

EI NEW ENERGY™

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Appetite Hits Critical Stage for Direct Air Capture

Direct air capture (DAC) is here to stay, as evidenced by soaring investor interest. This is the key message Christoph Gebald, Climeworks' co-CEO, delivered at the end of the DAC summit his company organized last week in Zurich. "This hasn't been clear until recently, but we're now absolutely convinced that we'll have multimegaton capacity by 2030."

A good indication of the world's "skyrocketing interest" for DAC is the success of Climeworks' recent \$650 million equity round, Gebald pointed out. JPMorgan's Allison Fleming confirmed this. "Investors' appetite and interest was truly amazing," she told the summit.

What Else Is Needed?

Beyond finance, which remains abundant, what DAC needs the most is corporate action and policies, said Gebald. Corporate action means that more emitters should commit to long-term fixed-price carbon contracts to boost DAC and ensure the technology's bankability. "At this stage, it's really a volume question and it's too early to bother about cost and price," said Microsoft's chief environment officer, Lucas Joppa, who urged more companies to "buy removals" - as in carbon removals. Right now, most offtakers belong to the professional services, technology and aviation sectors, said consultancy BCG's Bas Sudmeijer.

Oil and gas companies are also looking at DAC with potential synthetic jet fuel applications in mind, he added. Atmospheric carbon from DAC or biomass - as opposed to carbon captured from industrial processes - is the only way of making truly sustainable synthetic fuels, said the German Institute for International and Security Affairs' Oliver Geden.

By contrast, carbon capture and utilization is "problematic" because it recycles fossil carbon, which ends up being emitted. It could even "lock in" certain carbon-intensive processes, which could otherwise be fully decarbonized with electricity or green hydrogen. Without clear rules and limitations on carbon sources, "we might create a new industry based on questionable assumptions," Geden warned.

On the policy side, multiple speakers insisted on DAC's storage durability, a key benefit of the technology over less permanent carbon dioxide removal (CDR) options such as afforestation-reforestation. This should be reflected in standards and accounting methodologies as permanence is becoming "a very critical issue" in climate discussions, Geden said. Joppa suggested a weighting system could be applied to CDR technologies to reflect storage quality and durability. This would avoid "a financial race to the bottom," he said.

Perfecting Policy

Similarly, to avoid conflicts between policies and technologies, consultancy Valence Solutions' Gabrielle Walker recommended separating targets for emissions reductions

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REGIONAL POWER GENERATION COSTS

(\$/MWh)	Dvlp.				
	US	Europe	Japan	Asia	Mideast
Large Solar PV	37	70	117	37	32
Wind Onshore	41	54	83	47	61
Gas CCGT	58	216	201	187	184
Large Hydro	58	76	78	47	93
Coal	73	202	96	66	140
Geothermal	85	85	127	38	163
Wind Offshore	95	93	192	110	102
Gas OCGT	103	340	310	298	291
Nuclear	104	104	118	58	87
Solar CSP	116	176	NA	188	115
Biomass	132	132	132	108	125
Coal with CCS	142	233	195	137	247
Wave-Tidal	274	274	268	260	260

Levelized cost of energy, or cost of generating electricity over lifetime, including capital, operating, fuel and carbon costs. Dvlp. Asia = developing Asia, mostly China and India. Source: Energy Intelligence

and carbon removals. This would prevent countries and companies – particularly oil companies – from using DAC and other CDR technologies to comply with emissions targets. Phasing out fossil fuels should remain everyone’s primary goal, speakers emphasized.

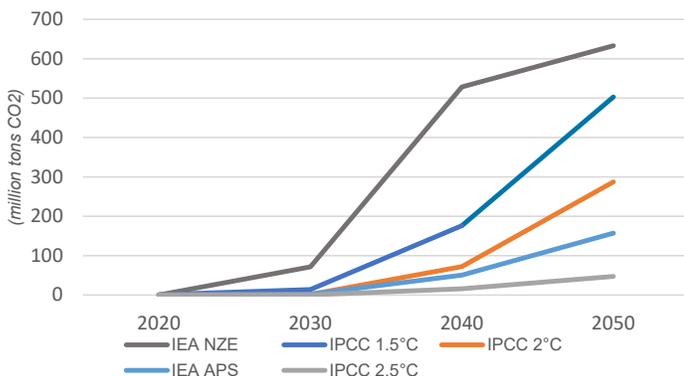
Indeed, the “window for a safe landing is rapidly closing” on climate change, said the Potsdam Institute for Climate Impact Research’s Johan Rockstrom. Models suggest that keeping global warming close enough to 1.5°C requires more than just slashing emissions, he said. “We also need an agricultural revolution – so that food production turns from a carbon source to a sink – and we need a lot of removals.” Even if emissions could fall by a “staggering” 7% per year between now and 2050, holding the 1.5°C limit would involve CDR reaching 12 billion–15 billion tons of carbon dioxide per year by 2050. “CDR technologies are necessary and need to be scaled very rapidly from today’s pilot scale to billions of tons per year within one generation.”

Gebald believes the DAC industry as a whole could reach 1 billion tons/yr by 2050. He sees the period between now and 2030 as a ramp-up phase. Individual plants would grow from Climeworks’ 4,000 ton/yr Orca plant, commissioned last year, to its 40,000 ton/yr Mammoth plant, announced in June, and eventually to multimillion-ton plants by the end of the decade.

Next Phase

The next phase between 2030–50 would see large-scale global deployment of hundreds of such multimillion-ton units. That would involve investing about \$30 billion–\$50 billion/yr in DAC plants over 20 years, plus 25 gigawatts per year in renewable energy capacity to power them. This is relatively modest in comparison with current investment in renewables at around \$370 billion and 275 GW last year, or projected investment in renewables at \$600 billion–\$700 billion and 840 GW by 2050, Gebald insisted.

DIRECT AIR CAPTURE SCENARIOS



NOTE: Direct air capture projections to 2050 under various IPCC and IEA scenarios, in million tons of CO2 per year. Source: IPCC, International Energy Agency

Deployment incentives such as fixed-price contracts or tax breaks will however be key to achieving such rapid growth, said nonprofit Carbon Gap’s Eli Mitchell-Larson. Incentives are even more important for DAC than they were in the early days of renewables. “Solar and wind produce electricity, a good that people want to buy” – whereas CO2 is a public good which needs a public framework to become commercial and attract funding.

Philippe Roos, Zurich

POLICY

US Ruling Delivers (Partial) Blow to Climate Agenda

The US Supreme Court has narrowed the federal government’s authority to regulate power sector emissions – at least in a way that is too prescriptive. The 6–3 decision, handed down Jun. 30, whittles down one of the most significant tools in the Biden administration’s climate toolkit but leaves room for other regulatory pathways, such as those encouraging hydrogen, carbon capture and other innovations in the US electricity sector.

The suit, *West Virginia v. EPA*, has been the most closely watched environmental case of the Supreme Court’s most recent term. The court majority held that the Environmental Protection Agency (EPA) overstepped its legal authority in crafting the 2015 Clean Power Plan. That policy was written under Democratic President Barack Obama’s administration and set greenhouse gas regulations on power plants. Specifically, the decision says the EPA went too far and states that fuel switching is off the table in shaping EPA emissions standards – notably fuel switching to renewables, and to a lesser extent natural gas.

Remaining Room

But the ruling leaves room for climate regulations that are crafted differently to curb power sector and other industrial emissions. “The decision blunts a key tool in EPA’s toolbox, but multiple pathways remain for the agency to address the significant climate change impact from coal and gas-fired electric generating units,” writes Clean Air Task Force attorney Jay Duffy in a recent analysis. Those pathways, which could be facilitated by EPA policies, include emissions control technologies like CCUS, natural gas and hydrogen co-firing, and market mechanisms like emissions trading, provided the trading occurs between power plants or other facilities of the same regulated entity.

The majority opinion, authored by Chief Justice John Roberts, reads “Congress did not grant EPA ... the authority to devise emissions caps based on the generation shifting approach the agency took in the Clean Power Plan.” The Clean Power Plan, which never took effect because of a Supreme Court freeze in

2016 and subsequent rewrite by the Trump administration in 2019, set a target of cutting 32% of carbon dioxide emissions below 2005 levels by 2030 – essentially by requiring utilities to shift away from coal to natural gas and renewables.

“The silver lining is EPA’s authority to determine the best system of emissions reduction is intact and reinforced,” and Roberts’ opinion preserves the possibility of broader emissions reductions measures, writes Harvard University law professor and former White House official Jody Freeman in a Jun. 30 tweet.

A rewrite of the power sector climate regulations is seen as a key tool in meeting the Biden administration’s pledge to decarbonize the electricity sector by 2035. EPA Administrator Michael Regan said the agency is “committed to using the full scope of EPA’s authorities” to combat climate pollution.

Wider Ramifications

Yet Biden’s climate agenda could be significantly impaired by the Supreme Court’s decision. The ruling is viewed as expanding on a fairly nascent legal doctrine that restricts agencies from addressing certain “major questions” with political or economic implications unless Congress explicitly directs them to do so.

The doctrine states that courts “expect Congress to speak clearly if it wishes to assign to an agency decisions of vast economic and political significance.” In the *West Virginia* case, the court majority took issue with what it characterized as the EPA’s interpretation that Congress meant for the agency to determine “how Americans will get their energy,” referring to generation switching.

The “major questions” language could prove problematic for much of Biden’s regulatory agenda, giving industry and Republican critics another legal cudgel with which to challenge climate and clean energy regulations. For example, the SEC climate disclosure rules and the EPA’s clean car standards for model years 2022–26 are believed to be somewhat vulnerable, with the doctrine already being raised in challenges to both policies.

Bridget DiCosmo, Washington

INDUSTRY SOLUTIONS

Shell Reinventing Giant Singapore Refinery Complex

Once known as Shell’s largest global refinery, the Bukom refinery in Singapore is now in the midst of transforming itself into one of Shell’s five sustainable energy and chemicals parks. As envisioned, it would be the only one located in Asia, where a carbon capture and storage (CCS) hub is also under study.

Shell reduced annual greenhouse gas emissions at its energy and chemicals park in Bukom last year by 580,000 tons compared to a year earlier, a “very, very significant” achievement, CEO Ben van Beurden said recently in Singapore. “Part of that is because we have started to high-grade that refining complex by taking out a crude distillation unit and a few other units to upgrade straightforward fuels to much more sophisticated products.”

Shell aims to halve its own carbon dioxide emissions in Singapore from 2016 within 10 years. The Bukom refinery – whose original 500,000 barrel per day capacity has been halved to 250,000 b/d since 2021 – is now Shell’s only refining asset in Asia, following sales or closures in Australia, New Zealand, Malaysia, the Philippines, Thailand and Japan.

Repurposing Bukom

After slashing Bukom refinery’s capacity, Shell now sets out to shift the product slates by producing lower-carbon, sustainable products and circular chemicals as feedstocks for its 1 million ton per year ethylene petrochemical cracker at nearby Jurong Island. Shell is building its first unit that would treat pyrolysis oil, made from waste plastics that would otherwise be dumped at a landfill, as the raw material for the ethylene cracker. Capacity would be 50,000 tons/yr and production will start in 2023.

Shell also expects to make a final investment decision by the end of this year for a 550,000 ton/yr biofuels facility to make sustainable aviation fuel (SAF) and biodiesel, Van Beurden says. This would follow a similar green light received for an 820,000 ton/yr biofuels facility at Rotterdam last year. Instead of palm oil, the planned Singapore biofuels facility is slated to use cooking oil and animal fats. But it remains to be seen how Shell would source these feedstocks as there are no robust existing supply chains yet.

The CEO highlighted Singapore’s position as a regional aviation hub and existing pipeline infrastructure with the country’s Changi Airport, which provide strong reasons for Shell to embark on SAF production. The Bukom project would support Shell’s target to produce around 2 million tons/yr of SAF globally by 2025. In February, Shell became the first supplier of SAF – sourced and blended in Europe – to Singapore. Shell is also hatching plans for a 300,000 ton/yr recycled chemical upgrader project and a Group II base oil project – essentially a feedstock for its lubricants plant – all of which are aimed at reducing Shell’s carbon footprint, including its Scope 3 emissions, said Van Beurden.

Capturing Carbon

Like its Rotterdam energy and chemicals park, Shell is also exploring a CCS hub in Singapore. As envisioned, the hub would capture 5 million–15 million tons/yr of its own CO₂

emissions and those of its customers. Shell is seeking partners for the proposed hub: it would take care of capturing the CO₂ itself, while transport and storage activities would be conducted by another company. Energy Intelligence understands the CO₂ would most likely be transported by pipeline, which is cheaper and easier than by ship, although Shell is also exploring the latter solution.

Shell declined to say where the CO₂ will be stored, but depleted gas reservoirs in Malaysia are likely to be used due to its proximity to Singapore. Another potential candidate is Brunei, where Shell has a huge footprint upstream and an integrated gas presence. Beyond Southeast Asia, Shell recently signed an MOU with Chinese state CNOOC and Exxon Mobil to study CCS at Daya Bay in Guangdong province, where Shell and CNOOC's petrochemical joint venture is sited.

"A lot of our customers are very keen all around Asia, looking for storage solutions for their emissions but also enabling them to start producing low-carbon products," such as hydrogen and biofuels, Shell's general manager for CCS Asia, Yu Li P'ing, recently told a media briefing.

Shell tends to pace the development of CCS with the development of policies and regulatory frameworks. "There is a lot of positive movement in the regulatory framework here in Singapore and in terms of the carbon pricing mechanism that they are setting," Yu says. But compared with Europe, carbon prices in Singapore are perhaps "not sufficient enough to incentivize and push forward for massive scaled-up CCS." Until carbon pricing is more robust in Singapore, Yu noted there are other mechanisms in place such as grants, tax credits and subsidies.

Clara Tan and Marc Roussot, Singapore

POWER

How China Is Sidestepping an Electricity Crisis

The widespread power outages in China last year that grabbed international headlines might have been a blessing in disguise in one sense, as they prompted Beijing to make early preparations to avoid the same embarrassing crisis this year. China's efforts to ensure energy sufficiency – which began even before the Ukraine crisis – are now paying off as the world grapples with record-high fuel prices. While countries like India and Australia are struggling with power emergencies or outages due either to heat waves, gas shortages or coal plant shutdowns, China has so far this year managed to avoid any major energy crunches. Judging from official coal stockpile and power supply data, China looks better prepared to

CHINA ELECTRICITY PRODUCTION

	Y-o-Y %Chg.	Jan-May'22 (TWh)	Jan-May'21 (TWh)
Total Generated Electricity	0.5%	3248.4	3177.2
Combustible Fuels (mostly coal)	-3.5%	2271.2	2341.7
Hydro	17.5%	434.6	368.5
Nuclear	4.5%	166.3	159.2
Wind	9.5%	325.6	297.2

Base year (2021) figures under adjustment; may not precisely reflect the % change. Data not available for solar. Source: China Electricity Council

weather the current summer peak demand season without blacking out.

Beijing is adopting a multipronged approach involving near-term measures emphasizing reliance on its vast domestic coal resources as well as longer-term, low-carbon solutions that call for accelerating renewable and nuclear energy deployment. China's decision to boost coal usage had initially drawn much criticism from environmentalists. But in the wake of drastic cuts in Russian gas supplies, even European countries like Germany have introduced temporary measures that entail burning more coal.

Blackouts Must Not Recur

This summer, "China's electricity market is expected to be in an overall balanced position," an official with industrial body China Electricity Council (CEC) told the local media recently. While there might be periods of supply tightness in certain regions in the event of extreme weather events, "those widespread power crunches of last year would not recur," the official asserted.

CEC's guarantee echoed the promise by President Xi Jinping, who commanded that the power blackouts that plagued China in the second half of 2021 "must not be allowed to recur" in a May article he penned for local media.

Record Coal Production

China's coal stockpile is now at a high and its hydro reserves are brimming after plentiful rainfall this year. A new nuclear reactor has also just entered commercial operations as of last month and construction of new wind/solar capacity is ongoing and accelerating.

On the coal front, "national raw coal output has surged by 10.4% year on year during January-May, with daily production at a historic high of over 12 million tons – so coal supply security has improved tremendously," said the China National Coal Association this week (CNCA).

Since last year's power crisis, Beijing has also been pressuring coal producers to commit fuel supplies to domestic power plants through medium- and long-term contracts. "Such contractual supplies now account for over 75% of coal

demand ... which is particularly helpful in keeping domestic prices stable,” the CNCA notes. The domestic coal market is thus expected to be “balanced to slightly long” during the summer peak, the association adds.

Plentiful Hydro Pushes Up Coal Stockpile

Abundant hydropower output this year has also eased the pressure on coal power plants to maximize operations, thus helping to conserve coal usage. Hydroelectric output surged by almost 18% year on year during January–May, latest data from the China Electricity Council (CEC) show. This has allowed coal power plants to lower production by 3.5%.

Lower utilization of coal power plants – coupled with higher coal production – means China’s coal stockpile is growing. The national stockpile level has surged to a high of over 30 days’ consumption, Zhao Chenxin, vice chairman of top economic planner the National Development and Reform Commission, told local media last month.

Renewables Still Rising

Meanwhile, China’s already massive wind and solar generation capacity continues to grow. Over the first five months of this year, China added over 32 gigawatts in combined wind and solar capacity – equivalent to some 30 nuclear reactors, according to CEC data. In fact, wind and solar accounted for nearly three-quarters of the new generation capacity completed during January–May.

China currently boasts over 650 GW in combined installed wind and solar capacity and plans to double that to at least 1,200 GW by 2030. The deserts and wilderness in northern China are to host a significant ratio of the planned additions. Construction work has already commenced on 85 GW of the total 450 GW in wind/solar capacity being planned in such arid regions.

New Nuclear

A sixth reactor at the Hongyanhe nuclear station in Liaoning province has just been completed and entered commercial operation on Jun. 23. That further fortifies power security in northern China, where a heat wave has sent air conditioning demand spiking. The new Hongyanhe unit 6 should add about 8 terawatt hours of electricity output annually, equivalent to over 3% of Liaoning’s power consumption.

Beijing wants “proactive and orderly” development of nuclear power as part of its efforts to peak carbon emissions. The aim is to increase nuclear capacity by 21 GW to 70 GW by 2025. Going full steam ahead with its nuclear plans, Beijing in April gave the go-ahead for the construction of six more new nuclear reactors – the highest number of units approved in a single stroke since 2008.

Demand Management

And in case the new coal, nuclear and renewable energy supply is still insufficient to meet this summer’s peak demand, many local energy authorities have announced “emergency” guidelines for “orderly electricity dispatch” – essentially rules for power rationing to avoid an unplanned outage.

In Shenzhen, for example, priority would be accorded to users in the agricultural, residential, public services and strategic sectors. Depending on the severity of the supply shortfall, selected industries would also be required to cease operations for one day to five days per week.

Kim Feng Wong, Singapore

POLICY

Come Join the G7 Climate Club

The G7 group of developed nations are forming a “climate club” to accelerate climate action and ambition so the world meets the goals of the Paris Agreement. The climate club, which could be up and running later this year, will prioritize reducing carbon emissions from the industrial sector while working to eradicate climate-related trade barriers between members.

So what will it seek? “At the club’s core, Germany wants members to put in place carbon prices at broadly equivalent levels and implement a joint climate levy at the club’s borders,” says Domien Vangenechten, a policy adviser at climate think tank E3G.

Carbon at the Core

The climate club would use tools including carbon pricing and carbon border taxes to prevent so-called carbon leakage, where companies relocate production operations to countries with weaker environmental standards.

The EU plans a carbon border tax – called a carbon border adjustment mechanism – that would levy a charge on imported goods from non-EU countries that don’t meet the strict climate standards set by the bloc.

The idea is that club members who match the EU’s climate ambitions would be exempt or could circumvent the tax.

G7 leaders, including German Chancellor Olaf Scholz, who proposed setting up a climate club in 2021 when he was Germany’s finance minister, said the climate club was nec-

essary. That's because "currently neither global climate ambition nor implementation are sufficient to achieve the goals of the Paris Agreement."

The idea is to get the world's largest economies and greenhouse gas emitters from the G20 countries to join the G7.

This is important because the G7 is shrinking on the world stage. Having represented some 70% of the world economy 30 years ago, the G7 now accounts for a collective 43.4% of world GDP and less than 10% of the world's growing population, although it does account for roughly 25% of global GHG emissions.

When Scholz proposed the idea in 2021, he said "important target countries" for the climate club were large GHG emitters such as China and the US, important trading partners of the EU, countries that put a price on carbon emissions or countries that have a large industrial base.

The G7 said "we invite partners, including major emitters, G20 members and other developing and emerging economies, to intensify discussions and consultations with us on this matter." The G7 statement notes that all countries are welcome to join if they are "committed to the full implementation of the Paris Agreement."

Founding Principles

Although there are no concrete guidelines yet for members, a G7 statement released last week said the climate club would be built on three founding principles: mitigation, reducing industrial emissions and joint energy partnerships.

Mitigation measures include adopting the best policies to reduce GHG emissions and monitor carbon leakage at "the international level." This would require strengthening emissions measurement and reporting mechanisms.

Transforming the industry would require a push to decarbonize industrial processes, use more low-carbon hydrogen across the industrial sector and expanding markets for green industrial products.

When the UK held the G7 presidency in 2021, it inked an industrial decarbonization initiative with the US, noting "reducing emissions, especially in hard-to-abate sectors such as cement, steel, and chemicals, while ensuring sustainable industrial growth, is possible through coordinated innovation policies and the creation of green markets."

The third pillar focuses on knowledge sharing, particularly through "joint energy transition partnerships" with countries such as India and South Africa. Both of those countries have inked deals along those lines with the EU and member states such as Italy over the last year.

German manufacturers are behind the idea of a climate club. The establishment of an international club "is done with the aim of uniting countries with similar climate protection ambitions in avoiding climate-related trade barriers. Especially in view of the many question marks in the European climate border adjustment ... this is more important than ever," says Thilo Brodtmann, executive director of German manufacturing association VDMA.

The G7 statement says designated ministers will work on establishing the climate club. They will engage with international institutions and bodies to make the club a relevant entity, including the OECD, International Monetary Fund, World Bank, International Energy Agency and World Trade Organization.

Jason Eden, London

POLICY

EU Council Keeps Door Open to Renewable Fuels

In a landmark decision, the council agreed to raise targets for reducing carbon dioxide emissions for new cars and new vans to 100% by 2035 - seen as an effective ban on conventional cars. Environmental campaigners praised this move. Brussels-based Transport and Environment (T&E) declared that "it's game over for the internal combustion engine in Europe," with the council agreement breaking "the hold of the oil industry over transport."

However, the agreement still leaves the door open to renewable fuels such as advanced biofuels and e-fuels. The council called for a review of the legislation in 2026, based on an assessment of progress against the reduction targets and technological developments, including plug-in hybrids. This "technology openness means that also hydrogen and other CO₂-neutral fuels can play an important role in decarbonizing road transport," said Oliver Zipse, president of the European Automobile Manufacturers' Association (ACEA) and CEO of BMW.

Welcomed by Refiners

European refiner group FuelsEurope welcomed the council's decision to complement vehicle electrification with the potential for hybrids with renewable fuels - which, it said, would help to accelerate the transition of liquid fuels. "Alongside the existing electrification strategy, the way forward must include a route to bring new supply of renewable fuels to market in a manner that gives governments, citizens as customers, and investors the assurances they each need, and we must avoid creating unnecessary policy

risk that can stand in the way,” said FuelsEurope Secretary-General John Cooper.

T&E said however that the new proposals on renewable fuels are a “diversion” and “waste of time” – suggesting that e-fuels, over their lifetime, emit significantly more CO₂ than battery electric vehicles and pump out as much toxic nitrogen oxide emissions as petrol vehicles. It has called on the parliament to “shut down any possibility of a loophole for synthetic fuels” in upcoming negotiations with the council, noting that members of parliament voted last month in favor of phasing out internal combustion engines “without exceptions.”

Brussels also needs to do more to support the move to electrification, according to carmakers. “It is now vital that all the framework conditions for going fully electric are put in place – including the roll-out of a truly EU-wide network of charging and refueling infrastructure and access to the necessary raw materials,” ACEA notes. Its concerns are shared by the European Association of Automotive Suppliers, which argues that “criteria such as affordability, access to raw materials, emissions along the life cycle and employment” in the sector will also need to be considered by Brussels going forward.

Trading Transport Emissions

Among measures to strengthen emissions trading, the council also agreed to include maritime shipping emissions within the scope of the EU ETS. Yet it watered down some proposals and also introduced exemptions for member states heavily dependent on maritime transport. These compromises were criticized by campaigners as potentially undermining the effectiveness of the carbon market and creating an unlevel playing field in the market, and are calling on parliament to stand firm with the more ambitious measure it proposed. Carbon Market Watch wants parliament to prevent a delay until 2026 for medium-sized ships to be considered for inclusion in the scheme and extent coverage to all vessels between 400 and 5,000 gross tonnage.

In addition, the council agreed to a new, separate emissions trading system for the building heat and road transport sectors. However, the start of the auctioning and surrendering obligations will be delayed by one year compared with the original European Commission proposal, which called for a full start from 2028 onwards.

Ronan Kavanagh, London

IN BRIEF

EU Keeps Gas’ ‘Green’ Label

The European Commission’s proposal to make investments in some natural gas and nuclear power plants eligible for green funding under the so-called “EU taxonomy” is set to become law after the most serious effort to halt the initiative was voted down on Wednesday by the European Parliament. The Strasbourg lawmakers voted 328 to 278 against an objection to the commission’s initiative. There’s now effectively no chance that the European Parliament or the European Council will meet high voting thresholds needed by Jul. 11 to halt the law. The inclusion in the taxonomy of certain gas and nuclear activities – which the commission noted is “time-limited and dependent on certain conditions and transparency requirements” – is therefore set to enter into force as of Jan. 1, 2023.

The likely new law, the text of which the commission finalized on Feb. 2, attaches “strict conditions” and a “limited time” eligibility to the gas and nuclear activities that are included in the taxonomy. Investments in gas generation, cogeneration and heat or cooling projects all are included, but only when life-cycle emissions are below 100 grams of CO₂/kWh, only before 2030, and only in member states that have committed to switching to “renewable or low-carbon gases” by 2035. Some nuclear investments, meanwhile, will be included in the taxonomy through 2045, although only in member states with plans in place for high-level radioactive waste repositories.

Growth in Climate Litigation

Oil and gas companies are increasingly being targeted by climate-related lawsuits to force them to take bolder and more urgent action to decarbonize their operations, notably in Europe, a new report shows. The number of climate change-related legal cases has more than doubled since 2015 – the year in which the Paris climate accord was signed. Roughly one-quarter of the 2,002 cases recorded have been filed in the last two years, according to the UK-based Grantham

Research Institute on Climate Change (GRI). Most cases have been brought against governments by individuals, advocacy groups or communities targeting the adequacy and execution of national net-zero commitments and goals. But a closer look at corporate cases shows a proliferation of disputes outside the US, with at least 13 suits filed recently targeting European majors.

Suncor Eyes Clean Hydrogen

Canadian oil giant Suncor Energy and utility FortisBC are teaming up with an Australian technology provider to develop an innovative, clean hydrogen project in British Columbia, with a pilot plant due to start up by the end of next year. The partners, including ASX-listed technology developer Hazer Group, have started front-end engineering and design and permitting work for the pilot plant to be built at Suncor’s Burrard Terminal site in Port Moody, outside Vancouver. The plant will deploy Hazer’s proprietary methane pyrolysis process, which uses natural gas and an iron ore catalyst to produce hydrogen and a high-quality synthetic graphite that effectively stores the carbon-dioxide emissions. The graphite can then be marketed for manufacturing or industrial use.

Victoria’s Gas-to-Solar Switch

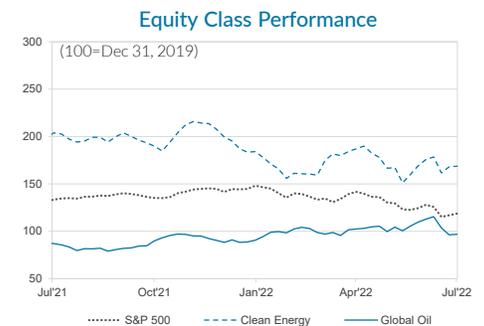
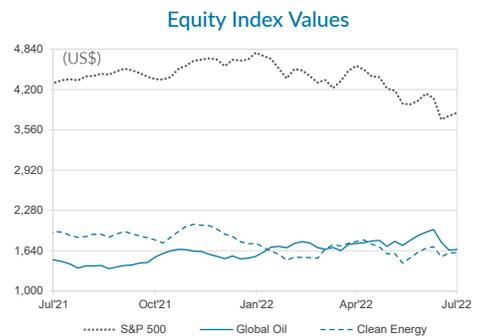
Australia’s state of Victoria has announced plans “to transition away from fossil gas and towards zero-emissions energy that delivers cheaper bills.” While gas was historically the cheapest fuel for Victoria, it’s getting too expensive, the state government said in its “gas substitution roadmap” released last week. The state government is encouraging users to switch from burning gas for heating to using electricity or solar panels, which it said could deliver savings of A\$1,020 (\$694) to A\$1,250 annually per household: “Firstly, a fully electrified household is no longer exposed to rising gas bills. Secondly, the efficiency of some electric appliances is significantly higher than their equivalent gas appliance.”

Uzbekistan Bets on Renewables

Uzbekistan is proceeding rapidly with an aggressive drive to develop renewables, including solar and wind, as part of a broader strategy to modernize the economy, ease dependence on exports and monetize national gas reserves. Foreign investors will be crucial to meeting those targets as the landlocked Central Asian country estimates investments in renewables will exceed \$12 billion by 2030.

“I think it is the right approach in developing the economy when you diversify it, create high value-added products ... and use your mineral resources with maximum return,” Azim Akhmedkhadjayev, the country’s deputy energy minister told Energy Intelligence in Tashkent. He added that a massive restructuring of the country’s economy initiated by Uzbek President Shavkat Mirziyoyev requires financial support from foreign financial institutions and investors, which are mostly eager to provide “green financing.”

CLEAN ENERGY EQUITY MARKETS



Source: S&P Global

EI NEW ENERGY DATA

ENERGY FUTURES: REFERENCE PRICES

	Jul 1	Jun 28	Chg.
Carbon (€/ton)			
ECX EUA	86.89	83.19	+3.71
CME GEO (\$/offset)	4.13	3.98	+0.15
Crude Oil (\$/bbl):			
Nymex WTI	109.06	107.18	+1.88
ICE Brent	114.00	112.74	+1.26
Natural Gas (\$/MMBtu):			
Nymex Henry Hub	6.14	6.53	-0.39
ICE UK NBP	24.24	23.22	+1.02
Coal (\$/ton):			
McCloskey CSX	174.60	166.60	+8.00
ICE Rotterdam	368.45	346.89	+21.56

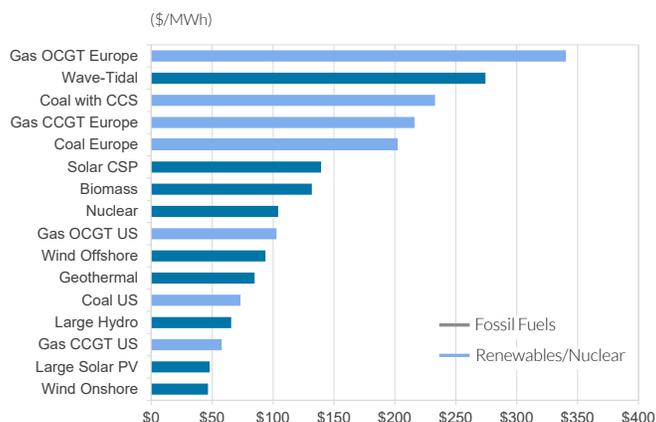
All prices are weekly averages and front-month. EUA = EU Allowances; GEO = Global Emissions Offset. Replaces ECX CER starting 3/30/21. ICE UK gas converted from p/therm. *Short tons. Source: Exchanges

GLOBAL ELECTRICITY PRICES

	Jul 1	Jun 24	Chg.
Europe (\$/MWh)			
Germany (EEX)	299.69	291.98	+7.71
France (Powernext)	340.59	337.52	+3.06
Scandinavia (Nordpool)	124.65	135.41	-10.76
UK (APX)	242.36	239.51	+2.85
Italy (GME)	382.30	350.91	+31.38
Spain (Omel)	148.45	147.21	+1.23
North America			
New England	75.55	62.09	+13.46
Texas (Ercot)	62.01	67.21	-5.20
US Mid-Atlantic (PJM West)	100.20	104.90	-4.70
US Southwest (Palo Verde)	67.50	72.53	-5.03
Canada (Ontario)	33.49	45.81	-12.32
Other			
Australia (NSW)	280.34	211.56	+68.78
Brazil (SE-CW)	10.60	10.72	-0.12
India (IEX)	66.02	64.12	+1.89
Japan (JPEX)	270.55	162.37	+108.18
Singapore (USEP)	163.64	133.20	+30.44

Weekly average of wholesale prices. Source: Exchanges

NEWBUILD POWER GENERATION COSTS



Source: Energy Intelligence

DATA: The complete set of EI New Energy data is available to web subscribers, including historical and forecasted levelized cost of energy (LCOE) calculations, EV sales, our Green Utilities rankings, fuel switching thresholds, electricity production by sector, ethanol and biodiesel fundamentals, carbon and energy prices, along with methodologies and reader's guides. The New Energy Data Service can be accessed [here](#).

LATEST INDICATORS: SALES AND FLEET PENETRATION OF EVS

China		US	
NEV sales (Mar 2022)	484,000	EV sales Mar '22	72,899
% LDV sales NEVs Mar 2022	21.7%	% LDV sales NEVs Mar '22	5.85%
NEV sales (Feb 2022)	334,000	EV sales Feb '22	59,554
% LDV sales NEVs Feb 2022	19.2%	% LDV sales NEVs Feb '22	5.66%
Total NEV fleet as of Mar 2022	8,915,000	Annual EV sales 2021	605,958
% fleet NEVs	2.90%	% LDV sales NEVs 2021	4.14%

Europe (EU, UK, and EFTA)

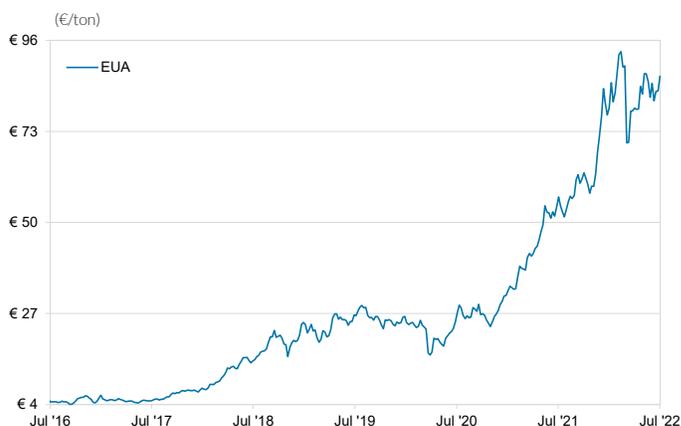
Sales Penetration		NEVs = all New Energy Vehicles. EVs = plug-in hybrids and all-electrics. LDVs = light-duty vehicles. EFTA includes Norway, Switzerland, Iceland, Liechtenstein. Sources: China Association of Automobile Manufacturers, China Passenger Car Association, US Alliance for Automotive Innovation, US Argonne National Laboratory/Wards Auto, European Automobile Manufacturers Association	
EV registrations Q1'22	562,276		
% LDV sales EVs Q1 '22	20.47%		
EV registrations Q4 '21	684,655		
% LDV sales EVs Q4 '21	26.2%		
EV registrations Q1 '21	454,694		
% LDV sales EVs Q1 '21	14.83%		

GLOBAL CARBON PRICES

	Jul 5	Jun 28	Chg.
Europe (€/ton)			
EUA Dec '22	83.19	87.40	-4.21
US (\$/ton)			
CCA (Calif.) Dec '22	30.56	29.48	+1.08
RGGI (Northeast) Dec '22*	14.00	14.00	0.00
New Zealand (NZ\$/ton)			
NZU (spot)	74.75	76.00	-1.25
Asia (\$)			
China (National)	8.66	8.97	-0.31
South Korea	16.02	12.96	+3.06

Benchmark months. *Short tons; all others metric tons. Source: ICE, OMF

EU CARBON FUTURES PRICES



ECX front-month futures. Source: ICE