Low Carbon Pulse - Edition 42

GLOBAL DEVELOPMENTS IN PROGRESS TOWARDS NET-ZERO EMISSIONS

Welcome to **Edition 42** of **Low Carbon Pulse** – sharing significant news on progress towards net-zero greenhouse gas (***GHG***) emissions (***NZE***) for the period from **Friday July 1**, **2022** to **Sunday July 10**, **2022**.

Click here for the ***First Compendium of Low Carbon Pulse*** (containing **Editions 1** to **28**, covering the period from October 6, 2020 to October 5, 2021), here for the ***Second Compendium of Low Carbon Pulse*** (containing **Editions 29** to **38**, covering the period from October 7, 2021 to March 31, 2022), and here for the ***Third Compendium of Low Carbon Pulse*** (containing **Editions 39**, **40** and **41** covering **April**, **May** and **June**, **2022**).

Welcome to the weekly news-cycle Low Carbon Pulse:

As foreshadowed in recent editions of Low Carbon Pulse, during July 2022 we are trialling a weekly news-cycle for Low Carbon Pulse. As regular readers of Low Carbon Pulse will know, for the last three months (April, May and June 2022) we have trialled a monthly news-cycle, having previously applied a two week news-cycle. Both the monthly and two weekly news-cycles resulted in long publications, not ideal for those seeking a "quick-read". It is hoped that the weekly news-cycle will provide the right balance / length (between 8,000 and 10,000 words, and 12 to 15 pages in length).

Vale those lost:

Our continued condolences for those lost in the conflict in Ukraine, and safe-haven for those displaced. Our condolences to the family and friends, and the people of Japan, for the cruel and untimely loss of Mr Shinzo Abe.

Legal, Policy Setting and Regulatory highlights, and Helpful Publications:

- **Taxonomy Delegated Act to go live on January 1, 2023**: On the basis that neither the European Council nor the European Parliament objected to the ***Taxonomy Complementary Climate Delegated Act*** by July 11, 2022, the **Taxonomy Delegated Act** will enter into force on January 1, 2023. The ***Taxonomy Complementary Climate Delegated Act*** provides the ***EU Taxonomy*** for what constitute **sustainable** activities. The action plan for financing sustainable growth noted the need for a clear definition of **sustainable** in the context of prescribed activities, being activities eligible for funding support under the **Green Deal**. Attached is the link to the first ***Taxonomy Climate Delegated Act*** that was published on December 2021 and has been applicable since January 2022.

  One of the matters debated from late 2021 to July 11, 2022 was the inclusion of **natural gas** and **nuclear energy** as sustainable, and the funding that accompanies green energy transition. The ***EU Taxonomy*** includes **natural gas** and **nuclear** activities as eligible for funding support in certain circumstances.

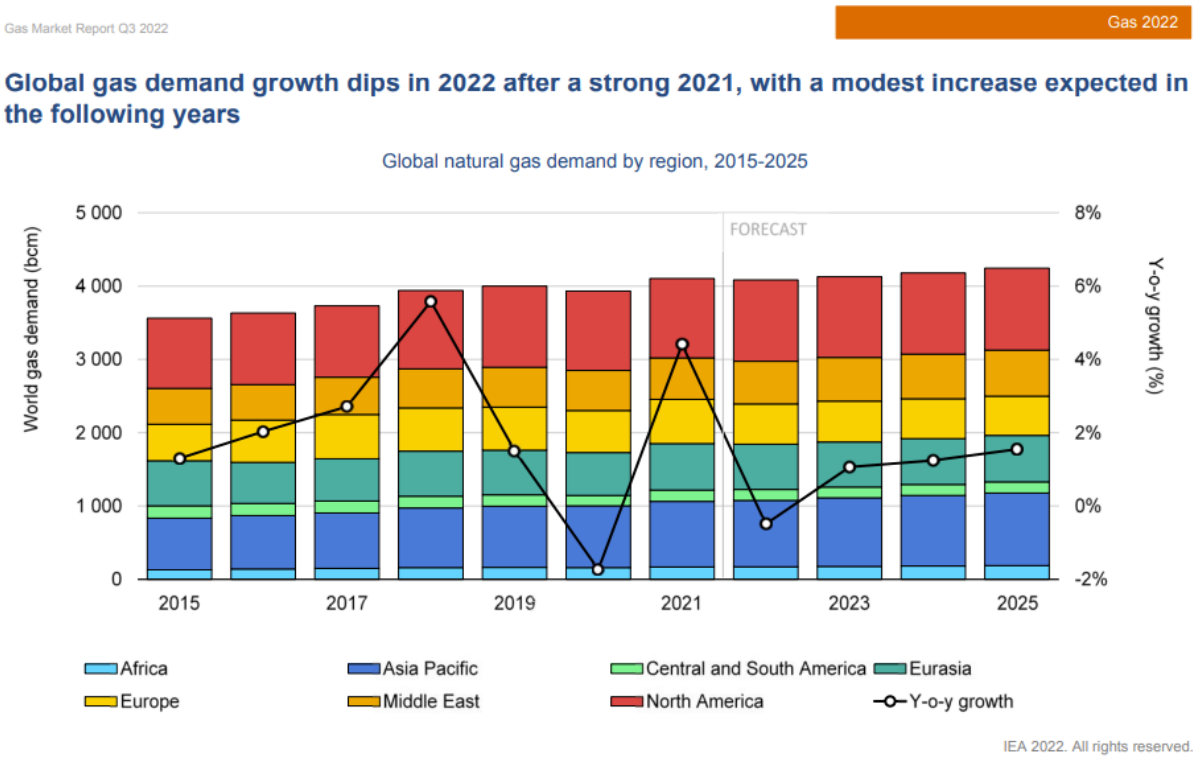
  By way of background: The ***EU Taxonomy*** is a classification system, establishing a list of environmentally sustainable activities, providing corporations, financiers and policy makers with clear definitions as to activities that are environmentally sustainable. The ***Taxonomy Regulation*** entered into force on **July 12**, **2020**, establishing that basis for the ***EU Taxonomy***, and in this context stating four overarching conditions that an activity has to achieve to be treated as environmentally sustainable. Under the ***Taxonomy Regulation*** the **European Commission** (**EC**) was responsible for the development of the ***EU Taxonomy***.

- **Nature Based Solutions**: During the first week of July, the author of Low Carbon Pulse read the **European Commission** publication ***The Vital Role of Nature-Based Solutions In a Nature Positive World***, which was released by the **Directorate-General for Research and Innovation**.

  The publication is an excellent primer for **Nature-Based Solutions** (**NBS**) and **Nature-Based Enterprises** (**NBE**). It is hoped the resources and time are devoted to the development of the thinking in the publication in the near term.
- **International Energy Agency** (***IEA***) publications:
  - On **July 5**, **2022**, the ***IEA*** published its ***Gas Market Report Q3-2022***. The publication is excellent, providing a good sense of the multi-facetted dimensions of current global gas markets. The headline is that natural gas demand is expected to decline in 2022, and to remain subdued through 2025.

    The pursuit of LNG by Europe is likely to result in prolonged tighter markets.

    Faster development and implementation of clean energy transition policy settings in mature gas markets would ease price pressure, and help emerging market access to natural gas suppliers that will allow them to achieve near to medium term improvements in carbon intensity and air quality.



  - On **July 6**, **2022**, the ***IEA*** published its ***Solar PV Global Supply Chains*** (**An IEA Special Report**). The publication is excellent, providing an **A-to-Z** guide to the photovoltaic solar supply industry, and policy setting recommendations. The key forward looking findings from the publication include:

    1. the need to diversify photovoltaic solar supply chains to ensure that the energy transition progress at the rate required to progress to ***NZE***; and

    2. Government policy settings are critical to ensuring that diversified and secure photovoltaic solar supply chains are realised.

    As usual with the ***IEA***, recommendations are made:

    (**a**) diversify raw material supplies, and manufacturing capacity;

    (**b**) de-risk investment, in particular in the development of manufacturing capacity;

    (**c**) ensure environmental and social sustainability;

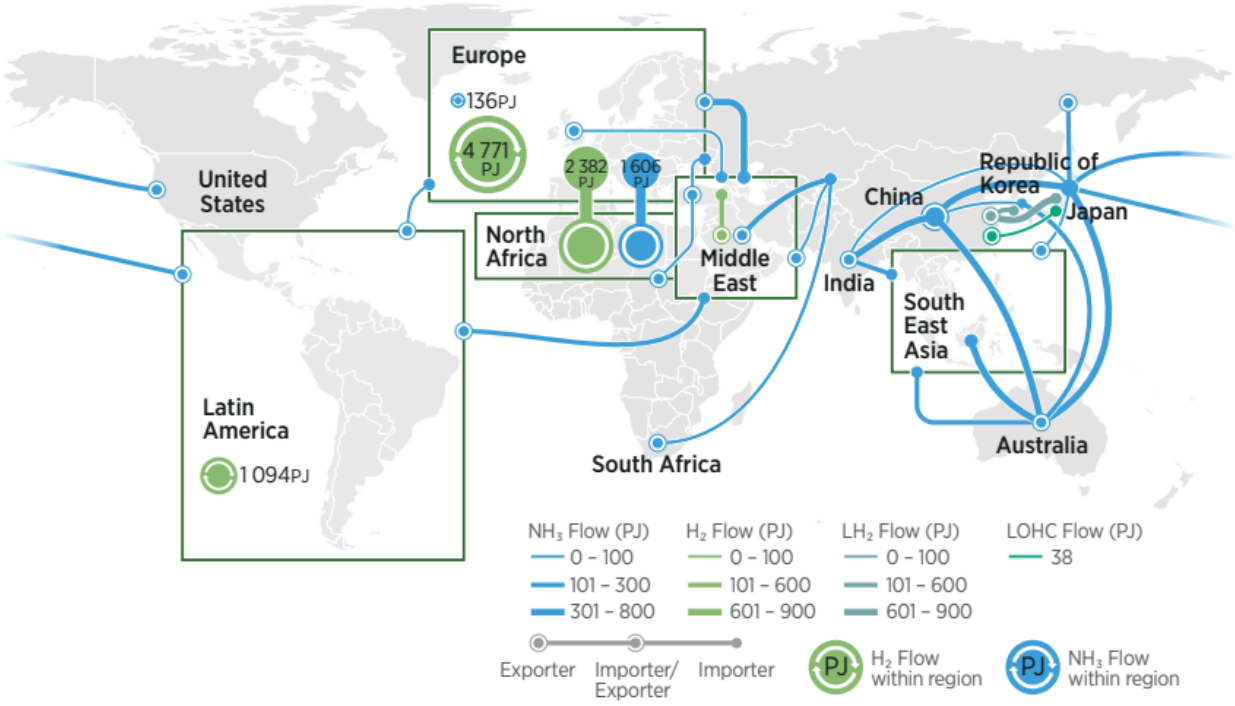
    (**d**) continue to foster innovation; and

    (**e**) develop and strengthen recycling capabilities.

    All of these recommendations are sound and of broad application to most, if not all, countries.
- **International Renewable Energy Agency** (***IRENA***) publications:
  - On **July 8**, **2022**, ***IRENA*** published ***Global Hydrogen Trade to Meet the 1.5°C Climate Goal – Part I – Trade Outlook for 2050 and Way forward***. (**Edition** 40 of Low Carbon Pulse included links and a brief analysis of **Parts** I and II: links to those publications are included for ease of reference.)

    The following infographic includes a summary of the suggested trade activity by 2050. The publication is excellent.

FIGURE 0.1. Global hydrogen trade flows under *Optimistic* technology assumptions in 2050



Source: ***IRENA***

One of the key findings from the publication is that international trade in hydrogen and ammonia will amount for about 25% of the total mass of hydrogen and ammonia produced.

> "To make trade cost-effective, the cost of producing green hydrogen must be sufficiently less expensive in the exporting region than in the importing region to compensate for the transport cost. This cost differential will be become larger as the scale of projects increases and technology develops to reduce transport costs".

The report goes on to make the more telling point:

> "As the operating cost of renewables are very low, having a low weighted average cost of capital (WACC) is critical to the cost-effectiveness of trade. Absolute levels of country differences in WACC both significantly affect the trade outlook and determine whether a country becomes an exporter or an importer. If WACC remains roughly as it is today, countries that have good-quality resources [i.e., renewable energy resources] and low WACC would become the largest green hydrogen exporters and would be responsible collectively for almost 40% of the global trade".

- On **July 8**, **2022**, ***IRENA*** published ***China's route to carbon neutrality: Perspectives and the role of renewables***. The publication takes as its starting point the announcement by **President Xi Jinping** (in September 2020 (see **Edition 1** of Low Carbon Pulse)) at the 75th Session of the United Nations General Assembly that the ***PRC*** would aim to achieve peak ***GHG*** emissions before 2030.

  The publication notes that for the ***PRC*** to peak before 2030 (and achieve its ***NZE*** goal by 2060), it will have to **maximise** the development and deployment of **renewable-based power** generation. This maximisation needs to be **combined** with direct and indirect **electrification** of **end-use sectors** (critically, the building, industrial and transport sectors), supplemented by the **sustainable use of bioenergy**, **hydrogen** and **synthetic fuels**. This is a common theme, not specific to the ***PRC***. Under the ***PRC* and Russia** section (at **page 5** below) the 13 recommendations of the publication are outlined.

Climate change reported and explained:

CO_2* levels**: Recent editions of Low Carbon Pulse have reported on the elevated levels of ***CO_2 in the atmosphere, in particular it was reported that:

> "On **May 14**, **2022** it was reported widely that a new daily record of **421.37 ppm** had been recorded by the **Scripps Institution of Oceanography** at the **University of California**, **San Diego**, with similar record levels confirmed by the US **National Oceanic & Atmospheric Administration** (**NOAA**) of **421 ppm**".

As reported in **Forbes**, in May 2022 the ***CO_2*** measured at **NOAA**'s Mauna Loa Atmospheric Baseline Observatory (Hawaii) peaked at **420.99 ppm**, consistent with the **420 ppm** reported in **Edition 40**.

During **June 2022**, the levels of ***CO_2*** in the atmosphere were at a slightly lower level than the peak of May. As explained in **Edition 40** of Low Carbon Pulse, ***CO_2*** levels tend to peak during April and May each year as a result of increased decomposition of vegetation.

The underlying trend however remains upwards, and increasingly so.

Middle East including GCC Countries:

- **UAE approves circular economy polices**: On **July 3**, **2022**, thenationalnews.com reported that the **UAE** had approved 22 policies intended to accelerate the transition of the **UAE** to a circular economy. The 22 policies focus on the food, infrastructure, manufacturing and transport sectors.
- **73 GW of renewable projects planned across MENA**: On **July 3**, **2022**, renewablesnow.com reported on the current planned development of renewable electrical energy projects across **MENA**.

Capacity in MW	Wind operating capacity	Wind prospective capacity	Solar operating capacity	Solar prospective capacity
Oman	50	0	130	15,300
Morocco	1,165	963	702	13,430
Algeria	10	5,030	434	4,982
Kuwait	10	132	20	9,500
Iraq	0	0	0	5,755
Saudi Arabia	400	500	376	4,590
UAE	0	30	2,600	3,970
Egypt	1,641	2,350	1,882	904

Source: renewablesnow.com

- **DEWA increases photovoltaic capacity**: On **July 5**, **2022**, it was reported widely that the **Dubai Electricity and Water Authority** (**DEWA**) had installed **100 MW** of **additional photovoltaic solar** capacity at the **5 GW Mohammed bin Rasid Al Maktoum Solar Park** as part of the fifth phase of the development of the project. The project comprises both photovoltaic solar and concentrated solar power.

Africa:

- **Gabon to create 187 million carbon credits**: On **July 1**, **2022**, bloomberg.com reported that **Gabon** (the second-most forested nation after Suriname) intends to create **187 million carbon credits**, almost half of which may be sold in voluntary carbon markets. As reported, the creation of **187 million carbon credits** (representing **187 million metric tonnes** of ***CO2*-e** emissions) would be the largest single creation of carbon credits to date. It is understood that the Government of Gabon is working with United Nations Framework Convention on Climate Change's **REDD+** mechanism to create the carbon credits.
- **Djibouti a thing of beauty for FFI**: On **July 5**, **2022**, **Fortescue Future Industries** (**FFI**) announced that it had signed a **Framework Agreement** with the **Government of the Republic of Djibouti** to undertake studies to assess the prospects for the development of Green Hydrogen production capacity. As noted by **FFI**, **Djibouti** has excellent geothermal, photovoltaic solar and wind renewable resources, and good access to ports to allow the development of Green Hydrogen production facilities (and associated renewable electrical energy generation facilities), and to export the Green Hydrogen produced.

India and Indonesia:

- **Tata Power and Government of Tamil Nadu do well**: On **July 4**, **2022**, pv-magazine-india reported that **Tata Power** (leading Indian integrated power corporation) and the Government of the **state of Tamil Nadu** had signed a memorandum of understanding to invest **USD 380 million** to develop a **4 GW photovoltaic giga-factory**. The giga-factory will integrate mono-**PERC** (passivated emitter and rear contact) bifacial technology with future n-type technology of **TOPCON** (tunnel oxide passivated contacts), and will produce high-wattage modules.
- **Websol to produce PERCs and TOPCONs**: On **July 4**, **2022**, it was reported widely that **Websol Energy Systems Limited** (leading manufacturer of photovoltaic cells and modules) had announced plans to develop a **1.8 GW** giga-factory manufacturing **PERC**s and **TOPCON**s.
- **First grid-scale storage tenders**: On **July 4**, **2022**, pv-magazine-india reported that **NTPC Limited** (state-run power producer, and India's largest energy corporation) and **Solar Energy Corporation of India Limited** or **SECI** (state-owned renewable energy corporation) are to procure **500 MW** / **3,000 MWh** and **500 MW** / **1,000 MWh** of ***BESS*** respectively, which on procurement and installation will be added to the 1 GW / 4 GWh of current ***BESS***.

This may be regarded as a great start of the development and deployment of ***BESS*** across India with the Central Electricity Authority of India predicting that India will have to develop and to deploy 27 GW / 108 GWh of grid-scale ***BESS*** and around 10.1 GW of pumped hydro-electric pumped storage (**PHES**) within the current decade to meet its non-fossil fuel goals for 2030.

- **Ministry of Steel seeks time-bound action plans**: On **July 4**, **2022**, The Economic Times reported (under ***Govt directs steel industry to draw time-bound action plan to lower CO2 emissions***) that the Government of India Ministry of Steel had asked stakeholders to develop time-bound action plans to reduce ***GHG*** emissions arising from the iron and steel industry.

  The Economic Times notes that the iron and steel industry in India is responsible for 12% of the total ***GHG*** emissions arising across India, and the Minister of Steel, Ram Chandra Prasad Singh is seeking commitments from the iron and steel industry consistent with the nationally determined contribution of India under the **Paris Agreement**.

  As might be expected, the use of green hydrogen and the use of CCS and CCUS technologies are being considered and discussed as the means to reduce ***GHG*** emissions arising from the iron and steel industry.
- **ACME Group announces Green Hydrogen production facility**: On **July 5**, **2022**, **ACME Group** announced plans to develop further **Green Hydrogen** and **Green Ammonia** production capacity in India with the development of a **USD 6.6 billion Green Hydrogen** and **Green Ammonia** production facility in the state of **Tamil Nadu**. (This follows the announcement in June to develop **USD 6.7 billion** production facilities in the state of **Karnataka**.)

  ACME Group has stated that it has signed an agreement with the Government of the state of **Tamil Nadu** for these purposes. As announced, the Green Hydrogen and Green Ammonia production facility will comprise **1.5 GW** of **electrolyser capacity**, and will be able to produce up to **1.1 million metric tonnes** of Green Ammonia a year.
- **NTPC Renewable Energy Ltd (NTPCREL) and Gujarat Alkalies and Chemicals Limited (GACL) team**: On **July 6**, **2022**, it was report that **NTPCREL** and **GACL** had signed a memorandum of understanding providing a basis for them to work together on Green Hydrogen and Green Ammonia and Methanol and renewable energy projects, including development of a production facility for captive / own-use by **GACL** at its Dahej and Vadorara complexes.
- **India Hydrogen Alliance- June 2022**: Attached is the link to the June edition of the ***India H2 Monitor – June 2022***. As noted in previous editions of Low Carbon Pulse, we intend to include the link to, rather than to repeat the content of, the ***India H2 Monitor***.

Japan and Republic of Korea (*ROK*):

- **Hanwha out and about:** On **July 1**, **2022**, **Hanwha** announced the establishment of **Q Energy**. Based in Berlin, Germany, **Q Energy** business comprises photovoltaic solar and wind farm and field development, with **Q Energy** to play a role along the entire supply / value chain as a technology provided, a developer, and as an EPC and O&M contractor. As announced, **Q Energy** intends to participant beyond its well-recognised strength in photovoltaic solar, including on off-shore wind field developments and hydrogen production.
- **K-Hydrogen Council establishes fund for the hydrogen industry**: On **July 8**, **2022**, hydrogen-central.com reported that at the **Korea H2 Business Summit**, the **K-Hydrogen Council** established a fund to promote the hydrogen industry. The fund was established with **₩ 500 billion** (USD 380 million).

  As reported, the hydrogen fund "will establish domestic and overseas hydrogen production, distribution and storage infrastructure and make investments to develop core hydrogen technology".

  By way of reminder: **Edition 19** reported that: "On June 10, 2021, Hyundai, Hyosung, and POSCO announced the launch of an industry wide body - the Korean Hydrogen Council. The Council will be launched officially in September 2021 as the K-Hydrogen Council. The Chair of Hyundai Motor Group, Mr Chung Euisun, stated that the goal of the K-Hydrogen Council is "to foster the widespread use of clean energy across industries and advance a hydrogen-based society".

PRC and Russia:

- ***PRC*** and ***IRENA*** - ***China's route to carbon neutrality: Perspectives and the role of renewables***: As noted above, on **July 8**, **2022**, as part of the strategic partnership between ***IRENA*** and the ***PRC***, ***IRENA*** published ***China's route to carbon neutrality: Perspectives and the role of renewables***.

  The publication contains a **13-Point Plan** for the ***PRC*** (being 13 recommendations for the PRC to consider and to explore), as the largest producer and consumer of energy, to reach **peak emissions by 2030**, and ***NZE*** **by 2060**.

  The **13-Point Plan** makes the following recommendations:

  1. Developing and implementing an integrated long-term energy plan; **2**. Maintaining energy efficiency improvements as a priority; **3**. Accelerating the phase-down of coal consumption; **4**. Accelerating the transition toward renewable power; **5**. Reforming power networks; **6**. Increasing the electrification of the end-use sector; **7**. Expanding the direct use of renewables, particularly biomass for energy purposes; **8**. Scaling up the production and use of hydrogen and synthetic fuels; **9**. Supporting cities as champions of low carbon living; **10**. Continuing progress in light-duty transport and broadening to heavy-duty and long-haul modes; **11**. Laying the groundwork for industrial sectors to achieve net-zero emissions; **12**. Continuing to support technology RD&D and broader systemic innovation; and **13**. Deepening global engagement.

  These recommendations (and sub-recommendations) are to be found on **pages 7** to **16** of the publication, and, along with the rest of the publication, are well-worth a read.

  We have included for completeness an earlier ***IRENA*** report on the ***PRC*****:** ***Net-Zero Pathways for Cities: The Case Study of Wuzhong District, Suzhou, China***.
- **BEVS in *PRC***: On **July 5**, **2022**, **S&P Global Commodity Insights** published an info-graphic detailing the dynamics of the development of the battery electric vehicle market in the ***PRC***.

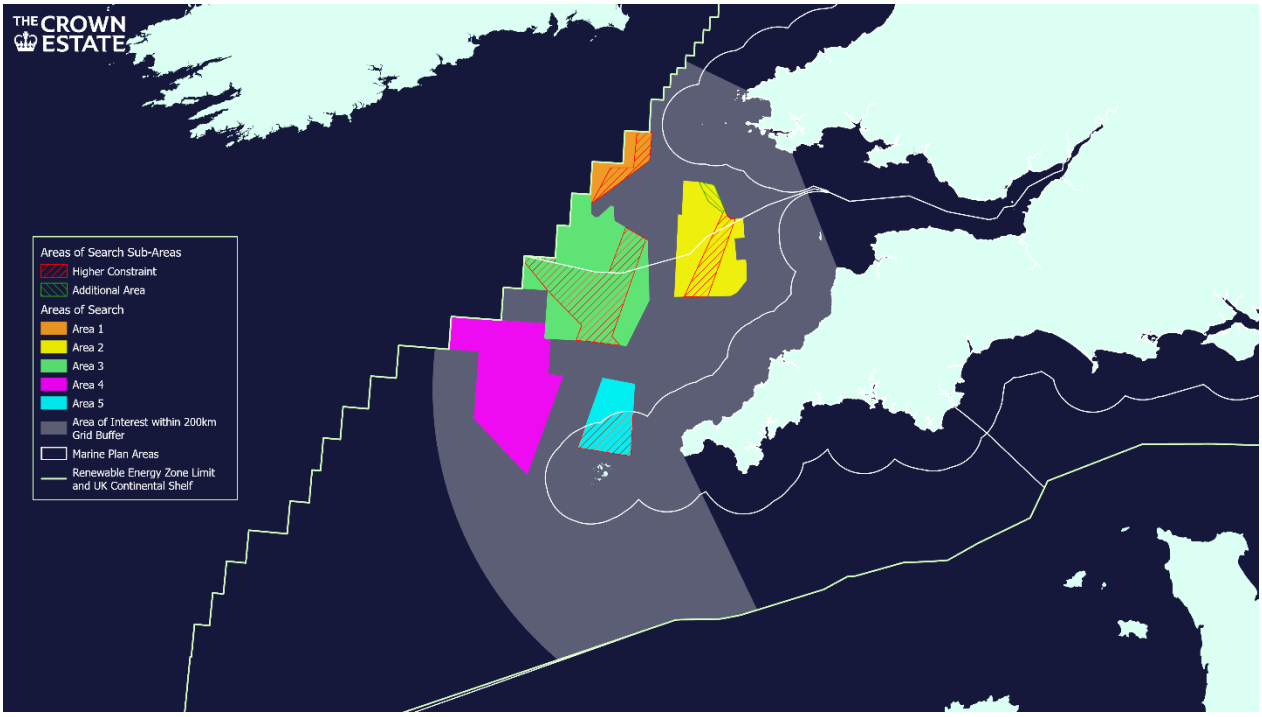
  We have included a link to the info-graphic. In passing, it is noted that the info-graphic tends to indicate that the ***PRC*** is ahead of the recommendations outlined above.

Europe and UK:

- **The Crown Estate announces Celtic Sea Floating Off-shore Wind areas**: On **July 5**, **2022**, **The Crown Estate** announced that it had identified five **Areas of Search**, being "areas of potential opportunity that have been highlighted".

  The next step in **The Crown Estate** process is to undertake further stakeholder engagement and technical analysis, and Plan-level Habitats Regulations Assessment (**HRA**) will start, bringing forward the **HRA** process before auction in 2023: this will narrow down the Areas of Search into more defined Project Development Areas.

  The Crown Estate notes that bringing forward the **HRA** process will accelerate development timelines and reduce risk for developers. It is expected that up to **4 GW** of Project Development Areas will be auctioned in the Celtic Sea.



- **GRR models and awards**: On **July 5**, **2022**, the UK **Department for Business**, **Energy & Industrial Strategy** announced the commencement of an open consultation process in respect of its business model for greenhouse gas removal (GRR) technologies: ***Business models for engineered greenhouse gas removals: accelerating investment in engineered carbon removals***. The consultation period closes at 11.45 pm on September 27, 2022.

  On **July 8**, **2022**, the UK **Department for Business**, **Energy & Industrial Strategy** announced the ***Projects selected for Phase 2 of the Direct air capture and greenhouse gas removal programme***, with 15 projects awarded funding: each project and its funding is outlined in the attached link.

- **Energy Security Bill introduced**: On **July 6**, **2022**, the UK **Energy Security Bill** was introduced into the UK Parliament by the **Business and Energy Secretary**, **Mr Kwasi Kwarteng**. On enactment, the **Energy Security Bill** will effect the "biggest reform of [the UK] energy system in a decade". The **Department for Business**, **Energy & Industrial Strategy** published background to the **Energy Security Bill** under **Plans to bolster UK energy security set to become law**, contains key points in the following publication: Energy Security Bill – Building a clean, affordable, home-grown energy system.

- **Contracts for differences awarded**: On **July 7**, **2022**, the UK **Department for Business**, **Energy & Industrial Strategy** announced the results of its renewables auction scheme for contracts for differences (**CfD**s), with **CfD**s awarded in respect of **10.8 GW** of clean energy. As announced, **CfD**s were awarded in respect of nearly **7 GW** off-shore wind field capacity, **1.5 GW** of onshore wind capacity, and **2.2 GW** of photovoltaic solar capacity. Attached is a link to the full list of the successful applicants for **CfDs**.

  The awards on **July 7**, **2022**, were made under the fourth round of the **CfD scheme**. The **CfD**s awarded under the scheme provide revenue certainty to those developing and financing clean energy projects. The award of **CfD**s in respect of **10.8 GW** in the fourth round is only a little less than **11.26 GW** awarded across the first three rounds combined.

  On **July 7**, **2022**, **Ørsted** announced that it had been awarded a **CfD** for the world's single biggest off-shore wind field – its **2.85 GW Hornsea 3** off-shore wind field project. In addition to the **CfD** for **Hornsea 3**, **CfD**s were awarded as follows for off-shore wind fields: **1.396 GW Norfolk Boreas** (**Phase 1**), **1.372 GW East Anglia Three**, **1,080 Inch Cape** (**Phase 1**) and **294 MW Moray West**.

- **FSRU arrives at Eemshaven**: **Edition 40** of Low Carbon Pulse reported on the activity around Europe to procure Floating Storage and Regasification Units (**FSRU**) to allow the regasification of imported liquified natural gas (**LNG**).

  On **July 5**, **2022**:

  - **Exmar** announced its floating **FSRU EEMSHAVEN LNG** is being prepared to commence operation at the **Gasunie**-operated Dutch LNG terminal in **Eemshaven**. The rate at which a number countries across Europe have mobilised to import LNG has been marked, and it seems unlikely that this rate of progress will slow.

- **Uniper** announced that it had commenced construction of the **LNG Receiving Terminal** at **Wilhelmshaven**, to be located at the **Voslapper Groden trans-shipment facility**. As reported in previous editions of Low Carbon Pulse, **Uniper** is developing the **LNG Receiving Terminal** with the support of the German Federal Government. Once constructed, the **LNG Receiving Terminal** will be able to import and re-gasify LNG to supply around 8.5% of the current natural gas demand of Germany.

On **July 7**, **2022**, **Shell Western LNG** was reported to have joined **ČEZ** in booking regasification capacity with **Gasunie** to allow it to import LNG at the **Eemhaven LNG hub** – the **EemsEnergy Terminal**.

An earlier progress check on FSRUs: The long form versions of **Editions 37** and **39** of Low Carbon Pulse reported on the procurement of floating storage regasification units (**FSRUs**) across Europe so as to address energy security concerns by allowing the import of liquified natural gas (**LNG**), as follows:

- **Germany chartering four FSRUs:** On **May 5**, **2022**, German Federal Government Economic Minister, Mr Robert Habeck announced that the **German Federal Government** had committed to charter **four FSRUs**, a commitment of **€2.04** billion (**USD 3 billion**) to allow the import of sufficient LNG to provide 20% of the demand for natural gas in Germany;
- **Gasunie chartering FSRUs**: On **May 10**, **2022**, it was reported widely that **Gasunie** had agreed to charter an FSRU from **New Fortress Energy** to allow the import of LNG at the **EEM Energy Import Terminal**.
- **Gasrid chartering FSRU**: On **May 20**, **2022**, marinelink.com reported that **Gasgrid Finland Oy** had entered into a 10 year charterparty with **Excelerate Energy** to allow the import of LNG for regasification to provide natural gas to the **Baltic Sea Region**, including **Finland** and **Estonia**. In addition, Estonia plans to develop an on-shore LNG receiving and re-gasification terminal at Paldiski; and
- **Lithuania Klaipeda FSRU**: **Latvenergo** has indicated that hopes to import LNG through the **Klaipeda FSRU**. In addition, Latvia has indicated an intention to develop an on-shore LNG receiving and re-gasification terminal at the Port of Skulte.

Americas:

- **Biden Administration opens applications for USD 2.3 billion grid funding**: On **July 6**, **2022**, the US **Department of Energy** (**DOE**) opened the application period for State, Tribal nations and territories to apply for the **USD 2.3 formula grant program** intended to modernise and to strengthen the US power grid against extreme weather, wild fires, and other natural disasters (***Preventing Outages and Enhancing the Resilience of the Electric Grid Program***), administered through the **DOE**'s ***Building a Better Grid Initiative***.
- **Photovoltaic and wind out generate nuclear**: On **July 7**, **2022**, solarpowerworldonline reported that during the first four months of 2022 electrical energy generation from renewable energy sources accounted for over 25% of the electrical energy generated across the US, and for the first time, in April 2022, renewable energy sources generated more electrical energy than nuclear generation power stations.

France and Germany:

- **Germany publishes draft off-shore wind development plan**: On **July 1**, **2022**, offshorewind.biz reported that the German Federal Government Maritime and Hydrographic Agency (**BSH**) had published a draft of the offshore wind area development plan and environmental reports for the North Sea and the Baltic Sea.

  As reported, area development plan covers areas with capacity for **60 GW** of installed capacity **by 2038**.

  As reported in recent editions of Low Carbon Pulse, **Germany** is **committed** to the installation of at least **30 GW** of off-shore wind field capacity **by 2030**, at least **40 GW by 2035**, and at least **70 GW by 2045**.
- **German Bundestag approves green energy law reforms**: On **July 8**, **2022**, renewablesnow.com reported that on **July 7**, **2022**, the German Federal Parliament approved the **Easter Package** (see **Edition 39** of Low Carbon Pulse) and with **Easter Package** given effect through amendment to **Renewable Energies Act**.

  The key amendments increase the target for installed photovoltaic solar from **60 GW** to **210 GW by 2030** (requiring an additional **22 GW** of photovoltaic solar to be developed and deployed annually), **115 GW** of on-shore wind **by 2030** (requiring an additional 10 GW annually), and, as noted above, for off-shore wind field installed capacity **30 GW by 2030**, **40 GW by 2035**, and at least **70 GW by 2045**.

Australia:

- **ARENA shortlisted for funding support**: On **July 6**, **2022**, the **Australian Renewable Energy Agency** (**ARENA**) announced that it had invited **12 *BESS*** projects to submit full applications for the purposes of the **Large Scale Battery Storage Round**. The aim of the **Large Scale Battery Storage Round** is to support grid-scale batteries to be equipped with advanced inverter technology.

  The **12 *BESS*** projects invited by **ARENA** to submit full applications (drawn from 54 expressions of interest reported to have been received by **ARENA**) have an aggregate storage capacity of **3.05 GW** / **7 GW**.
- **Quinbrook Infrastructure plans data storage precinct**: On **July 8**, **2022**, it was reported widely that **Quinbrook Infrastructure** plans to develop a **AUD 2.5 billion** data storage precinct in Brisbane, Queensland. The data storage precinct will source electrical energy to power the data storage precinct from renewable energy sources, and will develop and deploy a **2 GWh *BESS***.

  The project has been christened the **Supernode project**. The **Supernode project** is to be located in the vicinity of the South Pine substation at Brendale (around 30 kms from Brisbane's central business district). The South Pine substation being the central node of the Queensland Electricity Network, ideal for the data storage precinct.

Blue and Green Carbon Initiatives and Biodiversity

- **UN Ocean Conference – key takeaways**: **Edition 41** of Low Carbon Pulse reported on the **UN Ocean Conference** (under **Continued emphasis on the Burning Platform**), that ended on **July 1**, **2022**, and included a link to the communique / new political declaration (**Lisbon Declaration**).

The **key themes** that **emerged** include: the need to address the cumulative impacts of a warming planet and the degradation of eco-systems: "We are committed to halting and reversing the decline in the health of the ocean's ecosystems and biodiversity, and to protecting and restoring its resilience and ecological integrity".

At the **UN Ocean Conference** more than 150 Member States made voluntary commitments to conserve or to protect or both, at least 30% of the global ocean within Marine Protected Areas.

- **Blue Economy Financing Guidelines**: On the side-lines of **UN Ocean Conference**, **UNEP F1**, **Asian Development Bank**, (**ADB**), **International Capital Markets Association** (**ICMA**), **International Finance Corporation** (**IFC**), and **UN Global Compact** announced that they are to work together to develop a guide for bonds to finance the **sustainable blue economy**. As announced, the guide will provide clear criteria, examples and practices for blue bond lending and issuance. The guide is expected to be published in Q3 of 2022.
- **International Institute for Sustainable Development (IISD) score-card**: On **July 4**, **2022**, the ever-excellent **IISD** published its ***Ocean Conference Final: Earth Negotiations Bulletin***. **Pages 3** to **7** of the Bulletin outline the substance of the key debates at the **Ocean Conference**. While the balance of the Bulletin is helpful the text covering the key debates is both informative and succinct.
- **IPBES 9 held in Berlin**: From **July 3** to **July 9**, **2022**, the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (**IPBES 9**) was held in Bonn, Germany.

  On **July 8**, **2022**, the **IPBES Secretariat** issued a media release. The media release includes a ***Summary for Policymakers of the thematic assessment of the sustainable use of wild species of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services***. The summary for policymakers provides key messages as follows: Sustainable use of wild species is critical for people and nature, status and trends in the use of wild species, key elements and conditions for the sustainable use of wild species, and pathways and levers to promote sustainable use and enhance the sustainability of the use of wild species in a dynamic future. For those interested in biodiversity, this is an excellent publication.

  On **July 11**, **2022**, the ***Values of Biodiversity Assessment Report*** was published.

BIODIVERSITY

In the broadest sense, **biodiversity** describes the variety of the fauna and flora globally, and in any particular area. The preservation of **biodiversity** is a key policy setting. In this context, human activities and the clearing of land to undertake agricultural, forestry or other land use (**AFOLU**) is a key focus of policy settings. Desertification and deforestation are key concerns (both as a result of **AFOLU**), as is the broader impact of climate change on habitats, critically, the impact on change in temperature on land and in the ocean.

There is a balance in habitats, with eco-systems that have developed overtime, and that continue to develop. The balance of habitats and their eco-systems are impacted by **AFOLU** and climate change. There are many examples, but a consistent example (that many will recognise) is the need to preserve the habitats of bees and other pollinators, and to avoid loss of bees and other pollinators. As a policy setting, the rewilding of habitats is one element of preservation, and, in some cases, restoration of eco-systems. As a broad statement, preserving wilderness areas, and rewilding of areas, and reducing old growth forestry, and afforestation and reforestation, are key to the preservation and restoration of **biodiversity**. These are policy settings over which we have control in the near, medium and long term. In addition, overtime, policy settings may extend to addressing optimal use of land, optimal in the sense of preserving or restoring **biodiversity** while at the same time addressing climate change. As always, what is needed is known. As always, the challenge is acting upon it.

Climate change will impact the effectiveness of these policy settings (in particular coastal habitats, and areas of increased drought and desertification, driven by rising sea-levels and changes in weather patterns, as a result of climate change), but they are policy settings that are necessary and need to be progressed in the near term. In addition, acting to preserve and to restore **biodiversity** is likely to yield benefits, economic and social.

Bioenergy and heat-recovery:

- **CMA CGM and Engie plan biomethane production**: On **July 4**, **2022**, it was reported widely that **CMA CGM** (French shipping corporation) and **Engie** (leading international energy corporation) plan to develop a **biomethane** production project (**Project Salamander**), with a final investment decision contemplated in Q4 of 2022. Project Salamander will derive biogas and upgrade that biogas to produce **200,000 metric tonnes** of **biomethane** a year, with that **biomethane** (renewable natural gas) then liquified to produce renewable liquified natural gas (aka **Bio-LNG**) to be used by **CMA CGM** on its **E-methane-ready-vessels**.
- **A Gas for Climate report**: On **July 8**, **2022**, the **Gas for Climate** consortium published an update ***Biomethane production potentials in the EU***. The updated publication builds on the previous publication from **Gas for Climate** to take into account the acceleration of the use of biomethane now contemplated by the **EU** – see **Editions** **37** and **40** of Low Carbon Pulse.

  The **key findings** of the publication are: **1**. There is enough sustainable feedstock in the **EU** to achieve the **EU REPowerEU** target of **35 bcm by 2030**, with up to **41 bcm by 2030** and **151 bcm by 2050**; **2**. **Anaerobic digestion** is regarded as having the potential to derive up to **38 bcm by 2030**, and up to 91 bcm by 2050. In the **EU** context, France, Germany, Italy, Poland and Spain will be the top five producers of **biogas** derived **biomethane** using anaerobic digestion technologies. The **key feedstocks** for these purposes **to 2030** being **manure** (33%), **agricultural residues** (25%) and **sequential cropping** (21%); and **3**. **Thermal gasification** is regarded as having the potential to derive up to **2.9 bcm by 2030**, and **60 bcm by 2050**. In the **EU** context, France, Germany, Italy, Spain and Sweden will be the top five producers of biomethane using thermal gasification. The **key feedstocks** for these purposes **to 2030** are **forestry residues** and **wood waste**, together having 60% of the feedstock source.

BIOENERGY

Biomethane: is **Biogas** that has been processed and scrubbed (referred to as "**upgrading**") so that it can be used as pipeline gas. **Biomethane** is a **Biofuel**.

Biogas and **Biomethane** can be used as a fuel or as a feedstock. Also either may be referred to as **Renewable Natural Gas** (or ***RNG***), or in compressed form, as compressed natural gas (or ***CNG***) and in liquified form as **Bio-LNG** or, less frequently, **Renewable LNG**.

Biofuel is a fuel derived or produced from **Biomass**, whether in gaseous, liquid or solid form. In addition to **Biogas** and **Biomethane**, for example, wood products (gaseous and solid biofuels), the following may be regarded as the most prevalent **liquid biofuels:**

- **Bio-ammonia:** being ammonia that is derived or produced using H_2 derived from a renewable source that is then combined with N to produce the compound NH_3;
- **Bio-butanol:** being butanol (i.e., a synthetic alcohol) that is derived or produced from the microbial fermentation of carbohydrates (typically from corn and from agricultural waste), and is similar to motor spirit, and as such may be used as a fuel for internal combustion engines. (It is a drop-in fuel.)
- **Bio-diesel:** being diesel (i.e. synthetic paraffinic compound) that is produced typically using transesterification of animal fats and vegetable oils;
- **Bio-ethanol:** being ethanol (i.e., synthetic alcohol) that is derived or produced the microbial fermentation of carbohydrates (including from corn and sugarcane, and lignocellulosic biomass);
- **Bio-kerosene:** being kerosene (i.e., synthetic paraffinic compound and another kind of methyl ester) that is derived or produced from animal and vegetable oils (containing fatty acids);
- **Sustainable** or **Synthetic Aviation Fuel** (***SAF***), is a synthetic paraffinic kerosene. Currently most SAF is derived or produced from used animal fats and cooking oil and from the gasification of other organic waste streams (typically using some natural gas). (It is a drop-in fuel.);
- **Bio-LNG:** being Bio-methane that is liquified at a temperature of -161°C, with the liquified Bio-methane 1/600th the volume of gaseous Bio-methane; and
- **Bio-methanol:** being methanol (i.e., produced from CO_2 (captured or derived) and H_2 derived from Biomass) that is derived or produced from biochemical (fermentation) or thermochemical (including gasification and pyrolysis) technologies.

A **Biofuel** is an **E-Fuel** (an **electro-fuel**) if the electrical energy used to produce it is sourced from a renewable source. Hence the use of **E-Diesel**, **E-Ethanol**, **E-Kerosene**, **E-LNG** and **E-Methanol**.

BESS and HESS (and energy storage):

Stanwell Power Station Big BESS: On **July 1**, **2022**, it was reported widely that **Stanwell Power Station** (owned by Stanwell Corporation, a State of Queensland, Australia Government Owned Corporation) is to develop **1.45 GW** / **2.9 GWh** ***BESS*** to be co-located with the existing coal-fired power station. The ***BESS*** is to be developed and deployed on a staged basis, with **stage 1** comprising **150 MW** / **300 MWh** lithium-ion battery deployment, and **stage 2** to comprise **1,330 GW** / **2.6 GWh** the deployment of either flow battery or lithium-ion technology.

Carbon Accounting, Carbon Capture and Carbon Capture and Use and *CDR*:

During the news-cycle of this **Edition 42** of Low Carbon Pulse, the author did not come across any new news item sufficiently material or significant to merit inclusion.

Carbon Credits and Hydrogen Markets and Trading:

Impact of VCM on Tropical Rainforests: During the first week of **July**, **2022**, an **Environmental Defense Fund** financed study was published ***Impact of the Voluntary Carbon Market on Tropical Forest Countries – Implications for Corresponding Adjustments***. The study estimates the capacity of the tropical rain forests to match the demand for carbon credits. The study uses three scenarios for carbon credit demand covering two periods – 2021 to 2030 and 2021 to 2050. The study is excellent and well-worth a read.

E-fuels & feedstocks / Future Fuels & Feedstocks / Now Fuels & Feedstocks:

- **Howden and Raven SR compact**: On **July 1**, **2022**, hydrogen-central.com reported that **Howden** (leading compression technology corporation) had contracted with **Raven SR** to provide compression technology to **Raven SR** at its first **waste-to-hydrogen** facility, Richmond, California. (See **Editions** **20**, **23**, **37** and **39** for previous news items on **Howden** and **Raven SR**.)
- **Hydrogen to produce lime**: On **July 1**, **2022**, the constructionindex.com reported that a trial, led by **Tarmac** (UK building and construction materials supplier) at its sites at Tunstead, near Buxton, Derbyshire, UK, had used hydrogen successfully to displace the use of natural gas. As reported, the trial has demonstrated that it is possible to displace the use of natural gas completely by the use of hydrogen. Currently, lime is manufactured from the use of high-heat temperature kilns, heating calcium carbonate from limestone, using natural gas to create that high-heat temperature.

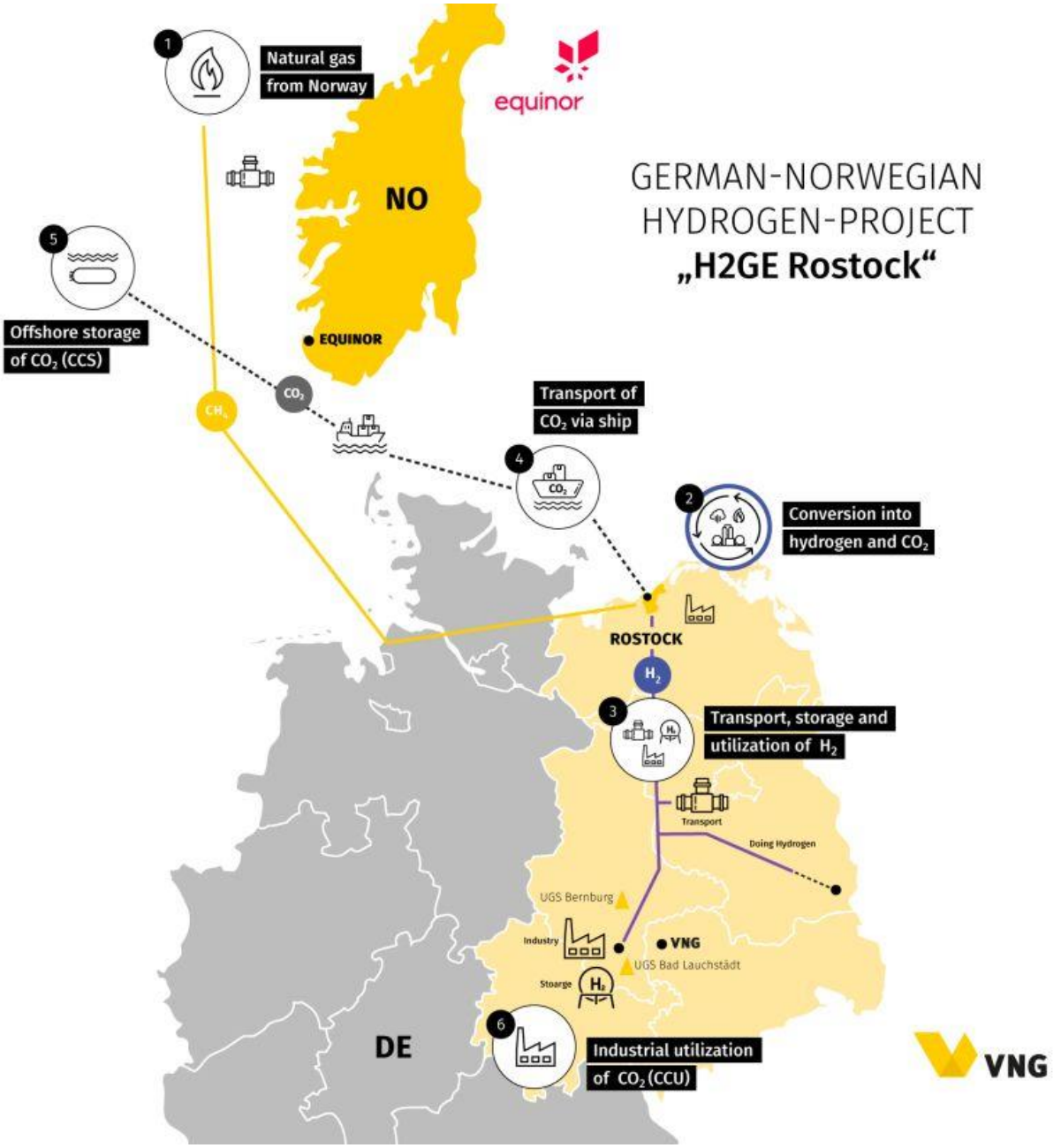
  The use of hydrogen to displace natural gas reduces the ***GHG***s arising from the combustion of fuel. It is important to remember however that this is the minor part of the ***GHG*** equation – the production of lime gives rise to one metric tonne of ***CO_2*** for each metric tonne of cement derived.
- **A first waste to hydrogen facility in the UK**: On **July 1**, **2022**, **EQTEC** announced that it had appointed Wood as its technology partner for the design, development and deployment of a waste-to-hydrogen facility at its Hybrid Energy Park, Southport, Merseyside.

  As announced **EQTEC** and **Wood** have agree to co-develop waste-to-hydrogen facility, using refuse derived fuel as the organic feedstock for the production of hydrogen.

- **Sunfire to provide first multi-megawatt high-heat temperature electrolyser**: On **July 5**, **2022**, it was reported widely that **Sunfire GmbH** had delivered the first two of 12 high-heat temperature electrolyser modules to be installed at **Neste**'s facility at the **Port of Rotterdam**, as part of the **MultiPLHY project**. Once all electrolysers are installed they will provide **2.6 MW** high-heat temperature electrolyser capacity, using **Sunfire**'s **solid-oxide electrolyser cell** (**SOEC**) which operates at temperatures of 850^{O}C.

  The announcement on **July 5**, **2022**, follows the announcement on **July 4**, **2022** that **Sunfire GmbH** is to receive funding support under the Important Projects of Common European Interest (**IPCEI**) initiative to allow it to scale-up its **alkaline electrolyser** and **SOEC technologies**. The German Federal Government (under Ministry for Economic Affairs and Climate Action) has granted an **early start** to the work of **Sunfire**.
- **Shell takes FID on Maasvlakte Green Hydrogen Project**: On **July 6**, **2022**, Shell announced that it had taken a final investment decision (**FID**) to develop its Green Hydrogen production facility located on the **Tweede Maasvlakte**. The Green Hydrogen production facility will deploy **200 MW** of electrolyser capacity to produce **60,000 kgs** (**60 metric tonnes**) of Green Hydrogen a day (**Holland Hydrogen I** project), with the renewable electrical energy to power the electrolysers to be sourced from the **Hollandse Kust** off-shore wind field.

  The Green Hydrogen production facility will be the largest in Europe. (See **Editions** **27** and **31** of Low Carbon Pulse for previous coverage.) The **FID** in respect of **Holland Hydrogen I** project was "big news". This was reflected by the fact that Dutch Prime Minister, Mr Mark Rutte, and Shell CEO, Mr Ben van Beurden, together, announced the **Holland Hydrogen I** project (and the blanket coverage of the announcement across news-feeds and publications).
- **Equinor and VNG coherent whole**: On **July 6**, **2022**, **Equinor** (leading international energy corporation) announced that it was working with **VNG** (German natural gas company) to assess options to produce low-carbon hydrogen from natural gas in Rostock on the Baltic Sea coast.



- **Air Products and VPI sign JDA**: On **July 6**, **2022**, **VPI** (UK-based **power supply company**) announced that it had signed a joint development agreement with **Air Products** (one of the Big Three industrial gas producers) to allow the development of the Humber **Hydrogen Humber Hub** (or **H3**). The **Humber Hydrogen Hub** involves the development of a 800 MW low-carbon hydrogen production facility in Immingham, Lincolnshire, England.
- **UK's first and second plastic parks approved**:
  - **Edition 41** of Low Carbon Pulse reported as follows:

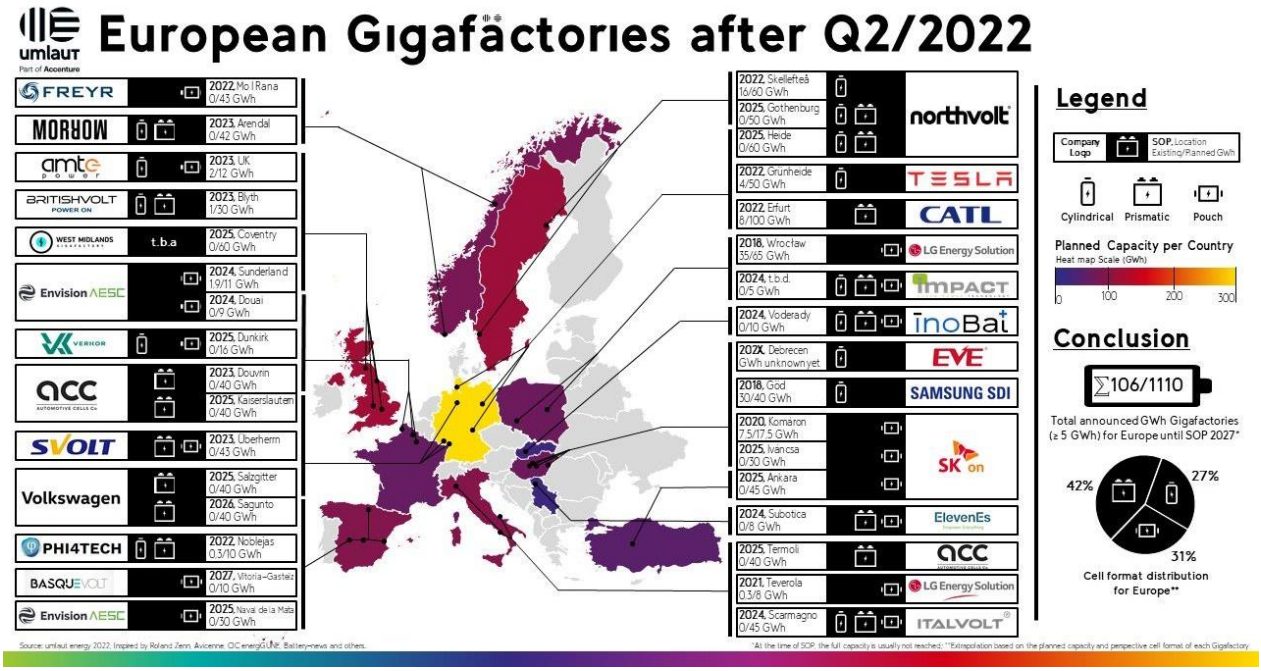
    "On **June 9**, **2022**, utilityweek.co.uk reported that West Dunbartonshire Council had approved the development of the UK's second plastics-to-hydrogen (**P-to-H2**) project. The **P-to-H2** project comprises a **13,000 metric tonne** facility that will derive sustainable hydrogen from non-recyclable plastics.

    The **P-to-H2** project will use **Powerhouse Energy** technology, and will be developed by **Peel NRE**. The **P-to-H2** Is to be located at Rothesay Dock, on the banks of the River Clyde. The **Powerhouse Energy** technology is reported to shred non-recyclable plastic, with the shredded plastic then treated thermally, at high-heat temperatures, with the plastic converting in a gaseous state, with the gases then reformed to derive a synthetic gas comprising ***CH_4*** and ***H_2*** (and ***CO***). The ***CH_4*** is used to generate electrical energy and the ***H_2*** is used as feed-stock to produce fuel for the mobility sector. **Peel NRE** and **Powerhouse Energy** are reported to plan the development of **11 P-to-H2** projects in the UK. The development of the **P-to-H2** project on the banks of the River Clyde, follows the **Peel NRE Protos energy and resource hub** near Ellesmere Port, Cheshire, England".
  - On **July 6**, **2022**, the Councillors at Cheshire West and Chester gave unanimous approval to the **strategic energy and resource hub** located near Ellesmere Port, Cheshire, England. The **strategic energy and resource hub** will process and treat up to **367,500 metric tonnes** of plastics and mixed recyclables a year (**Plastic Park**). The approval for the **Plastic Park** includes approval for the development and deployment of a **materials recycling facility** (**MRF**), **Plastics Recycling Facilities**, **One** and **Two**, a **Polymer Laminate Recycling Facility**, and a **hydrogen refuelling station**.
- **Tasmanian future fast-lane**: Over the weekend of **July 9** and **10**, **2022**, it was reported that **HIF Global** (a Porsche "vehicle") intends to develop a **Future Fuels production facility** in the State of Tasmania, Australia.

Cities, Clusters, and Hubs and Corridors and Valleys, and Giga-Factories:

- **EuroAsia Interconnector selects HVDC supplier**: Previous editions of Low Carbon Pulse have covered the **1,208 km**, **€2.5 billion 2 GW EuroAsia Interconnector** (see **Editions** 23, 32 and 34) to connect **Greece** (**Crete**), **Cyprus** and **Israel**. The **EuroAsia Interconnector** is an Important Project of Common European Interest (**IPCEI**), and was provided with **€657** of funding support earlier in 2022 (see **Edition** 34 of Low Carbon Pulse).

  On **July 4**, **2022**, **EuroAsia Interconnector Limited** announced its choice of **Nexans Norway AS** as its preferred bidder to supply the high voltage direct current cables for the project.
- **Umlaut giga-factory map**: On **July 5**, **2022**, **umlaut company** published its giga-factory map for Europe capturing the Europe giga-factories at the end of Q2 2022.



The map is a great addition to the coverage of the ever-quickening development and deployment of giga-factories.

Green Metals / Minerals, Mining and Difficult to Decarbonise Industries:

- **GravitHy gets off the ground**: On **July 1**, **2022**, it was reported widely that **GravitHy consortium** had announced plans to develop a **€2.2 billion 2 million metric tonnes** a year **direct reduced iron** (**DRI**) plant.

  The **GravitHy consortium** comprising leading corporations, **EIT InnoEnergy**, **Engie New Ventures**, **Forvia**, **Groupe IDEC** and **Plug**, plans to develop the **DRI** plant at **Fos sur Mer**, **France**. It is contemplated that the **DRI** produced will be used on-site as feedstock to produce Green Steel or it will be traded as **hot-briquetted iron** (**HBI**).

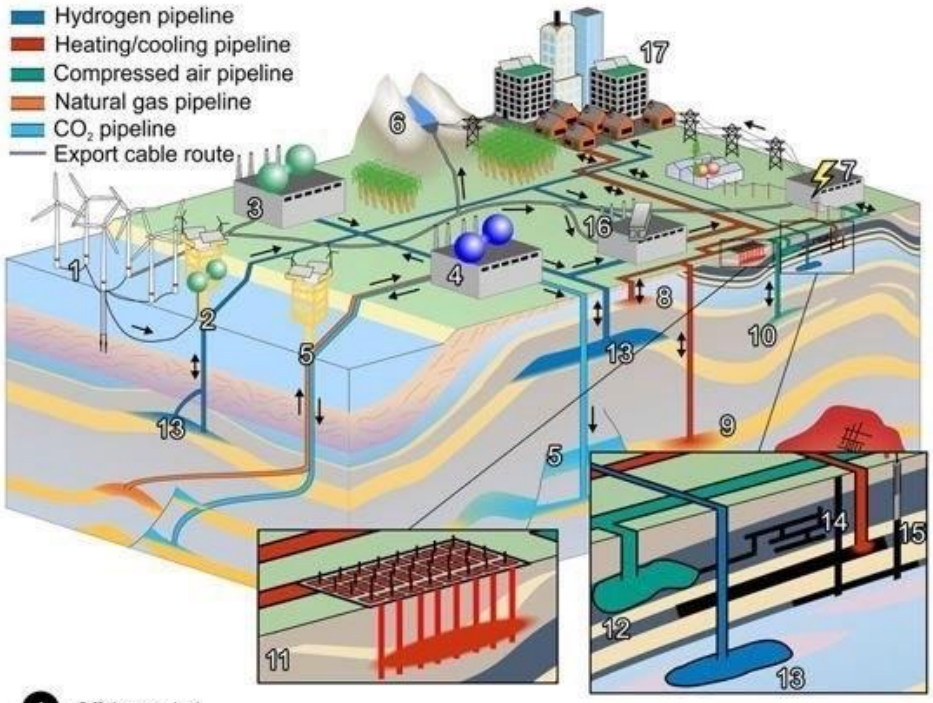
- **EC Technical Report on iron and steel**: In the first week of July, the author of Low Carbon Pulse read the **European Commission Joint Research Centre** (**JRC**) **JRC Technical Report** – ***Technologies to Decarbonise the EU Steel Industry***. The technical report is excellent, outlining the challenges with the decarbonisation of the iron and steel industry, the current size and scale of the iron and steel industry, the means of achieving decarbonisation (including hydrogen to produce direct reduced iron, CCS and CCUS, and iron ore electrolysis) and the cost of achieving decarbonisation, all placed in the context of current levels of ***GHG*** emissions and commitments to reduce them.

  The **JRC Technical Report** follows the publication of **The Sustainable STEEL Principles** (in late June, 2022), which comprises "a set of bank-led commitments to adopt a common measurement and disclosure framework to support the steel industry in forging a pathway to net-zero carbon emissions". There are five **STEEL Principles** reflecting: 1 **S**tandardised assessment; **2**. **T**ransparent reporting; **3**. **E**nactment; **4**. **E**ngagement; and **5**. **L**eadership. The **STEEL Principles** were developed within **RMI** (Independent non-profit clean energy development consultant) and five working group banks, led by **Citi**, **ING**, **Societe Generale**, **Standard Chartered** and **UniCredit**.

  It is estimated that greening the iron and steel industry in the **EU** will require **25.4 GWh** of renewable energy to produce sufficient Green Hydrogen. Stated another way, this is more than half of the increase in wind power capacity contemplated by the **EU REPowerEU** initiatives. As noted in a number of news items, the **EU** iron and steel sector is lobbying for **31 GW** of renewable electrical energy capacity to be developed and deployed by 2030.

Wind round-up, on-shore and off-shore:

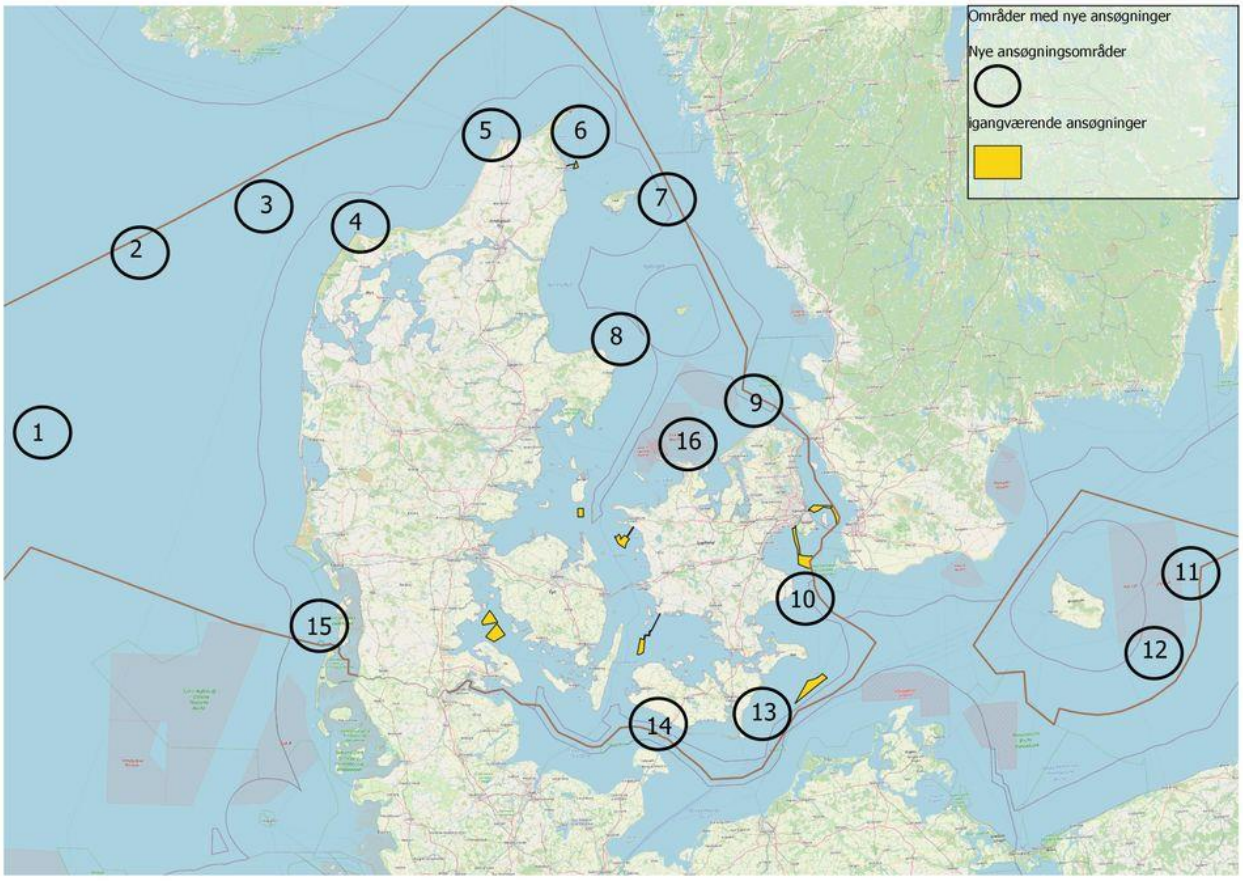
- **Australis and wpd AG JV**: On **July 1**, **2022**, (wpd announcement) it was reported widely that **Australis Energy Limited** (see **Edition 14** and **28** of Low Carbon Pulse) had entered into a **50:50 joint venture** with **wpd AG** (leading on and off-shore wind development corporation) for the purpose of the development and deployment of up to **1.4 GW** of offshore wind field capacity off the coasts of the States of South Australia, Victoria, and Western Australia.
- **Excellent info-graphic for OWF**: On **July 3**, **2022**, the author of Low Carbon Pulse came across the following infographic posted by Charley Rattan on LinkedIn. The graphic is excellent, providing a clear sense of the ecosystem necessary to off-shore wind field development.



1. Offshore wind
2. Offshore green hydrogen production & storage
3. Green hydrogen production & storage
4. Blue hydrogen production with CCS
5. Natural gas production and Carbon Capture & Storage (CCS) site
6. Pumped Hydroelectric Energy Storage (PHS)
7. Electricity substation
8. Shallow aquifer thermal energy storage (ATES)
9. High-temperature aquifer thermal energy storage (HT-ATES)
10. Compressed air energy storage in aquifers (CAES-A)
11. Borehole thermal energy storage (BTES)
12. Compressed air energy storage in caverns (CAES-C)
13. Hydrogen storage in salt caverns and porous media
14. Minewater thermal energy storage (MTES)
15. Mineshaft gravity energy storage
16. Industry energy use
17. Commercial and residential energy use

Source: Geoscience Solutions for Sustainable Offshore Wind Development

- **Corio and JERA align**: On **July 4**, **2022**, it was reported widely that **Corio Generation** (part of the Macquarie Group Green Investment Group) and **JERA** (leading utility corporation headquartered in Japan) had agreed to work together for the purposes of off-shore wind field auction process scheduled for Taiwan to take place in Q3 of 2022.
- **Door open**: On **July 5**, **2022**, offshorewind.biz reported that from **April 4**, **2022** to **June 30**, **2022**, the **Danish Energy Agency** (**DEA**) had received **43** applications to develop off-shore wind fields. Of the **43** applications **received**, **16** were **rejected** due to overlap with state land reservations, and of the **27** applications accepted for consideration, most of the applications are from **Andel**, **Copenhagen Infrastructure Partners** and **European Energy**.



Source: Danish Energy Agency

- **Island deferred**: On **July 5**, **2022**, it was reported widely that the **Danish Energy Agency** (**DEA**) had announced its decision to defer for 12 months the commencement of the tendering process in respect of the development of the energy / power island to be developed in the Danish sector of the North Sea – the **North Sea Energy Island**. (See **Editions** **5**, **8**, **9**, **27**, **32**, and **39** of Low Carbon Pulse.)

- **EIB loan to Vestas**: On **July 5**, **2022**, it was reported widely that the **European Investment Bank** (**EIB**) had agreed a **€475 million loan facility** with **Vestas** (Danish wind technology corporation). As reported the **€475 million loan** is to **fund research and development**, and **innovation initiatives**.
- **Rhode Island green**: On **July 7**, **2022**, offshorewind.biz reported that the **Governor of Rhode Island**, **Mr Dan McKee** had signed a bill to produce between **600 MW** and **1 GW** of off-shore wind field capacity off the coast of the **State** of **Rhode Island**. Under the bill **Rhode Island Energy** (electric utility corporation) is required to undertake a competitive procurement process by no later than October 15, 2022.

Solar and Sustainability (including *NZE* Waste):

- **Floating photovoltaic solar and hydroelectric hybrid**: On **July 1**, **2022**, the good folk at the **National Renewable Energy Laboratory** (**NREL**) published ***Enabling Floating Solar Photovoltaic Deployment*** considering the deployment of photovoltaic solar and hydroelectric sourced renewable electrical energy in combination. At a high level, **NREL** found that hybridisation of the two renewable electrical energy sources could reduce the curtailment of photovoltaic solar. The opportunities are regarded a highly prospective for South East Asia.
- **Tetra Pak progress to enhanced recycling**: On **July 3**, **2022**, gulfnews.com reported that **Tetra Pak** had committed to a goal of developing the most sustainable for packaging, to be made solely from recycled and renewable sources, so as to achieve carbon-neutral packaging. This commitment is outlined in Go Nature, Go Carton.

  Clarke Creek construction commences: On **July 7**, **2022**, pv-magazine-australia.com reported that construction had commenced of the **Squadron Energy 1.2 GW** hybrid renewable energy precinct in **Central Queensland** (around 150 kms north-west of Rockhampton, Queensland). The **Clarke Creek renewable energy precinct** comprises a **800 MW wind**, and a **400 MW photovoltaic solar**, farm.

As reported in previous editions of Low Carbon Pulse, the electrical energy from renewable energy precinct is the subject of an agreement between **Squadron Energy** and **Stanwell Corporation** (Queensland Government state-owned generation corporation).

Land Mobility / Transport:

- **Buses and coaches:**
  - **Qatar procures fleet in time for World Cup**: On **July 4**, **2022**, it was reported widely that **741 Yutong electric buses** had been delivered to Qatar, and will operated during the World Cup to be held later in 2022.
  - **Luxembourg procures midi-bus fleet**: On **July 7**, **2022**, sustainable-bus.com reported that on **July 19**, **2022**, **89 Karsan e-Atak eight-metre** electric buses will be mobilised in Luxembourg.
- **Cars** (including taxis and air-taxis): **Macquarie approved for Green Climate Fund**: On **July 4**, **2022**, **Macquarie Group** announced that it had been approved to lead the development of a finance platform to drive the adoption of the electric vehicles (**EV**s) across India. The finance platform will source financing from the private sector to provide leasing and financing options to help address the upfront capital costs of **EV**s, and the impediments around the development and deployment of **EV** charging infrastructure, and to manage uncertainty around performance of **EVs**.
- **Battery, Fuel Cell and ICE Technology**:
  - **China Yuchai hydrogen engine**: On **July 6**, **2022**, hydrogen-central.com reported that **China Yuchai International Limited** (leading manufacturer and distributor of internal combustion engines), through its subsidiary, Guangxi Yuchai Machinery Company Limited, had announced its hydrogen fuelled, **heavy-duty ICE**, **YCK16H**, being a **16-litre**, **560 horsepower ICE**.
  - **ICE for heavy-duty commercial vehicles**: On **July 8**, **2022**, it was reported widely that **Commercial Japan Partnership Technologies Corporation**, **DENSO Corporation**, **HINO Motors Limited**, **Isuzu Motors Limited** and **Toyota Motor Corporation** are to work together to assess the basis of the use of the internal combustion engine (**ICE**) fuelled by hydrogen for heavy-duty commercial vehicles.
- **Industrial Vehicles and Trucks**:
  - On **July 6**, **2022**, forbes.com reported that **Tevva** (UK headquartered advanced clean vehicle manufacturer) is to launch production of its **7.5 metric tonne** hydrogen fuel-cell powered and propelled electric truck.
  - On **July 8**, **2022**, Resilient Group announced the **first-ever hydrogen truck** deployment **in Spain**. As announced the deployment was achieved by **Hydrogenizing BCN** working together with **Butransa**, **Hyzon Motors**, **Redexis** and **Transportes Portuarios**.
- **Recharging and refuelling infrastructure**:
  - **LOHC HRS**: On **July 2**, **2022** it was reported widely that on **July 1**, **2022**, a hydrogen refuelling station (**HRS**) had been opened on Henri-Dunant-Strasse 2 on the Siemens AG campus, in **Erlangen**, [Germany]. The **Erlangen HRS** has been developed and deployed by **H2 Mobility Deutschland** together with its shareholder **Linde**, and **Hydrogenious LOHC Technologies** and **SiemensEnergy**, and supplying electrolytically produced hydrogen and hydrogen in **LOHC** form. (See the announcement from **H2 Mobility Deutschland** for more detail.)

    Hydrogenious LOHC Technologies supplies the **Erlangen HRS** with Green Hydrogen compounded in liquid organic hydrogen carrier (**LOHC**) form – as benzyl-toluene **LOHC**. The use of **LOHC** means that hydrogen comprised in it can be handled as a liquid fuel, being a fuel with high energy density and more readily and safely stored in underground tanks. This is a significant development.
  - **Europe's most powerful EV recharging station launched**: On **July 5**, **2022**, **Energy Superhub Oxford** announced that **Pivot Power** (part of **EDF Renewables**), **Fastned**, **Oxford City Council**, **Tesla Superchargers** and **Wenea** had opened the most powerful **electric vehicle** (**EV**) charging hub, marking the completion of the **Energy Superhub Oxford**. The **Energy Superhub Oxford** provides ultra-rapid charging for **42** vehicles at one time, with the electrical energy used to charge / recharge being 100% renewable electrical energy.
  - **BP and BOC refuelling plans**: On **July 6**, **2022**, forecourtrader.co.uk reported that **BP** (leading international energy corporation) and **BOC** (leading industrial gas corporation, and part of the Linde Group) are working together to assess how they may work together to develop a network of hydrogen refuelling stations across the UK. **BP** and **BOC** are building on a feasibility study that concluded that in the near term distribution of hydrogen as compressed gas (using road / tube-trailers) was the best option in the UK market, focusing on the heavy-goods vehicle sector.
  - **Daimler Truck AG, TRATON Group and Volvo Group JV**: On **July 8**, **2022**, it was reported widely that **Daimler Truck AG**, **TRATON Group** and **Volvo Group JV** had formalised their joint venture to develop and to deploy electric vehicle (**EV**) charging / recharging infrastructure across Europe (**EV JV**). As reported, the **EV JV** intends to install and to operate **1,700 high-performance EV** charging points to be located close to highways and motorways and within logistics hubs for use by the heavy-truck / vehicle sector. The investment contemplated currently is in the region of **€500 million**.
- **Trains**: **Static testing of bi-mode train**: On **July 7**, **2022**, fuelcellworks.com reported that **FCH2Rail** (a hydrogen powered and propelled train project) led by **Construcciones y Auxiliar de Ferrocarriles** (**CAF**) was to static test the electrical energy generation system of **FCH2Rail**, which sources electrical energy from hydrogen fuel-cells and from electric batteries (bi-mode). **FCH2Rail** will be a train without ***GHG*** emissions.

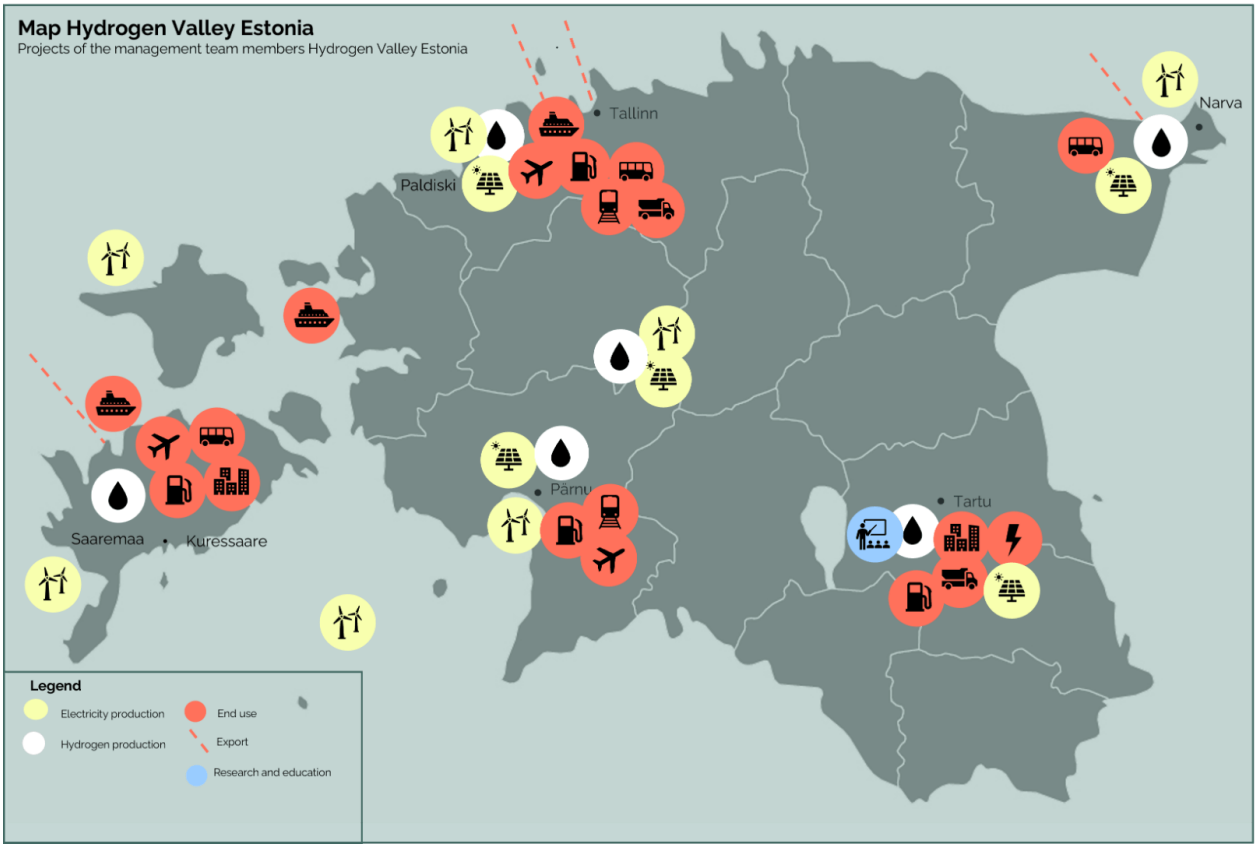
Ports Progress and Shipping Forecast:

- **Ferries and other craft:**
  - **Green City Ferries AB Beluga24 vessel**: On **July 4**, **2022**, batteryindustry reported that **Green City Ferries AB** was expanding its water-borne public transport offering in Stockholm, Sweden, with the development of the **Beluga24** ferry – stated to be the world's first fully emission-free, high-speed, carbon fibre catamaran. For these purposes, **Green City Ferries AB** has contracted with **Enchandia** (Swedish developer of heavy-duty energy solutions for maritime electrification) for the supply of fuel-cell technology.

By way of a reminder: **Edition** [34] (under **Having a whale of a time**) reported that: "In late January 2022, **Green City Ferries** provided an overview of fast passenger ferries power and propelled by hydrogen, outlining the **Beluga24** – the world's first hydrogen powered and propelled high-speed catamaran ferry. The **Beluga24** has an electric energy option for shorter journeys. Both the hydrogen fuel cell and the electric energy options are designed to carry 150 passengers and 28 bicycles. As announced the first **Beluga24** is to be used in the Stockholm archipelago, with support from the ***EU*** funding".

- **TECO 2030 fast route**: On **July 4**, **2022**, **TECO 2030** (leading technology corporation, including fuel-cell technology) announced that it is to lead a consortium of Norwegian corporations to develop the world's first hydrogen-powered-and-propelled-high-speed vessel. The consortium comprises **BLOM Maritime** (Marine engineering and maritime service company), **TECO 2030**, and **Umoe Mandal** (leading provider of surface effect ship technology), and the planned high-speed vessel is to carry between 200 and 300 passengers at speeds of up to 25 knots.
- **Green Ports (including infrastructure): Port of Tallinn leading public private partners**: On **July 6**, **2022**, it was reported widely that the Port of Tallinn was a founding partner in the Management Team, Steering Group and a Support Group for Hydrogen Valley Estonia. Other founding partners include Tallinn Airport, Alexela, Eesti Energia, Terminal, Tartu University, the Island of Saarema, and the Municipalities of Pärnu and Tartu.

  The Port of Tallinn is the mouth of the hydrogen valley. The following map outlines the Estonian hydrogen valley currently contemplated:



- **Green Shipping:**
  - **MPC Container Ships orders methanol powered box-ships**: On **July 4**, **2022**, splash247.com reported that **MPC Container Ships** (Oslo based box-shop owner) had contracted for two **dual-fuel-methanol-powered-and-propelled 1,300 TEU** newbuild vessels from Taizhou Sanfu Ship Engineering.
  - **MSC and Fincantieri order hydrogen powered cruise ships**: On **July 6**, **2022**, it was reported widely that **MSC Group** and **Fincantieri S.p.A** (leading shipbuilding corporation) are to construct two next generation cruise ships powered and propelled by hydrogen and liquified natural gas (**Explora V** and **VI**), with the hydrogen to power the on-broad hotel operations using a 6 MW fuel-cell, and allowing zero-emission operation in port. For these purpose **MSC Group**'s **Explora Journeys**, and **Fincantieri** have signed a memorandum of agreement.
  - **Biofuels be used to ship DHL**: On **July 7**, **2022**, offshore-energy.biz reported that **DHL Global Forwarding** (part of **Deutsche Post DHL Group**) had signed an agreement with container shipping line **Hapag-Lloyd** for **Hapag-Lloyd** to use advanced biofuels (being biofuels from waste fats, greases and oils (**FOGS**) to produce fatty acid methyl ester (**FAME**), and hydrotreated vegetable oil (**HVO**)) to ship **18,000 TEU**s.

    Elemanta H2 barge in: On **July 8**, **2022**, h2-mobile.fr reported that the **Elemanta H2** is to be installed in the river port of Rouen, France to provide electrical energy, and hydrogen bunker service, to vessels in dock. As reported, the **Elemanta H2** is able to provide power and refuelling services to container ships, cruise ships and to tankers. The **Elemanta H2** is being developed by a group of leading corporations led by **Hydrogène de France**.

Airports and Aviation:

SAF* continues to find, and to expand, market**: On **July 7**, **2022**, channelnewsasia.com reported that **ExxonMobil** (leading international energy corporation) had delivered its first sustainable aviation fuel cargo to **Changi Airport**, **Singapore** under a pilot program. Under the pilot program, **ExxonMobil** is supplying ***SAF to **Singapore Airlines** and to **Scoot**. (See **Edition 35** of Low Carbon Pulse.)

Key Contacts

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.

Michael Harrison
Senior Partner, Energy, Resources and Infrastructure

M +65 9728 8562 /+61 440 512 384/ +61 414 968 707
michael.x.harrison@ashurst.com

Richard Guit
Partner

T +65 6602 9153
M +65 9728 7943
richard.guit@ashurst.com

Daniel Reinbott
Partner

T +65 6416 9529
M +65 9728 8672
daniel.reinbott@ashurst.com

Andrew Roche
Partner

T +65 64160272
M +65 97287452
andrew.roche@ashurst.com

Eleanor Reeves
Partner

T +44 20 7859 1210
M +44 7823 340 854
eleanor.reeves@ashurst.com

Caroline Lindsey
Partner

T +61 8 9366 8109
M +61 417 788 649
caroline.lindsey@ashurst.com

Dan Brown
Co-Head International Projects Group

T +61 7 3259 7149
M +61 401 564 654
dan.brown@ashurst.com

Paul Curnow
Partner, Global Co-Head Energy

T +61 2 9258 5738
M +61 434 074 591
paul.curnow@ashurst.com

Michael Burns
Partner

T +44 20 7859 2089
M +44 7717 840 646
michael.burns@ashurst.com

Anna-Marie Slot
Global Environmental, Social and Governance Partner

T +44 20 7859 3724
M +44 7788 710 892
anna-marie.slot@ashurst.com

Antony Skinner
Partner

T +44 20 7859 1360
M +44 7917 635 974
antony.skinner@ashurst.com

David Wadham
Office Managing Partner, Tokyo

T +81 3 5405 6203
M +81 90 4828 5191
david.wadham@ashurst.com

Keep up to date

Sign up to receive the latest legal developments, insights and news from Ashurst. By signing up, you agree to receive commercial messages from us. You may unsubscribe at any time.

Sign up here

ashurst

www.ashurst.com

Low Carbon Pulse – Edition 42 – Published on July 12, 2022.
The researcher and author of each edition of Low Carbon Pulse is Michael Harrison.