Why an Electric Car Battery Is So Expensive, For Now

At Tesla Inc.’s ballyhooed Battery Day event last year, CEO Elon Musk set himself an ambitious target: to produce a $25,000 electric vehicle by 2023. Hitting that sticker price — about $15,000 cheaper than the company’s least expensive model today — is seen as critical to deliver a true, mass-market product. Getting there means finding new savings on technology — most critically the batteries that can make up a third of an EV’s cost — without compromising safety. Alongside Musk, traditional automaking giants including Toyota Motor Co. and Volkswagen AG are pouring tens of billions of dollars into the race.

1. Why are EV batteries so expensive?

Largely because of what goes in them. An EV uses the same rechargeable lithium-ion batteries that are in your laptop or mobile phone, they’re just much bigger — cells grouped in

packs resembling big suitcases — to enable them to deliver far more energy. The priciest component in each battery cell is the cathode, one of the two electrodes that store and release electricity. The materials needed in cathodes to pack in more energy are often expensive: metals like cobalt, nickel, lithium and manganese. They need to be mined, processed and converted into high-purity chemical compounds.

2. How much are we talking?

At current rates and pack sizes, the average battery cost for a typical EV works out to about $6,300. Battery pack prices have come down a lot — 89% over the past decade, according to BloombergNEF. But the industry average price of $137 per kilowatt hour (from about $1,191 in 2010) is still above the $100 threshold at which the cost should match a car with an internal-combustion engine. Costs aren't expected to keep falling as quickly, and rising raw materials prices haven't helped. Still, lithium-ion packs are on track to drop to $92 per kWh by 2024, according to BNEF forecasts, and $58 per kwh by 2030.

Greedy for Gigawatts

EVs are going to be the driving force for lithium-ion battery demand

Source: BloombergNEF Long-Term Electric Vehicle Outlook, June 2021

3. How will the batteries get cheaper?

A major focus for manufacturers is on the priciest commodities, and particularly cobalt. One option is to substitute the metal with nickel, which is cheaper and holds more energy. Doing so requires safety adjustments, however, as

cobalt’s advantage is that it doesn’t overheat or catch fire easily. Another move has been to use alternatives that don’t contain cobalt at all, like low-cost lithium iron phosphate cells, once derided for poorer performance but winning a revival as design changes deliver improvements. Simplifying battery pack design, and using a standard product for a range of vehicles — rather than a pack tailored to each model — will deliver additional savings.

4. What about fire risks?

Lithium-ion batteries, whether used in grid-sized storage facilities, cars or devices like smartphones, can catch fire if they’ve been manufactured poorly, damaged in an accident, or the software that runs them hasn’t been designed properly. Incidents remain rare, but garner huge scrutiny in what remains a developing sector. A decision in August by General Motors Co. to carry out a $1.8 billion recall of more than 100,000 Chevrolet Bolt models as a result of battery defects underscored the seriousness. Blazes or overheating incidents this year also impacted major energy storage projects in Australia and California. And the fires aren’t easy to extinguish; it took firefighters four hours and took more than 30,000 gallons (113,560 liters) of water to douse a Tesla Model S after a fatal crash in Texas. Tesla insists that incidents involving electric models garner undue attention. According to its 2020 Impact Report, cars with internal-combustion engines (ICE) catch fire at a “vastly” higher rate. From 2012 to 2020 there was about one Tesla fire for every 205 million miles (330 million kilometers) traveled, compared to a fire every 19 million miles for ICE vehicles, the EV pioneer said.

5. Who are the biggest manufacturers?

Asia dominates manufacturing of lithium-ion cells, accounting for more than 80% of existing capacity. The Chinese

company Contemporary Amperex Technology Co. Ltd. (CATL) shipped the highest volume in 2020, capturing almost a quarter of the market. By September this year it had extended its lead to 30%, followed by South Korea-based LG Energy Solution and Japan's Panasonic Corp. Tesla and Panasonic's joint venture is the biggest battery producer in the U.S. Emerging producers include Northvolt AB in Sweden, founded by former Tesla executives, and Gotion High-tech Co. in China.

6. Are the batteries all the same?

They have the same basic components: two electrodes — a cathode and an anode — and an electrolyte that helps shuttle the charge between them. But there are differences in the materials used, and that's key to the amount of energy they hold. Grid-storage systems or vehicles traveling short distances can use cheaper and less powerful cathode chemistry that combines lithium, iron and phosphate. For higher-performance vehicles, automakers favor more energy-dense materials, such as lithium-nickel-manganese-cobalt oxide or lithium-nickel-cobalt-aluminum oxide. Further refinements are seeking to improve range — how far a vehicle can travel before recharging — as well as charging speed.

7. So China's in pole position?

Yes, in almost every aspect. China is responsible for about 80% of the chemical refining that converts lithium, cobalt and other raw materials into battery ingredients, though the metals themselves are largely mined in Australia, the Democratic Republic of Congo and Chile. China also dominates processing capacity across four key battery components (cathodes, anodes, electrolyte solutions and separators), with more than half of the world's commissioned capacity for each, BNEF data shows. The nation faces a challenge when it comes to advanced semiconductor design and software, components that are increasingly important as cars become more intelligent.

Less than 5% of automotive chips are made in China, according to the China Association of Automobile Manufacturers.

8. Is cost the only hurdle?

There’s still an issue with driving range. While the most-expensive EVs can travel 400 miles or more before a top up, consumers considering mainstream models remain anxious about how often they’ll need to recharge. Automakers and governments have become directly involved in the roll-out of public recharging infrastructure for drivers on the road. However, most recharging is expected to take place at home, and that means another cost for consumers. While the average price of a home-charging kit has fallen 18% since 2017 to about $650, some top-of-the-line bi-directional chargers (which let you send energy from the vehicle to the home or grid), cost more than $6,000. Installation costs in the U.S. can run from as little as $400 to more than $3,300.

9. What’s around the corner?

Most keenly anticipated is the arrival of solid-state batteries, which promise a huge performance upgrade by replacing the flammable liquids that enable charging and discharging with ceramic, glass or polymers. QuantumScape Corp. says it has innovations in that field to increase a car’s range by as much as 50% and the technology could be deployed in vehicles at dealerships as soon as 2026. Another industry focus is modifying anodes — typically made using graphite — to add more silicon, or by using lithium metal. That would likely make it viable to power smaller aircraft. Storing renewable power with utility-scale batteries for days or weeks, rather than hours at present, is also a key challenge. Form Energy Inc. is developing iron-air batteries that it says could enable entirely carbon-free grids. CATL and others are also working on plans to substitute lithium, or combine it with, far cheaper sodium-ion technology for some

niche applications.

The Reference Shelf

- Electric vehicle sales should increase sharply in the next few years and account for 16% of regular car sales by 2025, BNEF forecasts.
- These are the Nobel Prize winning scientists who pioneered the lithium-ion battery.
- Bloomberg News examines how the U.S. is falling behind as the EV battery soars.
- More QuickTakes on the road to driverless cars, the broader trend toward electrification, greener hydrogen and electric airplanes.
- Bloomberg Opinion's Anjani Trivedi explains how new power packs will require new supply chains.
- Bill Gates discusses the electrification of transportation in this blog post.
- A TOPLive Q&A with Carnegie Mellon University professor Venkat Viswanathan on the future of batteries.

— With assistance by Chunying Zhang

Energy crunch deepening as US warns Europe isn't doing enough

Europe’s energy crunch is deepening, with gas and power prices hitting fresh records after the US warned the continent isn’t doing enough to prepare for what could be potentially a dire winter.

With about a month to go before the start of the heating season, Europe doesn’t have enough natural gas in storage sites and isn’t building inventories fast enough either. Amos Hochstein, the US State Department’s envoy for energy security, said on Friday he was worried about supplies this winter.

Energy demand is rebounding across the world as economies reopen and people return to the office. Gas stockpiles in Europe are already at the lowest level in more than a decade for this time of year, pushing up the cost of producing electricity. The rally in European energy prices is just a taste of what’s to come for other commodities, Goldman Sachs Group Inc said in a report.

“European energy pricing dynamics offer a glimpse of what is in store for other commodity markets, with widening deficits and depleting inventories leading to elevated price volatility,” said Goldman analysts including Jeff Currie. For European gas, “demand destruction is the only option to rebalance markets,” they said.

Europe is struggling to boost supplies, with flows from No 2 supplier Norway currently limited due to maintenance. Top seller Russia is “is coming off an extended period of inexplicably low supply” at a time when US deliveries of liquefied natural gas can’t be increased further, Hochstein said.

“I worry because I don’t think we should ever be in a position

knowing that if it’s a cold winter, there’s not enough supply,” he told reporters during a visit to Warsaw. Benchmark European gas futures traded in the Netherlands exceeded €60 a megawatt-hour, climbing as much as 4.6% to a new record. The UK contract for next-month surged as much as 4.3% to 151.79 pence a therm.

Soaring gas prices are fuelling a rally in electricity. German power futures for next year, a benchmark for Europe, surged to a record €99.25 a megawatt-hour, while the equivalent French contract reached an all-time high of €102.75 a megawatt-hour on the European Energy Exchange.

Short-term prices are also gaining, with low wind power across most of Europe boosting costs. A bigger requirement from more expensive fossil-fuelled plants to meet demand has lifted the German day-ahead contract to the highest since 2007 and the UK equivalent above 200 pounds for the fourth time in two weeks.

“If supply were to disappoint further and winter weather turns out colder than normal, European gas and power prices may have to rise further to ration demand and thus curb energy-intensive industrial production,” Goldman said.

Environmental threats are the ‘greatest challenge to human rights’: UN

The UN rights chief has said the “triple planetary crises” of climate change, pollution, and nature loss represented the biggest threat to human rights globally, at the opening yesterday of a month-long session set to prioritise environmental issues.

“The interlinked crises of pollution, climate change and biodiversity act as threat multipliers, amplifying conflicts, tensions and structural inequalities, and forcing people into increasingly vulnerable situations,” Michelle Bachelet told the opening of the 48th session of the UN Human Rights Council in Geneva.

“As these environmental threats intensify, they will constitute the single greatest challenge to human rights of our era,” she added.

The former Chilean president said the threats were already “directly and severely impacting a broad range of rights, including the rights to adequate food, water, education, housing, health, development, and even life itself”.

She said environmental damage usually hurt the poorest people and nations the most, as they often have the least capacity to respond.

Bachelet referred to recent “extreme and murderous” climate events such as floods in Germany and California’s wildfires.

She also said drought was potentially forcing millions of people into misery, hunger and displacement.
Bachelet said that addressing the environmental crisis was “a humanitarian imperative, a human rights imperative, a peace-building imperative and a development imperative. It is also doable”.
She said spending to revive economies in the wake of the coronavirus (Covid-19) pandemic could be focused on environmentally-friendly projects, but “this is a shift that unfortunately is not being consistently and robustly undertaken”.
She also said that countries had “consistently failed to fund and implement” commitments made under the Paris climate accords.
“We must set the bar higher – indeed, our common future depends on it,” she added.
Her remarks come at the opening session of the September 13 to October 8 session of the Human Rights Council, where climate change themes were expected to be central, alongside debates on alleged rights violations in Afghanistan, Myanmar, and Tigray, Ethiopia.
In the same speech, she voiced alarm at attacks on indigenous people in Brazil by illegal miners in the Amazon.
Geneva-based diplomats told Reuters that two new resolutions on the environment were expected, including one that would create a new Special Rapporteur on Climate Change and another that would create a new right to a safe, clean, healthy and sustainable environment.
Yesterday Germany’s Foreign Minister Heiko Maas voiced support for the first idea, which has not yet been formally submitted in draft form.
“Climate change affects virtually all human rights,” he said.
Marc Limon of the Universal Rights Group think-tank said the Council’s recognition of the right to a healthy environment would be “good news”.
“It would empower individuals to protect the environment and fight climate change,” he said.

During her address, Bachelet said that at the 12-day COP26 climate talks in Glasgow, set to begin on October 31, her office would push for more ambitious, rights-based commitments.

She added that in many regions, environmental human rights defenders were threatened, harassed and killed, often with complete impunity.

She said economic shifts triggered by the Covid-19 pandemic had apparently prompted increased exploitation of mineral resources, forests and land, with indigenous peoples particularly at risk.

“In Brazil, I am alarmed by recent attacks against members of the Yanomami and Munduruku peoples by illegal miners in the Amazon,” she said.

In her opening global update, Bachelet touched on the human rights situations in several countries, including Chad, the Central African Republic, Haiti, India, Mali and Tunisia.

On China, she said no progress had been made in her years-long efforts to seek “meaningful access” to Xinjiang.

“In the meantime, my office is finalising its assessment of the available information on allegations of serious human rights violations in that region, with a view to making it public,” she said.

Rights groups believe at least 1mn Uyghurs and other mostly Muslim minorities have been incarcerated in camps in the northwestern region, where China is also accused of forcibly sterilising women and imposing forced labour.

Beijing has strongly denied the allegations and says training programmes, work schemes and better education have helped stamp out extremism in the region.

Decisions made by the Council’s 47 members are not legally binding but carry political weight.

The Reality of Climate Financial Risk

Those who argue that climate change has little to do with macroprudential risk management are offering a counsel of despair. If the 2008 global financial crisis revealed anything, it is that regulation matters, even if it isn't always politically popular or easily optimized.

LAUSANNE, SWITZERLAND – In a recent commentary, John H. Cochrane, a senior fellow at the Hoover Institution, argues that "climate financial risk" is a fallacy. His eye-catching premise is that climate change doesn't pose a threat to the global financial system, because it – and the phase-out of fossil fuels that is needed to address it – are developments that everyone already knows are underway. He sees climate-related financial regulation as a Trojan horse for an otherwise unpopular political agenda.

We disagree. For starters, one should acknowledge the context in which regulation emerges. With respect to climate policy, the Intergovernmental Panel on Climate Change has set the stage with its sixth assessment report, which concludes with a high degree of certainty that the Earth's climate is changing,

and that human activities are the cause. Ecologist William Ripple, the co-author of another recent study of planetary "vital signs," goes further: "There is growing evidence we are getting close to or have already gone beyond tipping points associated with important parts of the Earth system."

Unlike the 2008 global financial crisis – when banks that took excessive risks were bailed out, and global financial regulation was overhauled in light of our new understanding about interdependent financial markets – unmitigated climate change will lead to a crisis with irreversible outcomes.

The question, as Cochrane puts it, is whether climate-related financial regulation can do anything to help us avoid such outcomes. Although the answer is complex and currently incomplete, we would argue that it can. Financial regulation to mitigate climate risk is indeed worth pursuing, because the stakes are too high to let the perfect become the enemy of the good.

Consider some of the arguments about systemic financial risk and extreme climate events. First, we are told that the risk of "stranded assets" – particularly fossil-fuel assets – will become a fact of life, to be borne only by investors. Here, Cochrane points out, correctly, that fossil-fuel investments have always been risky. But can we reasonably say that the prevalence of this energy source should be left to market players alone, or that only investors will bear the costs?

Though per capita fossil-fuel consumption in countries such as the United States and the United Kingdom has declined since 1990, total consumption has grown dramatically elsewhere, rising by 50% globally over the last 40 years. In 2020, China and India were the planet's two largest coal-energy producers, relying on coal for 61% and 71% of their electricity, respectively. Their economies, and those of many other developing countries, simply would not sustain a precipitous reduction in fossil-fuel energy.

Cochrane also suggests that there is no scientifically validated possibility that extreme climate events will cause systemic financial crises over the next decade, and that regulators are therefore stymied from assessing the risks on financial institutions' balance sheets over a five- or ten-year horizon. But the sheer scale of the challenge should make us reconsider the temporal dimensions of regulation.

If temperature increases are to be kept within 2° Celsius of pre-industrial levels this century, about 80% of all coal, one-third of all oil, and half of all gas reserves must be left unburned. All of the Arctic's oil and the remainder of Canada's oil sands – the world's largest deposit of crude oil – must be left in the ground, starting almost immediately.

Finally, it is said that the technocratic regulation of climate investments cannot protect us against un-modeled tipping points. But this view simply ignores the extensive literature in climate economics. In this field, the work of Nobel laureate economist William Nordhaus is widely referenced. His Dynamic Integrated Climate-Economy (DICE) model has influenced many scientists' and economists' own modeling of tipping points, and the US government already relies on these "integrated assessment models" to formulate policy and calculate the "social cost of carbon."

This interdependency between economics, policy, politics, public opinion, and regulation should be familiar from the crash of 2008. The dangerous over-leveraging that generated that crisis was an open secret; but those in a position, politically and culturally, to do something about it were willing to deny the systemic risk it posed. One can find the same denialism in the climate debate. According to the Center for American Progress, 139 members of the current US Congress (109 representatives and 30 senators; a majority of the Republican caucus) "have made recent statements casting doubt on the clear, established scientific consensus that the world is warming – and that human activity is to blame."

Cochrane makes an eloquent case for why policymakers should focus on creating coherent, scientifically valid policy responses to climate change and financial systemic risk separately, rather than pursuing climate financial regulation. But this isn't an either/or choice. We need both kinds of policies, and we need coordination between the two domains.

We therefore should welcome the approach being taken by US Secretary of the Treasury Janet Yellen's Financial Stability Oversight Council, which has brought together leading regulators and tasked them with preventing a repeat of the 2008 Wall Street meltdown. Yellen has said she will use this multi-regulator body as her principal tool to assess climate risks and develop the disclosure policies needed to shift to a low-carbon economy.

Counterintuitive though it may be, climate-related financial regulation could usher in a new form of political accountability, by putting governments and individuals (elected and unelected) on the hook for their decisions. Such accountability was notably absent before and during the 2008 crisis. With political will, serious thinking about regulating climate financial risk could open up a fruitful debate for similar action on all neglected policy fronts.

Surging wind industry faces its own green dilemma: landfills

Siemens launches first recyclable wind turbine blade

- **Anti-wind groups use dumping of blades as rallying issue**
- **Industry calls for EU landfill ban**

Wind turbines have become a vital source of global green energy but their makers increasingly face an environmental conundrum of their own: how to recycle them.

The European Union’s share of electricity from wind power has grown from less than 1% in 2000, when the continent began to curb planet-heating fossil fuels, to more than 16% today.

As the first wave of windmills reach the end of their lives, tens of thousands of blades are being stacked and buried in landfill sites where they will take centuries to decompose.

Spanish turbine maker Siemens Gamesa this week launched what it called a “game changer” – the first recyclable blades, which use a technology that allows their carbon and glass fibres to be reused in products like screen monitors or car parts.

“We have reached a major milestone in a society that puts care for the environment at its heart,” said Andreas Nauen, chief executive of Siemens Gamesa, which expects the blades to become the industry standard.

Europe is the world’s second largest producer of wind-

generated electricity, making up about 30% of the global capacity, compared to China's 39%, according to the Global Wind Energy Council, an industry trade association.

Wind Europe, a Brussels-based trade association which promotes the use of wind power in Europe, expects 52,000 blades a year to need disposal by 2030, up from about 1,000 today.

"The public want to be reassured that wind energy is fully sustainable and fully circular," said WindEurope's chief executive, Giles Dickson, describing Siemens Gamesa's new recyclable blade as a "significant breakthrough".

While wind turbine blades are not especially toxic, the resulting landfill, if improperly handled, may contribute to dangerous environmental impacts, including the pollution of land and waterways.

All forms of energy have some environmental cost but renewables, almost by definition, cause less damage to the planet, said Martin Gerhardt, Siemens Gamesa's offshore wind chief.

"If you look at oil wells and the spills or if you consider methane leaks, compared to the fossil industries, wind is the lesser problem," he said.

Wind power is one of the cleanest forms of energy, with a carbon footprint 99% lower than coal and 75% less than solar, according to a study by Bernstein Research, a US-based research and brokerage firm.

Its emissions come mainly from the production of iron and steel used in turbines and concrete for windmill foundations.

If these were mitigated by techniques such as carbon capture and storage – where carbon dioxide is buried underground – "you'd be able to cut out the carbon footprint completely," said Deepa Venkateswaran, the study's author.

The growing mountains of waste created by old blades has become a rallying point for groups opposed to wind turbines, which they also say are noisy and spoil the countryside.

But landfill is likely to remain the preferred disposal option because it is the cheapest, said Eric Waeyenbergh, advocacy manager at Geocycle, a sustainable waste management firm.

“If you just throw it in the landfill, this is the cheapest price you can have when you’re dismantling the windmill. And that’s a problem because there’s no mandatory recycling or recovery obligation,” he said.

Geocycle and WindEurope are lobbying for landfills to be banned across Europe where only four countries – Austria, Germany, the Netherlands and Finland – have outlawed the landfilling of composite materials, such as wind turbine blades.

Geocycle co-runs a cement kiln in Germany, with building industry giant Lafarge, which is partly fuelled by burning thousands of tonnes of old wind turbines, which create less carbon dioxide than fossil fuels.

Recyclable blades can also be ground up for use in products such as rearview car mirrors and insulation panels, or heat-treated to create materials for roof light panels and gutters.

However, industry groups say these techniques are not currently available at commercial scale or at a price that would make them viable alternatives to landfill.

David Romero Vindel, co-founder of Reciclalia, which cuts and shreds turbine blades for recycling as carbon fibre yarn and fabric, said a landfill ban would help his firm.

“We need the EU to push the sector in this direction of recycling,” he said.

Vivian Loonela, a spokeswoman for the European Commission said it will review its landfill policies in 2024.

“The recycling of (windmill) composite fraction remains a challenge due to the low value of the recycled product and the relatively small amount of waste (produced), which does not stimulate the recycling markets,” she said.

– Thomson Reuters Foundation

How U.S. Presidents Use the Strategic Petroleum Reserve

As U.S. president, Joe Biden can tap the nation’s emergency oil stockpile to make up for supply shortages – be they disruptions to crude flows such as in Louisiana this week after Hurricane Ida, or price spikes caused by geopolitical instability in the Middle East. The tool at his disposal is the Strategic Petroleum Reserve, set up in the aftermath of the Arab oil embargo in the 1970s as a national energy safety net. It’s the world’s largest supply of emergency crude, stored in deep and heavily guarded underground salt caverns along the U.S. Gulf Coast.

1. How much oil is in reserve?

The reserve stood at 621.3 million barrels as of Aug. 20, enough to replace more than half a year’s worth of U.S. crude net imports. Current inventory is about 87% of its maximum authorized storage capacity.

2. In what circumstances can presidents release stockpiled oil?

It’s pretty much the president’s prerogative. But the 1975 law that established the reserve says a president can order a full drawdown in the event of a “severe energy supply interruption” that threatens national security or the economy. A limited drawdown (up to 30 million barrels) can be ordered in the event of “a domestic or international energy supply shortage of significant scope or duration.”

3. Have presidents tapped the reserve before?

Yes. In 2011, President Barack Obama released 30 million barrels as part of a joint effort with other nations to counter supply disruptions from Libya. In 2005, President George W. Bush released 11 million barrels in the wake of Hurricane Katrina. And in 1991, under President George H.W. Bush, 17 million barrels were released during the first Gulf War. Test releases take place from time to time, as well as limited releases in the form of swaps. In 2017, the Energy Department authorized the release of 5 million barrels to Gulf Coast refineries when Hurricane Harvey wreaked havoc on the region. Such arrangements are designed to address short-term emergency needs, and the crude is repaid, in kind, at a future date.

4. What’s happening in the wake of Hurricane Ida?

Exxon Mobil Corp. is starting its huge Baton Rouge refinery and needs a large amount of crude to process, and fast. Major disruptions to nearby pipelines and production facilities in the wake of the storm have spurred the oil giant to ask for up to 1.5 million barrels of oil from the reserve to temporarily replace its usual supply sources. The Department of Energy is encouraging refiners to prioritize making products such as gasoline, which is badly needed in the area for cars and generators.

5. What does a release entail?

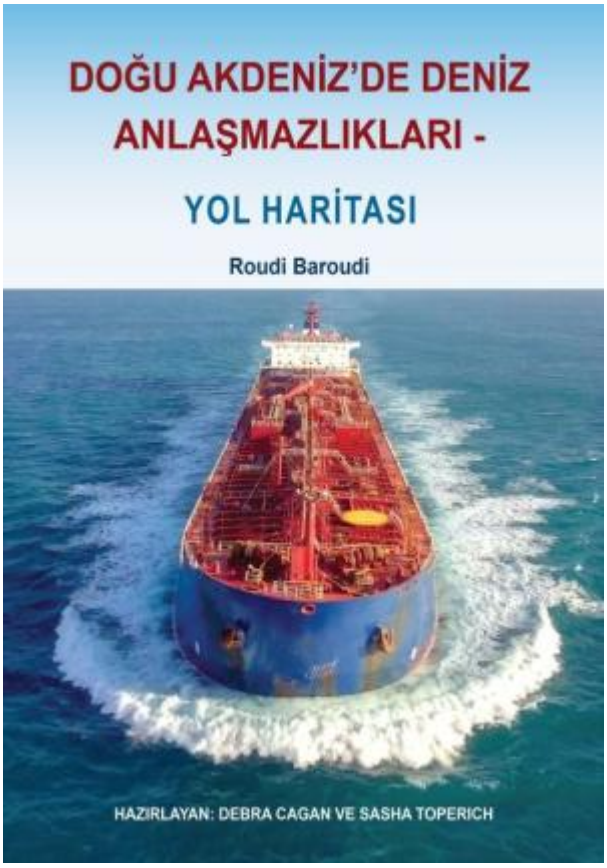
The maximum drawdown capability is 4.4 million barrels a day, according to the Energy Department’s website, and it takes 13 days for SPR oil to reach the open market after a presidential decision. But the mere announcement that the SPR is being deployed could have an immediate, if short-lived, effect on oil prices.

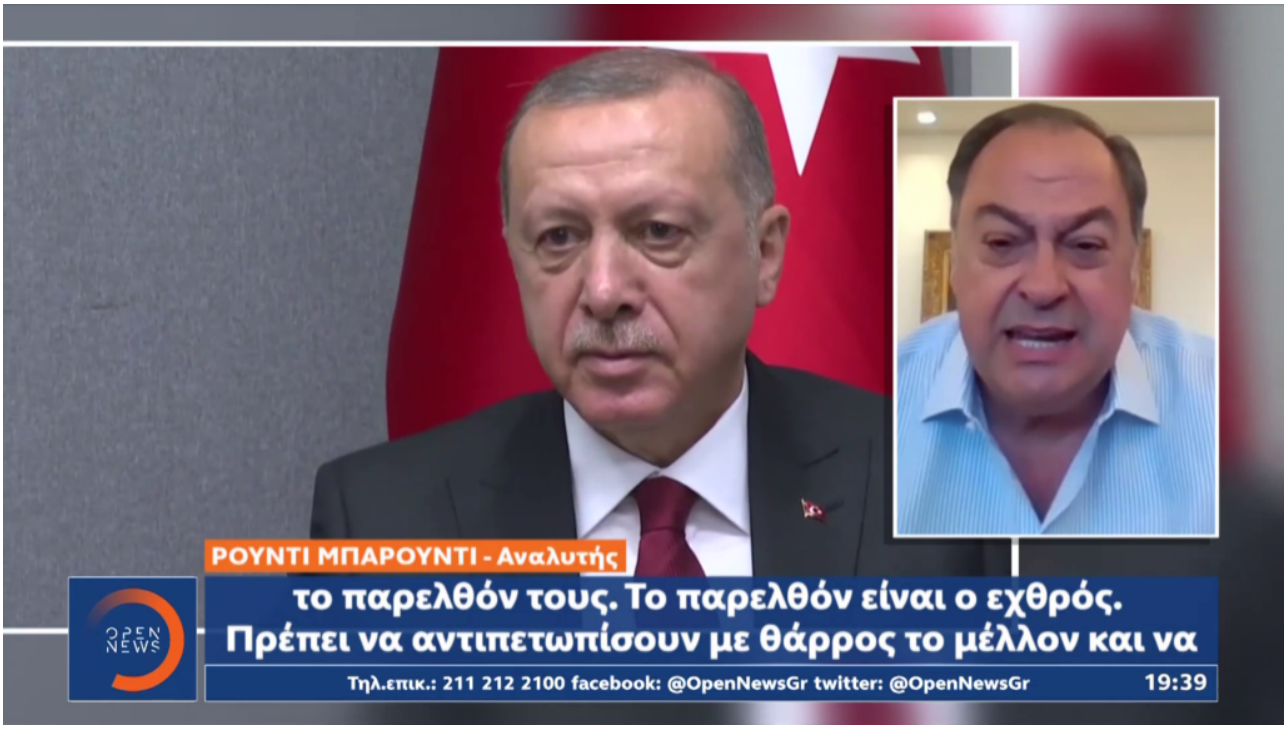
6. What’s the outlook for the U.S. stockpile?

The domestic shale boom has allowed the U.S. to join the ranks of the world’s biggest oil producers, lending weight to arguments that the emergency reserve is past its sell-by date. But in recent months shale production has stalled, demand has increased and imports have also gone up. In the past the reserve has been used to pay government bills ranging from roads to deficit reduction and drugs, and current plans are for the stockpile to be cut almost in half over several years. But periodic use of the reserve after natural disasters may be the most effective rebuttal to the case for doing away with it.

More stories like this are available on bloomberg.com

SEMINAL BOOK ON SETTLING MEDITERRANEAN BORDER DISPUTES NOW AVAILABLE IN TURKISH





Study stresses diplomacy, international law as pathways to energy boom and regional stability

Washington D.C. – 27th July 2021

WASHINGTON, D.C.: A highly influential book about maritime boundary disputes in the Eastern Mediterranean has been

translated into Turkish, its publisher announced on Monday, spreading its message of peaceful dialogue to a key audience in a region poised for offshore energy riches.

The Transatlantic Leadership Network said it hoped the Turkish translation of author Roudi Baroudi's "Maritime Disputes in the Eastern Mediterranean: The Way Forward" would be just as well-received as its Arabic, French, Greek, and original English versions. The book, distributed by the Brookings Institution Press, co-edited by Debra Cagan and Sasha Toperich has been hailed by a wide variety of academics, diplomats, and other experts.

Baroudi's study emphasizes the paucity of settled maritime boundaries in the region, how crucial these are to the safe and effective exploitation of offshore energy resources, and the proven avenues available for dispute resolution. He explains the purpose and ever-increasing applicability of the United Nations Convention on the Law of the Sea (UNCLOS), the use of legal and diplomatic creativity to circumnavigate mistrust, and the power of shared interest to foment some form of cooperation, even if indirect.

Given recent history, the subject matter could be neither more relevant, nor more timely. Enormous quantities of natural gas have been discovered off the coasts of several East Med countries in the past few years, but thus far the only ones to make real development progress have been Egypt, Israel, and, to a lesser extent, Cyprus. Baroudi's book stresses that the only thing these countries have in common is that their shared maritime boundaries are not in dispute, which has enabled them to attract the necessary investment to the areas in question.

The problems involved – and the solutions on offer – relate to several points of friction across the region, including (to note but a few) a years-long US mediation effort to resolve the maritime boundary between Israel and Lebanon; decades-old tensions between Greece and Turkey, especially over

Castellorizo, a Greek-ruled island just 2 kilometers off Turkey's Mediterranean coast; and multiple side-effects of the division – and partial occupation by Turkish troops – of Cyprus.

Maritime Disputes in the Eastern Mediterranean: The Way Forward" examines these and other complexities of the regional situation, and the several analyses reach a single conclusion: for each of the region's countries, the only viable option is to trust in the rules and processes of UNCLOS, engage in bi- and/or multilateral dialogues with its neighbors, and start reaping the rewards of this emerging energy hub.

Baroudi's background consists of more than four decades in the energy sector, during which time he has helped design policy for companies, governments, and multilateral institutions, including the European Commission, the World Bank, U.S. Exim Bank and the International Monetary Fund. His areas of expertise range from oil and gas, petrochemicals, power, energy security, and energy-sector reform to environmental impacts and protections, carbon trading, privatization, and infrastructure. This book was his latest as being author and co-author of several studies and his next – a study of the region's Blue Economy prospects in the post-carbon era – is expected to come out in the first half of 2022. He currently serves as CEO of Energy and Environment Holding, an independent consultancy based in Doha, Qatar.

Qatar's low-carbon LNG expansion to meet world's

growing demand for cleaner energy: PwC

Qatar’s low-carbon LNG expansion will meet world’s growing demand for cleaner energy, PwC has said in its ‘Qatar Economy Watch’ report.

Qatar’s gas production process is among the lowest carbon-intensity globally and will further decline as a result of Qatar Petroleum (QP) sustainability strategy, announced in January that includes cutting methane leaks, using solar power for operations and boosting carbon capture and storage, PwC noted.

As part of these efforts, Qatar was one of the five founding members in April 2021 of the Net Zero Producers’ Forum, alongside the US and Saudi Arabia. This commitment to reducing the intensity of production will further add to Qatar’s competitive edge against other LNG producers.

In a world-first in September 2020, QP signed a LNG contract with Singapore that includes wellhead-to-delivery reporting of greenhouse emissions. This was a first step towards a future in which carbon taxes or other mechanisms could advantage lower-intensity producers like Qatar.

PwC said, “The combination of an improving demand outlook for LNG with delays to new supply because of the weakened balance sheets of private hydrocarbon companies, makes it an ideal moment for Qatar to press ahead with expansion. In February 2021, QP awarded the main contract to build the four new LNG terminals for the North Field East expansion. The new supply will come onstream in stages during 2025-2027 and QP intends to soon commission another two trains.

“QP may be considering further expansion in the future, which makes sense given that North Field’s reserves are sufficient for around three centuries of production at current levels, whereas the global economy is expected to have fully decarbonised by the end of this century.”

The report said, “Financing the project, expected to cost around $43bn for all six trains, will benefit from the low interest rate environment, enabling QP to finance much of the capex through low-cost bonds as well as equity contributions from joint-venture partners. Equity bids were received from six oil majors in May 2021, and discussions are also underway for customers, including in China, to take smaller stakes.”

The six new trains will boost Qatar’s LNG output by nearly two-thirds and also lift its production of valuable by-products including condensates, natural gas liquids, ethane and helium. This will enable ongoing government expenditure to boost the economy as well as QIA’s reserves. Work on the project will pick up rapidly over the next few years, providing a significant boost to the post-Covid-19 recovery, particularly for the construction sector and for companies supplying goods and services to the project. Energy prices have recovered to pre-Covid-19 levels and may show continued strength for several years, PwC noted. This is because there has been a sharp drop in capital expenditure by oil and gas companies which may result in supply constraints, depending on how strongly demand recovers and how rapidly the Opec+ output cuts are tapered.

Speaking at the Qatar Economic Forum in June, the CEOs of ExxonMobil, Shell and Total Energies, along with Qatar’s

Minister of State for Energy Affairs, HE Saad bin Sherida al-Kaabi, warned that underinvestment could cause oil prices to spike towards $100. “Of particular relevance for Qatar is the fact that a raft of major LNG projects have been postponed or cancelled as a result of the lower capex budgets and worries about long term prices, reducing competition for the new capacity that will be generated from its own North Field expansion.

“At the same time, there has been a growing emphasis in global commitments to tackle climate change and address ESG (environmental, social and governance) concerns, such as China pledging to reach net-zero emissions in 2060. Sustainability advocates are finding traction in leveraging the willingness of governments to take decisive action against Covid-19 as a precedent for stronger action on climate change, including the Biden Administration’s pledge to “Build Back Better”. This shift in focus benefits Qatar because of the importance of gas as a lower-carbon transition fuel,” PwC said.

Rolls-Royce, Shell Deepen Sustainable Jet-Fuel Partnership

Rolls-Royce Holdings Plc and Royal Dutch Shell Plc said they'll deepen their cooperation on sustainable aviation fuels as part of the push to achieve net-zero carbon emissions.

At the heart of the agreement are plans to explore opportunities for bringing 100% SAF to certification, the companies said Wednesday. Such fuels can currently be blended with kerosene in concentrations of no more than 50%.

Airlines are counting on SAF to reduce carbon emissions in the years before electric- and hydrogen-based propulsion systems become widely available, most likely after 2035. Progress has been hampered by regulatory hurdles and a lack of supply both

of biofuels and their synthetic equivalents, which has pushed prices significantly beyond those for traditional jet fuel.

The collaboration will also aim to develop new innovations, with SAF expected to have a role powering hybrid-electric versions of flying taxis currently in the final stages of development as well as jetliners and corporate aircraft, Rolls-Royce Chief Technology Officer Paul Stein said.

“The investments that are going to be required to scale up sustainable aviation fuels are measured in billions,” Stein said in an interview following the announcement. For energy companies, “before they invest their dollars in SAF-plants they need comfort that the market will be there and customers will buy the fuel.”

The agreement deepens an existing partnership between the companies in alternative fuels. Shell will supply sustainable aviation fuels to Rolls-Royce as the company aims to test engines like Ultrafan to demonstrate they are 100% SAF compatible. Shell is also the exclusive supplier for Rolls-Royce’s new SAFinity service allowing business travelers to take carbon-neutral flights, while the firms will also look at opportunities to co-operate in shipping and rail.

The key to moving forward with sustainable fuels is getting regulation in place to mandate their use, said Stein. The U.S. favors subsidizing the fuel at source, which is “not incompatible” with the European approach, he added.

In April, Shell announced an investment in sustainable-fuels technology company LanzaJet, adding to a string of deals meant to position the oil giant for the energy transition. Rolls-Royce in turn plans to make all of its in-production civil aircraft engines compatible with burning 100% SAF by 2023.

How biofuels cut emissions:

The carbon dioxide absorbed by plants during the growth of

biomass is roughly equal to the amount produced when the fuel is burned, making SAF approximately carbon-neutral over its life cycle. However, CO2 released during the production and transport of SAF means the reduction in emissions is about 80% compared with fossil fuels. Feedstocks for biofuel also include spent cooking oil, waste gases and agricultural residues.

Economics needs a climate revolution

By Tom Brookes And Gernot Wagner/ Brussels/New York

• There is no excuse for continuing to adhere to an intellectual paradigm that has served us so badly for so long

Nowhere are the limitations of neoclassical economic thinking – the DNA of economics as it is currently taught and practised – more apparent than in the face of the climate crisis. While

there are fresh ideas and models emerging, the old orthodoxy remains deeply entrenched. Change cannot come fast enough.

The economics discipline has failed to understand the climate crisis – let alone provide effective policy solutions for it – because most economists tend to divide problems into small, manageable pieces. Rational people, they are wont to say, think at the margin. What matters is not the average or totality of one's actions but rather the very next step, weighed against the immediate alternatives.

Such thinking is indeed rational for small discrete problems. Compartmentalisation is necessary for managing competing demands on one's time and attention. But marginal thinking is inadequate for an all-consuming problem touching every aspect of society.

Economists also tend to equate rationality with precision. The discipline's power over public discourse and policymaking lies in its implicit claim that those who cannot compute precise benefits and costs are somehow irrational. This allows economists – and their models – to ignore pervasive climate risks and uncertainties, including the possibility of climatic tipping points and societal responses to them. And when one considers economists' fixation with equilibrium models, the mismatch between the climate challenge and the discipline's current tools becomes too glaring to ignore.

Yes, a return to equilibrium – getting "back to normal" – is an all-too-human preference. But it is precisely the opposite of what is needed – rapidly phasing out fossil fuels – to stabilise the world's climate.

These limitations are reflected in benefit-cost analyses of cutting emissions of carbon dioxide and other greenhouse gases. The traditional thinking suggests a go-slow path for cutting CO2. The logic seems compelling: the cost of damage caused by climate change, after all, is incurred in the future, while the costs of climate action occur today. The Nobel prize-winning verdict is that we should delay necessary investment in a low-carbon economy to avoid hurting the current high-carbon economy.

To be clear, a lot of new thinking has gone into showing that even this conventional logic would call for significantly more climate action now, because the costs are often overestimated while the potential (even if uncertain) benefits are underestimated. The young researchers advancing this work must walk a near-impossible tightrope, because they cannot publish what they believe to be their best work (based on the most defensible assumptions) without invoking the outmoded neoclassical model to demonstrate the validity of new ideas.

The very structure of academic economics all but guarantees that marginal thinking continues to dominate. The most effective way to introduce new ideas into the peer-reviewed academic literature is to follow something akin to an 80/20-rule: stick to the established script for the most part; but try to push the envelope by probing one dubious assumption at a time. Needless to say, this makes it extremely difficult to change the overall frame of reference, even when those who helped establish the standard view are looking well beyond it themselves.

Consider the case of Kenneth J Arrow, who shared a Nobel Prize in Economic Sciences in 1972 for showing how marginal actions taken by self-interested individuals can improve societal welfare. That pioneering work cemented economists' equilibrium thinking. But Arrow lived for another 45 years, and he spent that time moving past his earlier work. In the 1980s, for example, he was instrumental in founding the Santa Fe Institute, which is dedicated to what has since become known as complexity science – an attempt to move beyond the equilibrium mindset he had helped establish.

Because equilibrium thinking underpins the traditional climate-economic models that were developed in the 1990s, these models assume that there are tradeoffs between climate action and economic growth. They imagine a world where the economy simply glides along a Panglossian path of progress. Climate policy might still be worthwhile, but only if we are willing to accept costs that will throw the economy off its chosen path.

Against the backdrop of this traditional view, recent pronouncements by the International Monetary Fund and the International Energy Agency are nothing short of revolutionary. Both institutions have now concluded that ambitious climate action leads to higher growth and more jobs even in the near term.

The logic is straightforward: climate policies create many more jobs in clean-energy sectors than are lost in fossil-fuel sectors, reminding us that investment is the flipside of cost. That is why the proposal for a $2 trillion infrastructure package in the United States could be expected to spur higher net economic activity and employment. Perhaps more surprising is the finding that carbon pricing alone appears to reduce emissions without hurting jobs or overall economic growth. The problem with carbon taxes or emissions trading is that real-world policies are not reducing emissions fast enough and therefore will need to be buttressed by regulation.

There is no excuse for continuing to adhere to an intellectual paradigm that has served us so badly for so long. The standard models have been used to reject policies that would have helped turn the tide many years ago, back when the climate crisis still could have been addressed with marginal changes to the existing economic system. Now, we no longer have the luxury of being able to settle for incremental change.

The good news is that rapid change is happening on the political front, owing not least to the shrinking cost of climate action. The bad news is that the framework of neoclassical economics is still blocking progress. The discipline is long overdue for its own tipping point towards new modes of thinking commensurate with the climate challenge. — Project Syndicate

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