P2N0

NEWS AND VIEWS ON THE DRIVE TOWARDS NET-ZERO GHG EMISSIONS

Welcome to the second edition of **P_2N_0** covering the drive to reduce greenhouse gas (**GHG**) emissions to net-zero (**NZE**). In addition to **P_2N_0**, it is anticipated that articles on matters relevant to **NZE** will be published quarterly. At the moment, we anticipate publishing articles on **Carbon Capture Utilization and Storage** (during Q4 of 2023) and **Carbon Credits and developing Voluntary Carbon Markets** (during Q1 of 2024).

P_2N_0 identifies significant news items globally, reporting on them in short form, focusing on policy settings and project developments. **P_2N_0** will not cover news items relating to climate change generally, M&A activity, or that are negative.

Headlines August 2023

News from around the World:

- Africa, Middle East and South Asia;
- Americas;
- APAC;
- Europe and the UK; and

Helpful publications and data bases.

(The numbers throughout the publication (for example [1]) connote endnotes, which provide further information.)

Edition 2: August 1, to August 31, 2023 (covering news items arising during this period)

HEADLINES AUGUST 2023

During August 2023:

- **European Hydrogen Bank (EHB) Auction Rules**: On **August 29**, **2023**, the **European Commission** (**EC**) published Innovation Fund Auction Terms and Conditions. The **EHB** will apply the Auction Rules to an auction anticipated in the very near future.

> **By way of background:**
>
> **European Hydrogen Bank to run auction during Q4 2023**: On **May 16**, **2022**, the **European Commission** (**EC**) ran a workshop during which the **EC** reported on the consultation process undertaken to **May 11**, **2023**[1]. During the workshop, the **EC** stated that it expected the **European Hydrogen Bank** to run the first auction in **Q4 of 2023**, and it confirmed that only projects producing **renewable hydrogen**[2] would be eligible to bid. In addition to **renewable hydrogen** production facilities in **Member States** (of the **EU**), it is understood that projects located in Iceland and Norway (each a member of **European Economic Area**, but not Member States) will be eligible to participate in the auction process.
>
> On **May 31**, **2023**, it was reported widely that Germany is to provide an additional **€1 billion** in funding for its **H2Global** policy for the purchase of Green Hydrogen from countries outside the **EU**, with consideration being given to folding **H2Global** into the **European Hydrogen Bank** initiative.
>
> On **August 3**, **2023**, it became apparent that Germany is inviting other **Member States** to join the **H2Global** import scheme. The invitation was made as the Federal German Government firmed up a number of initiatives and policy settings at the start of August. As might be imagined, the reasoning is informed by the buying power of the EU and the increased scale that comes with exercise of increased buying power.

- **European Commission settles CBAM reporting rules**: On **August 17**, **2023**, it was reported widely that the **European Commission** had settled, and adopted, the reporting rules to apply from **October 1, 2023** to **December 31, 2025** (**Transitional Phase**) in advance of the application of the Carbon Border Adjustment Mechanism (**CBAM**). A link to the Implementation Regulation is attached. During the **Transitional Phase**, those that will be subject to

CBAM from January 1, 2026 will have to report on the embedded carbon in the goods (or electrical energy) imported into the **European Union** (**EU**), providing a learning period with the opportunity to make amendments to the means of determining embedded carbon and reporting on it[3].

- **Dutch Council of State clears way for Porthos**: On **August 16**, **2023**, the **Council of State** determined that the minor, or the one-off, deposition of nitrogen during construction of the **Porthos Project** would **not** have a significant impact on the areas surrounding the **Porthos Project**. The determination will allow the **Porthos Project** to proceed: the Project is intended to store permanently around **2.5million** metric tonnes of **CO_2** a year. The **Porthos Project** has indicated that it intends to commence construction in 2024, and that the Project will be operational by 2026.

Porthos' Players	
Developers of CO_2 storage	**Customers for CO_2 storage services**
EBN B.V., **Gasunie** and **Port of Rotterdam**	**Air Liquide**, **Air Products**, **ExxonMobil** and **Shell**
Dutch Government: The Dutch Government is to provide funding support for the development of the **Porthos Project**, including grant funding, and with each **Porthos Customer** having an **SDE++** subsidy under which it receives the difference between the costs under the **EU ETS** and higher the costs of capture, transport, and storage of **CO_2**.	

- **DOE awards DACs USD 1.2 billion**: On **August 11**, **2023**, the **US Department of Energy** (**DOE**) announced that it is to provide up to **USD 1.2 billion** in funding support for the development of "two commercial-scale direct air capture facilities in Texas and Louisiana", the funding provide under the Bipartisan Infrastructure Law **Regional Direct Capture Hubs program**: the two projects are **Project Cypress** (in Calcasieu Parish, Louisiana) and **South Texas DAC Hub** (in Kleberg Country, Texas). The **DOE** announcement states that the development of the two DACs facilities "will be the world's largest investment in engineered carbon removal in history".

- **Rice methane reduction**: On **August 11**, **2023**, the good folk at **Mongabay** reported (under **Bali rice experiment cuts greenhouse gas emissions and increases yields**) that researchers, working with farmers, in Bali, Indonesia, suggest that by changing irrigation methods it would be possible to reduce GHG emissions arising from rice fields by up to 70%, and to increase yields. The study was undertaken by **I Wayan Alit Artha Wiguna** (Balai Pengkajian Teknologi Pertanian Bali) and **Steve Lansing** (Sante Fee Institute). Given that 11% of the methane emissions globally arise from the production of rice from paddy fields, the report is worth consideration, with "More than 90% of the world's rice is grown on some 200 million rice farms in Asia".

  The article provides a helpful description of how methane is emitted: "Rice paddies are like mini power stations. Each stalk acts like a chimney and shoots greenhouse from the soil [in which organic matter is decomposing] into the air".

CO_2-e from food growth and supply

It is estimated that around **13.7 billion** metric tonnes (or **13.7 giga-tonnes**) of CO_2-e emissions arise from the growth and supply of food each year. As might be expected, the rearing of livestock gives rise to the highest ratio of kg of food to kg of CO_2-e emissions, with beef a 1 kg of beef giving rise to 60 kg of CO_2-e emissions. In contrast, plant-based foods give rise to lower CO_2-e emissions: for example, with the growth and supply of 1 kg of apples giving rise to less than 1 kg of CO_2-e emissions.

Agriculture (Crops and Meat & Diary) and **Land Use** (Forest, Grassland, Land Use and Other Arable) together account for between 18% and 20% global CO_2-e emissions, with total anthropogenic emissions being estimated as **56 giga-tonnes** of **CO_2-e** for 2020.

- **Germany**: On **August 10**, **2023**, it was reported widely that the **Federal German Government** is committed to providing **€18.6 billion** in funding and funding support over the four years, 2024 to 2027, to develop the hydrogen industry in Germany, with **€3.6 billion** to be provided during 2024. The funding provided will be sourced from the **Climate and Transformation Fund** (**KTF**). The **KTF** represents the amounts that Germany receives from the **EU ETS**; the **EU ETS** generates money from the purchase of emissions permits acquired by corporations and other organizations that are required to match their GHG emissions with emissions permits. There is an excellent piece from **Deutsche Welle** (at **https://www.dw.com**, under **Germany commits €57 billion to green infrastructure in 2024**), that provides an overview of the application of the support.

Federal German Government, Green Funding:

The **Federal German Government** is committed to providing **€212** in funding support for decarbonization and energy transition initiatives over the near term (2024 to 2027) under the **KTF**, with **€57.6 billion** committed for 2024.

As might be expected, the **KTF Economic Plan** will decarbonize industry, expand renewable electrical energy generation capacity, renovate and retrofit buildings to ensure an energy-efficient built environment, roll-out charging and refueling infrastructure to allow support electromobility, and support the digitalization of activities (including through support for the semi-conductor production sector).

- **California all in on green hydrogen**: On **August 9**, **2023**, it was reported widely that the Governor of California, Gavin Newsom, had announced the "**California is all in on clean, renewable hydrogen – an essential aspect of how we'll power our future and cut pollution**". For these purposes, the State is to develop a plan with all key State agencies, critically, the **California Air Resources Board**, the **California Energy Commission** and the **California Public Utilities Commission**. It would seem that the statement is in anticipation of the award of funding to the **Alliance for Renewable Clean Hydrogen Energy Systems** (**ARCHES**) as one of the 6 to 10 regional hydrogen clusters (**Hydrogen Hubs**). For further detail, a link is provided to **Executive Order N-08-23** that provides details of the size and scale of investment contemplated by the State of California (and the anticipated outcomes). This is in addition to any funding support that may be given for **ARCHES**.
- **UK**: On **August 16**, **2023**, the **UK Government** (Department for Energy Security & Net Zero) announced (at **https://www.gov.uk**, under **Hydrogen Business Model / Net Zero Hydrogen Fund: negotiations list for allocation round 2022**) that it had invited **17 projects** totaling **262 MW** of hydrogen capacity across England, Scotland and Wales to participate in the first electrolytic allocation round (**HAR1**). As announced, the UK Government intends to complete allocation in respect of **250 MW** of hydrogen capacity by the end of 2023.
- **Alternative fuels to power and propel container carriers**:

  July and **August 2023** saw an increase in the greening of the maritime sector with the following news items worthy of note:

  - On **August 30**, **2023**, it was reported widely that **JP Morgan** has ordered two methanol carriers from **Guangzhou Shipbuilding International** (**GSI**) for delivery during 2026. As reported, on delivery, **JP Morgan** will time-charter the carriers to **TotalEnergies**.
  - On **July 26**, **2023**, **The Maritime Executive** (under **China Launches First 700 TEU Electric Containership for Yangtze Service**) reported on the floating, on **July 26**, **2023**, of a 700 TEU containership built for **COSCO Shipping Heavy Industry** powered and propelled by electrical energy[4]. A world first. The containership is to commence sea trials in September 2023, and will ply its trade along the Yangtze.

- On **July 13**, **2023**, it was reported widely that **Evergreen Marine** had committed **USD 5 billion** to procure **24 dual-fuel** powered and propelled container carriers. The procurement is split, with **16**, **16,000 TEU**, container carriers being procured from **Samsung Heavy Industries** (for circa **USD 3.1 billion**) and 8, **16,000 TEU**, container carriers from **Nihon Shipyard** (a joint venture between **Imabari Shipbuilding Co., Ltd** and **Japan Marine United Corporation**).

- On **July 12**, **2023**, **Clarksons Research** reported that it estimates that around 44% of orders for new carriers during the first half of 2023 were for alternative fueled (including LNG) or dual-fueled (methanol).

- On **July 12**, **2023**, **A.P. Moller Maersk** announced that it had taken delivery of its first container carrier to be powered and propelled using green methanol: the 2,100 TEU box-ship was delivered at the **Hyundai Mipo Dockyard**. On **July 16**, **2023**, **OCI** completed the bunkering of the box-ship: loading 1,000 metric tonnes of **OCI HyFuels**, being ISCC certified green methanol. The bunkering took place at the **Odfjell Terminal Korea** (**OTK**), located at the Port of Ulsan. The bunkering with green methanol was a world first. A second world first (!) took place in Singapore on **July 27**, **2023**, with the Singapore registered tanker, MT Agility, bunkering the box-ship with 300 metric tonnes[5] of ISCC certified green methanol to allow it to continue on its maiden voyage[6].

  News items about bunkering of the box-ship followed in its wake: during the week-beginning **August 21**, **2023** the box-ship bunkered as it passed through the **Suez Canal**, and during the week-beginning **August 28**, **2023**, it bunkered at the **Port of Rotterdam**. (Third and fourth world firsts!)

  In the years that the author has been following (and, since 2016, writing about) decarbonization and the energy transition no other news story has garnered the coverage of this box-ship. It feels as though we have reached one of the necessary tipping points on the voyage towards net-zero.

  The methanol bunkered box-ship is now sailing to **Copenhagen**, **Denmark**, for its official naming (on September 14, 2023) by its designated godparent, Ursula von der Leyen, the President of the European Commission.

- **With the development of methanol ready carriers comes the need for methanol**: On **August 6**, **2023**, the **Methanol Institute** reported on the development of "a new [USD 2 billion] green methanol production facility in Central Louisiana…. [to produce] 400,000 metric tonnes of green methanol a year", with the fuel to be sold to A.P. Moller Maersk". As reported, the developer, **Beaver Lake Renewable Energy LLC**, is to use wood fiber as feedstock, with 1 million tonnes of CO_2 emissions arising from the production of methanol to be captured and stored.

- On **July 7**, **2023**, **MAN Energy Solutions** and **Seaspan** and **Hapag-Lloyd** agreed on a program (firm and optional) to retrofit container carriers with dual-fuel ME-LGIM engines capable of using green methanol. In addition, **MAN Energy Solutions** has tested successfully its ammonia fueled engine.

In early **August 2023**, the good folk at the **Methanol Institute** announced that:

> "A total of 62 alternative-fueled vessels were ordered in July, including a record number of methanol-fueled ships, according to the latest figures from **DNV's Alternative Insight (AFI)** platform… [July 2023] saw a record 48 new methanol-fueled ships added to the AFI platform, including 15 retrofits."

To complete the narrative, the other 14 alternative-fueled ships were 14 LNG powered and propelled ships. The orders continued in August: on **August 15**, **2023**, it was reported widely that:

- **Wallenius Wilhelmsen ASA** ordered **four 9,350 TEU** (with options for a further eight) carriers from **Jinling Shipyard**, each ammonia and methanol capable. It is understood that the first carriers will be delivered in 2026; and

- **COSCO Shipping** took delivery of the methanol ready **Green Kotka** built by **Dalian COSCO KHI Ship Engineering Co., Ltd** shipyard.

In the context of progress of greening of the maritime sector clear sighted analysis has emerged.

One of the more telling pieces of analysis relates to the consequences of the electrification of activities using renewable electrical energy on land (including by the mobility sector) on the volume of shipping required to carry energy vectors by sea, principally, the transportation of coal and petroleum products.

By some estimates, the volume of sea-borne carriage of energy vectors will decrease by up to a half by 2050 the electrical energy generation is decarbonized.

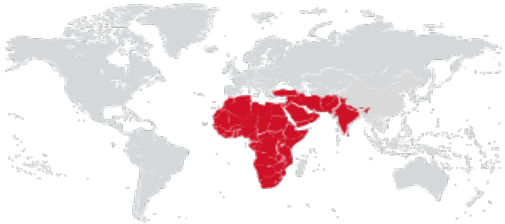
- During **July** and **August 2023** a narrative arose around **Natural Hydrogen** (or native hydrogen or white hydrogen) including in a number of news items:

  - In France, **La Francaise d'Energie** and **GeoResources** reported a large find of natural hydrogen in the Lorraine region of France at a depth of 1,000 metres.

  - On **July 17**, **2023**, Jorgo Chatzimarkakis, CEO of **Hydrogen Europe**, penned a piece outlining the potential of natural hydrogen, noting the resources that exist around Europe.

  - On **July 18**, **2023**, the good folk at **The Business Times** (under **Could 'white hydrogen' change everything for shipping – and everybody else?**) provided a helpful analysis.

  Also, in **July 2023** a number of news items reported on natural hydrogen, including on the plans of Kolonia to drill for natural hydrogen. Among others, Kolonia is backed by Bill Gates' Breakthrough Energy. For further reading, **Science** published an article entitled **Hidden Hydrogen Does Earth hold vast stores of a renewable, carbon free fuel?** back on February 16, 2023. Also in July 2023, **Ryze Hydrogen** provided a further perspective under **Are we sitting on the clean energy of the future?** And more recently, on **August 12**, **2023**, **The Guradian** (under **Prospectors hit the gas in the hunt for 'white hydrogen'**) published an article, with the key narrative being: "The size of the prize could be enormous: the US Geological Survey has said that even if only a small fraction of hydrogen under the Earth's surface could be recovered, there would probably be enough to last for hundreds of years".



NEWS FROM AROUND THE WORLD

Africa, Middle East and South Asia

OWF Tender in the offing: On **August 21**, **2023**, the **Ministry of New and Renewable Energy** in India released its revised strategy for tenders to award OWF development areas. The good folk at **OffshoreWind.biz** (under **India Eyes**

Launching Offshore Wind Tender in December, Gov't Proposes Thress Site Allocation Models) provide a helpful summary of the state of play.

Zimbabwe lands on carbon credit split: On **August 17**, **2023**, Zimbabwe released regulations on revenue sharing in respect of carbon credits arising from green carbon projects within the country. The final revenue split is secondary to the point of principle raised by Zimbabwe. The point of principle for countries in which activities and projects giving rise to carbon credits are undertaken is for those countries to treat the value arising from carbon credits as a resource, the revenue from which should be shared.

This is a long-standing point of principle (pointed out by the author since the mid-2000s) providing a basis for the grant of concessions for green carbon projects (and blue carbon projects) to derive carbon credits, and for that revenue to be shared. A new form of production sharing contract. Whole-of-country carbon credit schemes will allow countries to maximize revenue, and to forward sell carbon credits.

Tata Power plans 2.8 GW of pumped storage: On **August 9**, **2023**, it was reported widely that **Tata Power** and the **State of Maharashtra** had agreed to develop two pumped-storage facilities, together having capacity of **2.8 GW** (1.8 GW at Shirawta, Pune, and 1 GW at Bhivpuri, Raigad), and combined development cost of **USD 1.6 billion**.

Egypt green run continues: On **August 9**, **2023**, it was reported widely that **Ocior Energy** had agreed early-stage arrangements to pave the way for the investment of up to **USD 4 billion** to develop Green Hydrogen production facilities in the **Suez Canal Economic Zone**. As reported, in respect of other Green Hydrogen (and Ammonia and Methanol) production facilities projects in Egypt, these arrangements provide a basis to proceed to a final investment decision.

Hyphen – Itochu align: On **August 8**, **2023**, it was reported widely that **Hyphen** and **Itochu** had signed a memorandum of understanding (**MOU**) in the presence of the **Minister for Mines and Energy** (Namibia) and the **Minister of Economy**, **Trade and Industry** or **METI** (Japan). The purpose of the **MOU** is to provide a framework for cooperation to determine the basis upon which Itochu may invest in the **USD 10 billion**, **2 million** metric tonnes a year, Green Hydrogen and Green Ammonia Project in Namibia (having **7 GW** of installed renewable electrical energy capacity to power **3 GW** of electrolyser capacity).

Various projects in **Namibia** are setting the pace for development of projects, both to produce and to use Green Hydrogen. **HyIron** and the **Federal German Government Ministry of Economics and Climate Protection** are working together to develop a direct reduced iron (**DRI**) plant using renewable electrical energy and Green Hydrogen for electrical power and for heat.

Jordan Flags Down Renewables: In early **August 2023** a number news items arose flagging that Jordan intends to develop policy settings to provide for the accelerated development of renewable electrical energy capacity, and to allow the production of Green Hydrogen for export. This will build on existing policy settings intended to achieve the target of sourcing 50% of electrical energy demand from renewables sources by 2030, having reached around 30% already.

Americas

Gulf of Mexico OWF auction: On **August 29**, **2023**, the **Bureau of Ocean Energy Management** (**BOEM**) ran an auction process in respect of **three offshore lease areas**, **two areas offshore Galveston**, Texas, **one offshore Lake Charles**

Louisiana. Bids were not received for either of the two areas offshore Galveston. **RWE Offshore US Gulf LLC** was successful in its bid for the offshore lease area offshore Lake Charles.

US Department of Energy (DOE) committed to CO_2 transport: On **August 25**, **2023**, the **DOE** announced its intention to fund the development of **CO_2** transportation system across the US, with **USD 500 million earmarked** for this purpose from the **DOE's Carbon Dioxide Transportation and Finance Innovation Future Growth Grants** program.

Monarch Energy Louisiana Green Hydrogen project planned: On **August 24**, **2023**, it was reported widely that **Monarch Energy** intends to develop a **USD 425 million** Green Hydrogen production plant in the **Ascension Parish**, **Louisiana**.

US Hydrogen Hubs assessed: On **August 1**, **2023**, the good folk at **hydrogeninsight** (under **The top ten US hydrogen hubs most likely to win $7bn of government funding**) provided an analysis of the basis upon which the **DOE** may determine which of the 22 proposals[7] will be successful in an award of funding to produce, to transport and to distribute and to sell and purchase hydrogen across the hydrogen value chain. As announced, under the **Infrastructure Investment and Jobs Act** the six to ten hydrogen hubs across the US to receive funding support.

The good folk at **hydrogeninsight** shared the thinking of **Rystad Energy** on which of the 22 applicants are most likely to be successful: **DOE** is expected to pick between 6 and 10 of the applicants as hydrogen hubs. Each of the **hydrogeninsight** article, the **Rystad Energy** publication, are well-worth a read.

APAC

Singapore and Vietnam hands-on: On **August 28**, **2023**, **Singapore** and **Vietnam** exchanged side-letters to allow for the expansion of cooperation under the **Singapore-Vietnam Connectivity Framework Agreement**. The exchange of side-letters is an indication of the continued progress towards the development of the Asian Grid through bi-lateral agreements.

Japan schedules hydrogen and SAF takeoff: On **August 22**, **2023**, the good folk at **hydrogeninsight** (under **Japan to spend at least $34 bn on hydrogen-powered aviation over the next decade**) reported that the **Ministry of Economy, Trade and Industry** (**METI**) anticipates providing **USD 34 billion** in funding support for hydrogen powered and propelled aviation, with **USD 13.7 billion** in funding support to be provided by 2030.

China guidelines:

- On **August 21**, **2023**, the **Methanol Institute** reported that the **China Classification Society** is to release **Guidelines for Marine Methanol Fuel Bunkering**, with the **Guidelines** having been approved.

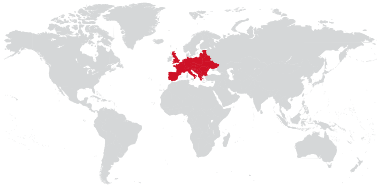
- On **August 9**, **2023**, **CGTN** (under **China issues first hydrogen industry guideline**) reported that China had issued its first national guidelines for standards of production, storage, transportation and use of hydrogen, and what may be described as five activity driven sub-systems, and 20 secondary and 69 tertiary level activities. As reported, the guidelines, developed jointly by the **National Standards Commission**, and six other agencies, are intended to accelerate the development and implementation of technical standards in the country.

Green and Gold off-shore applications open: On **August 9**, **2023**, it was reported widely that the Federal Government of Australia, **Department of Climate Change, Energy and Environment and Water** (**DCCEEW**) had opened applications for the feasibility licences for the declared **offshore renewable energy zone** off the coast of New South

Wales (in the Pacific Ocean). Six **offshore renewable energy zones** are contemplated: the first declared was Gippsland (the Gippsland Declared Area), with the second being the **Hunter Declared Area**[8]. In respect of the **Hunter Declared Area**, applications for feasibility licences are open through **November 14**, **2023**. Considerable interest is expected. Successful applicants will have the opportunity to progress projects to development stage once the feasibility stage is complete and all approvals have been obtained.

BlackRock All Green Play: On **August 8**, **2023**, the **Australian Financial Review** reported that **BlackRock** is to invest around **NZD 2 billion** in development of large-scale battery storage and re-charging infrastructure in New Zealand.

Green and Gold on shore interest: On **August 7**, **2023**, it was reported widely that the **NSW Government** had received considerable interest in its tender for **950 MW** of renewable electrical energy and **550 MW** of long-duration energy storage (**LDES**) projects. Responses were received in respect of **3.1 GW** of renewable electrical energy capacity and **1.6 GW** of **LDES**. Successful tenderers will contract for the provision of electrical energy or **LDES** services, under the Long-term Energy Service Agreements (**LTESAs**), with each **LTESA** providing a floor price for the provision of services.



Europe and the UK

Greece greening: On **August 24**, **2023**, **Balkan Green Energy News** (under **Greece plans 1.7 GW of electrolysers, strong of new projects to become green hydrogen leader**), reported that the **National Energy and Climate Plan** (**NECP**) targets the installation of **1.7 GW** of electrolyser capacity **by 2030**, which, given current efficiency and utilization levels, is estimated to equate to **135,000 metric tonnes** of Green Hydrogen, overtime increasing to **30.6 GW** of electrolyser capacity by **2050** (2.3 million metric tonnes). It is expected that the primary market for the Green Hydrogen will be the mobility sector.

Green light for CCS funding: On **August 21**, **2023**, it was reported widely that the **Danish Government** had allocated **USD 4 billion** in funding support (in the form of State Aid) to support the development of CCS projects to store permanently **2.3 million metric tonnes of CO_2 a year**.

This continues the trend of governments providing funding support to allow the development of CCS as part of integrated policy settings to avoid, reduce and remove CO_2.

Four more OWF awards: On **August 10**, **2023**, it was reported widely that four OWF had been awarded concessions, three to **RWE** (N-3.5 and N-3.6, and awarded provisionally N-6.6) and one to **Waterkant Energy** (N-6.7), with a total of **€784** to be paid for the concessions.

Padeswood to capture CO2: On **August 9**, **2023**, the **BBC** (at **https://www-bbc-com.cdn**, under **Climate Change: Flintshire cement work's carbon capture plan**) reported that **Heidelberg Materials**' subsidiary Hanson it to capture **CO_2** at its cement works in Padeswood, Flintshire, with an investment of **GBP 400 million**. The **800,000 metric tonnes** of **CO_2** captured each year will be transported by pipeline for storage permanently in Liverpool Bay as part of the **HyNet North West Project**.

In the US, **Heidelberg Materials North America** continues innovation announcing that it intends to use **400,000 tonnes a year** of slag granules to displace clinker (derived from limestone) in cement production.

Baltic hot spot:

- **Baltic Powers ahead**: On **August 18**, **2023**, it was reported widely that **Baltic Power** (a joint venture of PKN Orlen and Northland Power) is continuing with the development of its **1.2 GW offshore wind field**, with the grant of three building permits to allow construction to commence.

- **EIB goes Baltic**: On **August 7**, **2023**, it was reported widely that the **European Investment Bank** (**EIB**), in principle, had approved project financing facilities and funding support of up to **€1.4 billion** for **Baltica 2** (1.5 GW) and **Baltica 3** (1 GW) to allow **PGE** and **Ørsted** to develop **2.5 GW** of offshore wind field capacity in the **Baltic Sea**, with the renewable electrical energy generated to be supplied by **PGE** into Poland.

UK Government a green light: On **August 2**, **2023**, the **UK Government** published its:

- **Hydrogen Strategy Update to the Market: August 2023**, which, among other things, outlined plans to undertake tenders for Green Hydrogen annually. The **UK Government** will announce the short-listed proponents for its first procurement of Green Hydrogen (**HAR1**), and engage with them with a view to contracting in Q4 of 2023. As announced, the contracts, entitled **Low Carbon Hydrogen Agreements** (**LCHAs**), will be published shortly.

  The **Hydrogen Strategy Update** (the author reported on the **original Hydrogen Strategy** published on August 17, 2021 in detail) states that it is the plan "to launch the second hydrogen allocation round (**HAR2**) later [in 2023] with the aim to award contracts of up to 750 MW in 2025, subject to affordability and value for money". All hydrogen projects from which hydrogen may be procured will be required to have a lifetime emissions intensity profile of less than 20 g of CO_2-e per MJ (2.4 kg CO_2-ekg/H_2), which is an existing policy setting, not new.

- **Hydrogen transport and storage infrastructure: minded to positions**: As the title of the publication suggests, it outlines the policy settings and the business models that the **UK Government** is minded to adopt having concluded consultation. The key **minded to position** as to be found on pages 6 and 7 of the publication. For those who have followed the process taken by the UK Government, there are no surprises – "if it ain't broke, don't fix it".

RWE progressing to renewable hydrogen-ready gas fired power plant: On **August 2**, **2023**, **RWE** announced that it is going to develop a renewable-hydrogen ready gas fired power plant in **Weisweiler** at the site of two shuttered power plants. As announced, **RWE** intends to develop the hydrogen-fired power plant by 2030, and has commenced seeking approvals for its development.

Uniper reaches for green: On **August 2**, **2023**, it was reported widely that **Uniper** intends to decarbonize gradually its natural gas business, transitioning to Green Hydrogen and to bio-methane with the objective of being carbon neutral by 2040 (subject of course to the acceleration of this objective with ever-more dynamic policy settings of the Federal German Government).

Federal German Government a light: On **August 1**, **2023**, the **Federal German Government** announced that it would undertake tenders to procure up to **23.8GW** of hydrogen-fired power plants by 2035, with **8.8 GW** to be developed to be fired by hydrogen only, and **15 GW** to be capable of being co-fired with natural gas pending phase out of natural gas on completion of the hydrogen transmission network (**Co-fired Capacity**)[9].

As announced, the hydrogen-fired power plant capacity will provide renewable electrical energy when the supply from other renewable energy sources does not match load.

> "As a first step, we want to put 10 GW of [the Co-fired Capacity] out for tender by 2026 and then carry out an evaluation before the remaining 5 GW [of the Co-fired Capacity] can be tendered".

This initiative may have been regarded as the missing piece in the jigsaw puzzle of policy settings formulated by the Federal German Government – the jigsaw puzzle is now complete, showing a clear pathway to the decarbonization of the electrical energy system in Germany by 2035.

It is understood that the **Federal German Government** will need to obtain approval of the **European Commission** (**EC**) in respect of the funding support that will need to be provided to allow the development of hydrogen capacity (the funding support will involve State Aid). It is understood that preliminary approval has been progressed with the **EC** to allow the development of 4.4 GW of renewable hydrogen-fired power plants between 2024-2028 (under the Sprinter procurement program), the development of 4.4 GW (under the Hybrid procurement program) and the development of 10 GW between 2024 – 2026 (under the Hydrogen-ready procurement program).

HELPFUL PUBLICATIONS AND DATA BASES JULY AND AUGUST

Renewable Power Generation Costs in 2022: On **August 29**, **2023**, the **International Renewable Energy Agency** (**IRENA**) published Renewable Power Generations Cost in 2022. The publication provides comprehensive coverage of the costs of renewable electrical energy commissioned during 2022, and provides insights as to the costs over Q1 of 2023.

The headlines from the publication are: **1. The Levelized Cost of Electricity** (**LCOE**) from newly commissioned onshore wind and photovoltaic solar fell in 2022; **2.** China was the key cause of the fall in **LCOE** during 2022; and **3.** Relatively, renewable energy is now competitive with, or cheaper than, fossil fuel sources of power, critically, the **LCOE** of onshore wind in 2022 was 52% less than the lowest cost fossil fuel sources of power, having been 95% more in 2010, and for photovoltaic solar the comparison is 29% less than the lowest costs fossil fuel source, compared to 710% more in 2010.

State of The Art: CCS Technologies 2023: During the week commencing **August 21**, **2023**, **The Global CCS Institute** published State of The Art: CCS Technologies 2023. The publication provides a thorough overview of the technologies developed by equipment and technology providers and suppliers across the CCS Value Chain, and is well-worth a read. Likewise, the **World Resources Institute** report, International governance of technological carbon removal: Surfacing questions, exploring solutions, is well-worth a read.

Electricity Market Report Update Outlook for 2023 and 2024: During the week commencing **August 21**, **2023**, the **International Energy Agency** (**IEA**) published its Electricity Market Report Update Outlook for 2023 and 2024. The report is best read with the **Electricity Market Report – Update 2023** (see below), picking up on emerging, and increasingly established, themes.

The key established (or establishing) themes are that:

- the power sector is decarbonizing, with renewable electrical energy supply matching increased electrical energy demand;
- demand for electrical energy is declining in the more developed economies, most of which have achieve peak emissions, and is increasing in developing economies, with many developing economies yet to achieve peak GHG emissions; and
- renewable electrical energy generation will exceed that of coal-fired generation in 2024.

IEA commentary: On **July 21**, **2023**, the good folk at the **International Energy Agency** (**IEA**) published a commentary entitled Tripling renewable energy capacity by 2030 is vital to keep the 1.5°C goal within reach. The information and themes in the commentary are entirely consistent with other publications and reports referred to in this edition of **P_2N_0**.

Electricity Market Report – Update 2023: On **July 18**, **2023**, the **International Energy Agency** (**IEA**) published its **Electricity Market Report – Update 2023**. This **IEA** publication drops annually providing an assessment of information and trends. This year five key matters arise for the publication: **1.** While the demand for electricity is expected to continue to grow, the impact of the energy crisis in 2022 is likely to have an on-going impact, with the result that growth in demand will be moderate; **2.** The decarbonization of new electrical energy generation capacity is now established, with new demand being matched by new renewable electrical energy capacity; **3.** While peak demand for electrical energy has been passed in many developing countries, demand for electrical energy continues to grow in countries whose economies continue to grow (most clearly illustrated by China and India); **4.** Declining demand for electrical energy is manifest in Europe, where the impact of the energy crisis continues to impact economic activity; and **5.** The progress of renewable electrical energy is continuing, and globally in 2024 more load will be matched by renewable electrical energy generation than by coal-fired electrical energy generation.

While the fifth key point gives rise to optimism that optimism needs to be tempered – in 2022 the total mass of GHG emissions arising from the generation of electrical energy was an all-time high – 12,431 million metric tonnes (or 12.43 giga-tonnes). The reason is that the supply and demand for electrical energy continues to increase, and while the rate of increase in renewable electrical energy capacity is outstripping thermal electrical energy, thermal electrical energy is still being developed.

In addition, during **July 2023** the **IEA** published its **Coal Market Update – July 2023**. The publication is companion reading to the **Electrical Market Report**. Consistent with what is noted above, demand for coal is set to continue at the record high levels of 2022 during 2023.

Renewable Energy Statistics 2023: On **July 13**, **2023**, the **International Renewable Energy Agency** (**IRENA**) published **Renewable Energy Statistics 2023**. **IRENA** publishes this data rich statistics report annually, providing a good sense of progress in the development and deployment of renewable electrical energy globally.

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[1] **Action processes under consideration**: On **March 31**, **2023**, the **EC Innovation Fund** announced that **competitive bidding** (auction) was to be used to award support to successful bidders. As reported, contracts for differences (**CfD**), carbon contract for differences (**CCD**)[1], and fixed premium contract models were being considered. The **EC Innovation Fund** published a **draft of the economic terms and conditions of the 2023 Innovation Fund pilot auction**. The auction process will be a key pillar of the **European Hydrogen Bank**. The consultation process was undertaken, with feedback sought by May 11, 2023, and a workshop planned for May 16, 2023. It is good to see adherence to the timetable

[2] For these purposes, **renewable hydrogen** is Green Hydrogen using 100% renewable electrical energy sources that satisfy the additionality and match renewable electrical energy source generation to Green Hydrogen production.

[3] The basis for carbon accounting under **CBAM** is based on the **carbon footprint of products** or **CFP** (and in the case of electricity, services) imported in the **EU**. We say "based on" the **CFP**, because **CFP** measures **GHG** emissions arising from upstream and downstream processing and treatment, and manufacture, transportation, use, and through life-cycle. This means of measurement covers a broader footprint than the measurement for the purposes of the **EU ETS**, and as such downstream, transportation, use and life-cycle **GHG** emissions are not measured,

[4] As reported, this electric-drive-only container carrier is powered and propelled by batteries in containers, swapping charged for depleted as required.

[5] As reported, during the green methanol bunkering drones with methanol detectors and infrared cameras were used to monitor for any release of methanol, monitoring for methanol leaks to the climate system and methanol flames.

[6] The CEO of the **Maritime and Port Authority of Singapore** (**MPA**) made an **announcement** in respect of the "world's first ship-to-containership methanol bunkering operation", name checking all organizations involved.

[7] These 22 hydrogen hub proposals have been "short-listed" from an initial 79 proposals, reduced to 33 proposed hydrogen hubs invited to make full form proposals.

[8] In addition to being declared by the Australian Federal Government, the Hunter Region was declared as a renewable energy zone by the NSW State Government in early 2023.

[9] The Federal Ministry of Economic Affairs and Climate Action (BMWK) has indicated that the hydrogen-fired power plants will be procured using three forms of tender, with 1 and 2 to procure 8.8 GW (Sprinter(generating electrical energy from Green Hydrogen only) and Hybrid (or, integrated with photovoltaic solar and wind capacity and hydrogen storage) and 3 to procure the 10 GW (being hydrogen-ready).