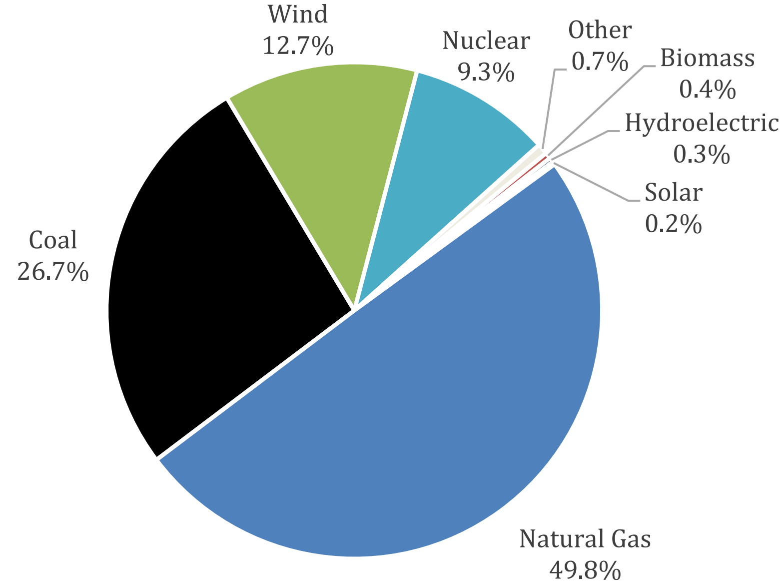
State Brief: Texas

BACKGROUND

Texas' Electricity Mix 2016



Total GWh: 454,047 Source: EIA

Natural gas and coal dominate Texas' energy mix. The state accounts for one-eighth of U.S. total energy consumption – the largest share in the nation. The industrial and transportation sectors accounted for nearly 75 percent of the state's total energy consumption in 2016.

Leading the nation in energy production, Texas provides more than one-fifth of the nation's 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.

In 2017, Texas produced more renewable energy than any other state in the U.S. (excluding hydroelectric) and had 22,800 MW of installed wind capacity. In 2017, installed solar capacity in the ERCOT region exceeded 1,000 MW. 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.

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 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[1]

The National Renewable Energy Laboratory (NREL) developed the notion of "policy stacking,"[2] 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 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.

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[1] For more information on policy opportunities, please visit the SPOT for Clean Energy. For more information on specific policy actions related to these opportunities, please review the *Clean Energy Policy Guide for State Legislatures*.

[2] 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.

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

Policymakers can view grid modernization as creating a policy structure that supports and ties together many other initiatives, such as smart metering infrastructure, customer data management, energy storage, electric vehicle infrastructure, and utility business models.

In the last two decades, 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 (DERs), energy storage technologies, electric vehicles, and assist in addressing the challenges associated with planning, congestion, asset utilization, and energy and system efficiency. On the customer's side of the meter, advanced metering infrastructure, dynamic pricing, and other emerging technologies allow an exchange of information and electricity between a consumer and their electric provider.

According to the Grid Modernization Index, Texas is third nationally 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. The state's utilities and grid operator also excel in customer engagement and support, and a recent decision by the state's PUC will improve access to and use of smart meter data.

There are additional supportive policies that Texas' policymakers could adopt to promote grid modernization.

1. Require that utilities and ERCOT develop and follow-up on plans to enhance cybersecurity, integrate distributed energy resources (including electric vehicles and energy storage), increase demand response and/or demand-side management (DSM) programs, and measure and report on the results of grid modernization 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. Develop new utility business models. Utility regulation varies, to some extent, by a state's utilities commission. Most Commissioners and commission staff, however, still adhere to the regulatory principles outlined when utility companies were vertically integrated; experiencing increases in load and had the ability to capitalize on economies of scale for new generation. These "natural monopolies" warranted a state regulatory body that could balance the tradeoff between efficiency (in the form of least cost production) and equity (consumer protection). Many have argued recently that the regulated utility industry needs a new set of principles that are more sophisticated, forward-planning, and incentive-based. The state could continue to investigate alternative ratemaking mechanisms and utility business models for utilities to support grid modernization, which includes promoting improved system efficiency, increased penetration of clean and distributed energy resources, and enhanced affordability, reliability, and customer satisfaction. Last year's PUC report and recommendations on alternative ratemaking mechanisms to the state's legislature suggests that a handful of minor changes might be especially important for non-ERCOT utilities. The state might also investigate performance-based regulation.

The adoption of incentives for or a requirement to integrate a certain amount of energy storage on the grid alongside enhancing renewable energy and electric vehicle policies would also support modernization efforts.

ENERGY STORAGE

Energy storage offers a unique opportunity to dynamically manage supply and demand while maximizing the value of grid resources. By deploying storage in strategic locations, utilities can more effectively manage their energy portfolios. First, storage provides management of intermittent demand – helping to flatten peak demand requirements for the utility. Second, the responsiveness of energy storage can allow the utility to implement voltage regulation and other ancillary services, which are useful for improving system efficiency. Third, storage can dispatch power to better integrate intermittent resources like renewable energy. Finally, energy storage can help the commercial sector avoid costly demand charges. As utilities around the country consider extending demand charges to the residential sector, this will become an even more important issue.

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 stand-alone 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 a number of 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.

Following the 2018 dismissal of American Electric Power (AEP) Texas' request to install two battery storage systems, the PUC opened a rulemaking docket (#48023) "to 'develop facts necessary to establish a regulatory framework' allowing for energy storage and other technologies within the limits of Texas' Public Utility Regulatory Act (PURA)". The main issues of concern are whether distribution companies can legally own energy storage, how the batteries would be charged, and the use of storage, by distribution companies, to meet demand. There are several opportunities for developing supportive legislation:

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. In Texas, this would require amending PURA's current definition of energy storage as generation.

4. Consider adding 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 jump-start market creation, spur fast learning, and guide the development of a regulatory framework. Five states currently have energy storage goals that range from five megawatt hours (MWh) to two gigawatts (GW).

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. Policymakers could allow utilities that

provide incentives to customers to 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 would help reduce their demand charges. Policymakers might want to start first with a policy to incentivize solar system owners.

In addition to these options, policymakers might also review the Brattle Group's analysis of energy storage policies completed for Oncor Electric Delivery Company in 2014.

MAINSTREAMING RENEWABLES

As the renewable energy industry has matured, technology has improved, and global production of generating equipment has increased, renewable energy is increasingly seen as the least cost and lowest risk form of energy (excluding energy efficiency). A 2018 Bloomberg New Energy Finance report predicts that at least 50% of total global electricity will be renewable 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 interests of policymakers to ensure that their states are well positioned to benefit from the transition to clean and sustainable energy resources.

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

Customer-Oriented Policies

1. Interconnection, net metering, and streamlined permitting – In general, customers want a clear, streamlined, affordable, and predictable system for connecting renewable energy systems to the grid. ERCOT's distributed resource energy and ancillaries market task force (DREAM TF) is working to develop rules related to DERs. According to a 2016 report by the Pacific Northwest National Laboratory (PNNL), a market change ERCOT is considering is allowing aggregated DERs that can deliver electricity to consumers in regions where it is costly to deliver power. 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. Allowing shared, or community, renewable energy projects addresses these barriers. These projects have multiple owners or subscribers who pay for a portion of the generation provided by the system. At least nine utilities in Texas currently operate community solar programs. To expand on these, state policymakers might consider requiring that utilities contract a minimum capacity of shared renewables annually. Alternatively, legislation might direct the PUC to develop a virtual net metering policy. 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 (LMI) households' adoption of renewable energy solutions. Supportive policies for shared renewables can be designed to encourage participation by LMI households; this can increase adoption of renewable technologies and reduce energy costs. Low-income participation can be encouraged either through 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-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 financial support 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. In just the last four years, over nine GW of renewable contracts have been announced by corporate entities. In the first quarter of 2018 alone, corporations signed 14 agreements for over 1700 MW of renewable energy. 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 with 31 deals. Early in 2018, AT&T and Nike signed agreements to procure 386 MW from wind projects in the state. 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 and develop or lease onsite renewable energy projects. The state might consider expanding access to 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 megawatt (MW) targets and goals have been met and surpassed. States might see an emissions or clean peak standard as the next step in a progression from renewable portfolio standards (RPSs). To increase utility adoption of clean energy technologies, Texas' policymakers might consider the following:

1. Emissions standards 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 1) a carbon portfolio standard approach, or 2) a market-based approach. A portfolio emissions standard sets emissions reduction targets to be achieved over time. This can be implemented through the long-term planning process or by establishing a maximum allowable rate of emissions per unit. Under a market-based approach, a state or a group of states might set a certain emissions reduction target, for example, 20% below 1990 levels by 2040. This reduction is achieved by the distribution of annual emission allowances that decrease to the point that the standard is met in 2040. One of the advantages of a market-based program is that it is designed to reduce emissions in the most economically efficient manner possible. Such a standard can also address other concerns such as environmental justice or water use.

2. 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 that focuses 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.

ELECTRIFICATION OF THE TRANSPORTATION SECTOR

An estimated 55% of new car sales will be electric by 2040. 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). The TCEQ also offers vehicle replacement vouchers that can be applied to the purchase of an EV. In addition to these programs, there are a number of additional opportunities to expand the market for EVs in Texas:

1. EV and EVSE Financing and Financial Incentives – While a few utilities in Texas offer incentives for EVs and EVSE, there is currently no state policy in place to support these efforts. Providing additional financial incentives and innovative financing options can help spur greater market penetration of EVs. Sales, property, and income tax credits are some of the simplest methods for addressing high 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.[3] Some states have adopted other financial incentives including low-interest loans. 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. For the most part, EVs are cars used for commuting and local trips. Furthermore, while a driver of a conventional vehicle stops only briefly at a gas station for the specific purpose of filling up, a driver of an EV is generally looking to refuel when they are parked for a longer period of time, for example when going shopping, going to a restaurant, or going to work. Charging infrastructure plans should target these types of locations and attempt to pair the appropriate level of charging infrastructure with a reasonable amount of time a person will be at that location. Legislation could direct a state agency to develop such a plan through a stakeholder process.

   Texas could also participate in a regional plan to promote EV adoption across multiple states. For example, eight Western state governors recently signed a memorandum of understanding to create a regional EV infrastructure plan (the REV West Plan).

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, requiring, for instance, that for every 100 parking spaces, there must be at least one EV charging space. Legislation could also incentivize utilities to develop make-ready locations. These locations supply power to the point where a utility or third party developer might install an EV charging station. Texas' statewide building energy code could also be updated to include requirements for EV charging infrastructure.

NEWS

- August 26, 2018: Exxon Mobil Invites Texas Bids for Renewable Expansion
- August 23, 2018: Texas is Going Green: 86% of Future Capacity Solar or Wind, Zero Coal
- August 23, 2018: Texas Wind Generation Keeps Growing, State Remains at No. 1
- August 13, 2018: Utilities Back Out of Deal to Create Smart Home Electricity Networks
- July 27, 2018: AEP Cancels Largest US Wind Project After Texas Rejection
- July 17, 2018: Texas Power Demand Breaking Records During Heat Wave - ERCOT
- July 13, 2018: Dallas Deploys Electric Bus Fleet
- July 6, 2018: Xcel Energy buys Hale Wind Project in Texas Panhandle
- July 5, 2018: In West Texas, A Giant Battery Could Make Renewable Energy More Viable
- July 3, 2018: Largest Texas Solar Farm to be Built in West Texas for $400 Million

OTHER RESOURCES

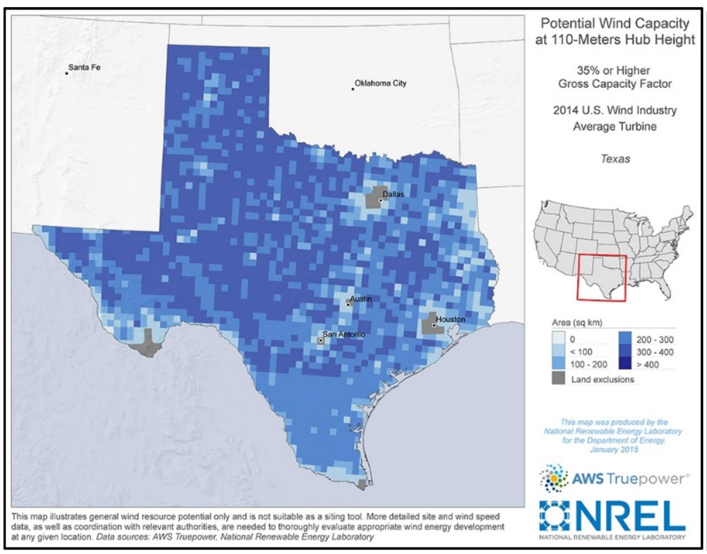
- American Wind Energy Association (AWEA), Texas: http://awea.files.cms-plus.com/FileDownloads/pdfs/Texas.pdf

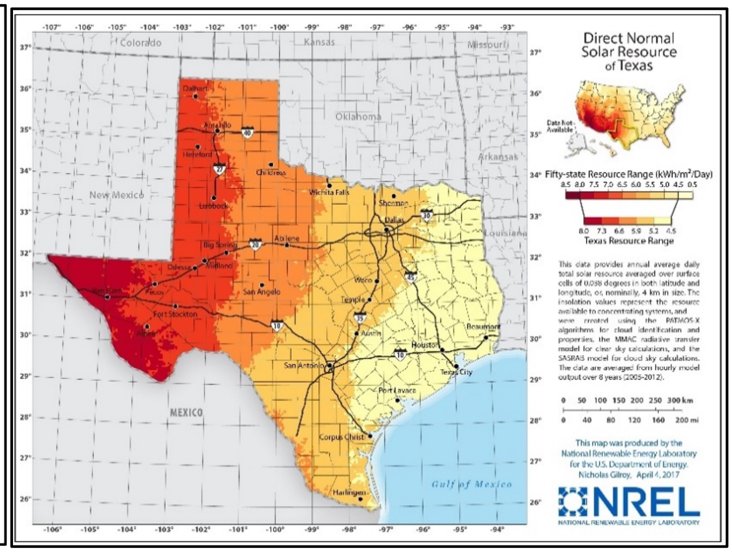
[3] A study by the Congressional Budget Office however suggests that tax credits are important tools for ensuring increased adoption of alternative-fueled vehicles.

- 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: http://programs.dsireusa.org/system/program?fromSir=0&state=TX
- U.S. Energy Information Administration, Texas: https://www.eia.gov/state/?sid=TX
- National Renewable Energy Laboratory, Biomass Maps: https://www.nrel.gov/gis/biomass.html
- U.S. Department of Energy's Alternative Fuels Data Center, Texas: https://www.afdc.energy.gov/states/tx
- SPOT for Clean Energy, Texas: https://spotforcleanenergy.org/state/texas/
- 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/

TEXAS' WIND AND SOLAR RESOURCES

WIND https://windexchange.energy.gov/states/tx[4]
SOLAR https://www.nrel.gov/gis/solar.html





Our Resources

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

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

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

Clean Energy Policy Guide for State Legislatures: http://cnee.colostate.edu/cleanenergypolicyguide/

The Energy Policy Podcast: http://energypodcast.colostate.edu/

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[4] Please see your packet for a higher resolution wind energy capacity map.