# Norway to set new limit for Arctic oil drilling

OSLO (Reuters) – Norway may restrict oil firms' access to offshore resources in the Arctic by moving the so-called ice edge, a line that sets a legal limit on the extent to which companies can go north in search of oil. The ice edge is a legally drawn boundary that is meant to approximate the constantly changing southern fringe of the permanent ice sheet. Anything north of that legal line is off-limits to oil drilling under Norwegian law.

However, instead of redrawing the line further north to reflect the retreating ice sheet, the ruling coalition may move it further south as it responds to political pressure to extend environmental protection of the Arctic.

The ice cover in the Barents Sea has halved over the past 40 years. In practice, it would be ice-free year-round by 2050 given the current trend, Tor Eldevik, a professor at the

Bjerknes Centre for Climate Research at the University of Bergen told Reuters.

“It’s one of the difficult issues (for the government to decide on),” Prime Minister Erna Solberg told Reuters in an interview.

“The ice cap is moving, it’s been moving upwards … You can’t measure it every year, so you have to put the line, and have a discussions where that line would have to be.”

“If you take it too far down then it would cross some areas that are already being explored.”

The centre-right minority government has been reviewing the ice edge boundary and is due to present its new demarcation line to parliament in April. It has already received recommendation from an advisory group of Norwegian research institutions and state agencies, which have presented two options.

One would be to draw the line where the sea ice appeared at least 30% of the time in April, the peak month for the Arctic ice sheet in the Barents Sea, between 1988 and 2017.

That would place the line further north than today, as the current line, set in 2006, was based on sea ice observations from 1967 to 1989.

The other option is to draw the line at where sea ice probability is only 0.5%, in order to protect the Arctic environment. This would place the line further south and would be problematic for oil and gas companies, Norway’s biggest industry.

It would affect at least eight oil exploration licenses operated by Equinor, Aker BP and Spirit Energy, majority owned by Britain’s Centrica, the Norwegian Oil and Gas Association (NOG), a lobby group, said.

It would also come close to the Wisting discovery estimated to hold 440 million barrels of oil. Equinor plans to develop the discovery together with OMV, Idemitsu Petroleum and Petoro, a Norwegian state-owned firm.

“The sea ice influences the ecosystem that lies further south … and this is why some think that it should be further south than it has been before,” said Cecilie von Quillfeldt, a senior adviser at the Norwegian Polar Institute.

The NOG is proposing a third option: to use a “dynamic” ice edge definition, meaning that the line would move along with observable sea ice, and is not set as “a static and politically determined line on the map”.

Lawmakers Reuters spoke to said the most likely deal would be moving the line further south than now, but without affecting oil licenses already granted to companies.

“None of the extremes would gain enough support. The line would be put somewhere in the middle,” Lene Westgaard-Halle, a Conservative lawmaker on parliament’s energy and environment committee, told Reuters.

An opposition lawmaker, speaking on condition of anonymity, said such a compromise would be acceptable.

However, pro-green lawmakers in all parties are enjoying popular support and could be successful in pushing for the ice edge definition that goes the most south.

Waters close to the ice sheet are important feeding grounds for many Arctic species, from tiny zooplankton to polar bears and whales. At the same time, the Barents Sea may contain two-thirds of the oil and gas yet to be discovered off Norway, according to Norwegian official estimates.

# Meet the First (And Only) German City to Commit to ‘Zero Waste’

Germans are world leaders in recycling, but one city has decided more needs to be done to protect the environment.

Kiel, a Baltic port known for its annual sailing regatta, last year became the first – and so far only – German municipality to sign up to the global “Zero Waste” initiative.

The ambitious goal of the city of nearly 250,000 is to eliminate waste, conserve and recover resources and not burn or bury them. It’s a recognition that waste management, anti-incineration, and reduced plastic production are vital to efforts to reduce the greenhouse gas emissions blamed for

global warming.

“On the one hand, we are world champions at separating rubbish, but on the other the creation of plastic waste has not declined in any way, quite the contrary,” said Andreas von der Heydt, head of Kiel’s environmental protection agency.

“That means we really need to think about how we can avoid waste creation in the first place,” he said, citing “quite shocking” data showing surging global waste production.

## Waste Generation Is Rising Globally

The “Zero Waste” concept has been around for almost two decades, even if it has taken more time to catch on in Germany than other countries. The subject was on the agenda at the World Economy Forum in Davos this month and firms such as Adidas AG and Unilever, as well as asset management giant BlackRock Inc. are embracing it.

The European Union adopted a “Circular Economy Package” in December 2015 designed to push member states away from a “‘take, make, use and throw away approach.” Last year, the bloc said that in 2016 alone, activities such as repair, reuse or recycling gave a boost worth almost 147 billion euros ($162 billion) to the economy and generated some 17.5 billion euros of investment.

The flow of materials accounts for more than half of emissions in OECD countries and reducing waste could help achieve the target of limiting temperature increases in the atmosphere to below 1.5 degrees Celsius, Zero Waste advocates say.

Other German cities are considering following Kiel’s lead. Munich Mayer Dieter Reiter said in October he wants the Bavarian capital to pursue Zero Waste “in the not too distant future.” Germany has a good deal of catching up to do. Around 300 municipalities in Italy, where Zero Waste Europe has its

origins, have signed up, along with about 100 in Spain.

“We’ve all got those pictures of plastic-filled oceans in our heads,” Reiter said. “That’s why I wanted to know, as mayor, what we can do to in concrete terms to prevent waste from being generated in the first place.”

A European Environment Agency report published last week said that there is “still a long way to go to turn Europe into a truly circular economy” and it will require “long-term involvement at all levels, from member states, regions and cities, to businesses and citizens.”

## Waste Generation

Germany generates more waste per capita than the EU average

Kiel, the capital of the region of Schleswig-Holstein, which is run by a coalition of Chancellor Angela Merkel’s Christian Democrats, the Greens and the Free Democrats, is attempting to rise to the challenge, helped by federal government funding. Von der Heydt said a detailed action plan will be presented to the city administration for approval in April.

As well as trying to change people’s consumption habits, measures will include efforts to reduce packaging in stores and promote second-hand markets for things like furniture, textiles and construction materials.

Kiel has benefited from a know-how sharing partnership with San Francisco, an early convert to the “Zero Waste” concept, and advice from Germany’s Wuppertal Institute, which conducts research on sustainable development. Zero Waste Europe, which gets most of its funding from the EU, will oversee the city’s progress.

Von der Heydt said Germany has been relatively slow in adopting Zero Waste policies probably because of a widespread

belief that enough is already being done through existing recycling programs. At 68%, Germany has the highest rate of recycling for municipal waste, according to the most-recent data, well above the EU average of 46%.

## Waste Recycled

Germany has the highest recycling rate in the EU

(Latest data available for municipal waste recycled and composted are for 2017)

“Many people believe that our waste system in Germany is already very well developed and that it’s enough to maintain the status quo,” Von der Heydt said by telephone. “The system we have is such that it’s difficult to change tack in the short term.”

Jack McQuibban, cities program coordinator at Brussels-based Zero Waste Europe, said that many administrations need waste to feed incinerators to generate heat or energy – and a profit – for the local community.

“We need to challenge this idea that incineration or zero waste for landfill is actually zero waste. It’s not,” McQuibban said. “We haven’t been able to grow as much in Germany perhaps because of that and there’s a real opportunity there.”

– *With assistance by Brian Parkin*

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# Green deal law to make EU’s energy shift irreversible

Bloomberg/Brussels

Europe wants to make its goal of becoming the first climate-neutral continent irreversible under a new law that is to be unveiled next month, offering investors the certainty they ask for before backing unprecedented levels of investment.

The climate law will require all corners of the economy to take action and give the institutions co-ordinating the shift the legal authority to act when the promises to deliver are broken, according to Frans Timmermans, executive vice-president of the commission.

“This is an exercise in disciplining this transformational age,” Timmermans told a conference in Brussels yesterday. “Transforming a society that is entirely based on carbon to a society that no longer needs carbon as a fundamental basis for its functioning is of a tectonic nature.”

The remarks are meant to build support for the package due on February 26 and to give groups with a stake in the issue a sense of the scale of the project.

The industry is already working on technologies such as carbon capture and storage or hydrogen, and for companies it's no longer a question of climate targets but of how to ensure the necessary funds for the unprecedented overhaul, according to Marco Mensink, director general of the chemical industry association Cefic.

"I've been in Brussels for 15 years now, and I think that people in the room agree we've never been in as an exciting moment as we are right now," Mensink told the conference on the climate law. "That is a 1tn euro or more market opportunity if we get it right; it's also an enormous investment that has to come to Europe."

The measures would enshrine in law the Green Deal, a far-reaching strategy to eliminate greenhouse gas emissions by the middle of the century. The shift is at the heart of the agenda of European Commission President Ursula von der Leyen and will affect areas from energy production to transport and agriculture.

The deal is aimed at putting Europe in sync with the objectives of the Paris Agreement on climate change. It would also entrench Europe's leadership on the environment, putting it ahead of major polluters including China, India and Japan, which have yet to translate their voluntary Paris pledges into binding national measures. US President Donald Trump wants to withdraw from the Paris Agreement.

"This is an epic challenge," Timmermans said. "It's also an incredible opportunity for Europe to lead. If we get it right, I can assure you that worldwide there will be huge interest in studying our idea for the climate law. I get questions about this from all parts of the world."

The climate law requires support from member states and the European Parliament. It will make the 2050 climate neutrality goal binding and may include hints on the trajectory for the bloc to get to zero net emissions.

Von der Leyen signalled she wanted to toughen the 2030 emission-reduction goal to 50% or even 55%. The target is currently to cut pollution by at least 40%.

The commission is likely to stop short of proposing a new target for 2030 at this stage, waiting with more details until the second half of this year when it’s due to publish an analysis on tougher climate goals. That’s set to create friction with the European Parliament, which is adamant that the new law include a 55% reduction target for 2030.

Legislative work on the new climate law is set to last several months. Croatia, which is chairing meetings of member states in the first half of 2020, wants national governments to agree on their common negotiating position in June.

The European Parliament’s environment committee may approve a stance on the law in June, its chairman Pascal Canfin told the conference yesterday. The committee’s decision could be followed by a plenary vote in mid-July, he said. Only then can the two institutions start discussions about the final shape of the law.

While Europe is ready to bet its future on the environmental clean-up, the costs of the transition are dizzying. Reaching the existing climate targets will require additional spending of €260bn ($286bn) annually, according to commission estimates. The commission earlier this month unveiled a sustainable investment plan to help mobilise at least 1tn euro over the next decade to help the green shift.

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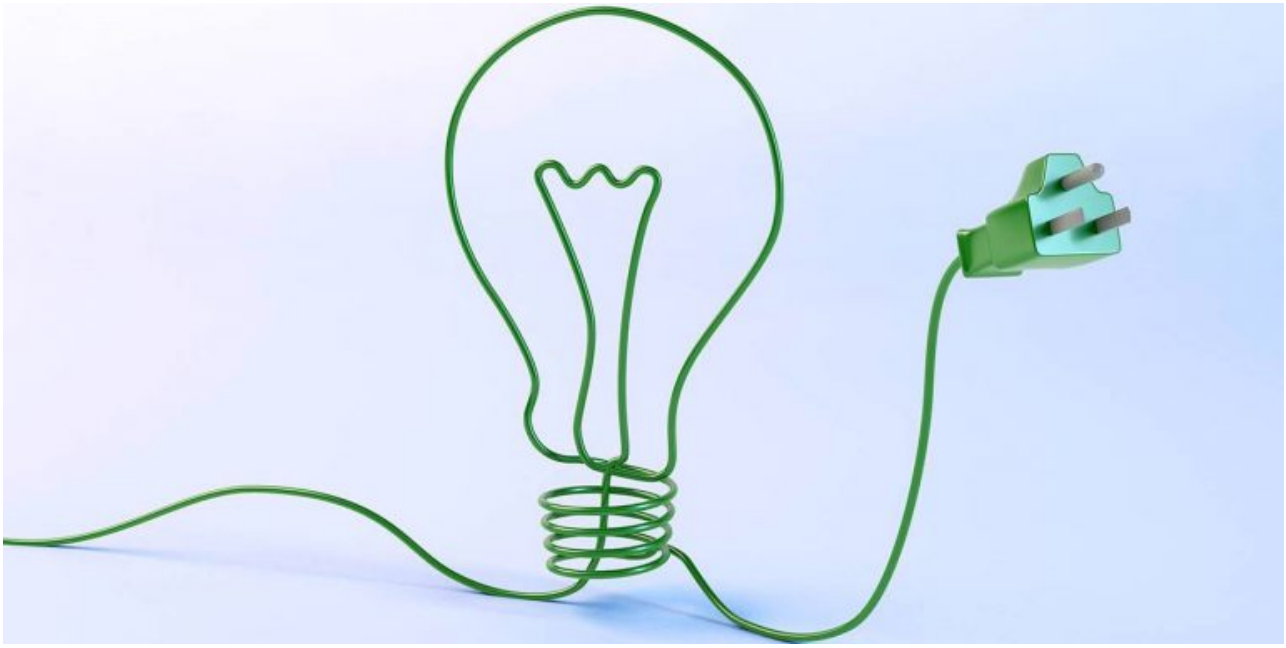
# Winning the electrification race



If governments adopt bold policies to help accelerate the production of clean electricity, the world could build a zero-carbon economy fast enough to limit climate change to a manageable degree. But without such measures, a zero-carbon economy will come much too late.

LONDON – There is no doubt that by the year 2100, the world will enjoy abundant cheap zero-carbon energy. Coal will be confined to museums, and oil and gas use will be dramatically reduced. Technological progress makes that inevitable, even if unassisted by government policy. But to prevent potentially catastrophic climate change, a zero-carbon global economy must be achieved by mid-century. That, too, is possible, but only with strategic vision and strong policy support.

Electricity will dominate the future global energy system. Currently, it accounts for only 20% of final energy demand, with direct fossil-fuel use still dominant in transport, heating, and heavy industry. But most economic activities can be powered by electricity, and many will be far more efficient once electrified.

For example, internal-combustion engines typically turn 60-80% of all the energy they use into wasted heat, and only 20-40% into kinetic energy to drive the vehicle. Electric engines, by

contrast, are over 90% efficient. Moreover, they are so much simpler to produce that within five years the cost savings on engines will offset the cost of batteries, making electric vehicles cheaper than diesel or gasoline cars. Similarly, electric heat pumps can deliver more than three kilowatt-hours of residential heating for only one kilowatt of energy input; no gas boiler could deliver more than 0.9 kWh for the same input.

Although battery-powered electric engines will play a growing role in short-distance aviation and shipping, batteries will be too heavy to power long-distance flights or intercontinental shipping for several decades yet. But ship engines could burn ammonia rather than fuel oil – and ammonia can be a zero-carbon fuel if it is made from hydrogen produced by electrolyzing water, using electricity generated from renewable sources. In addition, synthetic jet fuel can be made from hydrogen and carbon dioxide extracted from the air. Hydrogen, whether used as a fuel or a key chemical input, will also play a major role in the decarbonization of heavy industrial sectors such as steel and chemicals.

Without assuming any fundamental technological breakthroughs, we could certainly build by 2050 a global economy in which electricity met 65-70% of final energy demand, and hydrogen, ammonia, or synthetic fuel met a further 12-15%. Bioenergy and fossil fuels would then need to meet only about 20% of total energy use – and applying carbon capture to this greatly reduced fossil-fuel use could then ensure a truly zero-carbon economy.

Moreover, such widespread electrification would deliver huge environmental benefits, eliminating the pollution, noise, and unwanted or wasted heat inevitably produced by burning fossil fuels in vehicles, gas boilers, and industrial processes.

Building this economy will require an annual global electricity supply of about 90,000 terawatt-hours, compared to

23,000 TWh today; all of that must be generated in a zero-carbon way. But this goal, too, is undoubtedly attainable. Every day, the sun radiates to earth enough energy to cover humans' daily energy needs 8,000 times, and we could provide 90,000 TWh of solar electricity using less than 1.5% of Earth's land surface (or less than 0.5% if its water surface could be used as well). Solar-energy costs have fallen by 85% in the last ten years, and in many locations solar power is already cheaper than coal; by mid-century, it will be cheaper still.

Wind-power costs also have declined fast, and nuclear fusion may be a commercially viable technology within two decades. Battery costs have fallen by more than 80% since 2010 and will likely more than halve again by 2030, while a recent report suggests that electrolysis costs will now most probably "plummet." Furthermore, a wide array of other energy-storage and demand-management technologies promises to answer the key question for renewable power systems: what to do when the sun doesn't shine and the wind doesn't blow.

These developments make it inevitable that by 2100 the world will have an ample supply of cheap and totally clean energy. But it is not inevitable that we will avoid catastrophic climate change. Fossil-fuel use is still increasing, and global warming is currently on track to reach 3°C above pre-industrial levels by 2100, dramatically overshooting the target of well below 2°C set by the Paris climate agreement. And although solar and wind costs have plunged, we need to increase capacity at 3-4 times the current rate to have a feasible chance of producing 90,000 TWh of clean electricity by 2050.

The macroeconomic cost of such an effort is not at all daunting: the total incremental investment required to build a zero-carbon economy by 2050 amounts to about 1-1.5% of global GDP per year. But the required acceleration will not occur without forceful government policies.

Such policies must start by recognizing that massive clean electrification, plus large-scale hydrogen use, is the only route to zero-carbon prosperity. Governments should set challenging targets for increasing renewable (and in some cases nuclear) power capacity, while using auctions to secure private-sector delivery at the lowest possible cost. Road-transport strategies must aim to completely eliminate internal-combustion engines from our roads by 2050 at the very latest: this will require bans on the sale of new internal-combustion vehicles far sooner. In addition, carbon pricing is essential to make industrial decarbonization economic. Finally, governments must support new technologies with initial deployment subsidies of the sort that have helped to reduce rapidly the costs of solar photovoltaic technology, wind turbines, and batteries.

With such policies, the world could build a zero-carbon economy fast enough to limit climate change to a manageable extent. But without the right measures, a zero-carbon economy will come much too late.

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# CEOs in Davos say they can’t save the planet on their own

INTERNATIONAL – As the financial industry comes under pressure to avoid funding dirty energy, the heads of Citigroup Inc. and Zurich Insurance Group AG said they need their clients to do more work too.

“I say to our clients, ‘I don’t want to be the sharp end of the spear,’” enforcing industry standards, Michael Corbat, chief executive officer of the New York-based bank, said Tuesday in a panel discussion at the World Economic Forum in Davos, Switzerland. “You should set those, you get proper buy-in and we will be here to support you.”

Mario Greco, the CEO of Zurich Insurance, agreed with Corbat that carbon was mispriced, and said insurance firms are having a tough time deciding what to underwrite as a result.
Insurers are underwriting “based on ethical standards,” and “compliance with the Paris agreement, but it’s not fast enough and it’s a tough job,” Greco said. “We don’t know exactly” how an industry should restructure itself, “and we are not supposed to do that, so the only thing we can do is stop funding. Stopping funding is a brutal reaction to market displacement.”

This year’s meeting of the global business elite in Davos has focused on sustainability, with teenage activist Greta Thunberg criticizing a lack of action on climate during her appearance.

Financial companies are under pressure to retreat from funding industries including coal-fired power, and the European Union is working on a so-called taxonomy governing sustainable investments. Lawrence Fink, who runs BlackRock Inc., last week pledged to incorporate environmental concerns into the asset manager’s investment process for both active and passive products.

“We are very much aligned” with Fink, Corbat said in Davos on Tuesday. “Where we don’t want to find ourselves is being the person that starts to dictate winners and losers.”

Corbat created the new role of chief sustainability officer at his bank in September. He said then that governments should create incentives for companies to adopt sustainable practices, rather than relying on punishments like carbon tariffs.

Greco was pessimistic that there will be more effective global agreements on matters like carbon pricing, calling the prospect “almost unthinkable.”

Global companies “will go wherever there is the best financial opportunity short-term for them, and they will follow what prices tell them to do. This is what makes me scared, or pessimistic, that we will achieve the right speed.”

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# Trump Takes Veiled Swipe at Environmental ‘Alarmists’


President Donald Trump launched a veiled attack on environmental “alarmists” in a speech to business and political leaders in Davos, taking a swipe at the World Economic Forum’s key focus this year. Speaking at the Swiss resort town on Tuesday, Trump invoked those who predicted an “overpopulation crisis” and the end of oil, saying: “These alarmists always demand the same thing, absolute power to dominate, transform and control every aspect of our lives.” He also said: “This is not a time for pessimism, this is a time for optimism. Fear and doubt is not a good thought process, because this is a time for tremendous hope and joy and optimism and action, but to embrace the possibilities of tomorrow, we must reject the perennial prophets of doom and their predictions of the apocalypse.” The World Economic Forum audience included 17-year-old climate activist Greta Thunberg, who brought a stark message to the business elite gathering in Davos: Everybody is talking about climate change, but nobody is doing anything. Trump has mocked Thunberg on Twitter. The forum is sounding alarm bells on climate change. This year and for the first time on record, environmental risks occupy the group’s top five long-term concerns, while corporate executives say they’re increasingly concerned about environmental issues. Trump’s remarks were largely focused on

America’s economy as an example to other nations, which he urged to cut regulations and taxes. Trump sought to take credit for a booming economy, repeating his reelection arguments just hours before the US Senate was set to formally start his impeachment trial. “I’m proud to declare that the US is in the midst of an economic boom, the likes of which the world has never seen before,” Trump said. “We’ve regained our stride, rediscovered our spirit.” Later in the speech, he said “pessimists” can’t be allowed to reverse course: “We will never let radical socialists destroy our economy, wreck our country or eradicate our liberty.” The president’s record on the environment is under attack from Democratic challengers ahead of November elections. Some are calling for significant policy changes to deal with climate change. Trump claims credit for overseeing an economy enjoying its longest-ever expansion, with an unemployment rate that fell to a five-decade low after tax cuts and spending increases. The Standard & Poor’s 500 Index, which Trump regularly cites as a marker of success, is up about 25% from a year ago. Trump described low unemployment rates for African Americans and women. But his fight with China over trade and other protectionist policies have created uncertainty among businesses, especially manufacturers. Despite last week’s interim trade deal with Beijing, the International Monetary Fund on Monday predicted economic growth will moderate to 2% this year and 1.7% in 2021 from 2.3% in 2019 as fiscal stimulus wanes. In his speech at the Swiss resort, Trump said: “The American dream is back, bigger better and stronger than ever before.” President Trump comments on the state of the US-China trade relations during his address at the World Economic Forum’s annual meeting in Davos. The president repeated his grievances with the Fed, saying it raised rates too quickly and lowered them too slowly. Trump said in his speech that he and Chinese leader Xi Jinping “love each other” even after their fight over trade. “He’s for China and I’m for the US, but other than that, we love each other,” Trump said. Trump is due to hold bilateral meetings with Iraqi President Barham Salih, Paki- stan’s Prime

Minister Imran Khan, European Commission President Ursula von der Leyen, Swiss President Simonetta Som- maruga and Nechirvan Barzani, president of the Kurdistan Regional Government, according to the White House. Trump will also meet with the forum's executive chairman, Klaus Schwab, and has said he'll meet with business leaders, too. He leaves Davos on Wednesday. This is Trump's second visit as president to the annual gathering of business chiefs, central bankers and foreign leaders. Hanging over the trip this time, however, is his impeachment trial set to formally begin in the Senate. Trump will almost certainly be acquitted by the Republican majority in the Senate, but the trial may produce surprises.

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# Energy Chiefs Tout CO2 Capture as Thunberg Slams Lack of Action

Capturing carbon dioxide from the fossil-fuel industry is key to slowing dangerous global warming, energy chiefs said in Davos as climate concerns dominated the annual business forum more than ever before. Oil and gas producers are under mounting pressure to help prevent a damaging rise in temperatures, and carbon capture is increasingly luring investors as a tool to curb emissions. Whether pulled from the exhaust of smokestacks or from the open air, the CO2 can be buried underground or used to extract oil. “There are investors that care, that want to protect our environment; those investors are starting to make a diff erence for us,” Vicki Hollub, chief executive off icer of Houston-based Occidental Petroleum Corp, said on a panel in Davos. “Within two years we will be building the largest direct air capture facility in the Permian.” Occidental’s air capture site will separate carbon dioxide directly from ambient air. The CO2 can then be injected into oil reservoirs to boost output in Texas’s Permian Basin. “If we can perfect direct air capture, then we can use it anywhere,” Hollub said. Climate concerns dominated the panel discussion, and run through the entire

program of this year's World Economic Forum. Climate campaigner Greta Thunberg spoke to a packed room in the WEF's opening session, issuing a sharp rebuke to leaders over the world's failure to curtail emissions. Also addressing the climate challenges facing the oil and gas industry was Fatih Birol, executive director of the International Energy Agency. Birol, like Hollub, touted the potential of carbon capture to help curtail emissions. Fatih Birol, IEA executive director, discusses "peak oil" and the need for carbon capture and storage. He speaks with Bloomberg's Francine Lacqua.

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# StanChart boosts clean energy target and nudges clients on coal

Standard Chartered Plc plans to fa- cilitate $35bn of funding for clean technology by 2025, joining rival banks including Goldman Sachs Group Inc that are stepping up their climate-change promises. The London-based bank also vowed to only support those clients who are moving to generate less than 10% of their earnings from thermal coal by 2030, according to a

statement on Tuesday. The new target ex- tends the previous 2016 goal that foresaw $4bn of green funding by 2020. “There has not been suffi cient invest- ment into this sector across emerging Asia, Africa and the Middle East,” the bank said. Chief executive offi cer Bill Winters said Standard Chartered is the fi rst bank ac- tive in emerging markets to “confi rm that we will be out of thermal coal by 2030.” Emerging markets are the focus of Stand- ard Chartered’s business, and generally rely more heavily on coal to generate elec- tricity than developed countries do. The bank also said it will withdraw from three coal-fi red power projects that it agreed to fi nance before revising its poli- cies last year. On Monday, Goldman Sachs announced a revision to its own policies, pledging to avoid directly fi nancing new thermal coal mines and upstream Arctic oil exploration. Standard Chartered also released a re- port detailing its progress aligning its lending portfolio with the goals of the Par- is Agreement, which aims to limit global warming to signifi cantly below 2 degrees. Standard Chartered’s plan to withdraw support from clients that aren’t transi- tioning away from coal will be implement- ed in phases, starting in January 2021. In 2018, the bank said it would prohibit direct fi nancing for new coal-fi red power plants.

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# How cleaner ship fuel will raise costs, ease coughing

By Brian Wingfield/ London

Ship owners and refiners are facing the biggest change to their industries in a generation: strict environmental rules for vessel fuel that kick in on January 1, 2020. Technically, it’s just a cap on sulphur content, but the repercussions are sweeping. Governments and companies across the globe have raced to prepare amid concerns about fuel shortages that could affect thousands of ships. Consumers, from cruise ships to truckers, will face higher prices. Some companies are already making a fortune. But the health benefits are expected to be substantial around the globe. If adopted widely – and enforcement is an open question – it may be the biggest single global change for air quality ever.

1. What are the new rules?
Fuel must have a maximum sulphur content of 0.5%, down from the current 3.5% limit in most cases. Known as IMO 2020, the regulation is set by the International Maritime Organization, a UN agency with responsibility for the safety and security of shipping as well as marine pollution by ships. Sulphur emissions are linked to acid rain and medical conditions such as asthma and heart disease.

2. Why does shipping cause pollution?
Because ships use heavy fuel oil — the gunk that's left over in the refining process once more valuable, less sulphurous products such as gasoline, diesel and jet fuel have been squeezed out of crude oil. Although IMO rules have progressively tightened sulphur limits since 2005, there's a long way to go: A Finnish study in 2016 estimated that air pollution from ships under current guidelines would contribute to more than 570,000 premature deaths worldwide between 2020 and 2025.

3. How are refiners affected by shipping rules?
Even though the rules apply specifically to ships, those vessels have to get their fuel from somewhere. Simply put, if refiners can make more IMO-compliant fuel, they stand to make more money. Complex refiners, such as those on the US Gulf Coast, would benefit. So-called simple plants, which can't adjust as easily, could be at risk. Demand for so-called sweet (low sulphur) crude such as Brent is set to rise, at the expense of sour (high sulphur) crude produced mainly in the Middle East. Refiners' economics from making a range of fuels — from gasoline to jet fuel — are being upended.

4. Which fuel will shippers switch to?
As of now, they seem to be favouring a somewhat broad group of products called very-low sulphur ship fuel, or VLSFO. Another option is marine gasoil, a distillate-based fuel. For this reason, analysts expect distillate demand to increase when the rules take effect. However, no single, IMO-compliant benchmark fuel has emerged. The market is still evolving, and companies including  Exxon Mobil Corp and Royal Dutch Shell Plc plan to offer a range of products. Shell has already made $1bn from fuel oil trading this year.

5. Will there be enough
compliant fuel?
It depends who you ask. In recent months, a flotilla of vessels storing compliant fuel has gathered near Singapore,

the world’s largest bunkering port. Shipping company Euronav NV has even filled a supertanker with oil to help it comply with the rules and sent it to the region — for a profit of $52mn by one estimate. In other places, such as Gibraltar, there’s been a back-up of vessels. Researcher EnSys Energy & Systems Inc — an early sceptic of fuel availability — thinks that even if there’s enough compliant-fuel at the outset, stockpiles will wind down within months.

6. Do shippers have any other options?
Yes, they can install pollution-reducing scrubbers that can handle oil with a higher-sulphur content. But here’s the thing: Fitting a scrubber can cost as much as $6mn per ship. New orders for scrubbers have dwindled, and only 3,000 new orders are expected to be installed by the end of the year, according to BloombergNEF. That means the vast majority of ships will need to switch to using more expensive, low-pollutant fuel.

7. How will these changes be enforced?
The IMO says it expects strict enforcement of the rules, and it’s up to ports to make sure that happens. Some, such as Greece, have pledged strict adherence and potential sanctions for violators. Others, like Fujairah, the Middle East’s main bunkering hub, are taking a much softer approach. In places like Denmark and Norway, drone aircraft are being used to sniff out those who run afoul of the IMO’s mandate. Still, it’s going to be tricky — about half of the IMO’s members didn’t sign up for the switch.

8. Who will suffer?
Potentially anyone who buys petroleum products — including cruise ships, trucking companies and automobile drivers. That’s because the extra demand for cleaner fuel from shippers could mean refiners may produce lower quantities of products such as jet fuel and gasoline. Some shippers contend that the new rules have the potential to upend world trade, since the cost of compliance will be high for many.

# Sweden’s energy deal collapses amid clash over nuclear power

* Capacity tax to be phased out over 2 years from 2017

* New reactors to be built to replace old ones (Adds Energy Minister comment, background)

STOCKHOLM, June 10 (Reuters) – Sweden said on Friday it would phase out some taxes on nuclear power and build new reactors to replace aging plants and secure energy supplies for decades to come.

Nuclear power providers in Sweden have said they would be forced to shut the country’s loss-making nuclear reactors unless a tax on nuclear capacity is abolished, risking a spike in electricity prices and energy shortages for industry.

“The aim is … to make sure we can always guarantee electricity at competitive prices, in a stable and sustainable way, both in the short and long term,” Energy Minister Ibrahim Baylan told reporters.

The tax, which brought in about 4 billion Swedish crowns ($488 million) in 2015, will be phased out over two years starting from 2017, but households will see their energy bills rise as Baylan said the government would increase taxes on energy users to make up for the nuclear tax. Heavy industry, however, would be excluded from the tax rise.

In a broad deal agreed with the main opposition parties, the government also said it would allow up to 10 new reactors to be built as the country closes its old plants, built in the 1970s and 80s.

The tax on capacity – which was increased last year – has hurt profitability at plants already under pressure from low market prices and the need for expensive upgrades to meet tougher safety standards since Japan’s Fukushima nuclear disaster.

Swedish state-owned utility Vattenfall and Germany’s E.ON have said they will shut four of Sweden’s 10 nuclear reactors earlier than previously planned. One of them was shut last year.

In April, Vattenfall said all the remaining six reactors would have to close by 2020 if the capacity tax was not abolished.

Nuclear plants produced around 34 percent of Sweden’s electricity in 2015.

The deal to end the tax is a blow for the Green Party, which wants nuclear power phased out as soon as possible and instigated the increase in the tax last year. ($1 = 8.1964 Swedish crowns) (Reporting by Johan Sennero; Editing by Simon Johnson and Susan Fenton)