America’s bipartisan climate-policy failure

By Mark Paul

SARASOTA – US President Donald Trump’s anti-climate agenda is in full swing. His administration has already taken action 117 times to repeal or weaken climate regulations, and much more deregulation is in the works. By unravelling environmental protections on an unprecedented scale, including through executive orders, Trump is using every tool at his disposal to increase fossil-fuel extraction and the production of dirty energy. Apparently, he is hell-bent on topping his predecessor’s own fossil-fuel boom.

That is right, former President Barack Obama presided over a fossil-fuel boom: the domestic shale-energy revolution enabled by the advent of hydraulic fracturing (or fracking). The fact is that neither major party in the United States has been the climate champion that the country and the world needs. While young activists around the world are stepping up to show what true climate leadership looks like, politicians are barely taking note. As Dianne Feinstein, a Democratic US

senator from California, dismissively told a group of young people advocating a Green New Deal (GND): “I’ve been doing this for 30 years. I know what I’m doing.”

The longer both parties cling to a policy of “business as usual”, the more likely we are to face a climate catastrophe in which millions of people perish or have their lives upended. In reality, though, the responsibility for adopting a new paradigm ultimately rests with the Democrats. While Trump has been disastrous for the planet, his administration’s policies are in keeping with a Republican Party that will not change anytime soon.

In a recent review of more than 1,000 climate-related bills introduced in the US Congress since 2000, we found that, in the past decade alone, Republicans presented 187 that would increase greenhouse-gas (GHG) emissions. Most of these bills have sought to advance the interests of the fossil-fuel industry over those of everyone else. The Republicans’ purported rationale is to achieve “energy independence,” which, in practice, has meant offering special treatment to the oil, gas and coal companies that spend exorbitant amounts on campaign contributions.

Not long after coming to office, Trump promised that by unleashing America’s fossil-fuel reserves, his administration would “create countless jobs for our people, and provide true energy security to our friends, partners and allies all across the globe”. Following the same logic, Don Young, a Republican congressman representing Alaska, has introduced the American Energy Independence and Job Creation Act, which would allow exploration and extraction of oil and gas reserves in Alaska’s Arctic National Wildlife Refuge. Adding insult to injury, the bill would direct half of the tax revenues generated by the exploitation of public resources to a pot of incentives for the fossil-fuel industry.

But the real insult is the behavior of Democratic leaders, who

continue to abide by what James K. Boyce of the University of Massachusetts calls “climate-change denial lite”. Consider the case of the Democratic National Committee (DNC). Last year, the DNC decided that it would no longer accept contributions from political action committees affiliated with the fossil-fuel industry, only to reverse course and embrace an “all-of-the-above” energy policy just months later.

Though congressional Democrats have introduced modest proposals to curtail GHG emissions, they have not made any major push for climate legislation since the failed American Clean Energy and Security Act of 2009 (the Waxman-Markey bill). And even that bill would not have reduced emissions fast enough, relative to what the climate crisis demands.

Among the more meaningful climate bills introduced by Democrats in recent years is the 100 by ‘50 Act, which includes provisions to “achieve 100 per cent clean and renewable energy by 2050”. But, again, this falls far short of what is needed to limit global warming to 1.5ºC above pre-industrial levels, the threshold beyond which the Intergovernmental Panel on Climate Change forecasts devastating consequences.

Fortunately, a growing chorus of Democrats has begun to demand genuine action that would start to make up for decades of climate-change denialism lite. They understand that without significant, comprehensive action by the US, the climate cannot possibly be stabilised at a level that is still conducive to human flourishing.

Rather than talking about what people must give up to reduce emissions, the climate realists are trying to sell voters on a new vision of the economy, one that offers long-term economic security and environmental stability. The GND resolution introduced earlier this year has rapidly shifted the window of discourse, such that once-radical proposals are now garnering

public support and being debated seriously.

Though the details of the GND still need to be fleshed out, Democratic presidential contenders such as Washington Governor Jay Inslee are already offering concrete proposals in accordance with its prescriptions. The GND could be the “north star” of the country’s decarbonisation path. But much will depend on Democratic congressional leaders such as Speaker of the House Nancy Pelosi, who has scoffed at ambitious climate proposals as a “green dream.” Either that changes, or we will all find ourselves in an environmental nightmare.

Mark Paul is an assistant professor of economics at New College of Florida. Copyright: Project Syndicate, 2019. www.project-syndicate.org

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Trade tensions put energy transition at risk, says BP chairman

LONDON (Reuters) – Trade tensions risk throwing the global economy's transition to greener energy into disarray and could hurt energy companies' preparations toward it, BP Chairman Helge Lund said as leaders of the world's largest economies gather for talks in Japan.

Lund, in his first interview since taking office in January, said BP would rather see a rapid, orderly phasing out of fossil fuels than a delayed and disorganized transition.

The former chief executive of Norwegian oil group Equinor said BP as well as rivals such as Royal Dutch Shell (RDSa.L) and ExxonMobil (XOM.N) would have a vital role to play to ensure a successful transition to low carbon economies.

"It is better for us to see a path that goes rapidly," Lund said. "It will be very difficult for the oil and gas companies but that is a better and a preferred solution than an uncontrolled sudden change maybe 10, 15 years into the future."

London-based BP, like some of its peers, has taken steps

toward meeting the 2015 Paris Climate Agreement to limit global warming, including setting targets to reduce carbon emissions from its operations, link them to managers' pay and ensure that investments are in line with the accords.

But many investors say BP will have to do more, including tackling emissions from the fuels and products it sells to millions of customers daily, known as Scope 3 emissions, to prevent a catastrophic rise in global temperatures.

Lund said however that such Scope 3 targets would tie BP's hands to make future investments, whether in renewable energy or oil and gas. He nevertheless said the company's thinking around Scope 3 was likely "to evolve over time."

BP invested around $500 million in renewable power, electric vehicle charging points and other low-carbon technologies last year, a fraction of its annual spending of $15 billion.

And the pressure on companies and governments to do more to curb greenhouse gases is rising as carbon emission levels show no sign of decreasing.

Investors managing more than $34 trillion in assets, nearly half the world's invested capital, this week demanded urgent action from governments on climate change, piling pressure on leaders of the world's 20 biggest economies meeting this week.

France has said it will not accept a final G20 communique that does not mention the Paris climate change agreement.

"The long-term framework around the energy transition is important. Over time it is much easier for big companies like BP if we have a stable global framework for trade and investments," Lund told Reuters at BP's London headquarters.

Lund said an unprecedented level of cooperation was needed between companies and governments to bring greenhouse gas emissions to zero by the end of the century.

He urged governments to introduce a price on carbon emissions to allow phasing out fossil fuels, even though only a handful of such schemes have been introduced around the world.

SOUND INVESTMENT

BP has faced a wave of protests by climate activists, including a blockade on its London office and protests at events the company sponsors.

Big investors, including Norway's sovereign wealth fund, are reviewing shareholdings in some oil and gas drillers, though not in BP and its largest rivals.

Lund, who took part in discussions on a climate resolution with a group of investors earlier this year, believes most investors understand that modern societies are almost built on hydrocarbons.

BP forecasts that even with a rapid increase in wind, solar and other forms of renewable energy, fossil fuels will account for the majority of energy supply for decades to come.

Lund also warned that attempts to curb fossil fuels too fast could harm societies.

"It takes time to change energy systems … If you try to build down the oil and gas industry quicker than you are able to build up a carbon neutral system you will pull societies back."

Lund said large oil companies would be vital for the transition due to their large balance sheets, technical expertise and innovation skills.

"To be a strong contributor in the long term we have to stay financially strong, we have to be a good investment."

Lund also said: "There is another dimension that we need to think about and that is if you believe that BP and other

integrated oil and gas companies understand energy markets, they have significant balance sheets, they have technical capabilities, they have innovation capabilities, they can take risks – so in my mind business and these companies play an incredibly important role in the energy transition."

SUCCESSION

Lund, 56, faces the task of leading BP through the energy transition and also overseeing the succession to Chief Executive Bob Dudley, who took the helm in 2010 following the crisis over the Deepwater Horizon rig explosion in the Gulf of Mexico.

Dudley also steered BP through the oil industry's worst downturn in decades so that the company is now producing strong profits which reached a five-year high last year of $12.7 billion.

"Bob is a very good leader, I am not sure where BP would have been without him," Helge said.

BP's board would ensure that when Dudley, who turns 65 next year, steps down, there will be "at least a number of candidates who can compete for the job," he added.

Lund, a former consultant and political adviser in the Norwegian parliament rejected suggestions he could replace Dudley to become the next CEO.

"I've been CEO for three companies. I thought about this when I left BG whether I should try to get one more (CEO) job or try to get a different life and I decided on the latter and I think it is rewarding," he said.

Europe’s tough emissions rules come with $39bn threat

Time is running out for car makers in Europe. Just six months out from stiff new emissions rules, the industry is facing up to an estimated €34bn ($39bn) in penal- ties as well as eroding profits from selling more electric cars. Starting in 2020, car fleets in Europe will need to meet more stringent regulations on how much carbon dioxide they’re allowed to release. The industry is ill prepared for the looming change, and the huge fines pending for subverting the new rules could prompt some brands to abandon the European market and test the mettle of those that remain. The threat is part of a broader pileup: vehicle sales are falling in key markets around the world, and the US is exchang- ing blows on trade with China and the European Union, threatening to raise costs and rattle the global economy. Worse yet, automakers have been unable to pry buyers from the highest-emission cars, such as the Mercedes-AMG GLE 63 S sport utility vehicle that spouts more than three times the car maker’s targeted CO2 fleet level from 2020. “In an industry that is already suff ering from global

trade issues, from Brexit, from peaking sales, that’s a very, very danger- ous cocktail,” Evercore IS auto analyst Arndt Ellinghorst said on a call earlier this month regarding the EU emissions issue.

Fines could mount to €34bn through 2021, according to research firm Jato Dynamics, whose projection tracks with other indus- try estimates. While the new regulations are expected to be painful for the industry to adjust to, past precedent suggests the EU is unlikely to allow Europe-based carmakers to be driven to ruin. Volkswagen AG, the world’s biggest car- maker, faces the largest penalty at about €9bn based on 2018 reported emissions, followed by Peugeot maker PSA Group and Fiat Chrysler Automobiles NV — the company with the single largest gap between actual performance and the new targets. BMW AGand Daimler AG could see earnings drop sharply due to their heavy reliance on high-emission SUVs. Toyota Motor Corp, maker of the Prius and several other hybrids, was the only automaker to see its emissions fall last year in Europe, according to Jato. While its calculation doesn’t take into account a blitz of upcoming electric models like Volkswa- gen’s ID.3 hatchback and Porsche Taycan, European Environment Agency data show emissions rising — not falling — for the past two years to a four-year high in 2018. Fumes are emitted from the exhaust pipe of an Audi in London. A Volkswagen spokesman reiterated recent comments by off icials including chief executive of- ficer Herbert Diess that it’s the company’s goal to meet European emission limits. A spokesman for BMW said paying fines wasn’t a strategic option, and the company on Tuesday brought forward its planned rollout of electric cars by two years. Daim- ler said its plan to reach the targets also depended on customer decisions. “It’s not quite an existential problem yet, but there are going to be questions of how do you explain to shareholders that I’m losing so much money, and it’s going to create immense pressure,” Michael Schweikl, managing consultant responsi- ble for automotive at PA Consulting Group, said in an interview. Starting January 1,

all but 5% of the EU's car fleet can emit no more than 95 grams of carbon dioxide per kilometre driven. One year later, no new vehicle can exceed that level.

Fines of 95 euros per gram for each car over the target will add up quickly, driving automakers to speed up the electrification of their lineups by of- fering more gasoline-electric hybrids and cars fully powered by batteries. "I have never seen such a material event risk in my career," Evercore's Ellinghorst warned in a research note to clients last month under the subject line "The 2020 CO2 cliff ." Automakers aren't panicking – yet. PSA expects to be compliant from day one and won't pay any fines, a spokesman said. However, in 2018, sales of EVs and hybrid vehicles accounted for less than 1% of PSA's registered sales. The quandary on CO2 doesn't end there, because in addition to being less popular, low-emission cars are much less profitable than the rest of automakers' fleets. At Volkswagen, less than 1% of sales were plug-ins or battery cars last year, and about 6% at BMW. An analysis by UBS last year estimated Ebit margins on Tesla Inc's Model 3 sedan were, at best, half those of BMW's gasoline-powered 330i model.

The push for electrification in Europe means selling mass-market vehicles there will be unprofitable "for a decade or two," John Murphy, an auto analyst for Bank of America Merrill Lynch, said during a presentation this month in Detroit. The 2020 limits were agreed to in 2014 after years of back-and-forth on balanc- ing a reduction in emissions while not costing carmakers too much. What no one foresaw was the extent of consumers' love aff air with gas-guzzling SUVs and Volkswa-gen's diesel-emissions cheating scandal that surfaced the following year. Diesels, which emit about a fifth less CO2 than equivalent gasoline cars, were a key plank in carmakers meeting the tighter regulation. But some European cities have started to ban diesels, leaving the cars to languish on dealer lots. "The top automakers will face trouble as none of them

are currently on track to meet the target," Jato Dynamics said in an April blog post. "The incoming CO2 targets can be seen as the apocalypse of the car industry in Europe." The new rules may prompt some brands without a strong presence in Europe to abandon the market altogether, said Ellinghorst, though he declined to specify which might do so. General Motors Co already eff ectively withdrew in 2017 when it sold the Opel brand to PSA. Companies without fully-electric vehicles in Europe such as Ford Motor Co and Japan's Mazda Motor Corp face steep challenges. Honda Motor Co does too, but it plans to launch a small battery-electric model later this year. Ford said in a statement it expects to meet the 2020-2021 targets, but that its longer- term strategy in Europe through 2030 "assumes a strong uptake of electrified vehicles" by consumers. Representatives for Mazda had no immediate comment. If the industry fails to clear the new bar set by regulators, it won't be the first time.

When many automakers missed the boat on the switch to new emissions testing in September, it was nearly enough to send Europe's largest economy into recession. Employees work on BMW i3 electric cars on the assembly line at a factory in Leip- zig, Germany. Simply selling more small cars won't help, as even the most fuel-eff icient gas-pow- ered vehicles also face tougher mandates. Carmakers aren't likely to be able to pass along the added costs for equipping those cars with cleaner technology, Bernstein analyst Max Warburton wrote in a recent report. He said that may lead to "the death of the small car" in Europe. The regulations do allow for some creative ways to lower average fleet emissions and mitigate penalties, at least during a phase- in period. Cars that emit less than 50 grams CO2 per kilometre will count for two cars in 2020, and slightly less each year after. Fiat Chrysler has also made use of the op- tion to pool fleets of high-emission autos with low- or zero-polluting cars, pairing up with Tesla Inc in a deal that likely will involve paying the US company several hundred million dollars. Mazda and Toyota are also forming a

pool. “I think that 2020 is doable. The concern is about customer acceptance for new technology,” said Antonio Massacesi, head of fuel economy and greenhouse gas compliance for Fiat Chrysler’s European business. “That risk is one of the reasons why we decided to enter into a pool with Tesla.”

Saudi Arabian crude inventories sink to historic low

Riyadh’s production cuts to support the oil price have caused domestic stocks to plummet

Saudi Arabia’s crude oil inventories have fallen under 200 mn bl for the first time in a decade as the Kingdom’s production cuts continue, according to Jodi data released on Wednesday.

The Kingdom’s oil stocks fell to 193.4mn bl in April,

representing a 17pc drop year-on-year. It is the lowest inventory level since February 2009, when the price of WTI was just $35/bl.

The decline in stocks continues a trend that has gathered speed since the inventory peaked at 329mn bl in September 2015. The trend accelerated in Q1 due to crude refinery runs growing 8pc to 2.653mn bl/d and a 7.4mn bl draw during April alone.

However, the inventory decline comes despite a rise in average production in the Q1, year-on-year, by 0.7pc to 9.993mn bl/d. Average monthly oil exports during Q1 2019 were 1pc lower than the same period in 2018, at 7.137mn bl/d.

Opec+ production

Opec+ members agreed last December to cut a combined 1.2 mn b/d of production. Saudi Arabia is contributing the lion's share of Opec's 800,000 bl/d contribution, which equates to roughly 6pc of its income.

Saudi Arabia needs to maintain stable production and export figures to limit the damage to the government's coffers.

Saudi rulers are also mindful maintaining good relations with the US Trump administration. By ensuring the global oil market is well supplied it bolsters the partnership that is aligned against the shared regional rival, Iran.

The price of WTI plummeted 23pc from a high of $66.5/ bl in mid-April to $50.82/ bl in early June, led by global demand concerns worsened by the US-China trade war as well as continued growth of US inventories.

The price slide persisted until a bomb attack on shipping in the Gulf led to rising tensions and a subsequent price surge starting 19 June.

All eyes are now on the Opec+ meeting to be held in in Vienna on 1-2 July, where the organisation will decide whether to extend the cuts.

Solar, storage and wind can keep us on track as far as 2030

With solar and wind power already the cheapest source of new power generation across two-thirds of the globe, analysts at Bloomberg New Energy Finance (BNEF) have predicted Europe will lead the race to decarbonize its grid.

The authors of this year's *New Energy Outlook* report, published today, expect Europe to generate 92% of its electricity from renewables by 2050 thanks to carbon

pricing and other supportive policies. The U.K. last week voiced a net zero carbon 2050 ambition and it is expected Ireland and the EU will follow suit in due course.

Power sector emissions in China, however, are not set to peak until 2026 – thanks to an extensive modern coal power fleet – although they are expected to decline by more than half in the subsequent 20 years. That is in part because of an anticipated rise in demand for electricity of more than 50% by 2050, with Asia due to present a $5.8 trillion power demand market – more than half the global figure during that period – and India and China alone a $4.3 trillion opportunity.

The U.S. will also lag behind Europe when it comes to decarbonization, according to the annual study, which is based on analysis of the costs of competing energy technologies. Renewables will more than double their contribution to the U.S. energy mix, to 43% in 2050, but will have to complete with abundant natural gas in a $1.1 trillion new energy capacity market.

Renewables are the big winner

Despite the prevalence of natural gas in the U.S., the *New Energy Outlook 2019* study predicts that as an energy source, gas will occupy roughly the same share of the market in 2050 as it does today, as will hydropower and nuclear. Oil will have disappeared as a source of energy by mid century, added the BNEF report, and coal – which supplies 37% of power generation today – will have been reduced to a 12% slice of the pie.

Renewables, helped by lithium-ion battery storage will fill the void, according to BNEF, with a rise from 7% of power generation today to 48% by 2050.

That is down to an estimation price reductions in solar, energy storage and wind technologies will continue at rates of 28%, 18% and 14%, respectively, for every doubling in

installed capacity. If those predictions are borne out, renewables will supply and store more energy than coal and gas "almost everywhere" by 2030, stated the report.

The good news is that would ensure the world stays on track for global heating of less than two degrees Celsius by 2050 up to the year 2030, without the need for any new public money incentives for renewables in the next 15 years. Beyond that point, however, new technologies would be required as renewables could top out at contributing 80% of energy generation in many countries by 2050.

New solutions needed

That would mean innovations and alternative solutions such as nuclear, biogas-to-power, green hydrogen-to-power and carbon capture and storage would need to be rolled out after 2030, which in turn would require significant spending on R&D before that point.

One other requirement needed to keep us on track as far as 2030 would be for power markets to be reformed to correctly acknowledge, and reward, the role played by renewables and storage in helping the grid.

In a press release issued to publicize today's BNEF report – which also considers the potential carbon savings to be made in a world with fully electrified transport and building heating – the organization's head of energy economics Elena Giannakopoulou stated: "[The] NEO [*New Energy Outlook*] is fundamentally policy agnostic but it does assume that markets operate rationally and fairly to allow lowest cost providers to win."

Therein lies the rub, perhaps.

Renewable Power Generation Costs in 2018

Renewable energy has become an increasingly competitive way to meet new power generation needs. This comprehensive cost study from the International Renewable Energy Agency (IRENA) highlights the latest trends for each of the main renewable power technologies.

Released ahead of high-profile United Nations energy and climate discussions, Renewable Power Generation Costs in 2018draws on cost and auction price data from projects around the world.

Download the chart data

Costs from all commercially available renewable power generation technologies declined in 2018. The global weighted-average cost of electricity declined 26% year-on-year for concentrated solar power (CSP), followed by bioenergy (-14%),

solar photovoltaic (PV) and onshore wind (both -13%), hydropower (-12%), geothermal and offshore wind (both -1%),the report finds.

Continuing cost declines, meanwhile, underline renewable power as a low-cost climate and decarbonisation solution. Within IRENA's global database, over three-quarters of the onshore wind and four-fifths of the utility-scale solar PV project capacity due to be commissioned in 2020 should provide lower-priced electricity than the cheapest new coal-fired, oil or natural gas option, the report notes.

Among other findings:

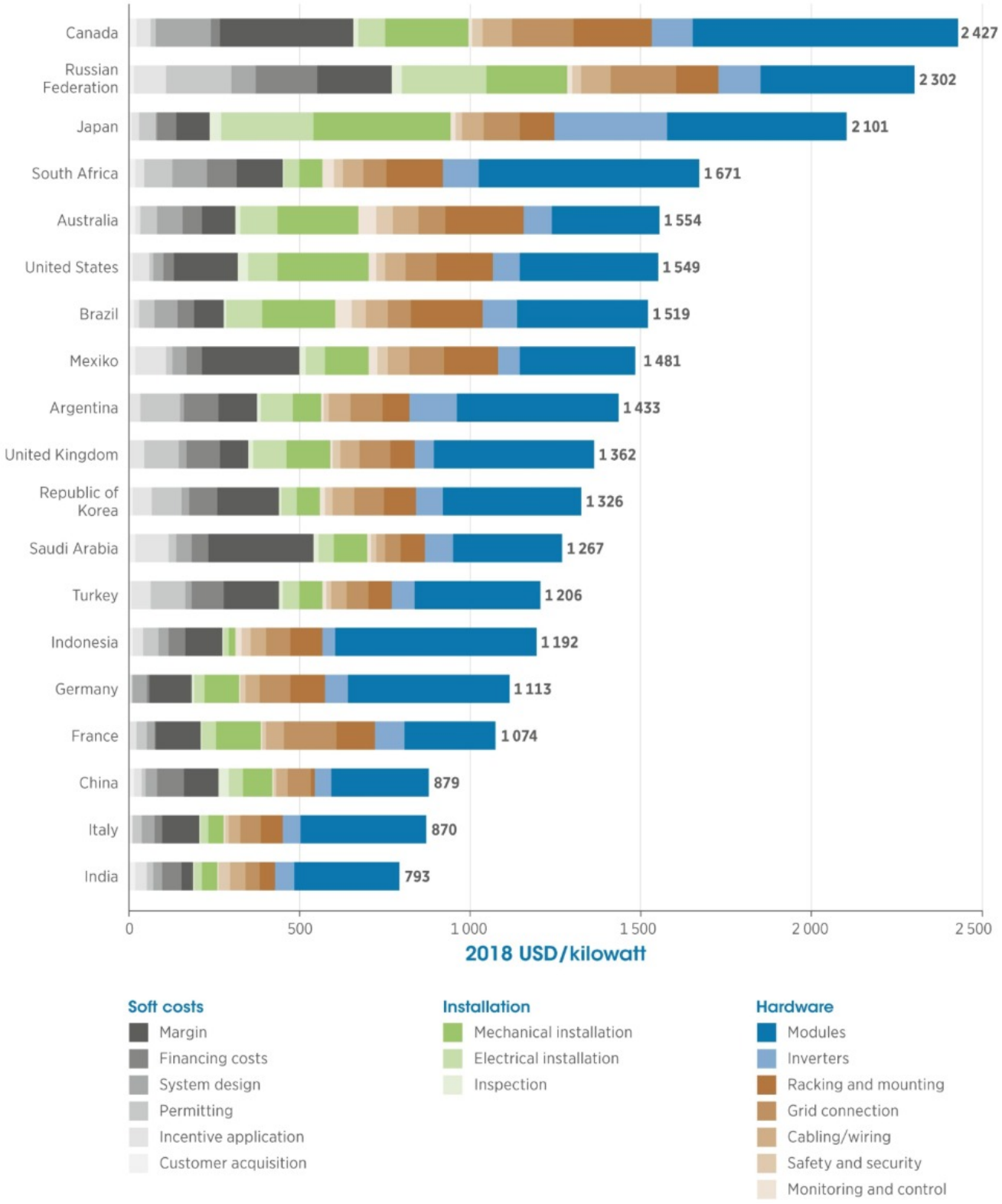
- Onshore wind and solar PV power are now, frequently, less expensive than any fossil-fuel option, without financial assistance.
- New solar and wind installations will increasingly undercut even the operating-only costs of existing coal-fired plants.
- Low and falling technology costs make renewables the competitive backbone of energy decarbonisation – a crucial climate goal.
- Cost forecasts for solar PV and onshore wind continue to be revised as new data emerges, with renewables consistently beating earlier expectations.

Along with reviewing cost trends, the report analyses cost components in detail. The report draws on IRENA's cost database of around 17 000 renewable power generation projects and 9 000 auction and power purchase agreements for renewable power.

Sample figure

Utility-scale solar PV:

Total installed costs in 2018 by component and country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Russian Federation 2 302
Japan 2 101
South Africa 1 671
Australia 1 554
United States 1 549
Brazil 1 519
Mexiko 1 481
Argentina 1 433
United Kingdom 1 362
Republic of Korea 1 326
Saudi Arabia 1 267
Turkey 1 206
Indonesia 1 192
Germany 1 113
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Incentive application
Customer acquisition
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Mechanical installation
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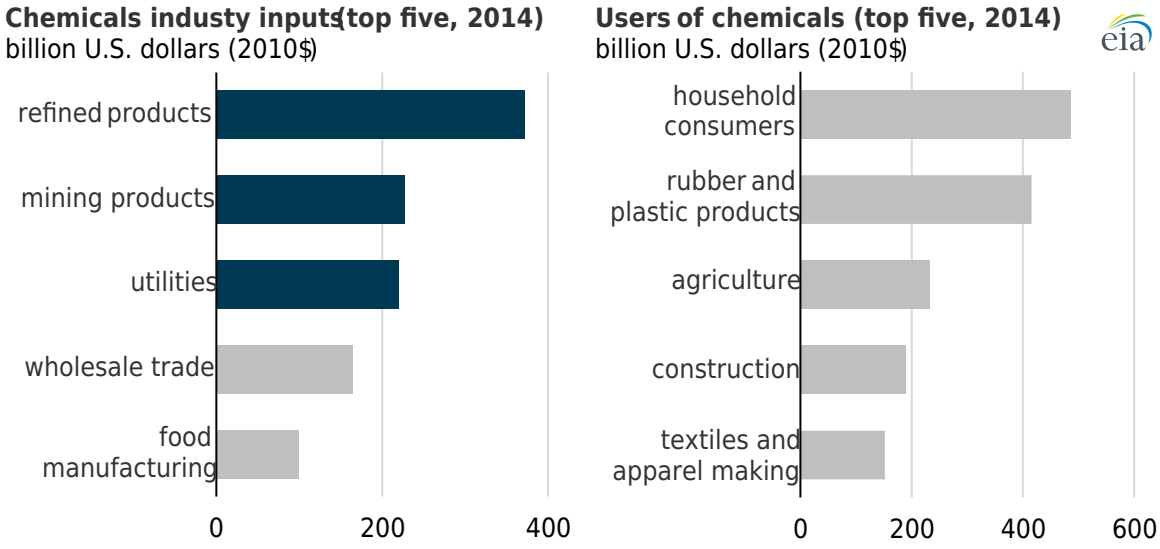
Racking and mounting
Grid connection
Cabling/wiring
Safety and security
Monitoring and control

Energy products are key inputs to global chemicals industry



Source: U.S. Energy Information Administration, based on World Input-Output Database
Note: Dollar values are expressed in 2010 U.S. dollars, converted based on purchasing power parity.

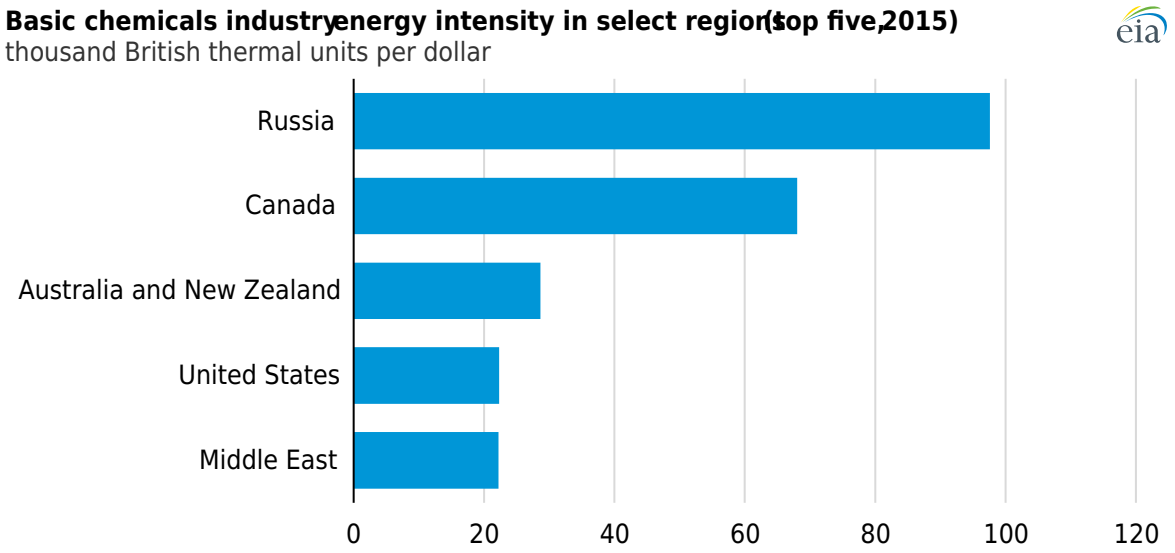
The industrial sector of the worldwide economy consumed more than half (55%) of all delivered energy in 2018, according to the International Energy Agency. Within the industrial sector, the chemicals industry is one of the largest energy users, accounting for 12% of global industrial energy use. Energy—whether purchased or produced onsite at plants—is very important to the chemicals industry, and it links the chemical industry to many parts of the energy supply chain including

utilities, mines, and other energy product manufacturers.

The chemicals industry is often divided into two major categories: basic chemicals and other chemicals. Basic chemicals are chemicals that are the essential building blocks for other products. These include raw material gases, pigments, fertilizers, plastics, and rubber. Basic chemicals are sometimes called bulk chemicals or commodity chemicals because they are produced in large amounts and have relatively low prices. Other chemicals—sometimes called fine or specialty chemicals—require less energy to produce and sell for much higher prices. The category of other chemicals includes medicines, soaps, and paints.

The chemicals industry uses energy products such as natural gas for both heat and feedstock. Basic chemicals are often made in large factories that use a variety of energy sources to produce heat, much of which is for steam, and for equipment, such as pumps. The largest feedstock use is for producing petrochemicals, which can use oil-based or natural-gas-based feedstocks.

In terms of value, households are the largest users of chemicals because they use higher value chemicals, which are often chemicals that help to improve standards of living, such as medicines or sanitation products. Chemicals are also often intermediate goods—materials used in the production of other products, such as rubber and plastic products manufacturing, agricultural production, construction, and textiles and apparel making.



Source: U.S. Energy Information Administration, *WEPS+*, August 2018
Note: Dollar values are expressed in 2010 U.S. dollars, converted based on purchasing power parity.

The energy intensity of the basic chemicals industry, or energy consumed per unit of output, is relatively high compared with other industries. However, the energy intensity of the basic chemicals industry varies widely by region, largely based on the chemicals a region produces. According to EIA's *International Energy Outlook 2018*, Russia had the most energy-intensive basic chemicals industry in 2015, with an average energy intensity of approximately 98,000 British thermal units (Btu) per dollar, followed by Canada with an average intensity of 68,000 Btu/dollar.

The Russian and Canadian basic chemicals industries are led by fertilizers and petrochemicals. Petrochemicals and fertilizers are the most energy intensive basic chemicals, all of which rely on energy for breaking chemical bonds and affecting the recombination of molecules to create the intended chemical output. These countries produce these specific basic chemicals in part because they also produce the natural resources needed as inputs, such as potash, oil, and natural gas.

By comparison, the energy intensity of the U.S. basic chemical

industry in 2015 was much lower, at 22,000 Btu/dollar, because the industry in the United States has a more diverse production mix of other basic chemicals, such as gases and synthetic fibers. However, EIA expects that increasing petrochemical development in the United States will increase the energy intensity of the U.S. basic chemicals industry.

The United States exports chemicals worldwide, with the largest flows to Mexico, Canada, and China. According to the World Input-Output Database, U.S. exports of all chemicals in 2014 were valued at $118 billion—about 6% of total U.S. exports—the highest level in decades.

Principal contributor: Elizabeth Sendich

Saudi Aramco allows sneak peek into its finances

The world’s focus, not surprisingly, has been on Saudi Aramco’s $111bn of net income recorded in 2018, making it the most profitable company in the world. But elements of the upstream story were largely ignored.

For example, the prospectus showed the company's largest oilfield, Ghawar, undershooting what many had thought was its current capacity of around 5mn bl/d, instead coming in at 3.8mn bl/d.

Ghawar has contributed about half of the estimated 150bn barrels of crude that Saudi Arabia has produced to date. Without doubt, Ghawar is an enormous field. Its remaining reserves are put at 48bn bl, so there is still a lot of oil out there, but it will get harder to recover, and require substantive expenditure.

Aramco is developing new fields to plug depletion, with half a dozen expected to come on stream by 2026 – adding an extra 1.25mn bl/d, according to data from consultancy Energy Aspects. Its co-founder Richard Mallinson emphasises that future upstream development is designed to keep things steady "at current capacity levels…Aramco is not talking, as it has done in the past, about possibly raising potential capacity from 12mn bl/d to 15mn bl/d."

Still, Aramco is not giving up on Ghawar anytime soon. The prospectus says field facilities and infrastructure there remain a central component in the company's long-term strategic framework.

"The scope of the utilisation and maintenance of the established infrastructure has expanded to be a hub for development of secondary reservoirs and satellite fields," says the prospectus.

The prospectus also shows how it has boosted production at other fields. At Shaybah in the south of the kingdom, and at the offshore Safaniyah field in the Gulf, Aramco reported production was close to double earlier Western estimates. At the Khurais field, near Ghawar in the east of the country, a "mega-project that started in 2009 with initial capacity of 1.2mn bl/d, has hoisted production to 1.5mn bl." In 2018,

Aramco produced 13.6mn bl/d of oil, including 10.3mn bl/d of crude.

Half a century of reserves

Overall, Aramco's reserves come in at a similar level to an independent audit published earlier this year: 261.5bn bl of crude and condensate, sufficient for proved reserves life of 54 years, "significantly longer than the 9 to 15 year proved reserves life of any of the five major IOCs based on publicly available information", claims the prospectus. The document also records 36.1bn bl of NGLs and 233.8tn ft^3 of natural gas.

Another scarcely mentioned disclosure in the prospectus was Aramco's shift to lighter-grade oil, in terms of projects that have come on line, and new ones in the pipeline. The question now is the extent to which Aramco can match this type of product to demand in the marketplace. The move to lighter is good in terms of petrochemical demand and positive when gasoline/diesel demand is strong.

The prospectus flags Aramco's rock-bottom cost of production based on a comparison of data of the five major IOCs and other leading oil and gas companies. The company's "average upstream lifting cost was $2.80/bl" of oil equivalent produced in 2018. Revenue from upstream operations stood at around $217bn, while downstream revenue was $139bn. It had $86bn in free cash flow at the end of 2018, with minimal debt.

But all that glistens is not gold. Aramco may be the world's most profitable oil company, producing more than 10pc of global crude, but the prospectus shows the state's reliance on the company means it generates less per barrel than privately-owned competitors. Riyadh relied on the oil sector for 63pc of its total revenue in 2017, according to the prospectus. In 2018, Aramco paid about $160bn to the government in dividends, taxes and royalties.

Top credit rating

The transfer of funds from Aramco to the kingdom meant the oil company made about $26/bl last year, compared with $38/bl for Shell and $31/bl for Total. That's why Moody's and Fitch assigned the company ratings of A1 and A+, respectively, arguing the government's reliance on the oil producer to fund its budget acted as a cap on its creditworthiness. ExxonMobil is rated AAA by Moody's.

The linkage between the state and company is an important one in the debate about whether Riyadh really does intend to float a minority stake in Aramco in 2021. Investors worry about the government's control over the oil giant and whether future decisions will be made for the benefit of the state or shareholders.

Andy Critchlow of S&P Global Platts says "investors may be cautious about an IPO because of uncertainty linked to sovereign risk and the kingdom's future potential financing needs [particularly if prices crash due to a swifter switch to green technologies]".

In the interim, the company is shoring up its defences in an uncertain world. It plans to double its refining network, mostly outside the country. The idea is to feed about 50pc of its oil into its fully-owned or joint-venture refineries, making it the largest consumer of its own crude. The prospectus states categorically that refinery expansion was a means "to secure crude oil demand by selling to its captive system" of refineries.

Also revealed is the way Aramco ensures it always has enough spare capacity up its sleeve. The aim is to have "the average maximum number of barrels per day of crude oil (MSC) that can be produced for one year during any future planning period".

Sovereign wealth boost

As of 31 December 2018, MSC stood at 12mn bl/d of crude. Spare capacity afforded by maintaining MSC enables the company "to increase production above planned levels rapidly in response to changes in global crude oil supply and demand".

Saudi Arabia is drawing on Aramco's cash to bolster its sovereign wealth fund to develop new industries to break the kingdom's reliance on oil. It is also trying to extract more profit from the crude it pumps by turning it into gasoline and diesel, as well as plastics and other materials used in consumer goods. The $69bn purchase of Sabic was a case in point and a major factor behind the bond offering.

The aim is to provide more cash for the Public Investment Fund, the kingdom's sovereign wealth fund, to invest both internally and overseas to wean Saudi off its addiction to fossil fuels. It is a race against time as the bond prospectus indirectly acknowledges via its references to risk factors that span climate change, among others. And that raises, once again, the issue of an IPO down the line in which the Saudis would like to raise a cool $100bn.

A listing may be better sooner than later if you believe in the relentless switch to cleaner fuel sources. That said, traders are wondering whether Aramco and Riyadh really need the money.

After all, have they not demonstrated how easily they can tap the bond markets for credit?

Scott Modell, head of geopolitical risk at Washington-based consultancy Rapidan Energy, disagrees with this thesis. "An IPO is necessary [otherwise MBS's] ambitious Vision 2030 programme designed to reduce oil dependence [could end up becoming] Vision 2130," he says. "And for that reason, the IPO [postponed last year] is certainly back on the table."

Trump talks to Saudi crown prince on Iran, oil

(Reuters) – U.S. President Donald Trump spoke on Friday to Saudi Crown Prince Mohammed bin Salman about Middle East stability and the oil market, the White House said, after tensions with Iran prompted a rise in oil prices.

“The two leaders discussed Saudi Arabia’s critical role in ensuring stability in the Middle East and in the global oil market. They also discussed the threat posed by the Iranian regime’s escalatory behavior,” White House spokesman Hogan Gidley said in a statement.

The phone call took place in the wake of Iran’s shooting down of an unmanned U.S. drone in the Gulf region, which prompted Trump to prepare but ultimately hold back from launching a retaliatory attack.

There was no word from the White House statement on whether Trump raised with the crown prince the death last October of Saudi journalist Jamal Khashoggi.

A 100-page report by the U.N. special rapporteur on extrajudicial executions, Agnes Callamard, earlier this week accused Saudi Arabia of a “deliberate, premeditated execution” and said the crown prince should be investigated for it.

(Reporting by Steve Holland; Writing by Doina Chiacu; Editing by David Alexander and James Dalgleish)

IEEFA report: Advances in electricity storage suggest rapid disruption of U.S. electricity sector

June 14, 2019 (IEEFA) – Momentum is gaining around an industry shift toward utility-scale battery storage systems nationally, finds a report published today by the Institute for Energy Economics and Financial Analysis (IEEFA).

The report – Advances in Electricity Storage Suggest Rapid Disruption of U.S. Electricity Sector –details upstart storage and storage-expansion projects in Arizona, California, Hawaii, Florida, Massachusetts, New Hampshire, Nevada, Texas, and Vermont.

Dennis Wamsted, an IEEFA editor/analyst and lead author of the report, said recent evidence of utility-scale storage adoption is most likely the beginning of a trend that will take hold broadly across the industry, benefitting renewables at the expense of gas- and coal-fired plants.

"Bigger changes loom," Wamsted said. "In the many examples we researched, each project, by and large was driven by one of several value streams–cutting transmission charges, providing grid resilience, offering peak power, allowing for early plant closures and the like–even if other benefits were accrued too."

The report details dozens of examples of electric companies large and small finding an assortment of cost savings in

electricity-storage technology and portability.

“Installation is still tiny in terms of absolute numbers, but power storage is now ubiquitous and energy storage is no longer a pie-in-the sky proposition,” Wamsted said. “These changes are taking place today.”

Excerpts from the report:

- Battery storage in combination with solar can be used to facilitate closure of coal and natural gas plants currently being used largely for peaking or seasonal needs, as shown by the NV Energy decision to close the North Valmy coal plant in Nevada, and by Florida Power and Light’s’s plan to shut two aging natural gas units in Florida.
- Battery storage can be used to meet system peak needs, as SCE is doing in California in replacing the two-unit Mandalay natural gas peaker plant.
- Battery storage can be used to provide firm renewable power, as both Arizona Public Service and Hawaiian Electric are demonstrating with projects they have named, respectively, “Solar after Sunset” and “Renewable Dispatchable Generation.”
- Battery storage offers utilities significant opportunities to boost system resilience and cut costs at the same time, as is being demonstrated in a number of other projects highlighted in the report.
- Battery storage can be used to enable more residential solar systems to be installed on local distribution lines without requiring potentially costly and time-consuming system upgrades, as can be seen in an existing program in Vermont and in one being proposed in New Hampshire.
- Battery storage can be used to improve the economics of existing utility-scale solar generation, as can be seen in the discussion about Vistra’s battery storage retrofit at a Texas PV plant.

Wamsted said economies of scale will help drive the expansion of utility-scale battery storage, as will a growing recognition by utility companies of the business case for embracing the shift: “It is likely that developers and utilities will be able to stack these benefits, making storage even more economically competitive.”

Full report: Advances in Electricity Storage Suggest Rapid Disruption of U.S. Electricity Sector

Author

Dennis Wamsted (Dennis.wamsted@gmail.com) is an IEEFA editor and analyst, tel: (703) 237-9531

Media Contact

Vivienne Heston (vheston@ieefa.org), tel: (914) 439-8921

About IEEFA

The Institute for Energy Economics and Financial Analysis (IEEFA) conducts global research and analyses on financial and economic issues related to energy and the environment. The Institute’s mission is to accelerate the transition to a diverse, sustainable and profitable energy economy.