P2NO

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

Welcome to the **thirteenth edition** of **P_2N_0** covering the drive to reduce greenhouse gas (**GHG**) emissions to net-zero (**NZE**). **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 news items that are negative.

The **fourteenth edition** of **P_2N_0**, covering **July 2024**, will be published during the first week of **August 2024**.

Access previous editions of **P_2N_0** by clicking **here**.

Content:

Edition 13: covering significant news items arising during June 1, to June 30, 2024.

HEADLINES FROM JUNE 2024

During **June 2024**, the following significant news items arose globally and seem to us to be the most note-worthy in the context of progress towards net-zero:

- **Good day for wild roses**: On **June 17**, **2024**, the **Nature Restoration Law** for the EU was agreed by the Council of the EU. The primary objective of the **Nature Restoration Law** is to restore not less than 20% of the land mass of the EU and sea by 2030, and 100% degraded areas by 2050. Under the **Nature Restoration Law**, EU member states are required to rehabilitate and restore degraded areas, including forests, grasslands, rivers and wetlands, and ecosystems in the marine and urban environment. The rehabilitation and restoration of degraded areas provides opportunities for carbon removal and carbon storage, and these outcomes may be regarded as a key focus and outcome of the Law. The Law is part of the **EU Biodiversity Strategy**. See **Edition 9** of **P_2N_0** for background on the Nature Restoration Law.

- **Not so good in Bonn**: On **June 13**, **2024**, the **Bonn Conference** concluded after 10 days (June 3 to June 13, 2024). The **Bonn Conference** provides the basis for preparation and progress ahead of each COP, this year **COP-29**, developing countries to decarbonize existing activities and to develop and to deploy lower, low or no GHG emission technologies, and to introduce mitigation and adaption responses to climate change. See the communique from the **Bonn Conference**. During 2022, developed countries provided USD 100 billion in climate finance (after two years of not doing so) to developing countries. The challenge is to maintain these levels of climate finance[1]. While progress on other issues might be regarded as slow, nevertheless there has been progress. In particular, in respect of the development of thinking around Article 6, and its operationalization.

  At the **Group of Seven** (**G7**, comprising Canada, France, Germany, Italy, Japan, the UK and the US) meeting in Italy from **June 13** to **June 15**, **2024**, the provision of climate finance did not receive the hoped for airtime. See the communique from the **G7 meeting**.

[1] The following link provides a helpful summary of the assessment of the Bonn Conference: The Guardian (at **www.the guardian.com**, under **Key takeaways from the Bonn climate conference**).

- **Global Carbon Project, N_2O budget**: On **June 10**, **2024**, the good folk at the **Global Carbon Project**, developers of the **Global Carbon Atlas**, published the **NO_2 Budget 2024** or **Global Nitrous Oxide Budget**. CO_2, CH_4 and N_2O are often referred to as the **big three GHG emissions** or the **well-mixed GHG emissions**. Together, their retention in the climate system is responsible for the vast majority of climate change. CO_2 and CH_4 may be considered to garner most attention, but NO_2 is ignored at our peril (it is no laughing matter!), critically, in the context of the planed increase in the use of ammonia. The publication is well-worth a read.

Getting to know NO_2	
Over a 100 year period, NO_2 has 272 x the GWP of CO_2	NO_2 accounts for 6.5% of global warming
After emission, NO_2 stays in the climate system for 117 years	NO_2 is an ozone depleting compound

- **International Energy Agency (IEA) World Energy Investment report**: On **June 6**, **2024**, the **IEA** published its **World Energy Investment** report. The report is one of the flagship reports from the **IEA** each year. The key theme from the report is that photovoltaic solar may be regarded as the leading technology used to deploy renewable electrical energy (and electrical energy as a whole), and that this will continue to be the case. It is estimated that over **USD 500** billion will be invested in PV solar during 2024.

  In addition to the deployment of PV solar at scale, households and commercial and industrial businesses are deploying roof-top PV solar, and investing in energy efficiency. The report estimates that in 2024 over **USD 3 trillion** will be invested across the energy sector, with **USD 2 trillion** of that investment being in respect of clean or cleaner technologies. The report is well-worth a read.

  Also, during **June 2024**, the **IEA** published a **World Energy Outlook Special Report** entitled **Strategies for Affordable and Fair Clean Energy Transitions**. The publication is welcome - affordability is an ever present concept in progress to net-zero. The publication explores affordable energy transition, investment and resulting bills and policies that promote affordability (across the entire cost chain), price shocks, and the impact on affordability. The publication is excellent, and, for those working in countries with economies that continue to develop, essential.

- **Lazard Levelized Cost of Energy + (LCOE+) Analysis**: In **June 2024**, the good folk at Lazard published the 17th edition of their flagship publication, **Levelized Cost of Energy +.** As always, the publication is well-worth a read, and likely will be a publication to dip into, until the next edition is published.

- **State of Carbon Dioxide Removal report**: On **June 5**, **2024**, the **State of Carbon Dioxide Removal** report was led by the University of Oxford's Smith School of Enterprise and the Environment. (The report is an update of its first edition, published in January 2023, and reported on by the author previously.)

  In the press surrounding the release of the report, one of its co-authors was quoted as stating:

  > "Global net greenhouse gas emissions were about 55 billion tonnes … in 2022, and emissions accumulate .." in the climate system.

  This is known, but it helps to preface any discussion with it.

  The report is excellent, and well-worth a read, outlining both the scale of carbon dioxide removal (**CDR**) required and the means of achieving that scale. The report provides a description and assessment of each method of CDR[2].

[2] Afforestation, reforestation, agroforestry, and forest management; peatland and coastal wetland restoration; soil carbon sequestration in croplands and grasslands; durable wood products; biochar; mineral products; enhanced rock weathering; biomass burial; bio-oil storage; bioenergy with carbon capture and storage; direct air carbon capture and storage; ocean fertilisation; ocean alkalinity enhancement; biomass sinking, and direct ocean carbon capture and storage.

For the author, the scale of that which is needed seems to increase with each passing report read, with the current scale of CDR needed in the **7** to **9 billion metric tonnes** of CDR a year range. In the context of the **State of Carbon Dioxide Removal** report, is it important to understand that these stated needs are in addition to the mass of CO_2 that needs to be captured and stored, as opposed to being removed.

On **June 11**, **2024**, the good folk at **BloombergNEF** published **CCUS Market Outlook 1H 2024: Trough of Disillusionment**. The publication is well-worth a read, emphasizing the importance of continued progress.

- **IEA reports on progress to the tripling of renewable electrical energy capacity by 2030**: On **June 4**, **2024**, the **International Energy Agency** (**IEA**) reported on progress towards the achievement of the pledge (given at COP-28) to triple installed renewable electrical energy by 2030 **COP-28 Tripling Renewable Capacity Pledge: Tracking countries' ambitions and identifying policies to bridge the gap**.

  Stated in absolute numbers, an additional **11,000 GW** (or **11 TW**) of renewable electrical energy capacity needs to be installed and deployed from the end of 2023 to 2030 to achieve the pledge.

  The report provides a country-by-country analysis to assess progress so far, considering the best case scenario based on current policy settings and commitments, concluding that if all of them are achieved about **7,500 GW** of renewable electrical capacity will be installed and deployed by 2030. The report is well-worth a read.

  Also, during **June 2024**, the **IEA** published its **Energy Efficiency Policy Toolkit 2024**. For those active or interested in this area, the publication is well-worth a read.

- **IRENA NDC Survey**: During **June 2024**, the **International Renewable Energy Agency** (**IRENA**) published **Climate action and the energy transition, IRENA Members' survey on Nationally Determined Contributions**. While the survey is in respect of the 55 member states of **IRENA** (rather than the parties to the Paris Agreement), the survey is instructive, and a good point of reference.

- **Global Offshore Wind Report**: During **June 2024**, (**Global Wind Energy Council**) **GWEC** published the **Global Offshore Wind Report**. The report is worth a read, providing a fulsome perspective on the dynamics facing the development of offshore wind projects, and providing a 10 year outlook for the development of offshore wind.

- **Carbon pricing**: During **June 2024**, two reports on carbon pricing came to the attention of the author, both are worth reading. First, **Carbon Pricing: Governments increasingly making polluters pay for climate change** (published by the **Institute for Energy Economics and Financial Analysis**), and secondly, **Updated position paper on Governmental Carbon Pricing** (published by UN-convened Net-Zero Asset Owner Alliance). The publications are of manageable length, and together provide a balanced and comprehensive assessment and appraisal of pricing carbon.

- **World Resources Institute** (**WRI**) **Climate Action**: During **June 2024**, the **WRI** published **State of Climate Action 2023 Report**. The **WRI Report** is excellent and is well worth a read (and is a manageable read). For the author, what needs to be done is known, the challenge remains developing and implementing policy settings that will achieve that which needs to be done.

Africa

Africa50 pledges USD 100 million: On **June 25**, **2024**, it was announced that the **International Renewable Energy Agency** (**IRENA**) had entered into a framework for collaboration with **Africa50** (the pan-African infrastructure investor). Under the framework, **Africa50** has pledged up to **USD 100 million** for the development of renewable energy infrastructure and projects across Africa through IRENA's **Energy Transition Accelerator Financing** (**ETAF**) platform.

Middle East and South Asia

CCS in the Cement Industry: As will be apparent from the next news item, India continues to develop. Key to the continued development of India is urbanization and industrialization is the use of concrete. To produce concrete (reinforced), cement and steel is needed. Basic chemistry means that one tonne of cement gives rise to one tonne of CO_2. The cement industry is a difficult to decarbonize industry. Among other technologies, carbon capture and storage is a means of capturing CO_2 emissions arising from the production of cement so that those emissions do not go to the climate system. Globally, the production of cement and concrete is estimated to be responsible for around 8% of CO_2 emissions.

During **June 2024**, **CCUS In the Indian Cement Industry A Review of CO_2 Hubs and Storage Facilities** was published. The publication is the work of the **Global CCS Institute**. The publication provides a clear perspective on the role that CCUS may play in decarbonization in India – it is one of a number of mitigation actions that will contribute, both across the industry and India. The publication is excellent.

India approves for first two offshore wind field developments: On **June 20**, **2024**, the Indian cabinet approved the development of the first two offshore wind field developments, which together will have **1 GW** of installed capacity. It is understood that the subsidy to be paid for the development of these two offshore wind fields is approximately **USD 820 million**.

India to all 15.4 GW of new coal-fired capacity in the 12 months to March 2025: On **June 19**, **2024**, the **Business Standard** (at **www.business-standard.com**, at **India set to register biggest jump in coal-fired power in a decade**) reported that in the 12 months to March 2025, India would complete the installation of 15.4 GW of coal-fired power stations. It is important to have in mind that India continues to develop its economy, increasing electrification to those without electrical energy and to respond to the increased demand arising from an increasing population, and increasing urbanization, and economic activity across its economy. India should not be criticized for the continued development and use of coal-fired power generation.

SECI procuring green ammonia: On **June 10**, **2024**, it was reported widely that the Indian state-owned enterprise, **Solar Energy Corporation of India** (**SECI**) is undertaking a reverse auction process to procure **540,000 metric tonnes** of green ammonia a year. As reported, the green ammonia is to be used for domestic purposes (it is understood as feedstock for fertilize production), and will be delivered to 11 delivery points across India.

ACCS accelerating on scheduled: On **June 10**, **2024**, it was reported widely that the front end engineering and design work had been completed in respect of the first phase of the **Accelerated Carbon Capture and Sequestration** (**ACCS**) project in the Kingdom of Saudi Arabia (**KSA**). The first phase of the ACCS project will capture CO_2 emissions arising from the natural gas processing plant facilities at Jubail, on the east coast of KSA. As reported, the ACCS will be the largest CO_2 cluster / hub in the world.

Americas

Polaris FID: On **June 26**, **2024**, **Shell** announced (at **https://www.shell.com**, under **Shell to build carbon capture and storage projects in Canada**) that it had taken a positive **final investment decision** (**FID**) to capture **650,000 metric tonnes** of CO_2 arising annually from its refinery and petrochemical facilities located in **Scotford**, in the Canadian Province of Alberta. At the same time as the taking of **Polaris FID**, **ACTO EnPower** and **Shell** agreed to proceed to develop the **Atlas Carbon Storage Hub** to provide storage for the captured CO_2 from the **Polaris project**. The **Polaris FID** continues work that has been done by Shell in the vanguard of CCS, critically, the development and operation of the **Quest CCS** project at **Scotford**. This is good news, showing the difference that CCS can make.

Air Liquide welcomed to Baytown, Texas: On **June**, **24**, **2024**, **Air Liquide** announced (at https://www.airliquide.com, under **Decarbonization: Air Liquide selected for invest up to 850 MUSD in largest low-carbon oxygen production in the Americas**) that it planned to invest up to USD 850 million to build, own and operate four Large Modular Air separation units (and ancillary infrastructure) under a long-term offtake agreement with ExxonMobil. (See **Edition 10**, of **P_2N_0** for details of other offtake agreements.)

US EPA publishes 2024-2027 Climate Adaptation Plan: On **June 20**, **2024**, the **US Environmental Protection Agency** (**EPA**) published its **2024-2027 Climate Adaptation Plan**. The **EPA Plan** outlines the actions of the EPA "to address the impacts of climate change and [to] help build a more climate resilient nation". The **EPA Plan** is worth reading from a general interest perspective, as well as by those with specific interest in the subject matter.

Also, during June 2024, the **Ceres** published **Navigating Climate Risks – Progress and Challenges in the US Insurance Sector Disclosures**. The report is excellent, highlighting a number of trends, critically, increased disclosure of risk.

Terra firmer: On **June 20**, **2024**, it was reported widely that **TerraPower** had broken ground in respect of the development of the **USD 4 billion** nuclear power station development in Kemmerer, in the US State of Wyoming. The Kemmerer nuclear power project, among others, is being funded by Bill Gates and the US Department of Energy, and uses Natrium technology. One of the privileges of following progress to net zero is that announcements are made a number of years before breaking ground, and they then come to pass.

Californian ISO Grid renewed:

- **Approaching 100 days of wind-water-solar**: On **June 22**, **2024**, the **California ISO Grid** dispatched 100% renewables to match load for the 96th day out of 108 days, and on 17 out of 22 days in June. The consistency of dispatch, and the ability to match differing sources across the **California ISO Grid** demonstrates material and substantial progress, and gives the **California ISO Grid** "pathfinder" status.

- **BESS breaking new ground**: On **June 17**, **2024**, it was reported widely that BESS sent out 29.52 GWh of electrical energy across the **Californian ISO Grid**. As reported, electrical energy from BESS has reduced the need for peaking

gas-fired plants at the evening peak, and have flattened the duck-curve. It is understood that California has 10.3 GW of BESS installed and dispatchable, with a further 3.8 GW to be available by the end of 2024.

Canada greening:

- **Clean Investment Tax Credit legislated**: On **June 19**, **2024**, Canada's **investment tax credit** or **ITC** (included in the national budget) was passed by the House of Commons, then approved in the Senate, and was given the royal assent by the Governor-General on **June 21**, **2024**. It is understood that **Bill C-59** provides ITCs for CSS projects, with an ITC for 50% of the capital cost of CCS projects developed between 2022 and 2030 (and 25% after 2030 and before 2040), and 60% (and 30% after 2030 and before 2040) for DACCs, and an ITC for 35.5% of the cost of transport, and use or injection and storage facilities between 2022 and 2030 (and 18.75% after 2030 and before 2040). This is good policy, and good news.

- **Last coal-fired power plant shuttered**: On **June 17**, **2024**, the last coal-fired power plant in **Alberta**, **Canada**, was shuttered, as the **Genesee 2 Facility** ceased to fire coal, completing its transition to natural gas. The transition away from coal has occurred a five and half years ahead of the target of 2030.

- **CCS on waste-to-energy**: On **June 11**, **2024**, it was reported widely that **Gibson Energy Inc.**, is developing a waste-to-energy facility (**W-t-E Facility**), and is contemplating the use of carbon capture and storage at the **City of Edmonton**, **Alberta**, **Canada**. This is not an entirely new concept for W-t-E Facilities[3], in fact it may be expected to become the norm, but it would be a first for Canada. **Gibson Energy** is reported to have agreed a deal with the **Canada Growth Fund** under which **Gibson Energy** would hold 50%, the **Canada Growth Fund** would hold 40%, and **Varme Energy AS** (of Norway, with expertise in CCS) would hold 10% of the W-t-E Facility. In addition, the **Canada Growth Fund** is to acquire carbon credits arising from the capture of 200,000 metric tonnes of GHG emissions a year.

APAC

JERA and IHI complete co-firing testing: On **June 26**, **2024**, it was reported widely that **JERA**, working with **IHI**, had completed, successfully, testing of co-firing coal and ammonia (with an 80% coal / 20% ammonia mix). The testing was undertaken at **JERA**'s **Hekinan coal-fired power station**. The **Japan Times** (at **www.japantimes.co.jp**, under **Jera ends ammonia co-firing trial with positive results**) reported: "Jera said results were positive, confirming that nitrogen oxides levels were no higher than when firing coal alone, sulphur oxides were reduced by 20%, and generation of nitrous oxide, which has a strong greenhouse effect, was below detection threshold". As more detail is shared, it will be covered in **P_2N_0**.

Capacity Investment Scheme (CIS) fit for purpose: On **June 24**, **2024**, it was reported widely that the **Federal Government of Australia** had received responses in respect of **40 GW** of capacity under the **CIS**. Under the **CIS** the Federal Government is to undertake six competitive tenders through the end of 2027, with the intention of awarding contracts (capacity investment scheme agreement, a form of contract for differences) for the development of **9 GW** of

[3] **Edition 12** of **P_2N_0** under **CCS on WtE** reported that: "On **May 1**, **2024**, **enfinium** announced plans to capture up to **1.2 million metric tonnes of CO_2** a year. As one of UK's largest waste-to-energy operators, the capture of CO_2 will decarbonize the operations of **enfinium**, and contribute materially to the achievement of the UK's GHG avoidance, reduction and removal targets. The carbon capture program will allow **enfinium** to achieve net-zero across its Scope 1 and Scope 2 emissions by 2033."

dispatchable capacity, and **23 GW** of **variable capacity by**, 2030, so as to allow for the shuttering of coal-fired power stations across Australia.

European Energy plans 1.1 GW PV solar farm in Gladstone, QLD: On **June 20**, **2024**, it was reported widely that **European Energy** plans to develop a **1.1 GW** photovoltaic solar farm close to **Gladstone**, **Queensland** (**Upper Calliope Solar Farm**). If the **Upper Calliope Solar Farm** proceeds (to development) it will dispatch up to **2.8 TWh** of renewable electrical energy a year.

South Korea moves to nuclear power for H_2 production: On **June 19**, **2024**, it was reported widely that a consortium of major South Korean corporations is cooperating to develop a **10 MW** nuclear hydrogen production plant. While the scale of the pilot plant may be regarded as small, the ambition may be regarded a large.

Australian offshore wind has tail wind:

- On **June 15**, **2024**, the **Federal Government of Australia** announced the creation of another offshore wind zone, offshore of the coast of the Illawarra region south of Sydney, NSW, on Australia's east coast. As announced, the **Illawarra offshore wind zone** (covering 1022 km^2), located 20 km offshore, will allow the installation of **2.9 GW** of renewable electrical energy capacity. The **Illawarra offshore wind zone** is the fourth zone to be created by the Federal Government, with another zone approved off the NSW central coast (the **Hunter offshore wind zone**), and two zones created offshore of the State of Victoria, off of the coasts of the Gippsland and Portland regions.

- On **June 20**, **2024**, the **Federal Government of Australia** announced that a feasibility licence has been granted in respect of a floating offshore wind project to be located within the **Hunter offshore wind zone** (within the Pacific Ocean Zone, an 1,800 km2 area between Swansea and Port Stephens), the **Novocastrian Offshore Wind Farm**, being developed by **Equinor** and **Oceanex Energy**.

Singapore to provide tax rebates to soften the impact of carbon tax: On **June 13**, **2024**, it was reported widely that Singapore is to provide tax rebates to petrochemical and refining corporations to soften the impact of the price on

carbon arising the from the increased amount of the carbon tax. As reported, the rebates will be up to 76% and will apply for tax years 2024 and 2025.

China greens desert: In the first week of **June 2024**, it was reported widely that China had "gone live" generating electrical energy from a **3.5 GW photovoltaic solar farm** located in the desert region of **Xinjiang Province**. As reported, the PV solar farm will generate a little over **6 TWh** of renewable electrical energy a year. In other words, a little less than the electrical energy supply required to match the load of Luxembourg. This is the third PV solar wind farm developed in China at (or above) installed capacity of **3 GW** and continues the ever-increasing roll-out of renewable electrical energy capacity across China.

China is on target to invest **USD 359 billion** in 2024, considerably more than the Africa, EU, India, Latin America, Southeast Asia, and the US combined.

Pausing to reflect: In Q3 of 2020, the author wrote about the plans of China articulated by Chinese President, Xi Jinping, as China committed to achieve net zero by 2060. At that time, China committed to have 1,200 GW of PV solar and wind capacity installed by 2030. By the end of 2024, it is estimated that China will have 1,310 GW of installed PV solar and wind capacity. This demonstrates that planned roll-out can be achieved.

By way of reminder: In **Edition 12** of **P_2N_0**, under **China CO_2 emissions dip in March**, we reported that: "The Straits Times (at **www.straitstimes.com**, under **Have CO2 emissions in China peaked? A 3% fall in March gives reason for hope**) reported that the carbon emissions arising in China during March 2024 fell by 3%, following "a 14-month surge" in carbon emissions. The dynamics in China are fascinating: demand for electrical energy in China continues to increase, with a year-on-year increase of 7.4% to the end of March 2024, with 90% of that increased demand matched by ever increasing photovoltaic solar and wind development and deployment." During June 2024 it became clear that coal production in China had fallen by 54 million tonnes during the first five months of 2024, to 1,858 million tonnes.

By way of background: **DNV** published its **Energy Transition China Outlook** during **April 2024**. The publication is excellent, providing a balanced and insightful (as ever from **DNV**) assessment, and aligns with the dip during **March**.

World's Largest Green Hydrogen, Ammonia and Methanol Integrated Project: On **June 29**, **2024**, it was reported widely that a **USD 4.2 billion Green Hydrogen-Ammonia-Methanol Integrated Project** is to be developed by **Sungrow Hydrogen** in **Jilin**, **China**, to produce **110,000 metric tonnes** of green hydrogen and **600,000 metric tonnes** of green ammonia / green methanol a year. The project is to be developed in stages, with the first stage involving the development of **800 MW** of renewable electrical energy capacity (comprising photovoltaic solar and wind), a **45,000 metric tonnes** a year green hydrogen production facility, a **200,000 metric tonnes** a year green ammonia facility, and a **20,000 metric tonnes** a year green methanol production facility.

Singapore getting H_2 ready: On **June 4**, **2024**, the **Energy Market Authority** of Singapore, invited the private sector to build, own and operate two additional gas-fired power stations that are "H_2 ready", to achieve commercial operation by commercial operation dates (**COD**) by **2029** and **2030** respectively. Each power station is to have capacity of **600 MW**, continuing what may now be regarded as a market reshaping strategy. Taken with other development, Singapore will have procured an additional **3 GW** of electrical energy generating capacity.

H_2 Ready Power Stations		
Keppel Sakra Cogen Plant, 600 MW CCGT (COD in 2026)	**SembCorp**, 600 MW CCGT (COD in 2027)	**YTL**, 600 MW CCGT (COD in 2027)
Meranti Power and **PacificLight** are developing four power stations with fast start capacity to respond so as respond to short run demand increases and in so going provide maintain system integrity and stability		

Cases in point:

- **Aluminium greening**: In late **May**, early **June 2024**, it was reported widely that **Rio Tinto** had agreed to power purchase and supply contracts with electrical energy generators (including **Contact Energy**, **Mercury Energy**, and

Meridian Energy) for **572 MW** of load at its **Tiwai Point** aluminium smelter, on the South Island of New Zealand (**New Zealand Aluminium Smelters** or **NZAS**).

As reported, the power purchase and supply contracts provide for the supply of renewable electrical energy, and for the use of the aluminium smelter to provide load reduction services, with load reduction of up to 185 MW to manage the load across the transmission network of the South Island of New Zealand. In some of the reporting, this has been described as a battery electrical energy storage system (**BESS**). While not a BESS in the true sense, and the notion of load reduction is not new. This is a good news story.

- **Iron and steel greening**: On **June 4**, **2024**, it was reported widely that **Rio Tinto** is to invest **AUD 215 million** to develop a low to no emissions research facility in **Western Australia**. As reported, the facility will consider the feasibility of the use of biomass to green the production of iron and steel using a **BioIron technology**. As understood, the **BioIron technology** uses **fast growing biomass** as a source for the high heat temperature required to produce iron, and in combination with renewable electrical energy, may reduce the CO_2 emissions arising from the production of iron by 95% when compared to the use of blast furnace technology.

- The Strategy of Hydrogen Development in Hong Kong (**HK H_2 S**): During **June 2024**, **Hong Kong** published its **HK H_2 S**. The publication is punchy (at 35 pages), provides a clear perspective, and is well-worth a read.

Europe and the UK

Further state-aid approved for Green Steel: On **June 26**, **2024**, it was reported widely that the **European Commission** had approved state-aid in the form of a grant of **€265 million** from the Swedish Government to the €6 billion Boden Green Steel Project. As reported, the total state-aid now provided to the project is around **€500 million**.

Direct Reduced Iron (DRI) snapshot	
Iron feedstock is processed produce to **HDRI** (Hot Direct Reduced Iron) and **HBI** (Hot Briquette Iron), reducing / removing, oxygen.	
HDRI and **HBI** can be used processed to produce steel with **Electric Arc Furnace** (EAF) technology	**HBI** can be processed to produce steel with **Blast Furnace** (BF) or **Basic Oxygen Furnace** (BOF) technology

EIB to provide €1.2 billion loan to RWE for Thor: On **June 24**, **2024**, it was reported widely that the **European Investment Bank** (**EIB**) is to provide a **€1.2 billion** loan to allow **RWE** to fund the development of the **1.1 GW Thor** offshore wind field on the Danish sector of the North Sea. Also, during **June 2024**, **RWE** received approval for its **1.6 GW** offshore wind field project, **Nordseecluster**, as the name suggests, located in the German sector of the North Sea.

German Government announces results of offshore wind field auctions: On **June 22**, **2024**, the **Federal German Government** announced the results of the auction for **2.5 GW** of offshore wind field capacity. The successful bidders were, **Offshore Wind One GmbH** (owned by TotalEnergies), awarded a contract to develop area **N-11.2**, with the potential to install up to **1.5 GW** of capacity, and **EnBW Offshore Projektgesellschaft 1 GmbH**, awarded a contract to develop area **N-12.3**, with the potential to install up to **1 GW** of capacity. **N-11.2** and **N-12.3** are located about 120 kms northwest of Heligoland, and the capacity developed is to be operational by 2031.

The two successful bidders paid for the concessions, badged "negative bidding", i.e., rather than competing in a reverse auction to be awarded a contract for the lowest level of subsidy from the government, the auction involved negative bidding, because rather than seeking any subsidy, the successful bidders agreed to pay for the award of the contracts.

European Hydrogen Network Moving to Green:

- **ENNOH passes GO**: On **June 22**, **2024**, **37** infrastructure corporations and organizations (badged **Hydrogen Transmission Network Operators**) met to finalize framework agreements so allow the development of the **European Network of Network Operators for Hydrogen** (**ENNOH**). This is a material and significant development, paving the way for coordinated cooperation to deliver efficient outcomes across the EU.

- **German Government state-aid approved**: On **June 22**, **2024**, it was reported widely that the **European Commission** had approved the provision of **€3 billion** of state-aid by the **Federal German Government** to support the construction of the **Hydrogen Core Network** (**HCN**). The **HCN** will provide the core of the infrastructure within Germany which will then be connected to allow the development of a cross-border transmission network across Europe. The **HCN** will be financed by hydrogen transmission system operators (**TSOs**) to be appointed by the **Federal German Government**. The state-aid will take the form of a guarantee by the **Federal German Government**, supporting the **TSO**s so as to enable them to access financing from the **German national policy bank**, **Kreditanstalt für Wiederaufbau**, at lower interest rates than commercial banks, and with a longer tenor (to 2055 as currently contemplated).

Also, during **June 2024**, the **European Scientific Advisory Board on Climate Change** published **Towards climate-neutral and resilient energy networks across Europe**. The publication provides **advice on draft scenarios under the EU regulation on trans-European energy networks**. The main theme of the publication is the challenges that arise from uncertainty attendant on the many facets of the energy transition, including CCS deployment and H_2 import and use and production and use. The publication is a good read.

Norwegian Government help funding ammonia fueled vessels: On **June 20**, **2024**, it was reported widely that the **Norwegian Government**, through **Enova**, had awarded funding of **USD 115 million** to shipping companies to develop nine hydrogen powered and propelled vessels and six ammonia fueled vessels. The funding is part of the policy settings of the **Norwegian Government** to decarbonize the shipping industry.

CCS exploration licenses granted:

- On **June 20**, **2024**, the **Danish Energy Agency** announced (at **https://ens.dk/en/press/first-licenses**, under **First Licenses in Danish history to explore on shore CO2 storage potential awarded**, that exploration licenses had been awarded to allow the assessment of the potential for the storage of CO_2 at three onshore locations. **Wintershall Dea International GmbH**, **INEOS E&P A/S**, and **Nordsøfonden** have been granted a licence at **Gassum**, **CarbonCuts A/S** and **Nordsøfonden** have been granted a licence at **Rodby**, and **Equinor Low Carbon Solutions Denmark A/S**, **Ørsted Carbon Solutions A/S** and **Nordsøfonden** have been granted a licence at **Havnso**. The ability to store of CO_2 onshore will be a game changer, critically, providing a shorter and lower cost CO_2 value chain from capture to storage.

- Also, on **June 20**, **2024**, the **Norwegian Ministry of Energy** announced that it had offered four new exploration licenses in respect of geological storage areas on the Norwegian Continental Shelf. **Equinor ASA** was offered two licenses, **Vår Energi ASA**, **OMV** (**Norge**) **AS** and **Lime Petroleum AS**, together, were offered one licence, and **Aker BP ASA** and **PNGiG Upstream Norway AS**, together, were offered one licence. Earlier in June, on **June 6**, **2024**, the seventh round of invitations to apply for licenses was released. Applications are to be made by **August 29**, **2024**.

While not as far progressed as Denmark and Norway, on **June 27**, **2024**, the **Austrian Government** announced its plans for the development of onshore CO_2 storage, principally to address the decarbonization of the "hard to abate" industries. As announced, CCS will be the subject of new law and regulation within the framework for the mining industry, an adapted legal and regulatory regime for the transportation of CO_2 that is captured, from the point of capture to the point of injection and storage, with targets for CO_2 capture and storage to provide scale.

TotalEnergies and Air Products sign 15-year Green H_2 deal: On **June 7**, **2024**, it was reported widely that **TotalEnergies** and **Air Products** had signed a contract with a **15 year term** under which **TotalEnergies** is purchase, and **Air Products** is to supply, green hydrogen, to decarbonize the refining operations of **TotalEnergies** across Northern Europe. As announced, **70,000 metric tonnes** of green hydrogen will be supplied and purchased each year from 2030.

In addition to the supply and purchase of green hydrogen, **TotalEnergies** and **Air Products** signed a power purchase contract under which **TotalEnergies** is to supply renewable electrical energy to **Air Products** in the US State of Texas.

European Commission approves fourth round of IPCEI projects: On **May 28**, **2024**, (and for some reason dropping out of the final draft of **Edition 12** of **P_2N_0**, the **European Commission** announced (see **http://ec.europa.eu**, under **Commission approves up to €1.4 billion of State aid by seven Member States for the fourth Important Project of Common European Interest in the hydrogen value chain**) that under **IPCEI HyMove**, Estonia, France, Germany, Italy, the Netherlands, Slovakia, and Spain, are permitted to provide up to **€1.4 billion** to provide funding support for **13 projects**, to be undertaken by **11 corporations**, across the **seven EU Member States**.

As reported on previously, by the author, IPCEI **HyMove** follows three earlier IPCEI rounds, **Hy2Tech** (July 15, 2022), **Hy2Use** (September 21, 2022), and **HyInfra** (February 15, 2024).

HELPFUL PUBLICATIONS AND DATA BASES

The most noteworthy publications read by the author during **June 2024** are as follows:

- **UN Sustainable Development Goals Report 2024**: On **June 28**, **2024**, the **UN Environment Programme** (**UNEP**) published **The Sustainable Development Goals Report 2024**. The headlines are that **17%** of the **Sustainable Development Goals** are progressing in line with targets, over **50%** showing some progress, and around **33%** (or so) not progressing in line with targets, a number having regressed. The **Report** is important, as is the conclusion that more work is needed.

  This follows the release in **May** 2024 of the following publications by the **UNEP**:

  - **Managing physical climate-related risks on loan portfolios**;
  - **Assessing Climate Transition Risk: Methodologies and Roles for Financial Institutions**; and
  - **The Climate Data Challenge: The Critical Role of Open-Source and Neutral Date Platforms**.

  The three technical reports are supplemental to the **UNEP FI Climate Risk Landscape Report**.

  In addition, the **Risk Centre** of the **UNEP** has published seven risk briefs covering the following sectors, **Agriculture**, **Industrials**, **Metals and Mining**, **Oil and Gas**, **Power Generation**, **Real Estate**, and **Transportation**. The risk briefs are intended to inform the understanding of the climate change and transition risks across each sector. They are all well-worth a read, and for those so inclined, might be helpful reading over the Northern Hemisphere Summer.

- **The Asia Pacific renewable supply chain opportunity**: On **June 27**, **2024**, the **Institute for Energy Economics and Financial Analysis** (**IEEFA**) published **The Asia Pacific Renewable supply chain opportunity**. What is written on the tin is in the tin: the publication outlines the scale of the renewable electrical energy market, focusing on photovoltaic solar farm and offshore wind field development. The publication is comprehensive and well-worth a read.

- **BHP Decarbonisation**: On **June 26**, **2024**, the good folk at **BHP** published **Decarbonisation: Strategy and progress, Investor Presentation**. The **presentation** outlines the approach **BHP** is taking to decarbonize its operations. The presentation is well-worth a read.

- **World Economic Forum publications**:

  - **Fostering Effective Energy Transition**: On **June 19**, **2024**, the **World Economic Forum** published **Fostering Effective Energy Transition**. The publication suggests 10 action items, as follows: 1. Implement Decarbonization Laws and Regulation; 2. Delivery Energy Equity through assistance to vulnerable households; 3. Increase Clean Energy Investments; 4. Invest in Energy Efficiency; 5. Upgrade Grid Capabilities; 6. Enhance Sector collaboration; 7. Accelerate Electrification; 8. Promote Technical Innovation; 9. Support Workforce Transition; and 10. Strengthen International Cooperation. While there is nothing new in any of the action items, the publication is good.

- **Health Impacts of Climate Change**: Also, during **June 2024**, the **World Economic Forum** published **Health Impacts of Climate Change: Evidence Landscape and Role of Private Sector**. The publication connects, clearly, the impacts of climate change on the health of folks, in particular vulnerable folks. The publication is important, and well-worth a read.

- **Scaling Up Hydrogen: The Case for Low-Carbon Methanol**: On **June 18**, **2024**, the good folk at **BloombergNEF** published **Scaling Up Hydrogen: The Case for Low Carbon Methanol, A BNEF and Climate Technology Coalition White Paper**. The paper is excellent, detailing a case that is **clear**.

- **The OIES Publications in June**: During **June 2024**, **The Oxford Institute for Energy Studies**, published, **How proper measurement of low carbon hydrogen's carbon intensity can reduce regulatory risk**, **Can Hydrogen and Carbon Capture and Storage (CCS) help decarbonize the coal power plants in Asia?** and **Potential Regulatory Frameworks for Cross-Border CO2 Transport between the EU and the UK**. Each publication is well-worth a read, and the subject matter of them is timely given that these are matters being grappled with in a number of jurisdictions.

- **World-Steel-In-Figures**: On **June 6**, **2024**, the **World Steel Association** published **2024 World Steel in Figures**. The publication is of interest, providing up to the minute facts and stats, and tying back to the recognition of the need to decarbonize the production of iron and steel. The publication covers Crude Steel Production, Steel Use, Raw Materials, Trade, direct and indirect, and Steel Markets.

- **Guide on climate-related disclosure for central banks**: During **June 2024**, the **Network for Greening the Financial System** published a technical statement, **Guide on climate-related disclosure for central banks**. The publication is worth a read, providing a helpful summary of current thinking. The publication is excellent.

- **Levelized Cost of Hydrogen (LCOH) Calculator Manual**: During **June 2024**, the **Clean Hydrogen Partnership** published **Levelized Cost of Hydrogen (LCOH) Calculator Manual**. The publication is excellent, covering the LCOH concept and calculator, the methodology applied, and its application and use.

- **Scope 3 Upstream**: During **June 2024**, the good folk at **CDP** and **BCG** (Boston Consulting Group), published **Big Challenges, Simple Remedies**, outlining thinking in respect of the reduction in Scope 3 emissions. The answers are simple, the achievement of them, hard. The publication is well-worth a read. Also, during **June 2024**, **BCG** published **Scaling CDR: Demand Drivers for Durable Carbon Removal**. Both excellent and timely.

- **Energy Institute 2024 Review**: During **June 2024**, the **Energy Institute**, working with **Kearney** and **KPMG**, published **Statistical Review of World Energy, 2024**. As might be expected, the publication is a gold mine of facts and stats across each source of energy, and key minerals. The publication is excellent, providing a valuable source of data and information.

- **Columbia University Centre of Global Energy Policy H2 tracker**: During **June 2024**, **Columbia University Centre of Global Energy Policy** published its **National Hydrogen Strategies and Roadmap Tracker**. The tracker is a useful point of reference, and cross-reference.

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