The Report Committee for Alec Robert Puente
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Don't Blow It: Engagement and Thoughtful Regulation for the Next Era of Texas Wind Energy

APPROVED BY
SUPERVISING COMMITTEE:

Catherine Weaver, Supervisor

Sherri Greenberg, Co-Supervisor

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by

Alec Robert Puente

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Abstract

Don't Blow It: Engagement and Thoughtful Regulation for the Next Era of Texas Wind Energy

Alec Robert Puente, M.P.Aff., J.D.

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Supervisor: Catherine Weaver

Co-Supervisor: Sherri Greenberg

Despite the state's generally conservative political orientation, Texas has fostered staggering growth in wind energy by taking a thoughtful, market-friendly approach to regulation and providing important incentives and policy supports to ensure the industry's competitive viability. As the industry has matured, however, new issues have emerged that pose risks to wind energy's future growth in Texas. Concerns over reliability, competitive pressures from other renewables like solar, falling wholesale electricity prices, and other factors have the potential to derail the Texas wind success story should lawmakers and regulators respond unfavorably. I argue that the wind industry and advocates of renewable electricity more generally should be willing to take leadership engaging with these issues to ensure the industry's continued involvement in policymaking and secure opportunities to push for ambitious, fair, and technology-neutral solutions. Specifically, I propose (1) ERCOT grid reliability and (2) wind turbine siting and decommissioning as two policy areas that the wind industry would be wise to take the initiative in addressing, and with potential to lead towards constructive policy for Texas's wind energy future.

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I. INTRODUCTION & HISTORY OF TEXAS WIND POLICY

Over the past few decades, renewable energy, and wind energy in particular, has "gone mainstream;" according to the United States Department of Energy, domestic wind energy has cemented its status as a "scalable, reliable and environmentally-sound energy technology" and is now a cost-effective source of low-emission power generation in those regions of the United States with substantial wind potential.[1] Wind energy has also made up a growing portion of total yearly capacity additions around the country, with about 2.3 gigawatts (GW) of capacity added in the State of Texas in 2017 alone.[2] Those trends have been bolstered by improving turbine and efficiency technologies that have driven down investment costs and made previously overlooked regions of the country viable for development.[3] The attractiveness of wind power is confirmed by the recent interest in direct power purchasing by non-utility buyers, who have looked to wind as a cost-effective hedge against volatile energy prices and as a tool to help fulfill corporate sustainability promises.[4]

No other state has experienced the wind boom to the extent that Texas has. In addition to federal policy support and tax incentives, wind developers in Texas have been the beneficiaries of the state's innovative Renewable Portfolio Standard (RPS) and Renewable Energy Credit (REC)

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[1] Wind and Water Power Technologies Office., "Wind Vision: A New Era for Wind Power in the United States" (United States Department of Energy, 2015), 21. https://www.energy.gov/sites/prod/files/WindVision_Report_final.pdf.
[2] Ryan Wiser and Mark Bolinger, "Wind Technologies Market Report" (Lawrence Berkeley National Laboratory, 2017), https://emp.lbl.gov/sites/default/files/2017_wind_technologies_market_report.pdf.
[3] Wind and Water Power Technologies Office., "Wind Vision," 23.
[4] Ibid, 29.

policies, as well as the state's willingness to take the lead in directing billions of dollars to build transmission lines to deliver that energy to market.

Still, there are growing questions about how the Texas wind energy industry will navigate the near-to-medium future as important tax credits expire and it enters an uncertain political environment at both the state and national levels. In this paper, I'll examine the factors that have led to Texas's success at harnessing wind power in a conservative political environment. Next, I'll discuss the changing environment of Texas wind politics and make a case for why the wind industry's orientation to these challenges should not be defensive, but should instead be to push for thoughtful, technology-neutral regulation and study of all energy sources. Finally, I make the case for the wind industry taking the lead on discussions for new regulations targeting (1) reliability on the ERCOT grid and (2) wind turbine siting and retirement. Both of these policy domains have the potential to generate constructive discussion from a range of stakeholders; conversely, they may also be significant sources of risk should the industry opt to abstain from the discussion.

A Brief History of Texas Wind Energy Policy

The story of Texas's wind boom, at least on a policy level, can be roughly traced back to 1999 when Texas became one of the first states in the country to enact a Renewable Portfolio Standard (RPS)[5], a policy requiring electricity providers to obtain a certain amount of renewable electricity in proportion with their total retail sales.[6] In Texas, that goal is effectuated through

[5] Senate Bill 7 (Enrolled), 76th Regular Session (Tex. 1999).
[6] Margaret Bryant, "Wind Energy in Texas: An Argument for Developing Offshore Wind Farms," *Environmental & Energy Law & Policy Journal* 4, no. 1 (2009): 129. https://www.law.uh.edu/eelpj/publications/4-1/Bryant.pdf

market-based systems to allow trading among those proportions between providers.[7] Importantly, Texas Public Utilities Commission (PUCT) also had the foresight to implement the RPS system by measuring MWh, which measures how much electricity is actually generated, rather than the MW of *capacity* that the RPS goal had set out.[8] The RPS initially mandated that electric providers in the state, according to their share of total competitive energy sales, install a combined total of 2,000 MW of renewable capacity by 2009.[9] The RPS's original 2,000 MW target was met in only about six years, and the legislature soon updated the standard to mandate 5,880 MW by 2015 (scaling up to 10,000 MW by 2025, including 500 MW of non-wind generation).[10] Since then, the updated RPS goal has been handily exceeded, with the state boasting more than 20,000 MW of installed capacity in 2018.[11]

Texas also used a system of Renewable Energy Credits (RECs), analogous to a type of currency, to stimulate electricity providers to meet RPS goals by trading among themselves.[12] A REC is equivalent to one MWh of renewable electricity generated, and utilities may buy RECs from generators or the open market to reach the levels required of them under the RPS.[13] When a utility is required to have a certain number of RECs, but cannot meet that goal through their own

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[7] Becky Diffen, "Competitive Renewable Energy Zones: How the Texas Wind Industry Is Cracking the Chicken & Egg Problem," *Rocky Mountain Mineral Law Foundation Journal* 46, no. 1 (2009): 13.
[8] Ibid.
[9] Drew Thornley, "Texas Wind Energy: Past, Present, and Future," *Environmental & Energy Law & Policy Journal* 4, no. 1 (2009): 84.
[10] Ibid.
[11] American Wind Energy Association Data Services, "U.S. Wind Industry Fourth Quarter 2017 Market Report."
[12] Diffen, "Competitive Renewable Energy Zones: How the Texas Wind Industry Is Cracking the Chicken & Egg Problem," 11.
[13] Ibid.

generation, they may purchase those RECs from other utilities; conversely, retailers with a surplus of RECs can sell them to other producers.[14]

At the time, the new REC system functioned quite well, channeling market principles to encourage responsive supply and demand as well as economies of scale for investment in innovative generation technologies.[15] An added benefit of the REC system was a new, if modest revenue stream for risk-averse wind developers already apprehensive about building new projects in an uncertain market and policy environment. More recently, however, analysts have noted that the oversupply of wind power (in terms of the REC, market, at least) is drastically driving down the value of RECs.[16] In recent years, the price of Texas Green e-wind RECs ranged between 65 cents/MWh to 85 cents/MWh.[17] Additionally, there has been speculation that least some of that downward pressure can be attributed to worries that the state legislature will attempt to repeal or otherwise weaken the requirements for the RPS or RECs[18], as it did in 2015.[19]

The most consequential piece of Texas's renewable energy policy approach was the Competitive Renewable Energy Zones (CREZ) process, the way Texas sought to solve the "chicken and egg" problem facing wind development.[20] The CREZ process extended transmission

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[14] Goal for Renewable Energy, Public Utilities Commission Substantive Rule §25.173 (Texas 2008).
[15] "Enriching Economy and Environment: Making Central Texas the Center for Clean Energy" (Austin Clean Energy Initiative: University of Texas at Austin, November 2002), https://research.wou.edu/c.php?g=551307&p=3785494
[16] Amanda Luhavalja, "Texas REC Prices Stall beneath $1/MWh amid Bearish Supply, Demand Factors" Clean Energy Brokerage, June 16, 2015, http://clearenergybrokerage.com/texas-rec-prices-stall-beneath-1mwh-amid-bearish-supply-demand-factors/.
[17] Ibid.
[18] Ibid.
[19] Jim Malewitz, "Senate Votes to End Renewable Energy Programs," The Texas Tribune, April 14, 2015, https://www.texastribune.org/2015/04/14/senate-votes-end-renewable-energy-programs/.
[20] According to the Department of Energy, adequate transmission is "essential for bringing new wind capacity online and accessing the highest-quality, lowest-cost wind resources." Depending on its location and other factors, a land-based wind plant may require new transmission lines or increased capacity on existing lines. Simply put, the "chicken and egg" problem refers to the dynamic in which developers are

lines between the wind-dense, but relatively isolated areas of the state and major metropolitan areas where the vast majority of electricity is used.[21] While adequate transmission will continue to be a challenge for wind developers, the CREZ proceedings have made transmission much less of a constraint. Perhaps the best illustration of this is through curtailment trends. Curtailment is the (usually involuntary) reduction of output from a generator.[22] When there is a transmission bottleneck, transmission system operators will sometimes order generators to stop producing power, or to produce less than their maximum output, in order to protect grid infrastructure and ensure reliability. Because wind energy projects are typically financed through power purchase agreements (PPAs), contracts which themselves are usually structured around delivered electricity, it's clear why the risk of curtailment would loom large in the minds of wind developers.

In 2009, before the CREZ process was fully implemented, existing and planned wind generation of 6,900 MW was sited in the state of Texas, and curtailment reached a staggering 17% of potential generation. By 2012, curtailment was down to 3.8%, falling further to 1.2% in 2013 and 0.5% in 2015. Today, with more than 20,000 MW of installed wind capacity in Texas, curtailment pressures have been greatly reduced, though the CREZ lines are now essentially at capacity.[23] In developing the CREZ plan, the Texas Public Utilities Commission (PUCT) was

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reluctant to build in wind-rich areas because of a lack of transmission capacity, and risk-averse grid planners and policymakers are reluctant to extend transmission capacity in the absence of demonstrated need for it, leading to a stalemate as the two groups wait for the other to act first. Diffen, "Competitive Renewable Energy Zones: How the Texas Wind Industry Is Cracking the Chicken & Egg Problem," 14.

[21] Ibid, 29.

[22] Lori Bird, Jaquelin Cochran, and Xi Wang, "Wind and Solar Energy Curtailment: Experience and Practices in the United States," March 1, 2014, https://doi.org/10.2172/1126842.

[23] Michael Goggin, "Plummeting Curtailment, More Low-Cost Wind: CREZ Transmission Policy Already Reaping Big Returns - The Advanced Power Alliance," accessed April 16, 2019, http://poweralliance.org/plummeting-curtailment-low-cost-wind-crez-transmission-policy-already-reaping-big-returns/.

directed to consider the financial commitment by generators and implement CREZ in the manner most beneficial and cost effective to consumers.[24] The decision to focus on commitment from developers is consistent with Texas's business-friendly approach to regulation, and meant that the process was lower-risk than it might have been had the relevant decision criteria instead been another measure, like potential wind resources. But the decision also meant that more challenging areas of the state like the Gulf Coast and Panhandle regions (thanks to lower capacity factors and being outside of ERCOT's wind-friendly jurisdiction, respectively) were skipped over or relatively de-emphasized in PUCT CREZ proceedings.[25]

Finally, Texas was able to leverage its political will more easily because of the unique jurisdictional arrangement of its energy market. In Texas, the vast majority of the state's electric grid (and serving four of its five major population centers in Houston, San Antonio, Dallas, and Austin) is under the jurisdiction of the Energy Reliability Council of Texas (ERCOT), not the Federal Energy Regulatory Commission (FERC). Because the ERCOT grid's interconnections are almost entirely contained within the state of Texas, it is not regulated as part of the Federal Power Act (FPA), which normally operates to give FERC broad jurisdiction over wholesale interstate energy transactions. Thanks to this jurisdictional arrangement, Texas has been able to implement its own set of wind-friendly policies with less regard for federal policy preferences, for better or worse.

Though CREZ and REC are by far the most consequential examples, there are other, more subtle ways ERCOT policies have helped level the playing field for wind energy. Unlike FERC,

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[24] Ibid, 20.
[25] Ryan Staine, "Crez II, Coming Soon To a Windy Texas Plain Near You?: Encouraging the Texas Renewable Energy Industry Through Transmission Investment," *Texas Law Review* 93 (2014): 521.

for example, ERCOT uses a "postage stamp" system that charges a faraway solar array or wind farm the same price to deliver energy over a transmission line as it charges a coal plant closer to the city.[26] FERC generally does the opposite, varying transmission prices geographically to favor generation sources nearer to the place of consumption and prioritizing use of the transmission grid for utilities serving their own customers.[27] While FERC's approach makes some sense given the commission's much broader and more diverse jurisdiction, it tends to disadvantage many renewable generators like wind farms that are almost always located far from major population centers.

Finally, ERCOT assigns the cost of building new transmission to electric utilities, which may then recoup those costs in their rate base. Distributing the burden this way represents massive cost savings to wind developers and makes the state an attractive place to do business compared to regions under FERC jurisdiction, where developers often must pay for a significant portion of new transmission infrastructure.[28] And when new transmission infrastructure is finally built, ERCOT's standardized interconnection process allows new wind generators to connect to the grid on a levelized playing field.[29] In sum, while Texas is not immune to the challenges facing wind development nationally, it remains an attractive place to do business.

Challenges with grid integration are emerging however, despite Texas's impressive step to address transmission constraints. And although ERCOT's jurisdictional arrangement opened up

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[26] Distribution Service Provider Transmission Cost Recovery Factors, Public Utilities Commission Substantive Rule §25.193 (Texas 2010)

[27] 'Filing of Rate Schedules and Tariffs,' 18 Code of Federal Regulations § 35

[28] Jess Totten, "Texas Transmission Policy and Renewable Energy," Continuing Legal Education (2007 Wind Energy Institute Conference: University of Texas School of Law, February 26, 2007), https://utcle.org/conferences/WE07.

[29] Diffen, "Competitive Renewable Energy Zones: How the Texas Wind Industry Is Cracking the Chicken & Egg Problem," 7.

opportunities for policymakers to enact more wind-friendly rules, it also produces its share of hiccups. While ERCOT covers the overwhelming majority of Texas, a small portion is part of the Southwest Power Pool (SPP), which is governed by FERC. [30] The Texas Panhandle, one of the windiest areas of the state, is among those areas partially covered by the SPP. Getting power from the Panhandle to the state's population centers, then, requires the construction of long and costly transmission lines to connect to the ERCOT grid.[31] And though developers may still sell energy out of state from SPP-covered areas, frustration with the difficulties of getting energy to market in this region has tamped down enthusiasm for development.[32] These factors are among those that led to the cancellation of the American Electric Power Company's nearly $5-billion Wind Catcher project, a massive wind farm that was planned to be built in Oklahoma and that would have connected to the SPP grid. [33]

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[30] Elizabeth Drews, Cedric Ireland, and Neil Yallabandi, "Addressing Wind Power Intermittency in the Ercot and SPP Regions," *Texas A&M Journal of Real Property Law* 1 (2013): 365.
[31] Diffen, "Competitive Renewable Energy Zones: How the Texas Wind Industry Is Cracking the Chicken & Egg Problem," 17.
[32] Ibid, 64.
[33] Dan Gearino, "AEP Cancels Nation's Largest Wind Farm: 3 Challenges Wind Catcher Faced," InsideClimate News, July 30, 2018, https://insideclimatenews.org/news/30072018/aep-cancels-wind-catcher-largest-wind-farm-oklahoma-oil-gas-opposition-clean-power-plan.

II. THE CHANGING STATE OF TEXAS WIND ENERGY POLITICS

Texas now has an abundance of wind generation capacity – about 75,000 installed MW as of 2018, representing about 16% of the overall energy mix.[34] As the Texas wind industry has matured and become a more entrenched part of the energy market, the policy discussion around wind and renewable energy has begun to shift away from the framing of the late 1990s and early 2000s, when the focus was on the best way to expand and enable the new generators' access to the market and maintain competitive viability. In part because of the success of that approach, wind energy (and other renewable generation sources) now have achieved significant penetration on the ERCOT grid, exert large effects on market dynamics, and pose a very real competitive threat to operators of traditional forms of generation, especially natural gas.[35] The result of this shift has been growing concern from a range of perspectives about the ways that growth may play out in the near-to-medium future. Among those expressing doubt are regulators concerned about grid reliability[36], natural gas and coal interests who feel that current policy unfairly favors renewable

[34] "Wind Energy in Texas," WINDExchange, Updated Annually, https://windexchange.energy.gov/states/tx.
[35] Chen-Hao Tsai and Derya Eryilmaz, "Effect of Wind Generation on ERCOT Nodal Prices," Energy Economics 76 (October 2018): 21–33, https://doi.org/10.1016/j.eneco.2018.09.021.
[36] Robert Walton, "Texas Regulators Voice Concern over Wind's Impact on ERCOT Market, Reliability," Utility Dive, April 6, 2016, https://www.utilitydive.com/news/texas-regulators-voice-concern-over-winds-impact-on-ercot-market-reliabil/439891/.

generation[37], landowners and local groups with aesthetic or environmental objections[38], and conservative groups with ideological objections to renewable energy incentives and subsidies.[39]

While Texas has been historically friendly to energy development, the experience of other conservative states around the country demonstrate that the wind industry should not necessarily rely on that approach's durability when it comes to wind. In Oklahoma, for example, a leading wind energy producer like Texas, policymakers began in recent years to look at options to cut or eliminate state incentives for wind energy, and even considered new production taxes on wind generators.[40] As the industry enters what is likely to be a vulnerable phase in its development, it must ensure that it is not simply playing defense in response to these risks. While it may be understandably wary of exposing itself to an often-unfriendly legislature, there are also significant risks to inaction. Facility developers in this environment want reasonable certainty about the rules they will operate under, and though local governments are free to craft their own regulations, those policymakers may be understandably reluctant to flex that power given the legislature's historic treatment of robust local rules targeting energy development.[41] And if they do act, developers will

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[37] Asher Price, "Fight Over Wind Power Rises Up in Texas," Austin American-Statesman, April 5, 2019, https://www.statesman.com/news/20190405/fight-over-wind-power-rises-up-in-texas.

[38] Montague County Heritage Association, "Montague County Against Wind Farms: Providing Facts and Figures to Inform the Public about the Realities of Wind Energy," accessed April 17, 2019, http://mcawf.org/.

[39] Lisa Linowes, "The Texas Wind Power Story: How Subsidies Drive Texas Wind Power Development" (Texas Public Policy Foundation, May 2018), https://www.texaspolicy.com/texas-wind-power-story-part-1/.

[40] Ryan Handy, "In Oklahoma, a War over Wind Power" Houston Chronicle, February 14, 2018, https://www.houstonchronicle.com/business/article/In-Oklahoma-a-war-over-wind-power-12612928.php.

[41] In 2014, voters in Denton, Texas overwhelmingly approved a ban on hydraulic fracturing within the city's limits. Within hours, the Texas General Land Office brought suit calling the ban "arbitrary, capricious and unreasonable" and private parties soon launched their own legal challenges. The standoff was put to an end when the legislature passed a bill that preempted local regulation of oil and gas activities and required related local regulations to be "commercially reasonable." House Bill 40 (enrolled), 84th Regular Session (Tex. 2015).

still face significant regulatory uncertainty as they navigate both a patchwork of local regulations across the state and the biennial possibility of those rules being upended by the legislature. And of course, there is always the background risk of the legislature moving unfavorable policy on its own initiative, as it did in Oklahoma, without meaningful input from the wind industry. Instead, the wind energy and its allies must demonstrate a willingness to engage in thoughtful, fairly-framed discussions about new regulation. Taking a more open and constructive approach to working with wind's detractors would help secure the industry a meaningful seat at the policymaking table, of course, but this approach can also reveal opportunities for constructive work on less-controversial measures, like subtle tweaks of market rules and programs that have wide-ranging grid benefits while also improving wind's compatibility with it.

A Technology Neutral, Innovation-Friendly Approach

Perhaps more significantly, this strategy can strengthen the industry's position to argue for a continuation of Texas's careful, technology-neutral approach to wind regulation, which has benefitted both the industry and citizens generally. My recommended strategy follows two primary principles: (1) maintaining, where possible, a fair and technology-neutral approach to studying the problem and implementing solutions; and (2) encouraging policymakers and regulators to continue opening and tweaking rules, allowing innovative technology and the market to better align the energy mix with consumer habits.

A recent proposal in the Texas Senate illustrates the importance of the technology-neutral principle. Senate Bill 2232 would require the PUCT to direct an ERCOT study that examines the effects of renewable energy subsidies on pricing, reliability, and efficiency of the ERCOT market.

And less the bill be dismissed as an inconsequential study, it also directs the PUCT to include a description of proposed rules and actions to address the study's findings. When the Senate Business and Commerce Committee considered the bill, witnesses representing renewable energy interests expressed reactions ranging from nervousness to confidence that the report would bear out the benefits of renewable energy.[42]

In reality, supporters of wind should be pessimistic that such a narrowly tailored charge will generate favorable results for renewable industries – limiting this study and others like it to the effects of renewable energy will almost certainly produce volumes of material to form the findings for unfriendly legislation in future sessions. While parties may quibble on the line between an "incentive" for oil and gas production and a "subsidy" for renewable generation[43], the fact remains that renewable energy and especially wind have relied heavily on policy supports for their growth – most obviously the $7 billion spent making that energy accessible through CREZ. And even if the study is limited to the effect of federal, rather than state, subsidies, the effects of the Investment Tax Credit and Production Tax Credit can still lead to similar results spinning wind as an inefficient drain on public resources. Instead, wind and renewable energy advocates should seek to have studies like this examine reliability in a technology-neutral way – perhaps with the charge still limited to non-dispatchable energy, if the intent is to honestly examine the grid's reliability as the fuel mix continues to shift.

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[42] "Witness Testimony on S.B 2232 by Texas Solar Power Association and Advanced Power Alliance," Texas Senate Committee on Business and Commerce (86th Regular Session 2019).

[43] In the committee hearing on S.B 2332, Jeffrey Clark from the Advanced Power Alliance alluded to conversations between his organization and the Texas Public Policy Foundation and their disagreement on the question of whether policy supports for oil and gas should appropriately be called subsidies. Ibid.

While a study with these guiderails may still produce results that show reliability weaknesses attributable to renewable energy, the policy responses are likely to be better crafted if the background takes a more comprehensive view of the issue. Additionally helpful would be clear policy issues for the PUCT/ERCOT to evaluate, and for the legislature to act on – how does our changing fuel mix affect reliability in comparison to 2011, when ERCOT last saw blackouts, for example? Could subsidies and incentives be better structured for our needs going forward? What alternatives are there to building new generation, or stretching the life of old facilities past their normal dates of retirement? In any case, the goal of wind advocates should be to steer discussion away from the effects of specific fuels and toward a technology-neutral evaluation of issues and solutions.

Wind advocates must also take advantage of Texas's historically friendly regulatory approach to energy policy. Because wind's generation profile is very different than that of the energy sources our grid evolved to deliver, there are significant gains to be had in adjusting market rules to better accommodate intermittent generation like wind. Because these rules need not be wind or renewable-specific and because Texas has relative autonomy over the ERCOT grid, this can be a fruitful avenue for making the market more wind-friendly.

In a recent memo rejecting a push from major energy generators to assign marginal losses in calculating electricity prices, PUCT Chair DeAnn Walker cited the potential of solutions like demand response and distributed generation to strengthen the grid without the disruption that marginal losses would entail.[44] The wind industry should be encouraged by the PUCT's willingness to work with, rather than against, the changing energy mix. Wind and renewable

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[44] PUCT Chair DeAnn Walker, "Memorandum to Commissioners D'Andrea and Botkin of ERCOT" (Texas Public Utilities Commission, January 16, 2019).

proponents should work to sustain Texas's friendly regulatory attitude while advocating for technology-neutral rulemaking and legislative approaches to whatever problems, if any, are identified. In the next sections, I'll discuss two broad policy domains that offer fertile ground for beginning those conversations, as well as more specific policy options to consider. While the details and wisdom of any specific course of action will depend on the political context at the time, these options should provide useful starting points for building the next phase of Texas's wind energy success story.

III. POLICY APPROACHES

Strategy 1: Improve Reliability Through Grid Flexibility

As the amount of wind energy on the ERCOT grid has exploded in recent years, concerns over grid reliability have surfaced as a potent wedge issue for wind's opponents. The simple formulation of the issue is that the legacy infrastructure and markets that wind installations must rely on to get their power to consumers were built to rely on easily dispatchable sources of power, like coal and gas, that can be burned and delivered when energy demand necessitates it. Consumer habits have adapted, and the public generally expects to use energy when they want at it and at more or less the same cost throughout the day. This setup is not ideal for wind production, which usually peaks at night and can't easily be ramped up if mother nature does not cooperate. The Texas Public Policy Foundation, a conservative think tank, illustrates how this can be turned into a potent narrative critique [45]:

> When the demand peaked about 6 pm on the 22nd, the wind was producing about 3,199 megawatts, or about 4.5% of demand. As opposed to 1 a.m. that morning, when wind produced 11,505 megawatts, or about 22.5% percent of the 51,059 megawatts of demand.
>
> Supporters of wind energy would note that the 4.5% of demand that wind provided that day was greater than the 2.5% reserve margin we reached. However, that small boost to capacity came at great cost to consumers and taxpayers: $13 billion worth of subsidies for renewables in Texas over the last 12 years. Texas could have built a number of gas

[45] Bill Peacock, "Hot Summer, No Wind," Texas Public Policy Foundation, August 3, 2018, https://www.texaspolicy.com/hot-summer-no-wind/.

> turbine generators for far less than that that would actually provide reliable and affordable energy when we need it.
>
> The bottom line? When the wind blows we don't need it, and when we need it, the wind doesn't blow.

Rhetoric aside, many believe the issue may be coming to a head soon – and the PUCT is behaving accordingly. As coal and nuclear generators exit the market, in part because a flood of cheap energy from renewables (not to mention hydraulically-fractured natural gas), reserve margins during Texas's hot summers have fallen significantly.[46] In 2018, ERCOT forecasted a reserve margin for summer 2019 at 8.1%, 2.9% lower than expected.[47] 8.1% would be the slimmest reserve margins ever, and regulators openly worried about the grid's reliability to keep up and declined to rule out the possibility of blackouts for the first time since 2011.[48] With the imminent retirement of a 470 MW coal plant, reserve margins fell even further to 7.4%.[49]

In January 2019, responding to the further drop in the reserve margin to, the PUCT moved to address growing concern by directing ERCOT to modify the Operating Reserve Demand Curve (ORDC), which provides scarcity pricing bonuses for energy generators, by adjusting the Loss of Load Probability, a formula factor that predicts the likelihood that demand will outpace

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[46] Jeff Mosier, "Texas' Power Grid Operator Won't Rule out Rolling Blackouts as Tight Supply Meets High Summer Temps," Dallas News, April 30, 2018, https://www.dallasnews.com/business/energy/2018/04/30/texas-summer-electricity-outlook-improving-still-state-goal.

[47] "Capacity, Demand, and Reserves Report" (The Electric Reliability Council of Texas, December 4, 2018), http://www.ercot.com/news/releases/show/168033.

[48] Robert Walton, "Texas Grid to Face Tighter Electricity Reserves This Summer: 'Does That Scare You?,'" Utility Dive, December 5, 2018, https://www.utilitydive.com/news/texas-grid-to-face-tighter-electricity-reserves-this-summer-does-that-sca/543579/.

[49] Robert Walton, "ERCOT Reserve Margin Declines Further as Municipality Pulls Texas Coal Peaker," Utility Dive, January 9, 2019, https://www.utilitydive.com/news/ercot-reserve-margin-declines-further-as-municipality-pulls-texas-coal-peak/545616/.

generation.[50] The hope is that the resulting higher payments will incentivize dispatchable production to stay online and spur the construction of more capacity.[51] Significantly, Chair Walker in the same memo declined to call for ERCOT to incorporate marginal line losses, which would have penalized far-away production like wind for the losses associated with transmission. The PUCT's recognition that the benefits would be marginal and the disruption significant is encouraging, suggesting that the PUCT would prefer to not single out wind without a well-founded policy motivation. Lawmakers are also beginning to take note of the issue. Senate Bill 2232, by Senator Kelly Hancock (R-Fort Worth), would require the PUCT to study the effects that renewable energy subsidies have on reliability, among other impacts.[52]

EFFICIENCY AND FLEXIBILITY AS A HEDGE AGAINST RELIABILITY ISSUES

Researchers recently examined the extent to which the variable output of renewable generation like wind and solar can provide consumers with consistent, reliable power on the ERCOT grid. They found strong "complementarity" between the state's sun and wind resources, such that generation could be planned in the future to take advantage of temporal profiles to maximize reliability with minimal investment in expensive new technology.[53] However, it's unlikely that "build more turbines," without more, will be an effective or convincing way to

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[50] PUCT Chair DeAnn Walker, "Memorandum to Commissioners D'Andrea and Botkin of ERCOT" (Texas Public Utilities Commission, January 16, 2019).
[51] Gavin Bade, "Texas Regulators Direct Higher Plant Payments amid Capacity Crunch Concerns," Utility Dive, January 22, 2019, https://www.utilitydive.com/news/texas-regulators-direct-higher-plant-payments-amid-capacity-crunch-concerns-1/546540/.
[52] Committee Substitute to Senate Bill 2232, 86th Regular Session (Tex. 2019).
[53] Joanna H. Slusarewicz and Daniel S. Cohan, "Assessing Solar and Wind Complementarity in Texas," Renewables: Wind, Water, and Solar 5, no. 1 (December 2018): 7, https://doi.org/10.1186/s40807-018-0054-3.

address worries about reliability. Beyond discussion of advantageous siting, advocates of wind energy should focus on thoughtful policy that can maximize the benefits of our existing capacity and resources.

Improving the efficiency and flexibility of Texas's energy grid is important both as a tool to address reliability concerns and a way to take pressure off the generation side of the equation, because at high enough levels of implementation, the energy savings can represent significant load reductions to the system. By pairing efficiency measures with policies that support "demand flexibility," the Rocky Mountain Institute's term for policies supported by a suite of smart technologies that can shift energy consumption in ways that are beneficial to the grid, Texas can continue thoughtfully integrating renewables into the market while staving off reliability problems.[54]

Simply put, more ambitious energy efficiency goals, in concert with policies that make the grid more flexible and responsive to changing conditions, can better align current consumer habits with the changing energy mix and defer the need for expensive (and potentially dirty) new generation infrastructure in the future. And because this approach is largely technology-neutral, it promises to be less treacherous ground for the wind industry to collaborate on favorable tweaks, and there are signs that this dynamic is already playing out. I offer several policy ideas to addressing the reliability problem that advocates of wind energy could pursue, ranging from the least controversial to the most ambitious.

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[54] Cara Goldenberg, Mark Dyson, and Harry Masters, "Demand Flexibility: The Key to Enabling a Low-Cost Grid" (Rocky Mountain Institute, n.d.), https://www.rmi.org/wp-content/uploads/2018/02/Insight_Brief_Demand_Flexibility_2018.pdf. Cara Goldenberg, Mark Dyson, and Harry Masters, "Demand Flexibility: The Key to Enabling a Low-Cost Grid" (Rocky Mountain Institute, n.d.), https://www.rmi.org/wp-content/uploads/2018/02/Insight_Brief_Demand_Flexibility_2018.pdf.

Measures for Flexibility and Efficiency

ENERGY STORAGE

While battery energy storage systems have been a widely-touted solution to grid reliability woes around the country, market rules in Texas have made rolling out and testing the technology difficult.[55] [56] In 2014, for example, Texas transmission utility Oncor announced a plan to spend upwards of $5 billion to install up to 5 GW of grid-connected batteries across its service area.[57] A report prepared for Oncor found that battery storage technology was on the verge of commercial viability, potentially during the next several years, and could provide significant benefits for customers and the grid alike.[58] But Oncor's plans ran afoul of Texas's deregulated electric market rules that vary what assets may be owned by classifying certain uses of energy storage as transmission, and others uses as generation[59]:

> …Oncor can only use batteries for functions that improve reliability or the performance of the grid, such as deploying them instead of static VAR compensators to control voltage, or using them to avoid outages. But other functions, such as smoothing out the intermittency of renewables or using batteries for demand management, are not allowed. Essentially, using batteries for any function that is traditionally the realm of Texas' competitive power market is off-limits to the utility.

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[55] Mark Dreyfus, "Renewable Energy in Texas: From the Goal to the CREZ – Successes and Challenges." (2007 Wind Energy Institute Conference: University of Texas School of Law, February 26, 2007).
[56] Julian Spector, "Why Is the Texas Market So Tough for Energy Storage?," Greentech Media, November 19, 2019, https://www.greentechmedia.com/articles/read/why-is-the-texas-market-so-tough-for-energy-storage.
[57] Jeff St John, "Texas Utility Oncor Wants to Invest $5.2B in Storage: Can It Get Approval?," Greentech Media, November 10, 2014, https://www.greentechmedia.com/articles/read/texas-utility-oncor-faces-opposition-on-its-5-2b-bet-on-distributed-energy.
[58] Judy Chang, "The Value of Distributed Electricity Storage in Texas: Proposed Policy for Enabling Grid-Integrated Storage Investments" (The Brattle Group, November 2014), http://files.brattle.com/files/7589_the_value_of_distributed_electricity_storage_in_texas.pdf.
[59] Gavin Bade, "Whatever Happened to Oncor's Big Energy Storage Plans?," Utility Dive, September 1, 2015, https://www.utilitydive.com/news/whatever-happened-to-oncors-big-energy-storage-plans/404949/.

Though Oncor proposed a workaround to this problem that would have involved auctioning off to traditional generators whatever excess battery storage capacity was not being used for grid reliability functions, objections from power generators, questions of costs to ratepayers, and a lack of legislative interest in changing market rules ultimately led to the proposal's demise. Now, nearly five years later, Senate Bill 1941 would amend statute to allow transmission and distribution utilities to contract with generation companies to provide electricity from an energy storage facility, with an emphasis on the technology's reliability benefits.[60] While PUCT approval is a prerequisite to a valid agreement, provisions allowing a storage facility to sell electricity or ancillary services (as long as sufficient reserves are maintained for reliability) could also help free wind production from the constraints of its generation profile. This legislation (or future legislation like it) represents an important step in real terms, but also exemplifies the innovation-friendly regulatory approach that advocates should take care to maintain.

UPGRADE THE ENERGY EFFICIENCY RESOURCE STANDARD

Texas was once at the vanguard of energy efficiency policy, implementing a first-in the-nation energy efficiency resource standard (EERS) in 1999 requiring that investor-owned utilities meet at least 10% of annual load growth through energy efficiency programs.[61] That goal has since been increased to 30%, or if that target is already met, 0.4% of the utility's peak demand.[62] Those updates have not been enough to keep Texas's EERS competitive, however; other states have since implemented much more ambitious targets, and Texas in recent years has ranked near the middle

[60]Committee Substitute to Senate Bill 1941, 86th Regular Session (Tex. 1999).
[61] Senate Bill 7 (Enrolled), 76th Regular Session (Tex. 1999).
[62] The EERS was amended by H.B. 3693 in 2007 to aim for 15% demand growth in 2007 and 20% in 2009, and the PUC was directed to study the effects of energy efficiency programs. Senate Bill 1125 in 2011 updated the goal to 30% and added the alternative measure of 0.4% of a utility's peak demand. Public Utilities Regulatory Act, Texas Utilities Code § 39.905.

of the country for energy efficiency.[63] Still, there is significant opportunity for Texas to once again become a leader in energy efficiency. As the South-Central Partnership for Energy as a Resource points out[64]:

> Independent investigations overseen by the PUCT have concluded that Texas has significant untapped potential for additional energy and demand savings.30 And as data reported here indicates, every time the goals have been increased, the larger utilities have had little problem meeting and surpassing those new goals. These programs have proven to be cost-effective, and because such investments benefit both participating customers directly, and all customers indirectly, the state should consider increasing its goal, more in line with that of other populous states.

Part of the reason these programs are underutilized is that Texas's updates to the EERS have been fairly weak. The most recent update to the EERS, in 2011's Senate Bill 1125, updated the efficiency goal to 30% of annual load growth, but also set a cap on fees for customer-funded efficiency programs and set a new goal (after 30% is achieved) of 0.4% of peak demand, a relatively modest slice of to aim for in comparison to most utilities' load growth.[65] Another sign that Texas's leadership in efficiency has waned is the opening of regulatory loopholes since the EERS was last updated; relying on statutory language allowing industrial customers to opt-out of efficiency programs, the PUCT in 2012 approved rules allowing any company qualifying for a manufacturing tax exemption to do the same. [66]

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[63] "The State Energy Efficiency Scorecard," American Council for an Energy-Efficient Economy, 2018, https://aceee.org/state-policy/scorecard.

[64] Rob Bevill and Brennan Howell, "Examining the History of Texas Energy Efficiency Programs and The Effect of Changes in the EERS," White Paper (South-Central Partnership for Energy Efficiency as a Resource, June 2017), https://eepartnership.org/wp-content/uploads/2017/07/EE-History-series-Changes-in-EE-Goal-and-Impacts-1.pdf.

[65] "Required Energy Efficiency Goals," Interactive Database, Database of State Incentives for Renewables & Efficiency, http://www.dsireusa.org/.

[66] Texas Public Utilities Commission, "Order Adopting Amendments to §25.181 as Approved at the September 28, 2012 Open Meeting," October 17, 2012, Docket No. 39674.

There are a range of ways to strengthen the EERS and orient it toward improving reliability, from raising the targets to further shifting its focus toward achieving savings during peak demand events. Undoing the manufacturing-tax loophole, removing fee caps (for successful programs), and establishing more ambitious efficiency goals for investor-owned utilities are the most obvious avenues to take, and have the political advantage of requiring only updates to existing policies, rather than entirely new programs.[67] Beyond this, tweaks like extending the planning budget window for efficiency projects (allowing the implementation of programs requiring longer periods for cost recovery) or adding a performance bonus calculation for savings achieved during peak demand times could strengthen the EERS and shift the efficiency market's focus toward new technology and programming options.[68]

EFFICIENCY AND FLEXIBILITY AS A RESOURCE

Strengthening the EERS is an important but relatively modest step to take to make the ERCOT grid more compatible with the shifting energy mix. More significant would be opening up market rules to treat programs that save energy or reduce the load on the grid as "energy" resources in their own right.

Treating energy efficiency and flexibility as a resource means using technology and policy to generate savings capable of displacing the need for generation from coal, natural gas, nuclear

[67] SPEER, for example, suggests a new efficiency goal of 0.5% of all energy sales for each investor-owned utility by 2022, to be increased to 1% by 2030. Christine Herbert, "SPEER Review of the Texas IOU Energy Efficiency Programs," Summary Report (South-Central Partnership for Energy Efficiency as a Resource, February 2019), https://eepartnership.org/wp-content/uploads/2019/02/IOU-Program-Review-SPEER-Report-2.13.19-final.pdf.
[68] Ibid, 16.

power, or other supply-side resources, including wind power.[69] By some estimates, efficiency improvements can save as much energy as additional generation that would cost consumers 2-3 times as much.[70] This strategy would include both (1) measures that reduce overall energy consumption and (2) measures that shift consumption away from high-stress moments on the grid. And while the industry might be understandably wary of reducing the ultimate demand for its product (electricity), in the latter case the net effect would likely be to shift load toward times when renewable supplies are abundant and competing energy sources are relatively less-so.[71]

Utilities are currently prevented from treating efficiency and flexibility as a resource by market rules similar to those that impeded utility-scale battery storage projects like Oncor's. Under Texas's approach to deregulation, efficiency programs are considered the responsibility of the transmission and distribution utilities (TDUs), which actually move the energy between generators and retail electric providers.[72] While this makes conceptual sense under the unbundling approach that separates utilities according to the appropriate provision of services, it also makes it difficult for utilities to realize monetary gains from delivering those improvements to ratepayers. For example, TDUs in Texas are prevented from implementing "standard offer" programs that notify all of a utility's customers of efficiency programs and incentives, because the task of ratepayer

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[69] Autumn Thoyre, "Energy Efficiency as a Resource in State Portfolio Standards: Lessons for More Expansive Policies," Energy Policy 86, no. Journal Article (2015): 625–34, https://doi.org/10.1016/j.enpol.2015.08.015.

[70] "Levelized Cost of Energy Analysis" (Lazard, 2018), https://www.lazard.com/media/450784/lazards-levelized-cost-of-energy-version-120-vfinal.pdf.

[71] Jeff St. John, "How 'Demand Flexibility' Could Boost Renewables and Save Texas Billions | Greentech Media," Greentech Media, February 14, 2018, https://www.greentechmedia.com/articles/read/demand-flexibility-could-save-texas-billions-boost-renewables.

[72] Public Utility Regulatory Act, Texas Utilities Code § 39.905

communication is the domain of the unbundled Retail Electric Providers (REPs).[73] On the flip side, transmission and distribution utilities are prevented from owning certain assets, like battery storage systems, that qualify under ERCOT/PUC rules as generation (and therefore should be owned by generators under Texas law). The utilities therefore risk revenue by implementing these programs in three ways under current rules, according to the South-Central Partnership for Energy Efficiency as a Resource:

> (1) the utility incurs costs to conduct the program;
>
> (2) the utility loses revenue as a result of reductions in sales due to improved energy efficiency; and,
>
> (3) because of difficulties reaching and signing up ratepayers, the utility has little reason to develop the expertise to manage a program to encourage them to improve their energy efficiency.[74]

Investor-owned TDUs in Texas, then, have little incentive to roll out the sort of large-scale efficiency and flexibility measures that would be needed to make a meaningful dent in the reliability problem beyond the modest requirements of the EERS. An effective way to change this would be to adjust market rules to allow investor-owned utilities and potentially REPs to secure energy efficiency assets or programs and treat them as energy resources. This could be accomplished by implementing a formal energy efficiency cost recovery mechanism into the ratemaking process, allowing utilities to take on and recover larger investments in energy efficiency. There are several ways to do this, from performance bonuses for meeting efficiency

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[73] SPEER Staff, "Energy Efficiency as a Resource in Texas," Whitepaper prepared for The SPEER Commission on Energy Efficiency (South-Central Partnership for Energy Efficiency as a Resource, August 2014), https://eepartnership.org/wp-content/uploads/2015/07/energy-efficiency-as-a-texas-resource-whitepaper-for-speer-commssion-august-2014.pdf.

[74] Robert King et al., "Efficiency and Ratemaking: Aligning the Interests of Utilities and Their Customers" (South-Central Partnership for Energy Efficiency as a Resource, March 2016), https://eepartnership.org/wp-content/uploads/2016/03/SPEER-Efficiency-and-Ratemaking-report-2.pdf.

targets, to shared savings mechanisms to spread benefits between ratepayers and utilities, to "save-a-watt" mechanisms that allow returns on *avoided* investments.[75] Because of the complexities of the ERCOT grid, it is difficult to know which, if any, of these approaches would be best for Texas without further study. In any case, directing the PUCT to examine cost recovery mechanisms, aimed at achieving wider adoption of efficiency and flexibility programs to support healthy reserve margins without the need for new generation, would be an important step toward modernizing Texas's energy market for compatibility with renewables.

CONSIDER A CAPABILITIES MARKET

A much more ambitious, but still technology-neutral, plan would be to direct ERCOT to formally implement a variation on a limited capacity market – preferably in concert with rules similar to those contemplated above, ensuring that the approach to reliability maximizes potential on both the generation and demand side of the problem. A capacity market is an intervention intended to guarantee financial support for investment in reliable, productive capacity that might not otherwise occur.[76] Most discussions of capacity markets focus on "forward" capacity markets that pay generators upfront to be ready and available to come online when reserves dip below a target. ERCOT is one of the only electricity markets without a capacity market, instead relying on

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[75] John Milligan, "Economic Analysis of Duke Energy's Proposed Save-A-Watt Energy Efficiency Financing Mechanism," Masters project submitted in partial fulfillment of the requirements for the Master of Environmental Management Degree (Nicholas School of the Environment and Earth Sciences of Duke University, 2008), https://dukespace.lib.duke.edu/dspace/bitstream/handle/10161/570/MP_jrm31_a_200805.pdf?sequence=1&isAllowed=y.

[76] Mike Hogan, "What Lies Beyond Capacity Markets? Delivering Least-Cost Reliability Under the New Resource Paradigm," Proposal for Discussion (Regulatory Assistance Project, August 14, 2012), https://www.raponline.org/wp-content/uploads/2016/05/rap-hogan-whatliesbeyondcapacitymarkets-2012-aug-14.pdf.

the market signals generated by scarcity pricing to incentivize reliable generation.[77] The PUCT decided against implementing a capacity market as recently as 2013, when the idea drew suspicion (if not outright opposition) from a variety of viewpoints concerned about undermining Texas's competitive culture[78], added costs to ratepayers[79], the risk of extending the state's reliance on fossil fuels[80], or simply believing that the reliability issue is overblown in the first place.[81] The PUCT ultimately decided against implementing a capacity market, hearing objections and choosing instead to increase the payments that wholesale energy generators can expect to earn under scarcity pricing.[82]

PUCT's decision to not implement a capacity market does not quite tell the whole story, however, because it chose to implement the raise in the maximum scarcity payment amount through a mechanism called an operational reserve demand curve (ORDC), which functions as a

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[77] The other wholesale electricity market not utilizing a capacity market is the Southwest Power Pool, which is also regulated in part by the PUCT. Bade, "Texas Regulators Direct Higher Plant Payments Amid Capacity Crunch Concerns."

[78] Terrence Henry, "Debate Gets Feisty Between Regulators Over Texas' Power Supply," StateImpact Texas, NPR News, October 15, 2013, https://stateimpact.npr.org/texas/2013/10/25/regulators-get-feisty-over-texas-power-supply/.

[79] Jim Malewitz, "Texplainer: What's an Energy Capacity Market?," The Texas Tribune, October 30, 2013, https://www.texastribune.org/2013/10/30/texplainer-texas-capacity-market-debate/.

[80] Marita Mirzatuny, "Demand Response Is the Best Cure for Texas' Ailing Grid," Texas Clean Air Matters, Environmental Defense Fund, April 1, 2014, http://blogs.edf.org/texascleanairmatters/2014/04/01/demand-response-is-the-best-cure-for-texas-ailing-grid/.

[81] Robert J Michaels, "Texas' Competitive Capacity Market," written testimony to the Texas Senate Committee on Natural Resources (Center for Economic Freedom at the Texas Public Policy Foundation, January 2014), https://files.texaspolicy.com/uploads/2018/08/16100827/2014-01-PP07-TexasCompetitiveCapacityMarkets-CEF-RobertMichaels-1.pdf.

[82] "PUC Rulemaking to Amend PUC Substantive Rule 25.505, Relating to Resource Adequacy in the Electric Reliability Council of Texas Power Region" (Public Utilities Commission of Texas, 2012), PUC Project No. 40268, https://www.puc.texas.gov/agency/rulesnlaws/subrules/electric/25.505/25.505ei.aspx.

price-adder that increases when reserve margins are tight. [83] Though conceptually in keeping with Texas's preference for an energy-only market, it can be thought of as a sort of limited capacity market because barring some extreme scenario, the expectation is that most of these low-reserve margin scenarios will happen during times when wind and renewable supply is least abundant, and generators are needed that can be quickly available like natural gas operators. Of course, addressing these moments of low renewable availability is partly the goal of a capacity market in the first place – as proponents note, "Even if the scarcity pricing is not enough and a long-term capacity market is necessary, better scarcity pricing would make the capacity market less important and thereby mitigate some of the unintended consequences."[84]

The risk to embracing this approach lies in the ORDC's ability to morph from a useful tool to shape market incentives to more of a crutch to prop up grid reliability by subsidizing fuel-burning facilities (to the detriment of renewable or non-generation solutions).[85] There are some signs that this dynamic is already taking shape. In the most recent PUCT action directing ERCOT to increase the rate at which the ORDC ramps up (and therefore increase scarcity payments to generators), for example, Chair Walker said:

> [T]here should be various responses from the entire market such as increased development of demand response, distributed generation, self-generation by customers, increased investment in generation maintenance, delays in pending generator retirements,

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[83] William W Hogan, "Electricity Scarcity Pricing with an Operating Reserve Demand Curve" (April 18, 2013), Presentation at 2013 Austin Electricity Conference, https://sites.hks.harvard.edu/fs/whogan/Hogan_Austin_041813.pdf.
[84] Ibid, 9.
[85] "It is important to keep in mind that capacity mechanisms are not intended to provide additional revenues to system resources over and above what they would expect to earn in a properly functioning energy-only market. Rather they are designed to substitute a more stable, predictable stream of payments for capacity in place of a portion of the more variable, less predictable revenues that would otherwise have been earned through the sale of energy. Hogan, "What Lies Beyond Capacity Markets?", 14.

expedited return to service of certain generating units, and additional investment in newer generation technologies that are quicker to build and more operationally flexible.

While the PUCT memo nods toward the usefulness of alternative measures like demand response, the weight of both the memo's tone and the PUCT's policy response have tilted toward maintaining and building out a healthy cushion of reserve generation, rather than a holistic process that examines and reduces the need for such a large cushion in the first place. Especially because renewable energy bears much of the responsibility for the low energy prices that challenge legacy generation, this dynamic could represent a significant competitive disadvantage if it becomes the status quo. Instead, it may be prudent to seek PUC or legislative action that would re-examine the viability of a carefully-drawn "capabilities market," a term for a market intervention that works similarly but that takes a more comprehensive view than a traditional forward capacity market. A capabilities market could operate in concert with the ORDC according to the following principles:

(1) Prioritizing investment in or meaningful incentivization of demand-side efficiency measures.

(2) Opening of market rules to allow investor-owned utilities to recover costs of beneficial efficiency measures.

(3) For remaining reserve margin targets that cannot be met through existing capacity, efficiency and flexibility measures, and the ORDC, implementation of a limited capacity market to guarantee reserve supply.

In a capabilities market, regulators would be able to guarantee payments to utilities for reserve generation as in a traditional capacity market, but could also pursue grid reliability targets through performance-based returns for load-saving and load-shifting measures. An IOU could

promise a certain amount of load reduction during peak summer hours by rolling out A/C demand response technologies, for example, or a utility could recover the costs of assisting customers with home efficiency upgrades or "smart" electric vehicle infrastructure. Identifying and incentivizing "low-hanging fruit" measures like these would be the first priority of a capabilities market. Beyond those measures, if the ORDC is determined to be inadequate to achieve reserve margin targets, the capabilities market could make up the difference by operating like a traditional forward capacity market with somewhat narrower latitude.[86] If thoughtfully designed, a limited capabilities market can reduce the market's reliance on the ORDC to incentivize reliable generation and solidify a more technology-neutral approach to reliability issues.

Strategy 2: Lead a New Approach to Siting and Decommissioning

Consistent with Texas's hands-off approach to energy management, wind turbine siting and retirement have been almost wholly unregulated at the state level.[87] To sell electricity on the ERCOT grid, wind operators generally need only execute a lease agreement in compliance with local zoning rules, where those are even applicable.[88] This approach can be contrasted with other jurisdictions that have implemented robust permitting processes at the state level, including

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[86] To avoid a similar risk of regulatory capture as the ORDC, the ability to use the capabilities market as a traditional forward capacity market should also be limited in some way. A cap on the amount of the reserve margin that can be procured through non-efficiency or flexibility measures, for example, or a maximum temporal limit on future agreements/contracts, could help achieve this goal and stimulate innovation in the marketplace.

[87] Miriam Fischlein et al., "Policy Stakeholders and Deployment of Wind Power in the Sub-National Context: A Comparison of Four U.S. States," *Energy Policy* 38, no. 8 (August 2010): 4437, https://doi.org/10.1016/j.enpol.2010.03.073.

[88] Adam Fremeth and Alfred A. Marcus, "The Role of Governance Systems and Rules in Wind Energy Development: Evidence from Minnesota and Texas," *Business and Politics* 18, no. 03 (October 2016): 3555, https://doi.org/10.1515/bap-2015-0045.

considerations of aesthetic and environmental impacts.[89] Instead, policymakers in Texas have largely abstained from addressing the question of how to handle siting to private agreements between landowners and operators, leaving the trickier questions for the courts to handle.[90] This has been an important advantage for wind energy in Texas relative to other states, and research has demonstrated a statistically significant relationship between simplified permitting procedures and an increased rate of wind capacity deployment.[91]

As the industry matures, however, policymakers have begun to reexamine this arrangement and look for ways to rein in the industry's freedom. Recently filed legislation would complicate the market by regulating siting only within counties meeting certain population and land use criteria[92], or by expanding rulemaking power only in counties with military installations.[93] While the particular effects of this type of legislation are difficult to determine before passage, the wind industry should be worried about piecemeal, ad-hoc regulatory treatment becoming the default legislative approach. Despite the risks, it should be open to a larger discussion about wind facility siting and decommissioning to ensure that the resulting policies are fair and that it has a place at the table when they are implemented.

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[89] Minnesota, for example, implemented a process for wind siting requiring approval from local, state, regional, and federal agencies. Ibid, 345.
[90] Alan J Alexander, "The Texas Wind Estate: Wind as a Natural Resource and a Severable Property Interest," *University of Michigan Journal of Law Reform* 44 (2011): 454.
[91] Christiane Bohn and Christopher Lant, "Welcoming the Wind? Determinants of Wind Power Development Among U.S. States," The Professional Geographer 61, no. 1 (February 2009): 87–100, https://doi.org/10.1080/00330120802580271.
[92] H.B. 4554 would allow the Texas Parks and Wildlife Department to establish siting rules only for lands in a county between 45,000 and 55,000 in population, with a military aviation facility, and containing public lands acquired in 2010. House Bill 4554 (As Filed), 86th Regular Session (Tex. 2019).
[93] House Bill 4368 (As Filed), 86th Regular Session (Tex. 2019).

Policy Options for Siting and Decommissioning Reform

A COMPREHENSIVE APPROACH TO SITING.

New policies regulating the compatibility of wind energy infrastructure with existing land uses have emerged as some of the biggest threats to the Texas wind industry's growth. Consider, for example, the rise of legislation unnecessarily and unfairly regulating wind turbine compatibility with military infrastructure. In 2017, Senate Bill 277 disallowed tax abatements for wind farms within thirty nautical miles of a military aviation facility, ostensibly to address concerns about wind turbine interference with military flight operations.[94] Perhaps more significantly, it also disallowed limitations on appraised value for buildings, improvements, personal property, etc. if a wind-energy device is installed on the same parcel of land.[95] Beyond the obvious competitive disadvantage this system creates for wind, such legislation is also duplicative because the federal government already has a comprehensive process for ensuring compatibility.[96] Under that process, the Military Aviation and Assurance Siting Clearinghouse (the "Clearinghouse), part of the Department of Defense, reviews applications for energy projects for any adverse impacts on military operation and readiness and identifies feasible and affordable actions that could be taken by the Department, the developers or others." [97] Therefore, unlike the Texas approach, the federal Clearinghouse puts the responsibility for ensuring compatibility on the party for which it makes the most practical and financial sense, whether that is military or the operators. Changes to the

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[94] Senate Bill 277 (Enrolled), 85th Regular Session (Tex. 2017).
[95] Ibid, Section 3, subsection (b-1).
[96] "Mission Compatibility Evaluation Process," 32 Code of Federal Regulations § 211 § (2013).
[97] "Ike Skelton National Defense Authorization Act for Fiscal Year 2011," Pub. L. No. 111–383, § 358(c)(1)(B) (2011).

program in 2018 have heightened the contradictions in the two approaches even further: as federal policy begins to embrace the siting of renewables near military installations to take advantage of cost and climate benefits[98], Texas continues to search for ways to discourage the exact same thing.[99]

Rather than accepting this dynamic, the wind industry should make the case for fair, comprehensive processes to govern wind energy siting. Developers deserve reasonable certainty about the rules they will operate under, but a lack of an organized scheme (or even clear policy goals) for siting makes that difficult to ensure. The simplest solution to this problem would be a traditional statute or rulemaking approach that establishes statewide siting standards similar to those of other states, setting out setbacks, height and aesthetic considerations, environmental requirements, etc.[100] [101] This is certainly a defensible strategy, but not necessarily in keeping with Texas's preference for a light regulatory touch.

However, the siting regime that emerges from this process need not be a heavy-handed, top-down system. Some have suggested looking to Texas's regional strategy for groundwater regulation as a useful model, for example.[102] Under that strategy, the state leans on local and regional regulatory bodies called groundwater conservation districts (GCDs), which develop and implement groundwater management plans – a kind of state version of cooperative federalism.

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[98] Congress in 2018 updated the federal approach to military and wind compatibility, included provisions directing the Secretary to "use renewable energy sources, pursue energy security and energy resilience by giving favorable consideration to projects that provide power directly to a military facility." "National Defense Authorization Act for Fiscal Year 2018," Pub. L. No. 115–91, § 183(a) (2018).
[99] House Bill 3168 (As Filed), 86th Regular Session (Tex. 2019).
[100] California Public Resource Code §2100-21006.
[101] California Government Code §65100-65107; §65893-65899.
[102] Elizabeth A. Weis, "Wind Energy Legislation Strategies for the Lone Star State," Inquiries Journal 10, no. 05 (2018), http://www.inquiriesjournal.com/articles/1738/wind-energy-legislation-strategies-for-the-lone-star-state.

Those plans must be consistent with existing TCEQ rules regulating things like spacing and water quality and must be approved by the statewide Texas Water Development Board.[103] GCDs in Texas are set up many different ways, with differing priorities for groundwater management and even different governing structures that reflect the varying priorities of the communities they represent. A similar system of delegated regulatory authority in Texas could provide an avenue for local stakeholders to more easily and productively voice environmental and aesthetic concerns, set out fair state minimum requirements at the state level, and facilitate regional planning in rural areas of Texas where wind resources are abundant but effective governance is sometimes difficult to achieve across so large an area.

A REGULATORY SCHEME FOR WIND FARM RETIREMENT.

Texas's experience with aging and retiring oil infrastructure demonstrates why having thoughtful policy in place before a crisis strikes is necessary. Dealing with sites described by some as "ticking time bombs," Texas in recent years has been forced to navigate the environmental effects of abandoned wells whose owners have gone bankrupt, can't be found, or otherwise can't be asked to take responsibility for cleanup.[104] Left unplugged, these wells pose risks in the form of migration to surface or groundwater resources, the leaching of chemicals into surrounding soils, or more direct risks to human health like dangerous sinkholes or drilling chemical exposure. [105] [106]

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[103] Groundwater Conservation Districts, Texas Water Code § 36.
[104] The Texas Tribune and Jim Malewitz, "Abandoned Texas Oil Wells Seen as 'Ticking Time Bombs' of Contamination," The Texas Tribune, December 21, 2016, https://www.texastribune.org/2016/12/21/texas-abandoned-oil-wells-seen-ticking-time-bombs-/.
[105] Edith Allison and Ben Mandler, "Abandoned Wells: What Happens to Oil and Gas Wells When They Are No Longer Productive?," Petroleum and the Environment (American Geosciences Institute, 2018), https://www.americangeosciences.org/sites/default/files/AGI_PE_AbandonedWells_web_final.pdf.
[106] Tom Dart, "Texas Sinkholes: Oil and Gas Drilling Increases Threat, Scientists Warn," The Guardian, March 27, 2018, https://www.theguardian.com/world/2018/mar/27/texas-sinkholes-oil-gas-scientists-report.

These problems are exacerbated during economic downtowns like the savings and loans crisis of the mid-1980s, or oil-specific downturns like the one Texas experienced in the mid-2010s, when resources wear thin for regulators and operators alike.[107]

Texas has shown mixed success solving the problem of these abandoned wells. In 1992, the Railroad Commission launched its Oil Field Cleanup Program to plug wells using various tax and excise revenues collected from drillers and has since delivered an annual report of that program's activities to the legislature.[108] In its most recent update, the Commission touted the more than 35,000 wells plugged to date, including over 200 cleanup and remediation operations in 2018.[109] However, the Commission also reported that there were still 13,710 wells out of compliance with RRC rules, and that number has trended upwards in recent years as the state's oil economy has surged.[110] One reason for the ongoing difficulty is that, while operators are required by law to "properly plug a well when required" by rule, they are not required to post any sort of bond or cash deposit sufficient to actually undertake the plugging (or remediation if necessary).[111] Taxpayers, then, are often left on the hook for ensuring adequate cleanup.

A similar scenario affecting the wind industry should give supporters pause. In light of the industry's relative youth and historical reliance on price subsidies and other supports, it's not at

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[107] Christopher Helman, "Dear Texas: Enjoy The Oil Boom. Just Don't Blow It This Time.," Forbes, April 25, 2014, https://www.forbes.com/sites/christopherhelman/2014/04/25/dear-texas-enjoy-the-oil-boom-just-dont-blow-it-this-time/.
[108] Texas Natural Resources Code § 81.069
[109] Danny Sorrells and Clay Woodul, "Oil Field Cleanup Program Annual Report," Mandatory Report to the Legislature (State of Texas Railroad Commission, 2018).
[110] Jim Malewitz, "Abandoned Texas Oil Wells Seen as 'Ticking Time Bombs' of Contamination," The Texas Tribune, December 21, 2016, https://www.texastribune.org/2016/12/21/texas-abandoned-oil-wells-seen-ticking-time-bombs-/.
[111] Abandoned Wells, Texas Natural Resources Code § 89

all clear how capably the wind industry might weather a major economic downturn.[112] And given that wind begins with a much more tenuous base of political support than does oil and gas among most policymakers, and even among many allies, the need for a strong policy backstop is even more urgent. If wind is going to sell itself as a tool to revitalize rural economies and allow landowners to keep their land, advocates need to ensure they can live up to that promise in tough times, or at least not let circumstances convert wind farms into blights on the landscape and thereby risk supercharging existing aesthetic and land use objections. Wind facility decommissioning regulations should probably not be modeled entirely Texas's approach to abandoned wells, however. Beyond the fairness issues of asking taxpayers to clean up after absentee facility owners, there is reason to believe that the Railroad Commission underestimates the extent of contamination – while it found no instances of groundwater contamination between 1993 and 2008, an independent study by the Groundwater Protection Council found more than 30 examples of contamination.[113] Several states already have laws requiring the decommissioning of turbines, usually requiring deconstruction or remediation by a facility owner and the submission of a decommissioning plan.[114]

2019's SB 1372 would create a "wind generation decommissioning fund" as an account in the state treasury, and require operators of wind-generation facilities to maintain bonds or cash

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[112] William Stripling, "Wind Energy's Dirty Word: Decommissioning," Texas Law Review 95, no. 1 (2016), http://texaslawreview.org/wp-content/uploads/2016/12/Stripling95.pdf.

[113] Scott Kell, "State Oil & Gas Agency Groundwater Investigations And Their Role in Advancing Regulatory Reforms: A Two-State Review of Ohio and Texas" (Groundwater Protection Council, August 2011), http://www.gwpc.org/sites/default/files/State%20Oil%20%26%20Gas%20Agency%20Groundwater%20Investigations.pdf.

[114] California, North Dakota, and Illinois all have decommissioning requirements in place that require decommissioning of facilities but do not feature strong mechanisms requiring contributions, insurance, surety, etc. to ensure compliance.

deposits conditioned on good stewardship of property and the environment.[115] These changes could help insulate the industry from the blowback of public opinion in the event that market turns or aging technology cause the retirement of large swaths of the wind generation infrastructure. Less encouraging for wind advocates is the section of the bill which would give the Texas Public Utilities Commission investigatory authority to conduct an environmental assessment or site investigation, and potentially decommission the facility after notice and hearing.[116]

While this is nothing immediately objectionable about the SB 1372 approach, the bill unfairly requires the actual posting of bond or surety for decommissioning of wind facilities while leaving the current regime intact for oil wells (for which posting of actual surety is not required), where it has demonstrably failed. As the industry matures further, the political context might be better to push for larger-scale decommissioning reform that encompasses both wind and other forms of energy. Rather than asking for the same light regulatory touch as oil and gas producers, which is business-friendly ultimately bad policy, wind advocates should instead seek a fairer regime that sets forth technology-neutral decommissioning and financial surety requirements for all energy production facilities, including oil and gas, and a cleanup program funded by taxes and fees on operators. In addition to strengthening policy for the long-term, this change would put help to put wind and hydrocarbons on more equal regulatory footing. Operators of both hydrocarbon and wind facilities should be required to demonstrate their financial capacity to be good stewards of the environment.

Wind advocates should also push for a narrower, or at least a more clear, goal for siting reforms than achieving "a manner that protects the environment and the interests of the owner of

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[115] Senate Bill 1372 (Introduced), 86th Regular Session (Texas 2019).
[116] Ibid, § 37.206.

the property," lest it be left to the PUCT to ascribe meaning to those terms by rule. Lawmakers need not necessarily draft specific criteria for evaluation, but could look to laws that delegated rulemaking power to agencies with clear guideposts of legislative intent.[117] The PUC, for example, could be directed to consider remediation or decommissioning terms already in lease agreements between landowners and operators as evidence of protection of property, or could be directed to consider the effect of any forced decommissioning on the Texas Emissions Reductions Plan. And if that task is to be delegated to the PUC with such broad discretion, advocates should seek the addition of provision requiring a report similar to the one required of the Railroad Commission's Oil and Gas Division, detailing yearly the agency's strategic plan to protect public safety and the environment. This could at least provide the transparency necessary to monitor the Commission's approach and push for changes if necessary.

[117] 1999's S.B 7, for example, set out in Sec. 39.264(c) the intent of the legislature that emissions of nitrous dioxides and sulfur dioxides from coal-fired facilities not exceed certain levels. S.B. 7 (Tex. 1999).

CONCLUSION

The Texas wind energy industry is entering a crucial phase in its history. It has proven itself as an important part of Texas's energy mix, led to lower electricity costs for ratepayers, and won billions in state support for infrastructure to ensure that the state's abundant but far-away wind resources can actually access the market. That success was fueled in large part by Texas's hands-off regulatory approach and its policy preference for facilitating energy development, whether wind, solar, or gas. But in part because of that success, the favorable market and political environments that made Texas a model for wind development are at risk of shifting.

Advocates of wind and other renewable forms of energy cannot necessarily rely on past successes to justify the same approach in the future: Oklahoma, once an enthusiastic supporter of wind development, has in recent years moved aggressively to scale back incentives for and even tax wind generation.[118] To avoid a similar dynamic, the industry and its advocates in Texas should look for constructive ways to work with other stakeholders on reliability and turbine lifecycle issues, both as a means to maintain constructive channels of communication with decisionmakers and lessen interest in impulsive, punitive legislation in the future. A legislative strategy that simply offers different data and narratives with a more favorable frame will not suffice as regulators, policymakers, special interest groups, and competing business interests, gear up to examine the effects wind energy is having on the Texas grid. As the policy discussion intensifies, the wind industry would be wise to fashion itself a productive seat the table.

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[118] Joe Wertz, "Tough Talk As Oklahoma's Wind Industry Becomes A Political Target," National Public Radio, March 6, 2018, https://www.npr.org/2018/03/06/590877834/tough-talk-as-oklahomas-wind-industry-becomes-a-political-target.

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