021 AGL and Wartsila signed an memorandum of understanding (**MOU**) in respect of the development of off-grid / behind the meter electrical energy storage systems for large users of electrical energy. It is anticipated that hybrid energy supply offerings will be available to customers with more than 20 MW of electrical energy load. It is understood that the *MOU* contemplates that installation of up to 1 GW of off-grid / behind the meter BESS.

See: [AGL and Wartsila offer onsite solar and battery solutions to big energy users](#)

Clean Hydrogen Round-up:

- On April 15, 2021 it was announced that Uniper (German utility giant) plans to develop a hydrogen hub located in Wilhelmshaven (**Green Wilhelmshaven**) which is to develop a receiving terminal for green ammonia, then using a cracker to derive Green Hydrogen. In addition, it is planned that a 410 MW electrolyser will be developed at *Green Wilhelmshaven*. On full development it is estimated that the facilities at *Green Wilhelmshaven* will produce up to 295,000 tonnes per year of hydrogen or about 10% of the estimated Green Hydrogen demand in Germany by 2030.

Uniper COO Mr David Bryson noted that while Germany intends to produce Green Hydrogen comprising 14 TWh energy, the forecast demand is 90-100 TWh. Mr Bryson noted that: "We will be heavily reliant on imports if we want to use hydrogen to help us achieve our climate goals".

It is anticipated that *Green Wilhelmshaven* will supply industrial users as well as being connected to the infrastructure being developed in northern Europe and Europe more broadly (see above).

(The decision of Uniper to develop *Green Wilhelmshaven* is reported to have ended its plans to import LNG using a floating storage and regasification unit at Jade Bay, in Wilhelmshaven.)

See: [Uniper Plans to Make Wilhelmshaven a Hub for Climate friendly Hydrogen](#)

- On April 15, 2021 it was announced that RWE AG (German energy giant) and The Hydrogen Utility Pty (**H2U**) have agreed a memorandum of agreement (**MOA**) under which supply of hydrogen will be developed from Australia to Europe.

It is reported that the likely location for the import of the hydrogen would be Brunsbettel. H2U is working on project developments in Australia and New Zealand, most notably, the planned Eyre Peninsula Gateway project in South Australia, at which an 75 MW electrolyser is to be developed initially, with planned expansion to 1.5 GW to 2030. The *MOA* aligns with the joint German – Australian supply chain feasibility study "HySupply" currently being undertaken.

See: [RWE partners with H2U to bring Australian hydrogen to Germany](#)

- On April 15, 2021 it was reported that the Government of India is planning to use a 2 GW solar and wind capacity to facilitate the production of clean hydrogen, and to hold Green Hydrogen auctions as part of its broader plans to reduce GHG emissions. It is understood that it may be made mandatory for industrial users to source a stated percentage of the hydrogen demand from producers of Green Hydrogen located in India.

As noted in previous editions of Low Carbon Pulse and articles in the S2H2 series, policy settings are required from government to allow supply and demand to develop in tandem.

The policy settings being contemplated by the Government of India are ideal in that they allow the Green Hydrogen industry to develop and to grow as the percentage of Green Hydrogen used by industry increases, and because of a developing supply and demand side, other users of Green Hydrogen are likely to provide further demand to support future increased supply.

See: [Green hydrogen auctions, purchase obligations in the offing](#)

CCS and CCUS round-up:

- Under the Acorn Development Agreement for the 5mtpa Acorn CCS Project, Storegga Geotechnologies, Shell and Harbour Energy (as equal shareholders) are planning to proceed with CCS and hydrogen projects. CO₂ will be sourced from the St Fergus Gas Terminal (and from the UK and Europe) to the Port of Peterhead. The St Fergus Gas Terminal, which is near Peterhead, will use natural gas as feedstock to produce clean hydrogen (in the form of Blue Hydrogen). The Acorn CCS Project will satisfy half of the CO₂ emissions target in accordance with Point 8 (including to capture

and store 10 mtpa of CO₂ by 2030) in the UK Government's [Ten Point Plan](#) (reported on in [Edition 4](#) of Low Carbon Pulse).

In early March it was reported that Mitsui had invested in Storegga Geotechnologies. Macquarie Group and GIC are shareholders in Pale Blue Dot, the parent company of Storegga Geotechnologies.

See: [Acorn accord: Shell and Harbour become partners in UK blue hydrogen and CCS project](#)

- It has been reported that Mitsubishi Heavy Industries and Next-Decade have executed an agreement for CCS development at Rio Grande LNG, located in Brownsville, Texas: the agreement is reported to be an engineering services agreement for the design and licensing of post-combustion carbon capture technology to be used at the NextDecade Rio Grande LNG project. It is anticipated that on full development the NextDecade Carbon Solutions CCS project will capture and store permanently around 5 mtpa of CO₂.

See: [NextDecade and Mitsubishi Heavy Industries America Execute Engineering Services Agreement for Carbon Capture at Rio Grande LNG Project in Texas](#)

Net-zero round up:

- On April 9, 2021, Swedish shipping giant, Stena Bulk committed to net-zero GHG emissions by 2050: each consignment of cargo carried by Stena Bulk will be carried on a carbon neutral basis. As is the case with many other corporations committing to net-zero, Stena Bulk has set itself interim targets for 2025, 2030, 2035 and 2040.

As with other freight and transport companies, for Stena Bulk to achieve net-zero GHG emissions it needs to modify, and over time replace, its fleet to allow use of carbon-neutral energy carriers to power and to propel its cargo carriers. It is likely that Stena Bulk will use carbon-offsets to achieve interim targets that it has set itself.

See: [Stena Bulk sets 2050 net zero target](#)

- It has been reported that Anglo American has contracted for the provision of 100% of its electrical energy needs in South America to be matched from renewable electrical energy sources. For these purposes, Anglo American has recently contracted with Engie Energia Peru in respect of its copper mine at Quellaveco, Peru, to be supplied with the renewable electrical energy from the Engie USD 300 million, 260 MW Punta Lomitas wind farm project. In 2019, Anglo American contracted with Enel Chile in respect of its Los Bronces copper mine and its activities at El Soldado and Chagres.

It is anticipated that world copper production will double by 2050 as decarbonisation of energy use increases. As mining companies work to achieve their own net-zero GHG commitments it is clear that the role of renewable energy industry in the mining industry globally will increase, both to displace existing non-renewable sources, and to allow the development and expansion of new mining resources.

See: [Anglo American inspires rise in renewables](#) and [Copper demand to double with decarbonisation: BHP](#)

- Royal Dutch Shell Plc has released its [Shell Energy Transition Strategy](#), describing, at a higher level, what Shell intends as its works to become a net-zero emission energy business by 2050.
- On April 15, 2021, Apple Inc announced a plan to invest USD 200 million in fund to invest in timber-producing commercial forestry activities. The Restore Fund, is a partnership between Apple and Conservation International and Goldman Sachs. The aim of the Restore Fund is to remove one million tonnes of CO₂ from the atmosphere each year. This is an example of a negative GHG emission initiative.

As noted in [Edition 9](#) of Low Carbon Pulse and in the second article in the **Shift to Hydrogen (S2H2): Elemental Change** series, entitled **What needs to be decarbonised? And what role can hydrogen play** there is an increasing realisation of the need for negative GHG emission initiatives for countries, provinces and states within countries, cities and towns, and corporations to achieve their GHG reduction and net-zero GHG commitments.

See: [Apple announces US\\$200 million forestry fund to reduce carbon](#)

- On April 16, 2021, Singapore's DBS Bank committed to zero thermal coal exposure by 2039. The implications of this commitment are that DBS will cease immediately to accept as a customer any

organisation sourcing more than 25% of its revenue from thermal coal and from January 2026 will cease to finance any organisation that sources more than 50% of its revenue from thermal coal, other than to provide finance to such an organisation to enable it to develop non-thermal coal and renewable energy activities.

See: [DBS Bank commits to zero thermal coal exposure by 2039](#)

The author of Low Carbon Pulse is Michael Harrison.

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We bring together lawyers of the highest calibre with the technical knowledge, industry experience and regional know-how to provide the incisive advice our clients need.



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