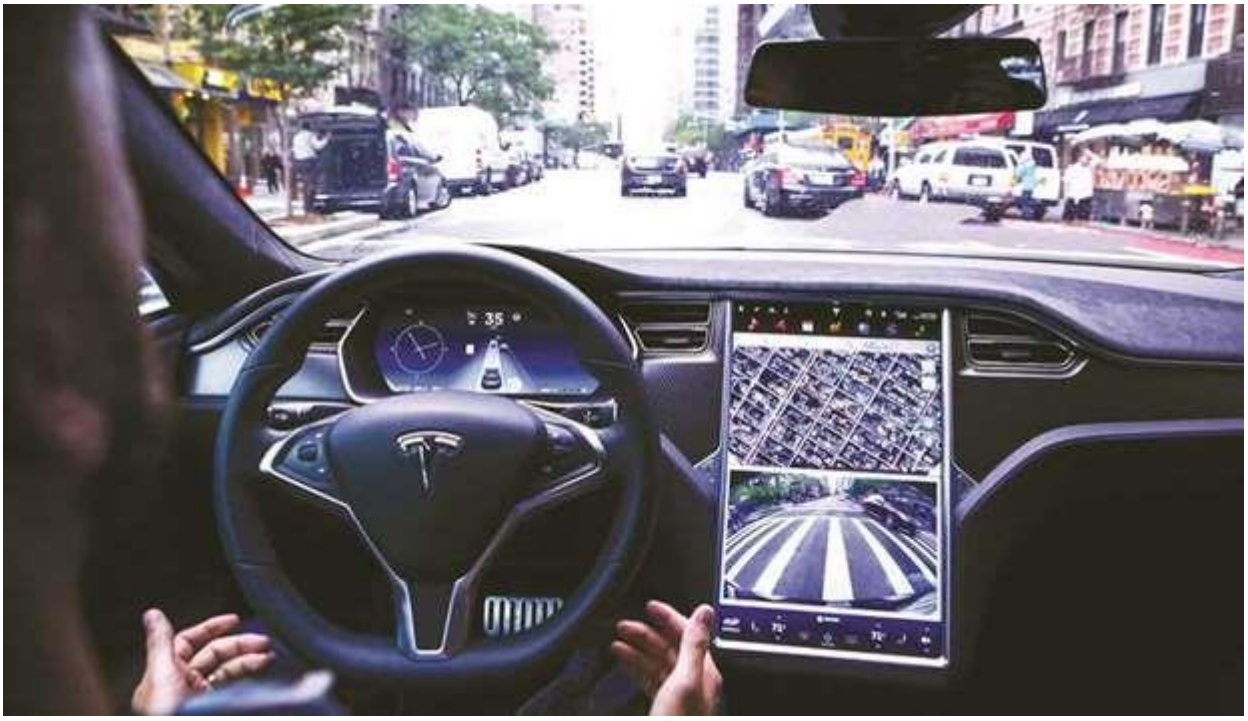
Electrical tape on speed limit signs tricks Tesla vehicles into violations



McAfee security researchers were able to trick Tesla vehicles into breaking the law by placing electrical tape on speed limit signs, in a demonstration of another vulnerability for self-driving cars.

In findings disclosed by McAfee through its official blog, the security company revealed that it fooled 2016 models of Tesla's Model X and Model S, which used camera systems by Intel's Mobileye, into breaking speed limits with the strategic placement of electrical tape.

Researchers applied a single piece of black electrical tape to extend the middle line in the "3" of a 35-miles-per-hour speed limit sign. This tricked the MobilEye camera into reading the sign as 85 miles per hour, forcing the Tesla vehicle's cruise control system to accelerate the car beyond the true speed limit.

Intel disputes that the trick was an adversarial attack, as the tape may also have fooled some human drivers into thinking that the tampered sign said 85 miles per hour.

Tesla, however, stopped using Mobileye's camera systems in 2016, which means that the newer Tesla vehicles are not affected by the electric tape trick. In addition, other vehicles using newer versions of Mobileye technology also appear to be resistant to the manipulation.

The Rich World Must Take Responsibility for Its Carbon Footprint

China and other developing economies are instinctively wary of developed-country proposals to combine domestic carbon prices with "carbon tariffs" imposed on imported goods. But such policies may be the only way for rich-world consumers to take responsibility for their carbon footprint in other countries.

LONDON – The climate activist Greta Thunberg has accused developed economies of "creative carbon accounting" because their measures of greenhouse-gas (GHG) emissions, and of achieved and planned reductions, fail to consider the gases emitted when imported goods are produced in other countries. As Chinese officials quite rightly point out, about 15% of their country's emissions result when goods are made in China but consumed in other, usually richer, economies.

China and other developing economies also are instinctively wary of developed-country proposals to combine domestic carbon prices with "carbon tariffs" imposed on imported goods. But such policies may be the only way for rich-world consumers to take responsibility for their carbon footprint in other countries.

The "creative accounting" charge would be unfair if it were meant to imply deliberate concealment; the United Kingdom's government, for example, publishes an easily accessible carbon-footprint report. But the figures certainly support Thunberg's point. In 2016, the UK emitted 784 million tons of GHGs on a consumption basis, versus 468 million tons on a production basis. And from 1997-2016, the UK's consumption-based emissions fell by only 10%, compared to a 35% decrease in production-related emissions.

Likewise, the European Union's total consumption-based emissions are about 19% higher than those related to production. And while the United States' gap of 8% is smaller in percentage terms, on a tons-*per–capita* basis it is just as large.

China is easily the biggest counterpart to this developed-economy gap, with consumption emissions of about 8.5 gigatons per year, versus ten gigatons on a production basis. And while China's *per capita* emissions have already overtaken the UK's on a production basis, it will be several years before the

country's *per capita* consumption footprint exceeds that of the UK.

So, if the developed world is serious about limiting potentially catastrophic climate change, it must take responsibility for emissions that its consumption generates abroad.

There are only two ways to do this. One is for the rich world to consume less. But although more responsible lifestyles – buying fewer clothes, cars, and electronic goods, or eating less red meat – should certainly play a role in making zero-carbon economies possible, such changes alone will not get us close to zero emissions. Nor will they necessarily close the consumption-versus-production gap, because consumption of domestically produced goods could fall as much as that of imports. And reduced imports by developed countries mean reduced exports for poorer economies, creating challenges for economic development.

The alternative is to ensure that imported goods are produced in a low- and eventually zero-carbon fashion. The ideal policy to achieve this would be a globally agreed carbon price, which would encourage producers in all countries to adopt low- or zero-carbon technologies. Absent this ideal, there are now growing calls in Europe and the US for a second-best solution – domestic carbon prices imposed in particular countries plus "border carbon adjustments," meaning carbon-related tariffs on imports from countries that do not impose an equivalent carbon price on their producers.

The immediate reaction of policymakers in China, India, and many other developing countries may be to condemn such policies as yet more protectionism in a world already destabilized by US President Donald Trump's tariff wars. And anti-Chinese political rhetoric in the US – sometimes including the absurd accusation that China is an irresponsible polluter even though its *per capita* emissions are half those

of the US – creates a difficult environment for rational policy assessment.

But in most industries, the combination of domestic carbon prices and border carbon tariffs poses no threat to the competitiveness and growth prospects of exporting companies in developing economies. Imagine that European steel producers were subject to a new carbon tax of €50 ($54) per ton of CO_2 within Europe, which also applied to imports of steel from China or anywhere else. In that case, the relative competitive position of European and foreign steel producers seeking to serve European customers would be unchanged compared to the no-tax starting point. And Chinese or Indian steelmakers, or companies in other high-emission sectors, are as well placed as their European or US peers to adopt new technologies that reduce the carbon content of their exports (and thus their liability to border carbon taxes).

Indeed, domestic carbon prices plus border adjustments are simply an alternative route to achieving the international level playing field that ideally would be secured through a global carbon price applied simultaneously in all countries. There is one crucial difference, though: if carbon taxes are imposed at the importing country's border, rather than within the exporting country, then the importing country gets to keep the tax revenue.

That fact increases the incentive for exporting countries to impose equivalent domestic carbon taxes, rather than leaving their companies to pay taxes at the importing country's borders. As a result, domestic carbon taxes with border adjustments could well prove to be an effective stepping-stone toward common global carbon prices, even if explicit international agreement on a global regime cannot be achieved.

Furthermore, such an approach suggests a potentially attractive way to encourage wider acceptance of border tariffs as being legitimate, necessary, and unthreatening. To be sure,

the revenues from any carbon taxes levied on domestic producers should be used within the domestic economy – whether to support investment in low-carbon technologies or as a "carbon dividend" returned to citizens. But there is a good argument for channeling the revenues from carbon tariffs to overseas aid programs designed to help developing countries finance their transition to a zero-carbon economy.

Thoughtful developing-economy negotiators should argue for such revenue transfers, rather than opposing a policy that developed countries will have to deploy. After all, richer economies must not only drive down their own industrial emissions, but also take responsibility for those that their consumption is generating elsewhere in the world.

Business must come clean quickly on climate: Carney

LONDON, Feb 14 (Reuters) – Bank of England Governor Mark Carney called on the world's businesses to publish strategies for cutting carbon emissions and adopting cleaner power sources by November, when world leaders meet in Scotland for U.N.-led climate talks.

"It's not just green assets and divestment campaigns or certain things are so brown or black. Every company ultimately has to have a plan for a transition and what the opportunities are and where the risks are," Carney said in an interview.

"For Glasgow that must be well on the path. That that is the norm. That the question doesn't even have to be asked because companies are answering that question as part of their strategy.

"And the answer is, it's the transition, stupid," he said, referencing a phrase coined by former U.S. President Bill Clinton's election strategist in reference to the U.S. economy.

Carney was speaking to Reuters a month before he leaves his

nearly seven-year posting at the helm of Britain’s central bank to take a new role as the United Nations’ envoy for climate.

The Canadian banker, who disarmed the British insurance industry in 2015 when, in a speech called “Tragedy of the Horizon,” he warned of their exposure to climate-related events, has been one of the most vocal public figures to push for better supervision and disclosure of climate risk.

The Task Force on Climate-related Financial Disclosures (TCFD), which he launched in 2015, has become a global standard that more than 1,000 companies, financial firms, governments and other organizations have adhered to.

The intentions behind it also chime with a shift of emphasis by another leading central banker, European Central Bank President Christine Lagarde.

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Carney said November's COP26 climate talks would also be a good deadline for regulators to map out how to make the TCFD framework compulsory.

"One of the things we will look at ahead at for the COP26 is 'should we have pathways to make the TCFD mandatory?' Not overnight, but through listing requirements or securities regulation disclosure standards," he said.

Such an effort needs to be global, Carney said, encompassing regions laying out their own plans for cutting emissions. The European Union recently announced a 1-trillion-euro ($1.08 trillion) effort become carbon neutral by 2050, a strategy that includes introducing a new climate law by next month.

"It would be productive if other jurisdictions that potentially will have mandatory disclosure standards… used more conventional routes than legislation, such as securities regulations or listing standards. Let's have that conversation," Carney said.

Carney could play an outsized role at November's summit, especially in view of a reshuffle of government and other senior positions by Prime Minister Boris Johnson.

Johnson last month sacked former energy minister Claire O'Neill from her role as president of the COP26 talks. Newly appointed Business Minister Alok Sharma was named to the position on Thursday.

Efforts by businesses, investors and financial institutions to disclose climate risk are gathering pace.

BlackRock BLK.N, the world's largest money manager with nearly $7 trillion in assets under management, said this month that it would take a tougher view of companies that are not properly disclosing their climate risk.

This week, BP <BP.L> set out one of the oil sector's most

ambitious targets for curbing carbon emissions, saying it would reduce its greenhouse gas emissions to net zero by 2050. BP plans to give details later this year.

“Last week, very few people would have said BP was Paris-aligned,” said Carney, referring to the 2015 global climate agreement, signed in the French capital. “They’ve jumped from towards back of the queue to the front of the queue.”

($1 = 0.9225 euros)

(editing by John Stonestreet)

Landing a Blow Against Climate Change

For the last decade, bioenergy has been confined to the sidelines of climate-policy debates, owing to the environmental problems associated with its production. But recent innovations have made this option for supplying sustainable, renewable energy not just viable, but necessary.

BONN – In the face of climate change, providing reliable supplies of renewable energy to all who need it has become one of the biggest development challenges of our time. Meeting the international community's commitment to keep global warming below 1.5-2°C, relative to preindustrial levels, will require expanded use of bioenergy, carbon storage and capture, land-based mitigation strategies like reforestation, and other measures.

The problem is that these potential solutions tend to be discussed only at the margins of international policy circles, if at all. And yet experts estimate that the global carbon budget – the amount of additional carbon dioxide we can still emit without triggering potentially catastrophic climate change – will run out in a mere ten years. That means there is an urgent need to ramp up bioenergy and land-based mitigation options. We already have the science to do so, and the longer we delay, the greater the possibility that these methods will no longer be viable.

Renewable energy is the best option for averting the most destructive effects of climate change. For six of the last seven years, the global growth of renewable-energy capacity has outpaced that of non-renewables. But while solar and wind are blazing new trails, they still are not meeting global demand.

A decade ago, bioenergy was seen as the most likely candidate to close or at least reduce the supply gap. But its development has stalled for two major reasons. First, efforts to promote it had negative unintended consequences. The incentives used to scale it up led to the rapid conversion of invaluable virgin land. Tropical forests and other vital ecosystems were transformed into biofuel production zones, creating new threats of food insecurity, water scarcity, biodiversity loss, land degradation, and desertification.

In its *Special Report on Climate Change and Land* last August,

the Intergovernmental Panel on Climate Change showed that scale and context are the two most important factors to consider when assessing the costs and benefits of biofuel production. Large monocultural biofuel farms simply are not viable. But biofuel farms that are appropriately placed and fully integrated with other activities in the landscape can be sustained ecologically.

Equally important is the context in which biofuels are being produced – meaning the type of land being used, the variety of biofuel crops being grown, and the climate-management regimes that are in place. The costs associated with biofuel production are significantly reduced when it occurs on previously degraded land, or on land that has been freed up through improved agriculture or livestock management.

Under the 1.5°C warming scenario, an estimated 700 million hectares of land will be needed for bioenergy feedstocks. There are multiple ways to achieve this level of bioenergy production sustainably. For example, policies to reduce food waste could free up to 140 million additional hectares. And some portion of the two billion hectares of land that have been degraded in past decades could be restored.

The second reason that bioenergy stalled is that it, too, emits carbon. This challenge persists, because the process of carbon capture remains contentious. We simply do not know what long-term effects might follow from capturing carbon and compressing it into hard rock for storage underground. But academic researchers and the private sector are working on innovations to make the technology viable. Compressed carbon, for example, could be used as a building material, which would be a game changer if scaled up to industrial-level use.

Moreover, whereas traditional bioenergy feedstocks such as acacia, sugarcane, sweet sorghum, managed forests, and animal waste pose sustainability challenges, researchers at the University of Oxford are now experimenting with the more

water-efficient succulent plants. Again, succulents could be a game changer, particularly for dryland populations who have a lot of arid degraded land suitable for cultivation. Many of these communities desperately need energy, but would struggle to maintain solar and wind facilities, owing to the constant threat posed by dust and sandstorms.

In Garalo commune, Mali, for example, small-scale farmers are using 600 hectares previously allocated to water-guzzling cotton crops to supply jatropha oil to a hybrid power plant. And in Sweden, the total share of biomass used as fuel – most of it sourced from managed forests – reached 47% in 2017, according to Statistics Sweden. Successful models such as these can show us the way forward.

Ultimately, a reliable supply of energy is just as important as an adequate supply of productive land. That will be especially true in the coming decades, when the global population is expected to exceed 9.7 billion people. And yet, if global warming is allowed to reach 3°C, the ensuing climatic effects would make almost all land-based mitigation options useless.

That means we must act now to prevent the loss of vital land resources. We need stronger governance mechanisms to keep food, energy, and environmental needs in balance. Failing to unleash the full potential of the land-based mitigation options that are currently at our disposal would be an unforgiveable failure, imposing severe consequences on people who have contributed the least to climate change.

Bioenergy and land-based mitigation are not silver bullets. But they will buy us some time. As such, they must be part of the broader response to climate change. The next decade may be our last chance to get the land working for everyone.

Why company carbon cuts should include ‘scope’ check

When a company pledges to cut its carbon emissions, how big a deal is it? That depends on what’s being counted. An oil company’s direct emissions – those from its trucks, drills and facilities – are only a sliver of the carbon released when the fuel it sells is burned, and an airport vowing to use wind power for its runway lights is making a much smaller commitment than if its promise covered the flights that take off there. As more investors take environmental factors into account, what had been a technical debate is taking on increased importance, as a matter of “scope.”

1. What does scope mean?

As the effort to boost green investment has grown, so have efforts to create metrics and standards for accounting and disclosure. Counting emissions isn’t as simple as tracking what comes out of a smokestack. Under what’s known as the Greenhouse Gas Protocol Standard, emissions are classed as Scope 1, 2 or 3. Scope 1 covers “direct emissions” – those from sources that are owned or controlled by a company, like those oil company trucks. Scope 2 covers emissions from the generation of energy the company buys, such as electricity or heat. Scope 3 is everything else: the emissions that come from the entire value chain.

2. What does that mean?

Scope 3 covers emissions from all of a company’s non-energy inputs, like steel for a drilling rig or cement for its buildings, and from all the uses to which a company’s products are put, like the fuel an oil company sells. It’s the complete supply chain, which means that for almost all companies, Scope 3 is far bigger than the other two scopes combined.

3. What’s the purpose of breaking it down this way?

To add meaning to company pledges about becoming more climate friendly, and to give investors more objective measures for evaluating how a company or sector is doing on going green. The hope is that disclosure will give the market the opportunity to reward or pressure companies depending on their performance.

Calculating Carbon

Oil companies’ carbon footprints are mostly due to scope three emissions

4. Where did this approach come from?

The first investor to measure the carbon footprint of a portfolio may have been Henderson Global Investors in 2005, but the idea gained momentum following the 2015 Paris Agreement on climate change, in which countries pledged to set specific targets for emissions cuts to slow down the threat of global warming. The Task Force on Climate-Related Financial Disclosures, an industry-led group set up that year to encourage companies to put details about their environmental risks in the public domain. It encourages investors and executives to disclose the scope 1 and scope 2 emissions of their portfolios, and scope 3 "if appropriate." (The task force was founded and is chaired by Michael R. Bloomberg, the majority owner of Bloomberg LP, the parent company of Bloomberg News.)

5. Is it working?

To an extent. Some companies are beginning to clean up supply chains that they've left to their own devices for decades. They're questioning how their raw materials are manufactured and, among other things, are moving to develop greener, cleaner ways of making steel or cement and transporting goods. Vestas Wind Systems A/S, the world's largest maker of wind turbines, promised to eliminate all waste in the production of its machines by 2040 as part of its drive to hit carbon neutrality by the start of the next decade. Big emitters like Royal Dutch Shell Plc, BP Plc and Equinor ASA have committed to carbon-emissions targets that include Scope 3, that is, the end use of the products they sell, while Repsol SA pledged to eliminate all emissions from its operations and fuel sold to customers by 2050.

6. What kind of problems are there?

Climate disclosure is voluntary, and among the companies that

are making pledges on emissions, there are no requirements about what kind of scope needs to be covered. For instance, last year National Grid Plc, the U.K.’s power network operator, unveiled a plan to hit net zero emissions by 2050, but the plan only covered Scope 1 and 2, which together made up only 18% of emissions when Scope 3 was included.

7. Can that change?

Maybe. The Science-Based Targets Initiative, a non-profit group that encourages companies to set emissions targets based on the latest available scientific pathways, has said that if any member company’s scope 3 emissions account for 40% or more of its total emissions, it should set a target covering scope 3. Companies also face growing pressure from asset owners, such as pension plans and sovereign wealth funds, as well as their employees, lawmakers and activists. Money managers from Amundi SA to BlackRock Inc have pledged to use their vast resources to combat climate change. Non-profits like CDP, a U.K.-based group, are pushing for increased transparency, working with thousands of companies around the world including Bloomberg to help them be more open and better understand their environmental impact.

Focus on Exxon, Chevron after BP pledges to be carbon neutral

BP’s pledge to zero out all its carbon emissions by 2050 deepens the divide between major European and American oil producers on climate change, increasing the pressure for Exxon Mobil Corp. and Chevron Corp. to do more.

The U.S. giants have committed only to reducing greenhouse gases from their own operations. On Wednesday, BP followed Royal Dutch Shell and Equinor in pledging to offset the carbon emissions from the fuels they sell. Known as Scope 3, the emissions from cars, homes and factories are responsible for 90% of fossil fuel pollution.

“If we do see capital flowing into BP, that may force the U.S. majors to rethink the speed at which they move on carbon reduction targets,” said Noah Barrett, a Denver-based energy analyst at Janus Henderson, which manages $356 billion.

The growing outcry against human-made global warming is increasingly making its way into mainstream business and investment strategies. It has already reshaped the way European oil producers operate by actively engaging in the transition to cleaner energy sources.

Exxon and Chevron agree with the goals of the Paris Climate Agreement, support a carbon tax and are committed to cleaning

up emissions from their vast network of wells, refineries and pipelines. They joined the Oil and Gas Climate Initiative later than their European rivals but are still fully paid-up members. They even lobbied against President Trump's plan to roll back Obama-era emission standards.

But the fundamental difference with European peers is that neither has any plan to allocate a chunk of their multibillion-dollar capital budgets toward proven low-carbon energy sources where they have no competitive advantage. The chief executives of both companies said last year that they remain committed to their core oil and gas businesses and have no plans to chase the crowd into lower-margin renewables such as wind and solar.

That puts them in an increasingly isolated position when compared with BP and Shell, whose executives have vowed to lead the energy transition.

BP went further than any other oil giant by pledging to become net zero, meaning it's aiming to completely offset its emissions with renewable energy. Spain's Repsol recently made a similar commitment.

Even so, environmentalists shouldn't get their hopes up. "I don't see Chevron or Exxon adopting a BP-like strategy in the near future," Janus' Barrett said. "The U.S. majors have historically been less aggressive in their shift away from traditional oil and gas."

When asked about potentially following Shell into the power sector, Chevron CEO Mike Wirth was clear.

"It's a business we haven't chosen to go in," he said in a February 2019 interview. "And it's inherently lower-return than the other things we could invest money in."

Chevron is investing in early-stage technologies that could aid carbon capture and energy storage, but they are small

fraction of its budget.

Effectively reducing Scope 3 emissions requires a combination of well-designed policies and carbon pricing mechanisms, Chevron said in a response to questions. Exxon said Scope 3 emissions are not within its direct control, but rather a function of energy demand and consumer choices.

Exxon CEO Darren Woods sees the answer to climate change as essentially a technology problem that has not yet been solved.

The oil giant is working on proprietary technologies that would reduce emissions in areas such as aviation, heavy-duty vehicles and industrial processes. “We can bring more value in the space where we don’t know what the solution is but we need one,” Woods said in an April interview.

This approach probably will come under attack at this year’s round of annual general meetings in May. Both companies are being asked by Dutch activist shareholder group Follow This to align their strategies with the Paris agreement. Exxon is asking the Securities and Exchange Commission to exclude the proposal from the ballot, arguing it “seeks to micromanage” the company.

Chevron shares rose 0.7% on Wednesday. Exxon shares climbed 1.2%.

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*

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.”

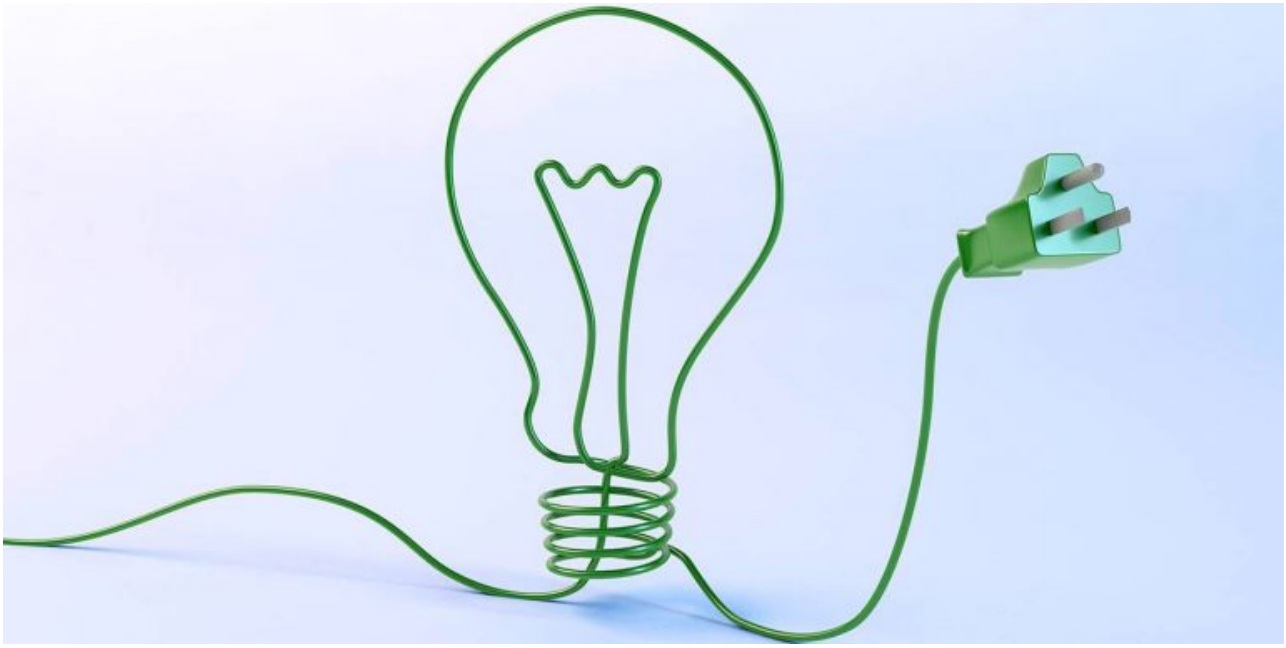
The climate law requires support from member states and the European Parliament. It will make the 2050 climate neutrality goal binding and may include hints on the trajectory for the bloc to get to zero net emissions.

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.

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.