



U.S. ENERGY TRANSITION REPORT

THE TRANSATLANTIC
SUN  WIND BELT

BY CLEAN ENERGY ASSOCIATES – 29 JULY 2022

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MANCHIN REVERSES, DEMOCRATS INTRODUCE CLEAN ENERGY BILL

By Christian Roselund

In a surprise turn of events, on July 27 Senator Joe Manchin announced that he has reached a deal with Senate Majority Leader Chuck Schumer on clean energy tax legislation. Given Manchin's newfound cooperation, this legislation is likely to become law in September. The Inflation Reduction Act (IRA) features provisions related to solar, wind and energy storage tax credits, as well as U.S. solar and wind manufacturing. This includes the following:

- Solar Investment Tax Credit (ITC) for businesses returns to 30% for projects that begin construction through the end of 2024
 - The full 30% is contingent on labor provisions
 - Energy storage 5kWh and larger becomes eligible for the ITC
 - An additional 10 - 20% ITC (to reach 40%-50% of project costs) is available for certain projects in low-income communities
- ITC for residential solar is extended for 10 years through the end of 2032
- Wind Production Tax Credit returns at \$0.015/kWh through the end of 2024 (contingent on labor provisions)
- After January 1, 2025, the ITC for businesses and the PTC for wind both go away and are replaced with a technology-neutral PTC for zero-emitting technologies:
 - \$0.015/kWh for installations smaller than 1 MW
 - \$0.003/kWh for installations larger than 1 MW
- Incentives for U.S. clean energy manufacturing
 - Eligible solar components: modules, cells, wafers, polysilicon, backsheets, inverters
 - Eligible battery components: modules, cells, electrode active materials, critical minerals
 - Eligible wind turbine materials: blades, nacelles, towers, offshore wind foundations, inverters
 - The above credits begin phasing out in 2030 and expire in 2033

The IRA now goes before the Senate Parliamentarian, who will ensure that it qualifies for the "reconciliation" approach, meaning that it can pass the senate with only a simple majority. It will also need to be approved by the House of Representatives; however, the House goes on recess on July 29. This means that the House will need to either reconvene for a special session or that the IRA will come to a vote in September.

CEA gives this legislation a 75% chance of passage; one of the few concerns is that progressive Democrats may balk at some of the other provisions in the bill for the oil and gas industry. As this bill will likely face united Republican opposition, it cannot afford to lose even one Democratic vote in the 50/50 Senate. If it does pass the House and Senate, President Biden has indicated that he will sign it.

If passed, this bill is likely to provide a significant mid-term (through 2025/2026) boost to solar, wind and energy storage markets, as projects come online under the ITC and PTC. It is also likely to spur some domestic manufacturing, at least of solar and energy storage components. CEA has not done an analysis of the impact that the IRA incentives would have on wind manufacturing.

Source: [Inflation Reduction Act of 2022](#) (U.S. Senate)

MASSACHUSETTS PASSES MULTI-SECTOR CLEAN ENERGY BILL

By Christian Roselund

On 21 July, 2022, the Massachusetts legislature passed a clean energy bill to accelerate zero-carbon solutions in the electricity, transportation, and buildings sectors, including accelerating offshore wind deployment and setting a phase-out date for petroleum-fired passenger vehicles. Top-line actions of “An Act Driving Clean Energy and Offshore Wind” include:

- Mandates that the state’s utilities contract for a minimum of 5600 megawatts of offshore wind by 2027
- Mandates that passenger vehicles sold in-state must be zero-emissions by 2035
- Provides EV rebates of up to \$5000, with an additional \$1500 rebate for low-income individuals
- Removes a cap on solar installations up to 25 kW under the state’s net metering program

The wide-ranging bill makes a number of other changes. These include reducing incentives for fossil fuel equipment starting in 2025, requiring building energy use reporting for large buildings, setting up a pilot programs for fossil-free building renovations, and requiring electric utilities to submit proposals for time-of-use rates.

The bill represents a reconciliation of two different bills that previously passed the House and Senate, and now goes to Massachusetts Governor Charlie Baker for approval. Sierra Club has described the bill as a “landmark” and noted that it will make it easier for the state to achieve its target of reducing emissions 50% economy-wide by 2030.

The bill does not accelerate Massachusetts’ Clean Energy Standard, which requires that the portion of clean energy sources (defined as having emissions 50% below the most efficient gas generator) increases 2% annually to reach 80% of electricity in 2050. But by increasing the offshore wind target, it is mandating a faster move to renewables in electricity. Using Vineyard Wind’s estimated capacity factor of 45%, 5600 megawatts of offshore wind would generate electricity equivalent to 46% of the state’s [retail electricity sales in 2021](#).

The bill’s requirement that only zero-emissions vehicles can be sold after 2035 follows on an executive order signed by California Governor Newsom in September 2020 creating a similar requirement for new vehicles. [Seven other states](#) including Massachusetts followed California’s lead, but Massachusetts’ Clean Energy and Offshore Wind bill takes the rare step of writing this requirement into law, instead of acting solely through state regulations.

Source: [An Act Driving Clean Energy and Offshore Wind](#) (Fast Democracy)

News coverage: [Massachusetts passes ‘landmark’ climate bill to decarbonize multiple sectors, add 5.6 GW offshore wind](#) (UtilityDive)

SOLAR, WIND PPA PRICES ROSE NEARLY 30% YEAR-OVER-YEAR

By Christian Roselund

New research from Level10 Energy shows U.S. solar and wind PPA prices rising nearly 30% over the last year. Using price offers from its energy marketplace, Level10 Energy shows North American wind prices increased 13% in the second quarter of 2022 to \$33.91 per megawatt-hour (MWh), with solar prices increasing more than 3% to \$36.33/MWh. When compared to the previous year, Level10 Energy says that these prices are nearly 30% higher.

These are “P25” prices, meaning that they refer to the most competitive 25th percentile offer price. These prices are for a variety of start dates, with average contract lengths in the 10 – 15-year range and include the value of renewable energy credits (RECs).

Price increases were very different across grid operator service areas, with sharp increases over the past six months for solar in the Midcontinent System Operator, PJM Interconnection, and Southwest Power Pool (SPP) grids, which cover the U.S. East Coast, Midwest to the Rocky Mountains, and part of the South. Prices for solar contracts in these three regions are now \$44/MWh and above. This is in sharp contrast to statewide grids in Texas and California, where prices did not change as much and are in the \$32-\$34/MWh range. For wind, prices have fallen sharply in PJM but rose in SPP. They show a very large range across grid operator, from a low of under \$30/MWh in Texas to above \$60/MWh in California.

Level10 cites several reasons for rising PPA prices, including “ongoing permitting difficulties, congested interconnection queues, a fractured supply chain, and powerful inflationary factors.” It also cites the impact of the anti-circumvention investigation against Southeast Asian solar products as creating “near-paralysis” in the solar industry during Q2 2022.

However, Level10 also notes that as renewable energy prices increase, so have wholesale electricity prices. The company observes that “the value of wind and solar PPAs remains high, even as their prices increase.”

Level10’s finding that some of the rising PPA prices reflect rising costs is echoed by global data by Bloomberg New Energy Finance (BloombergNEF), which found that the levelized cost of electricity (LCOE) from both new-build solar and onshore wind [increased during Q2 2022](#). BloombergNEF reports the average LCOE from onshore wind increased 7% year-over-year to \$46/MWh while solar rose 14% year-over-year to \$45/MWh.

BloombergNEF cited rising cost of “materials, freight, fuel, and labor” for solar and wind LCOE increases. Regardless, both sources remain much lower cost than new-build gas-fired generation (\$81/MWh) or coal-fired generation (\$74/MWh).

Source: [Q2 2022 PPA Price Index Executive Summary](#) (Level10 Energy)

COMPONENT CONSTRAINTS LIMIT TESLA BATTERY DEPLOYMENTS IN Q2

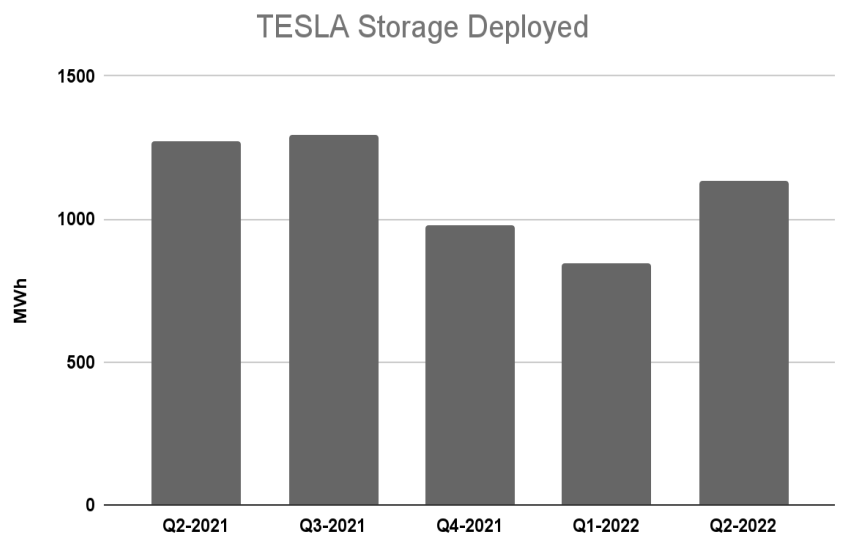
By Cormac O’Laoire

Tesla deployed more than 1 gigawatt-hour of battery energy storage systems in the second quarter of this year, but the company has been suffering from parts supply issues. In announcing quarterly financial results on 19 July, Tesla said a global semiconductor shortage was a major factor behind the 11% year-over-year decline in energy storage deployments.

Production of Tesla's residential Powerwall battery cells and Megapack 3 megawatt-hour (MWh) utility-scale system "remains component-constrained," Chief Financial Officer Zachary Kirkhorn said during a conference call discussing the results. Kirkhorn said the company hopes the situation will ease in the second half of the year.

In the second quarter of 2022, Tesla deployed 1133 MWh of storage, compared to 1274 MWh in the same period in 2021 and 1295 MWh in the third quarter of 2021. However, this figure has increased compared to the fourth quarter of 2021 (978 MWh) and the first quarter of 2022 (846 MWh).

The semiconductor shortage has had a bigger impact on the company's energy business than its core automotive segment, although the good news appears to be that the company is reporting strong customer demand. Tesla is ramping up Megapack production as demand continues to outstrip supply.



As stated in the company’s Q2 release: “Demand for our storage products remains in excess of our ability to supply. We are in the process of ramping production at our dedicated Megapack factory to address the growing demand.”

Access to lithium-ion battery cells and availability of raw materials such as lithium, nickel and cobalt remain a concern for Tesla. In the earnings call CEO Elon Musk called upon entrepreneurs to “enter the lithium refining business.” To grow the energy storage business, Tesla will require substantially more cells from suppliers such as Panasonic & CATL. Musk remarked that battery production is a “fundamental limiting factor” in the global energy transition.

Source: [Tesla Vehicle Production & Deliveries and Date for Financial Results & Webcast for Second Quarter 2022](#) (Tesla)

U.S. NATURAL GAS PRICES DOUBLED YEAR-OVER-YEAR IN JUNE

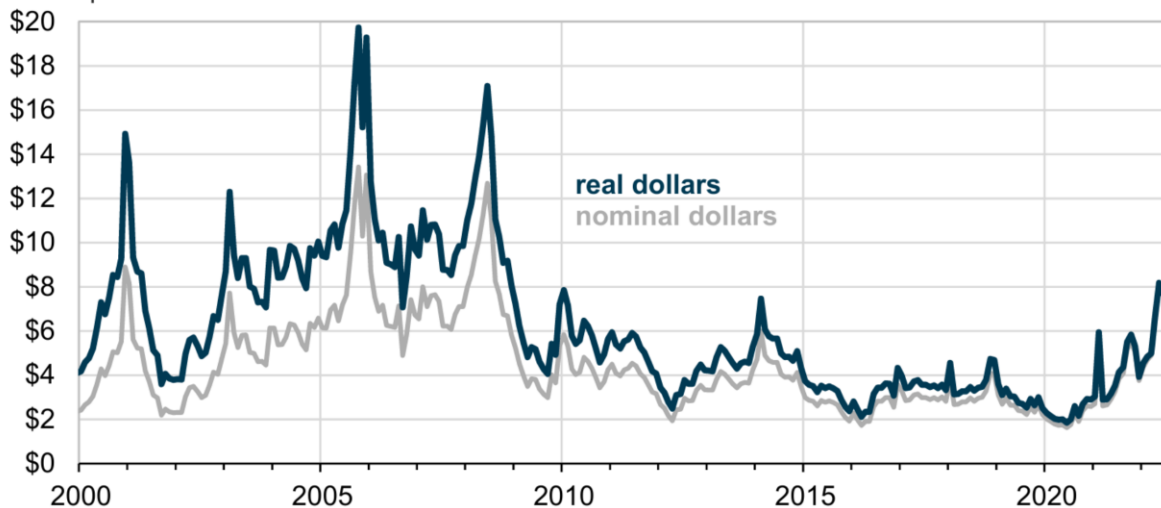
By Christian Roselund

While prices for solar and wind have been rising in the United States, recent data from the U.S. Department of Energy indicate that natural gas prices have been rising faster. The U.S. Department of Energy's Energy Information Administration (EIA) reports that prices at Henry Hub in Louisiana, which set a benchmark price for U.S. gas prices, have increased 101% from \$3.84 per million British Thermal Units (MMBtu) in July 2021 to \$7.70/MMBtu in June 2022.

This June price shows a slight decline from prices of \$8.17/MMBtu in May 2022, the highest price since November 2008. EIA states that prices have generally increased since mid-2021 as "demand growth has outpaced domestic production growth, keeping inventory levels low."

Monthly average Henry Hub natural gas spot price (Jan 2000–Jun 2022)

dollars per million British thermal units



Source: EIA

An important driver of sharply rising gas prices in the United States is the growth of liquefied natural gas (LNG) exports. The nation [has now surpassed](#) both Qatar and Australia as the world's largest exporter of LNG. EIA notes that due to this increased domestic and global demand, the United States entered April 2022 with the lowest natural gas storage level in almost three years. Further reflecting the connections between U.S. and global markets, a [fire at the Freeport LNG terminal](#) in Texas in early June has both reduced gas prices for U.S. consumers and raised EU gas prices.

These increases in the wholesale price of natural gas are being felt at the retail level as well. The most recent [Consumer Price Index \(CPI\) report](#) shows the price of utility gas service rising 38.4% year-over-year. This is the third-steepest increase among the consumer goods considered. CPI also showed that retail electricity prices have increased 13.7% year-over-year, the fourth-sharpest increase.

Source: [U.S. monthly average Henry Hub spot price nearly doubled in 12 months](#) (Today in Energy, EIA)

QCELLS BEGINS GEORGIA FACTORY EXPANSION

By Christian Roselund

QCells North America has begun preparing the site for a second factory building at its production site in Dalton in the U.S. state of Georgia. The new building will host the capacity to assemble an additional 1.4 gigawatts of solar PV modules per year, with initial operation planned for the second half of 2023. This adds to QCells' existing 1.7 gigawatts of production capacity at the site. QCells will host around one quarter of the nation's total solar module manufacturing capacity when this facility and another under construction by First Solar are complete in 2023.



Photo: Scott Moskowitz, Twitter

The modules made in the factory will feature high-efficiency cells which utilize tunnel oxide passivated contact (TOPCon) technology. These are more expensive than the standard passivated emitter and rear cell (PERC) cells that are standard in solar production, and the modules made from them will primarily serve the residential and commercial and industrial solar markets. CEA has confirmed that these cells will be imported from cell factories in Korea owned by QCells' parent company Hanwha.

Despite this expansion and a 3.3-gigawatt factory under construction by First Solar in Ohio, the United States is expected to remain dependent on imported solar modules to meet demand. Wood Mackenzie's latest estimate is that the United States will install 18 gigawatts-DC of PV modules in 2022, far more than its 8 gigawatts of module production capacity. In 2023 the United States is expected to install 26 gigawatts of solar, and with these two factories will have only 12.7 gigawatts of module capacity by the end of the year. Actual production of U.S modules will be lower than these figures, given that U.S. factories are not running at full utilization.

Source: [QCells North America Head of Public Affairs Scott Moskowitz](#) (Twitter)

Source: additional CEA Research

WASHINGTON D.C. PASSES CLIMATE, ALL-ELECTRIC BUILDINGS BILLS

By Christian Roselund

The City Council of Washington D.C. has approved two bills that increase the city's greenhouse gas reductions targets and as well as setting in place concrete measures to implement these reductions, particularly in the buildings sector. This includes net-zero and all-electric mandates for broad categories of new buildings, starting in 2025 and 2027, as well as mandating that the city only purchase electric vehicles for city government use.

Washington D.C. Mayor Muriel Bowser has expressed support for both bills, and upon signing they will give Washington D.C. stronger economy-wide greenhouse gas reduction targets than any U.S. state. This follows on New York City mandating all-electric buildings in December 2021, and dozens of cities and counties in California passing similar measures.

The Climate Commitment Act of 2021 begins by requiring a 45% reduction in economy-wide greenhouse gas emissions by 2025, a 60% reduction in 2030, and additional targets to reach carbon neutrality by 2045. As part of this, it mandates that the district shall not install any fossil fuel infrastructure in any of its buildings during initial construction or major renovations, including city schools, starting in 2025. In addition, it mandates that the city purchase only zero-emissions vehicles starting in 2026.

The second bill, the Clean Energy DC Building Code Amendment Act of 2021, will require that all new construction and substantial improvements will have to meet a net-zero energy standard starting in 2027. This includes a ban on installing appliances that burn fossil fuels in these buildings which applies to all commercial buildings as well as residential buildings four stories and higher.

This will make Washington D.C. the second city on the East Coast to mandate all-electric new buildings, and likely not the last. Legislation was introduced in Maryland, New York, and Rhode Island to mandate all-electric new buildings in the most recent legislative sessions.

Source: [B24-0420 - Clean Energy DC Building Code Amendment Act of 2021](#) (Council of the District of Columbia)

Source: [B24-0267 - Climate Commitment Act of 2021](#) (Council of the District of Columbia)

News coverage: [Washington set to be 2nd East Coast city with gas ban](#) (E&E News)

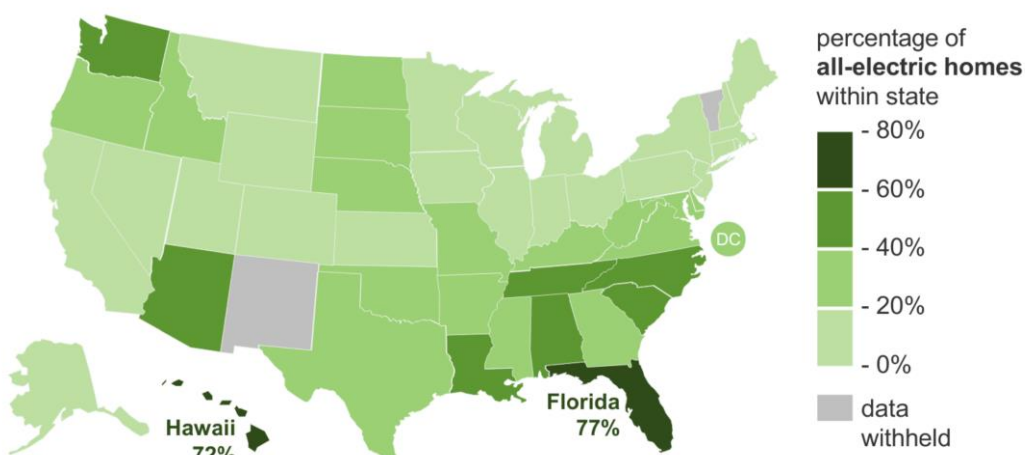
26% OF U.S. HOMES WERE ALREADY ALL-ELECTRIC IN 2020

By Christian Roselund

The U.S. Department of Energy’s Energy Information Administration (EIA) has published a state-by-state analysis of the degree of electrification of homes in the United States, finding that in 2020 26% of U.S. homes were all-electric. This information provides a baseline for electrification efforts and shows the need for attention in certain regions. The portion of all-electric homes varies widely from state to state, from a high of 77% in Florida to a low of 7% in New York and Michigan.

EIA observes that in colder climates most homes use natural gas, fuel oil, and/or propane for space and water heating. A map released by EIA confirms this, showing that less than 20% of homes in all states in the Northeast and Midwest are all-electric. California is an outlier; despite a mild climate only 8% of California homes are all-electric.

All-electric homes by state (2020)



Source: EIA

The information provided by EIA comes amid both a movement by cities, counties, and states to mandate electrification of new buildings (See “Washington D.C. Passes Climate, All-Electric Buildings bills”) and a wave of states [passing laws](#) to prohibit municipalities from passing these all-electric mandates. It also follows U.S. natural gas hitting its highest monthly price in 14 years in May 2022.

However, in many cases the states that have passed laws pre-empting municipal electrification mandates either already have high rates of all-electric buildings and/or have smaller populations. While Alabama, Arizona, Florida, Louisiana, and Tennessee are among the 20 states that have pre-empted municipal gas bans, in all these states more than 40% of homes were already all-electric in 2020. This suggests that state pre-emption will not necessarily have a major impact in terms of prolonging gas as the dominant fuel for meeting U.S. residential energy needs.

EIA also supplied information on the uses of electrification in homes. While 88% of homes use electricity for air conditioning, only 33% of homes use electricity for space heating. Rates of electricity use for water heating, cooking, and clothes drying fell between these two numbers.

Source: [2020 U.S. Residential Energy Consumption Survey](#) (EIA)

U.S. POSTAL SERVICE TO INCREASE EV PURCHASES

By Christian Roselund

The U.S. Postal Service has made changes to its plans to retrofit its fleet, planning for at least 40% of an order of 84,500 vehicles to be battery electric vehicles (BEVs). This is an increase from the 20% of an order of 50,000 vehicles previously planned, and comes after complaints by environmental groups, states, and the Biden Administration.

USPS' fleet of 212,000 vans is the largest civilian vehicle fleet in the world, and President Biden has set a goal to move all federal vehicles to BEVs by 2035. Given that many USPS vehicles are more than 30 years old, if USPS buys any new gasoline-powered vehicles they may still be on the road in 2035 and could cause this goal to be missed.

The volume of vehicles which USPS plans to purchase is still small compared to the overall U.S. EV market. U.S. consumers bought 608,000 BEVs and plug-in hybrid electric vehicles (PHEVs) in 2021, or roughly 4% of the 14.9 million cars, pickups, and sport utility vehicles sold during the year. However, it could spur more production of short-range delivery vehicles that could be used by other fleets, thus increasing overall U.S. electrification.

USPS is holding a public hearing on the new order on August 8, 2022. It plans to take written public comment through August 15. Once finalized, USPS expects the first vehicles to arrive under this new order in 2023.

Source: [Postal Service Modernization Enables Expanded Electric Vehicle Opportunity](#) (USPS)

NEWS ROUNDUP

Ultium Receives Conditional Commitment for \$2.5 billion Loan Guarantee

TVA Seeks 5 GW of Carbon-Free Electric Generation

GM, EVgo, and Pilot Plan Nationwide Fast-Charging Network

Panasonic Chooses Kansas for \$4 Billion EV Battery Factory

Georgia Power Plan with 3.2 Gigawatts of Renewables Approved

On 25 July, 2022, the U.S. Department of Energy (DOE) announced that it has made a conditional commitment to guarantee a \$2.5 billion loan to Ultium Cells to support the construction of three battery cell factories in the United States. Ultium is a joint venture between Korea's LG and General Motors, and plans to build facilities in Michigan, Ohio, and Tennessee to make large-format nickel-cobalt-manganese-aluminum cells for use in EVs.

Under solar industry pioneer Jigar Shah, the DOE's Loans Programs Office issued its first loan guarantee in nearly a decade to the ACES green hydrogen storage and generation project in Utah in June 2022. DOE also issued a conditional commitment to Syrah Technologies to build a graphite-based active anode material processing facility in Louisiana in April 2022.

Source: [LPO Offers Conditional Commitment for Loan to Build New EV Battery Cell Manufacturing Facilities in Ohio, Tennessee, Michigan](#) (Loan Programs Office)

On 11 June, 2022, the Tennessee Valley Authority issued a request for proposals for up to 5 gigawatts of carbon-free generation that must come online by the end of 2028. Eligible generation sources include solar, wind (onshore or offshore), hydro, geothermal, biomass, nuclear, "green gas," and battery energy storage, or any combination of these resources. TVA will require that developers submit proposals by 19 October, 2022.

TVA is a federally owned electric power company that provides wholesale electricity to utilities serving roughly 10 million people in Tennessee and parts of six other states in the U.S. South. It has a goal of reducing the greenhouse gases emissions from its operations 70% by 2030.

Source: [TVA Issues One of the Nation's Largest Requests for Carbon-Free Energy](#) (TVA)

Pilot, the owner of the nation's largest truck stop chain, has partnered with General Motors (GM) and charging company EVgo to build out a network of 2,000 fast-chargers at up to 500 locations spanning the continental United States. Unlike Tesla's Supercharger network, this network will be open to all EVs. However, GM customers will receive special benefits at Pilot Company's Pilot Flying J locations. A map provided by Pilot shows a particularly high density of chargers in the Midwest and South. These chargers are in addition to an EVgo/GM partnership to build more than 3,250 charging stations in U.S. cities and suburbs by the end of 2025.

Source: [GM and Pilot Company to Build Out Coast-to-Coast EV Fast Charging Network](#) (Pilot Company)

Panasonic has announced that it has provisionally chosen DeSoto, Kansas as the location for a new \$4 billion factory to produce lithium-ion batteries for electric vehicles. Panasonic currently produces cells for Tesla, and CEA has concluded that this will likewise be a battery cell facility.

In its statements, Panasonic has cited the approval of a state incentive program for large businesses as a key factor, and [Canary media reports](#) that Panasonic will receive \$829 million in tax breaks in exchange for meeting hiring targets. Panasonic has said that it will hire 4,000 workers for the site. According to state officials cited by Canary Media, the shell of a 4-million square foot facility could be completed next fall, allowing for the installation of manufacturing tools.

Source: [Panasonic Energy and Kansas Partner to Advance Plans for US-based EV Battery Facility](#) (Panasonic Energy Co. Ltd.)

Source: [Panasonic reveals Kansas as site for \\$4B EV battery megafactory](#) (Canary Media)

On 21 July, 2022, regulators in the U.S. State of Georgia approved Georgia Power's latest long-term plan, which includes procuring an additional 2300 megawatts of renewable energy over the next three years, as part of 6000 megawatts to be added by 2035. Under the plan, by 2028 the utility will also retire all its coal-fired power plants except one, Plant Bowen. Georgia Power further plans to procure an additional 2000 megawatts of electricity from natural gas-fired generators, and to make investments in its legacy hydroelectric plants.

Source: [Georgia Power's transformational plan for state's energy future approved, helps ensure company will continue to meet needs of customers and state](#) (Georgia Power)