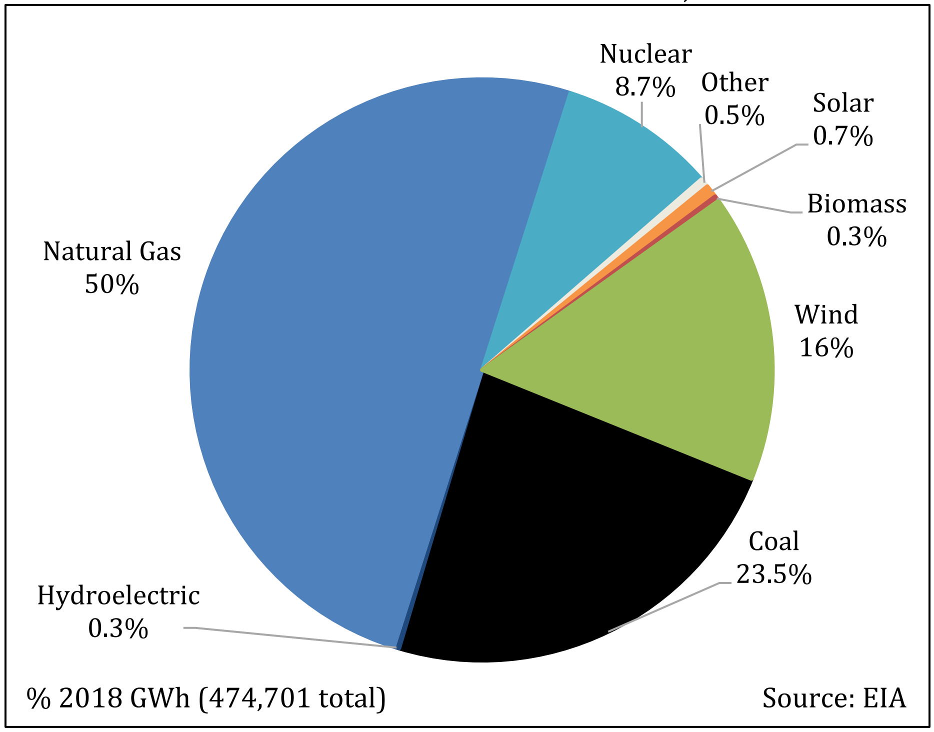
# State Brief: Texas

## BACKGROUND

Natural gas and coal dominate Texas' electricity portfolio. The state accounts for one-eighth of total U.S. energy consumption – the largest share in the nation. The industrial and transportation sectors accounted for approximately 75 percent of the state's total energy consumption in 2018.

Texas' Net Annual Electric Generation, 2018




Texas provides more than one-fifth of the nation's domestically produced energy – mostly from natural gas and crude oil. The Lone Star State is also the nation's largest lignite coal producer. Lignite coal accounts for more than 40% of the state's total coal consumption.

The 2020 U.S. Energy and Employment Report found that Texas has 607,626 traditional energy workers (4.8% of total state employment) and an additional 169,398 workers employed in energy efficiency. Texas produces more non-hydroelectric renewable energy than any other state and by the end of 2019, Texas had approximately 28,000 megawatts (MW) of installed wind capacity. While wind accounts for nearly all of the electricity generated from renewable energy in Texas, the state is also rich in many other renewable resources such as solar, biomass, and geothermal. In 2019, installed solar capacity in Texas exceeded 3,100 MW.

Texas is the only state in the contiguous U.S. with a stand-alone electric grid. The Electricity Reliability Council of Texas (ERCOT) serves about three-quarters of the state and is subject to the oversight of the state's legislature and the Public Utility Commission (PUC) of Texas. The governor appoints the three-members of the PUC, which also regulates transmission and distribution utilities outside of ERCOT. Texas is currently under unified control with Republican majorities in both the House and Senate. Republican Governor Greg Abbott was elected in 2014.

## POLICY STRENGTHS AND OPPORTUNITIES

The National Renewable Energy Laboratory (NREL) developed the notion of "policy stacking,"[1] an important framework for policymakers to consider. The basic idea behind policy stacking is that there is an interdependency and sequencing of state policy that, when done effectively, can yield greater market certainty, private sector investment, and likelihood of achieving stated public policy objectives.

In theory, but not always in practice, clean energy policies can be categorized into one of three tiers of the policy stack. Tier 1, market preparation policies, remove technical, legal, regulatory, and infrastructure-related barriers to clean energy technology adoption. Tier 2, market creation policies, create a market and/or signal state support for

[1] V.A. Krasko and E. Doris, *National Renewable Energy Laboratory*, 2012. Strategic Sequencing for State Distributed PV Policies: A Quantitative Analysis of Policy Impacts and Interactions. http://www.nrel.gov/docs/fy13osti/56428.pdf.

clean energy technologies. Tier 3, market expansion policies, create incentives and other programs in order to expand an existing clean energy market by encouraging or facilitating technology uptake by additional market participants.

For example, before financial incentives for combined heat and power (CHP) will be successful, two key considerations for deployment are having clear interconnection standards and favorable stand-by rates for customers who opt to add CHP. In this example, states should adopt policies to address interconnection and stand-by rates before adopting financial incentive programs.

## GRID MODERNIZATION

New digital technologies have enabled utilities to better manage the grid and provide opportunities for consumers to customize their services to fit their priorities. These technologies allow a two-way flow of information between the electric grid and grid operators and between utilities and their customers.

Emerging technologies improve system reliability and resiliency by enabling better tracking and management of resources. These technologies allow grid operators to incorporate central and distributed energy resources, energy storage technologies, electric vehicles, and assist in addressing the challenges associated with planning, congestion, asset utilization, and energy and system efficiency.

Grid modernization will require a suite of state and federal policy changes to support advancements in grid technologies, grid management, and utility regulation.

According to GridWise Alliance's latest (2018) Grid Modernization Index, Texas ranked in the top 10 for overall grid modernization efforts. Modernization initiatives undertaken by individual utilities and by ERCOT ensured the resiliency of the state's power grid after Hurricane Harvey made landfall. In 2019, the legislature passed two bills to ensure better grid protection. SB 475 creates the Texas Electric Grid Security Council to offer recommendations to improve grid security. SB 936 creates a program to monitor grid cybersecurity threats and allows utilities to recover the costs associated with the program.

There are policies that Texas' policymakers could adopt to support in-state modernization efforts.

1. Require that utilities and ERCOT develop and follow-up on plans to enhance cybersecurity, integrate distributed energy resources, or DERs (including electric vehicles and energy storage), increase demand response and/or demand-side management (DSM) programs, and measure and report on the results of these efforts. While ERCOT has taken initial steps towards planning for higher levels of DERs on the grid, more work remains to be done. A recent report by the Rocky Mountain Institute (RMI) demonstrates that investments in DERs that provide demand flexibility in Texas would result in significant cost savings and reduce $CO_2$ emissions and renewable curtailment.

2. Grid modernization plans and strategies can incorporate consideration of the impacts of electric vehicles (EVs) on the grid. Providing for EV charging rates and incentives, and planning for increased adoption can help control the impact of these vehicles on grid operations.

3. Develop new utility business models. Today, non-traditional energy resources, including emerging, disruptive technologies (for example, customer-owned distributed generation, EVs, and energy storage) are increasingly cost competitive with more traditional resources. This has not only led to shifting customer expectations but also to new market realities confronting energy providers. In light of this, many argue that the regulated utility industry needs a new set of principles that are more sophisticated, forward planning, and incentive-based. To address this, Texas could implement alternative ratemaking mechanisms, adopt performance-based regulation, and/or work with utilities to develop new business models that support grid modernization. A 2017 PUC report to the state's legislature suggested that a handful of minor changes might be especially important for non-ERCOT utilities, but no further state action has been taken.

## ENERGY STORAGE

Energy storage offers a unique opportunity to manage supply and demand dynamically while also maximizing the value of grid resources. By deploying storage to strategic locations, utilities can more effectively manage their energy portfolios. First, storage allows utilities to manage intermittent demand – helping to flatten peak demand requirements. Second, the responsiveness of energy storage can allow utilities to implement voltage regulation and other ancillary services, which are useful for improving system efficiency. Third, storage can dispatch power to better integrate intermittent power generation resources like renewable energy to the grid. Finally, energy storage can help the commercial sector avoid costly demand charges. As utilities around the country consider implementing or extending demand charges to other sectors, energy storage will become more relevant as a customer cost-saving investment.

The flexibility of battery storage, combined with advanced metering infrastructure, allows customers to control how and when they use energy from the grid or from solar panels installed on their home or business. In most cases, this can provide greater cost savings than standalone solar systems. Combined with time-varying rates or real-time pricing programs, state policy can further support customer choice and open a new market for energy services. Prices that better reflect the time-varying and location-dependent costs of producing and delivering electricity can lead to several economic and environmental gains.

Storage provides multiple benefits to both the customer and the utility. State planning and regulatory policies can help maximize these benefits by 1) establishing a framework for easy integration of energy storage into the grid and 2) establishing a marketplace that monetizes the benefits of energy storage for cost effective investment.

Texas does not have an energy storage procurement target or goal. Enacted in 2019, SB 1012 enables municipal utilities and electric cooperatives in the state to own energy storage facilities without registering with the PUC as a power generation company. The state established the Battery Energy Storage Task Force (BESTF) in the same year to develop policy recommendations for the integration of energy storage into the ERCOT system. There are several battery storage projects planned in the state, and investment in storage capacity has grown significantly in recent years. In addition to evaluating energy storage's benefits to the grid, there are several opportunities for developing supportive state policies:

1. Amend existing interconnection policies to ensure that storage can connect to the grid through a transparent and simple process. The Interstate Renewable Energy Council (IREC) has produced a series of interconnection protocols that states can easily adopt. The state could establish best practices for interconnecting storage in statute, or legislation could provide an instruction to the PUC to update existing policy.

2. Instruct the PUC and ERCOT to evaluate the value of energy storage in multiple strategic locations across the utility system and consider a requirement to deploy storage where it will be cost effective, or identify the price point at which it will become cost effective.

3. Require the inclusion of energy storage as a critical piece of the energy system as both a demand and supply management resource. Some states have required that utilities evaluate the cost effectiveness of non-wires alternatives (NWAs) to large transmission and generation investments. Alternatively, states might want to require that utilities develop a distribution investment plan that identifies the locations on the distribution system where energy storage or other distributed resources would offer the greatest value.

4. Consider creating a mandatory energy storage procurement target or requirement for energy storage with a documented process for periodic review of progress towards that goal. Procurement targets can limit the amount of utility owned storage to be procured; require that a certain amount of storage be targeted to low-income customers; and create carve-outs for specific amounts of storage to be procured at the transmission, distribution, and customer levels. Procurement targets can jump-start market creation, spur fast learning, and guide the development of a regulatory framework.

5. Finance and incentivize energy storage for customers and utilities. Incentives could enable customers to use storage to manage their electric load and store locally produced renewable energy. Incentives in the form of rebates, grants, and tax credits can provide a bridge to scalable deployment for storage. Incentives can be

designed to decline as storage values become more readily monetized and/or as the cost of storage decreases. Policymakers could allow utilities that provide storage incentives to customers to also recover the costs of installing smart meters. This would enable dynamic and time-varying energy management from multiple distributed battery systems. This should signal to customers the value of leveraging storage while better aligning customer costs with system costs. Financing energy storage installations for commercial customers could help reduce their demand charges. Policymakers might want to start first with a policy that provides grants to pilot projects. Policy might also target solar system owners. Financial incentives can be designed to ensure that the state will meet other goals including emissions and peak demand reductions, and equitable access to clean energy.

## MAINSTREAMING RENEWABLES

As the renewable energy industry matured, technology improved, and global production of generating equipment increased. Renewable energy is increasingly seen as the least cost, and lowest risk form of energy (excluding energy efficiency). A 2019 Bloomberg New Energy Finance report predicts that renewable resources will generate at least 60% of total global electricity and 43% of U.S. electricity by 2050. With increased deployment, utilities are learning more about how to integrate renewables effectively, investors are becoming more comfortable with the technologies, and building code officials are recognizing common standards and best practices. For these reasons, it is in the interest of policymakers to ensure that their states are well positioned to benefit from the transition to clean energy resources.

To reduce barriers to customer and utility participation in the renewable energy market, policymakers in Texas might consider several options.

### Customer-Oriented Policies

1. Interconnection, Net Metering, and Streamlined Permitting – In general, customers want a clear, streamlined, affordable, and predictable process for connecting renewable energy systems to the grid. ERCOT allows Distributed Energy Resources (DERs) to be connected to the grid, excess DER generation is at times sent to the grid without compensation. To support the adoption of DERs, legislation could provide an instruction to the PUC to adopt IREC's model net metering rules. Allowing aggregated net metering would be especially beneficial to the state's agricultural sector. Other applications for aggregated net metering include commercial properties and public entities like state and local governments, universities, and schools. The state might also consider establishing either statewide standards for streamlined permitting processes, or resources to support local governments that voluntarily implement a streamlined program, as Austin has done. State incentives, such as tax credits, financial incentives, or loans can be tied to systems that are established within a designated streamlined permitting jurisdiction.

2. Shared Renewables – Due to building and property attributes and ownership issues, many customers are unable to install renewable energy technologies where they live or work. Allowing shared, or community, renewable energy projects addresses these barriers. These projects have multiple owners or subscribers who pay for a portion of the project or the generation provided by the system. State policymakers might consider requiring that utilities contract a minimum capacity of shared renewables annually. The state might also consider adopting a virtual net metering policy to support the growth of community solar. Virtual net metering allows a customer to receive credits from a shared system as if the generation were on site. Virtual net metering is different from a power purchase agreement (PPA), which pays the customer for the proportion of power they produce. Because it is treated as a credit on the customer's bill, the customer can avoid the tax implications of a PPA payment - which can adversely affect the economics of the system (and may come as a surprise to the participant).

   Low credit ratings often deter participation in renewable energy markets; this can affect low- and moderate-income households' adoption of renewable energy solutions. Shared renewables policies can be designed to encourage participation by low- and moderate-income households; this can increase adoption of renewable technologies and reduce energy costs. Low-income participation can be ensured through either a percentage mandate for the overall annual contracted capacity, or by offering a higher rate of payment for the portion of shared solar capacity attributed to low- and moderate-income customers. States that have a shared renewable program may want to coordinate this program with implementation of the federal Weatherization Assistance Program to provide recipients of assistance with participation in a shared renewable system.

There are several additional policy options that Texas might consider to promote renewable energy uptake by low- and moderate-income consumers. Generally, successful state policies should be tailored to these customers, be cost-effective and financially sustainable, have measurable performance indicators, and be flexible enough to allow later changes in design.

3. Corporate Procurement – Many Fortune 100 and 500 companies have established either climate goals or commitments to purchase renewable energy. Over the last five years, over 20 gigawatts (GW) of renewable contracts have been announced by corporate entities. This is leading policymakers to provide additional avenues for businesses to procure renewable energy. Of the 25 states that host corporate renewable energy projects, Texas leads the nation in corporate procurement. Early in 2019, Facebook signed up to buy 200 MW from the Aviator Wind project in Texas, set to become the largest single-site U.S. wind farm when completed in 2020. The state's deregulated market offers customers a choice of hundreds of different electricity plans, which vary by the amount of renewable energy included. Texas' policy allows companies to purchase RECs or renewable energy, develop or lease onsite renewable energy projects, and enter into "virtual" PPAs. The state might consider expanding eligibility for onsite third-party PPAs and encouraging corporate participation in shared renewable projects.

## Utility-Oriented Policies

Some states have created programs that aim to reduce greenhouse gas emissions and increase investments in clean energy resources. Texas was the first state in the nation to establish an energy efficiency resource standard (EERS), and the state's renewable energy MW targets of 5,000 MW by 2015 and 10,000 MW have been met and surpassed. To increase utility adoption of clean energy technologies, Texas might see a clean peak standard as the next step in a progression from its RPS. Clean peak standards aim to increase the share of clean energy resources used to meet peak demand and decrease energy bills over the long-term by reducing peak demand in the hours when energy costs are highest. These objectives can be met through different policy options including: planning and procurement requirements that focus on peak demand; a moratorium on the construction of new peaking units or a phase out of existing units; incentives – including carve-outs in states with RPSs – for clean energy resources delivered during peak times; and/or adopting a new clean peak standard that sets a target for clean energy deliveries during peak times.

**PATHWAYS TO A LOW CARBON FUTURE**

The international scientific community has determined that steep and rapid reductions in global greenhouse gas (GHG) emissions are needed to avoid the worst impacts of global warming and climate change. Federal and state policy interventions are necessary to transform our energy systems and rapidly reduce GHG emissions in the U.S. In general, effective policies will:

1) Establish performance standards and place enforceable limits on carbon pollution;
2) Provide financial incentives for individuals, businesses, and industry to choose clean energy and greatly improve energy efficiency;
3) Spur public and private investment in clean energy infrastructure, including investment in advanced transportation systems for the movement of people and goods; and
4) Provide funding for research, development, and demonstration of technologies that will underpin the de-carbonization of the U.S. economy.

Texas' utilities have taken the lead in setting GHG emissions reductions goals. Austin Energy has a goal of net-zero carbon emissions by 2050. Xcel Energy, which serves customers in the panhandle region, adopted a climate goal of 100% carbon free electricity by 2050 with the interim target of 80% carbon free by 2030. Local governments such as San Antonio and Houston have established citywide goals of carbon neutrality by 2050. To compliment these efforts, Texas' policymakers might consider the following:

1. GHG Emissions Monitoring and Reporting – To effectively implement policies that reduce emissions, a mandatory system for monitoring, reporting, and verifying GHG emissions must be put in place. While the U.S. EPA has GHG reporting requirements, the federal reporting requirements focus on major industrial sources, leaving significant gaps in the information states need to fully understand their emissions profile. Policymakers might consider legislation similar to Colorado's SB19-096, which requires annual GHG reporting and establishes emissions baselines from which to measure progress.

2. Emissions Targets – Emissions targets can take a technology neutral approach that looks at the total emissions of the utility portfolio and drive emissions down with a combination of renewables, traditional fuels, efficiency, and technological advances. Emissions reductions can be achieved through a carbon portfolio standard approach, under which a state sets an emissions reduction target to be achieved over time, for example, 40% below 1990 levels by 2040. This can be implemented through the IRP or other long-term planning process or by establishing a maximum allowable rate of emissions per unit. Such a standard can also be designed to address other concerns such as pollution, asthma risk, environmental justice, and water use.

3. Cap-and-Trade / Cap-and-Invest – These policies place enforceable limits on carbon emissions that cannot be exceeded by regulated entities without penalty. Emissions allowances are allocated or sold to companies by the state and sources must hold an allowance for each ton of carbon they emit in a given year. Emissions caps and available allowances are reduced every year, requiring that industries reduce their emissions or pay higher market prices for available allowances. States might choose to invest the revenue associated with emissions allowances in renewable energy, public transportation, zero-emission vehicles, environmental restoration, sustainable agriculture, recycling, and other actions.

   States might consider joining an existing program like the Western Climate Initiative (WCI) or the Regional Greenhouse Gas Initiative (RGGI), as joining an established network can remove administrative barriers to entry.

4. Carbon Tax – Carbon taxes impose a price on each ton of carbon emitted and are levied on the purchase and use of fossil fuels by business and industry. That cost is subsequently reflected in consumer prices. If carbon taxes are levied at a high rate, they will discourage the use of GHG emitting resources and technologies, encouraging a market switch to new technology. Alternatively, carbon taxes can be set at a lower rate, which will have a limited impact on market behavior, but the revenue can be substantial and that revenue can be invested in energy efficiency and emission reduction technologies, which will result in lower emissions. States considering this option might examine British Columbia's existing tax structure or the federal proposals from the Citizen's Climate Lobby and the Climate Leadership Council.

5. Emissions Performance Standards – Transportation sources now emit more GHGs than any other sector, and rapid reductions from all types of vehicles, engines, and equipment is critical to achieving carbon reduction goals. The Low Carbon Fuel Standard (LCFS) implemented by both Oregon and California is another example of a flexible, market-based approach to regulating carbon emissions at the state level. LCFSs regulate the carbon intensity of transportation fuel in order to reduce the use of petroleum-based fuels and promote investment in low-carbon options (electrification, biofuels, hydrogen, etc.). The market mechanism LCFSs use is a crediting system where each fuel type is assigned a carbon intensity (CI) score. The allowable CI score is decreased yearly, requiring a switch to lower CI fuels. Entities who provide fuel below the regulated CI score earn credits. These credits can be sold to providers who operate at a deficit (above the mandated CI score), creating a market incentive for investment in cleaner fuels.

## ELECTRIFICATION OF THE TRANSPORTATION SECTOR

Bloomberg New Energy Finance estimates that 58% of all new passenger vehicle sales will be electric by 2040 and that price parity with conventional vehicles will be met for most segments in the mid-2020s. Therefore, a key part of building a modernized grid involves designing infrastructure that will facilitate easy connection of electric vehicles (EVs) to the grid. One of the most important barriers to increased adoption of EVs is the consumer's awareness of the availability of EV charging stations. Ultimately, drivers want to be sure that their car will get them where they need to go. Another important barrier to increased adoption of EVs is their higher up-front cost as compared to similar conventionally fueled vehicles. The good news is that both supportive policies for developing charging infrastructure and technological advancements have eased range anxiety.

The Texas Commission on Environmental Quality (TCEQ) administers a handful of grants and rebates for EVs and EV supply equipment (EVSE) as part of the Texas Emissions Reduction Plan (TERP), and utilities in the state offer rebates and charging incentives. There are several policy opportunities to further encourage and prepare for increased market penetration of EV's in the state, including:

1. EV and EVSE Financing and Financial Incentives – Providing additional financial incentives and innovative financing options can increase market penetration of EVs. Sales, property, and income tax credits are some of the simplest methods for addressing the up-front costs of EVs and EVSE. While sales tax credits are typically applied at the time of purchase, property and income tax credits may do less to address upfront cost barriers as receipt of the credit is typically removed in time from the purchase.[2] Some states have adopted other financial incentives including low-interest loans, grants, vouchers, and rebates. A handful of states qualify EVSE under their property assessed clean energy (PACE) programs. A simple solution is to increase and expand existing tax credits to incentivize commercial, publicly available charging stations.

2. Charging Infrastructure Plan – Locating charging infrastructure is different from locating conventional fueling stations. While some drivers will need to charge more quickly, others will refuel when they are parked for longer periods of time, for example when shopping, eating at a restaurant, or going to work. Charging infrastructure plans should attempt to pair the appropriate level of charging (level 2 or direct current fast charging) with a reasonable amount of time a person will be at that location. Legislation could direct a state agency to develop an infrastructure plan through a stakeholder process. States with existing registration fees for EVs could use a portion of this revenue to fund charging infrastructure development efforts, as Washington has done.

3. Parking Infrastructure Requirements – In tandem with the development of a statewide plan, legislation could set requirements for EV parking infrastructure. Some states have adopted permitting standards for parking lots. Hawaii, for instance, requires that for every 100 parking spaces, there must be at least one EV charging space. States and local governments are also updating building standards and codes to require that new buildings are EV ready, meaning that all conduit and wiring are able to accommodate EVSE. States can also implement programs to provide parking incentives for owners of EVs. Typically, these programs provide access to carpool parking, preferential spaces, reduced fees, and/or access to charging stations.

## NEWS

- September 3, 2020: Google Signs PPA for 140 MW from Solar Farm in Texas
- August 13, 2020: Texas Solar Hits a Turning Point
- July 13, 2020: New Report Finds Texas Utility-scale Solar Growth May Push Remaining Coal Plants into Retirement
- July 8, 2020: 8minute Solar Energy Completes Texas Debut with 280MW Duke Collaboration
- June 18, 2020: Xcel Energy Completes 240-mile Transmission Line between Texas, New Mexico
- June 12, 2020: 419MW Mesquite Star Shines in Texas
- June 11, 2020: Newcomer Broad Reach Power to Deploy Increasingly Large Battery Systems in Texas

## OTHER RESOURCES

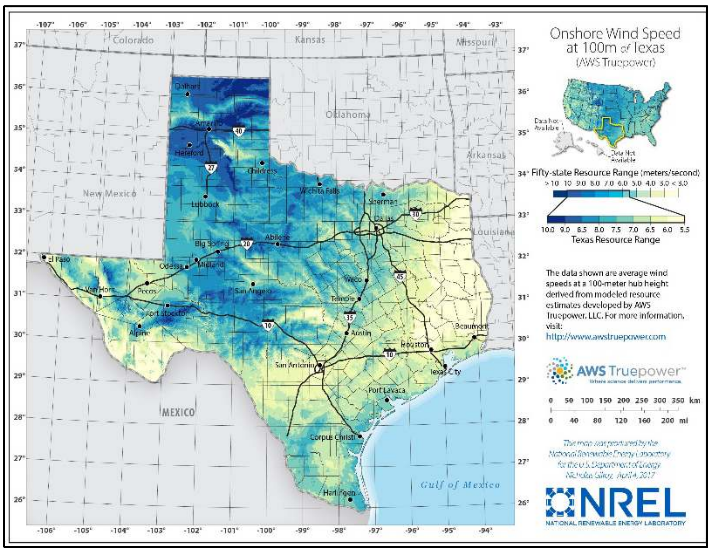
- Texas State Energy Conservation Office: https://comptroller.texas.gov/programs/seco/
- The American Council for an Energy-Efficient Economy State and Local Policy Database, Texas: https://database.aceee.org/state/texas
- The Database of State Incentives for Renewables and Efficiency, Texas: https://programs.dsireusa.org/system/program?fromSir=0&state=TX
- U.S. Energy Information Administration, Texas: https://www.eia.gov/state/?sid=TX
- U.S. Department of Energy's Alternative Fuels Data Center, Texas: https://www.afdc.energy.gov/states/tx

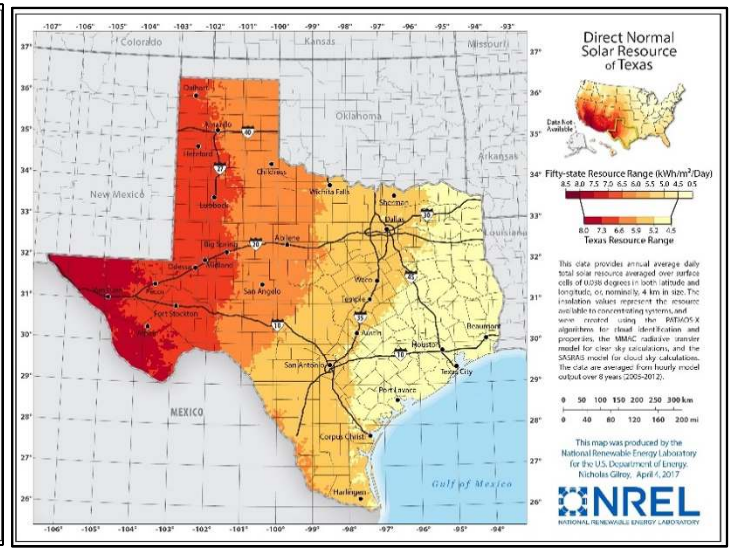
[2] A study by the Congressional Budget Office however suggests that tax credits are important tools for ensuring increased adoption of alternative-fueled vehicles.

- SPOT for Clean Energy, Texas: https://spotforcleanenergy.org/state/texas/
- American Wind Energy Association (AWEA): https://www.awea.org/resources/fact-sheets/state-facts-sheets
- National Renewable Energy Laboratory, Biomass Maps: https://www.nrel.gov/gis/biomass.html
- The Rocky Mountain Institute, From Gas to Grid – Building Charging Infrastructure to Power Electric Vehicle Demand: https://rmi.org/wp-content/uploads/2017/10/RMI-From-Gas-To-Grid.pdf
- The GridWise Alliance, EVs - Driving Adoption, Capturing Benefits: http://gridwise.org/evs-driving-adoption-capturing-benefits/
- The Regulatory Assistance Project, Performance-Based Regulation: https://www.raponline.org/event/performance-based-regulation-the-power-of-outcomes-part-1/
- The Interstate Renewable Energy Council, A Playbook for Modernizing the Distribution Grid, Volume 1: https://irecusa.org/publications/a-playbook-for-modernizing-the-distribution-grid-volume-1/

## TEXAS' WIND AND SOLAR RESOURCES

WIND https://windexchange.energy.gov/states/tx




**Our Resources**

CNEE Homepage: https://cnee.colostate.edu/

The SPOT for Clean Energy: https://spotforcleanenergy.org/

The Advanced Energy Legislation (AEL) Tracker: https://www.aeltracker.org/

**CNEE Contact Information**

Tom Plant, Senior Policy Advisor
Tom.Plant@colostate.edu

Trina Hoffer, Research Manager
Katherine.Hoffer@colostate.edu