A Renewable America

CORPORATE RENEWABLE PROCUREMENT AND TRANSMISSION PLANNING:

COMMUNICATING DEMAND TO RTOS NECESSARY TO SECURE FUTURE PROCUREMENT OPTIONS

CORPORATE RENEWABLE PROCUREMENT AND TRANSMISSION PLANNING:

COMMUNICATING DEMAND TO RTOS NECESSARY TO ENSURE FUTURE PROCUREMENT OPTIONS

October 2018

A Renewable America

A project of the Wind Solar Alliance

Wind Solar Alliance

Wind Solar Alliance

1501 M Street NW, Suite 900
Washington, DC 20005
202-552-8105

EXECUTIVE SUMMARY

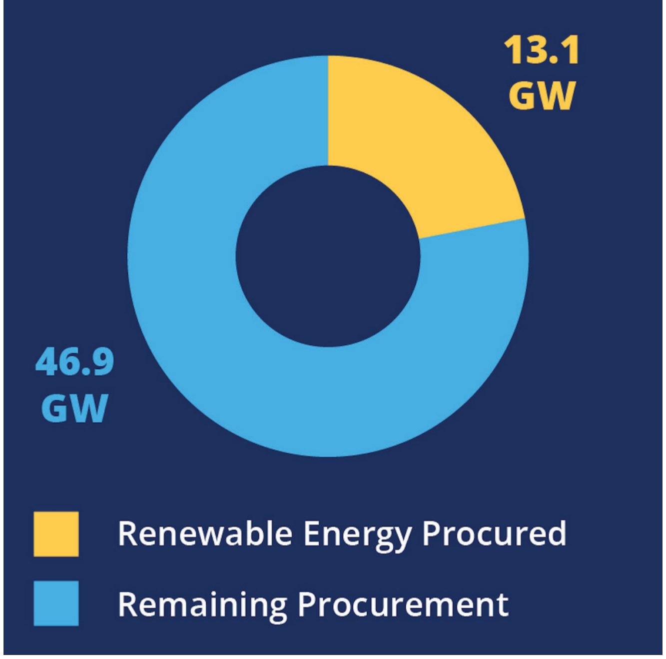
Large U.S. companies are acting on their renewable energy goals at a record pace, procuring nearly 4 gigawatts (GW) of utility-scale wind and solar capacity through August of this year.[1] That total already exceeds the previous record for a full year, set in 2015, by nearly 750 megawatts (MW).[2] The increased demand is largely driven by record-low prices, the price-certainty of long-term contracting, and the environmentally-friendly attributes of the two technologies. And the trend is showing no signs of slowing down, as companies with smaller energy demand are signing creative deals to aggregate their demand with larger energy users.[3]

This increasing pace of procurement is consistent with broader goals set by a group of corporate renewable energy buyers that first formed in July of 2014. That group, the Renewable Energy Buyers Alliance (REBA), now represents more than 100 U.S. corporate buyers and has set a goal of purchasing 60 GW of new U.S. renewable energy capacity by 2025.[4] REBA companies have now procured just over 13 GW of renewable power since 2013.[5]

While that procurement represents significant progress, it leaves about 47 GW of renewable purchases remaining over the next seven years to achieve their target.

In other words, corporates will need to procure an average of about 6.5 GW of renewables each year from 2019 through 2025 - all of which is dependent on new renewable energy projects having access to transmission. An expanded and upgraded transmission grid, particularly a nationally-connected grid with a high voltage backbone, would also assist in reducing electricity costs and meeting U.S. international climate commitments.[6]

REBA'S 60 GW BY 2025 RENEWABLE GOAL



However, as a Wind Energy Foundation (WEF) report produced earlier this year highlighted, entities responsible for planning the transmission grids are not accounting for corporates' shifting energy preferences in their planning processes. This gap in planning could preclude corporates from meeting their near-term renewable goals. In the long-term, a failure to synchronize and reform the current transmission planning, cost allocation, and permitting processes across grid regions could leave many of the nation's best remaining wind and solar resources undeveloped.

To date, corporate purchasers have, perhaps unwittingly, benefitted from proactive transmission planning and development in Regional Transmission Organizations (RTOs). In the Electric Reliability Ccouncil of Texas (ERCOT) and Southwest Power Pool (SPP) regions, recent transmission expansions and upgrades have delivered benefits that have far exceeded their costs, by easing curtailments, keeping electricity prices low for consumers, and spurring economic development. Similarly, the benefits of transmission lines recently completed in the Midcontinent Independent System Operator (MISO) region have exceeded their costs by a ratio of more than 2 to 1, while helping many member states cost-effectively meet their renewable portfolio standards.[7]

However, transmission planning has typically focused on demand growth within a region, rather than the type of generation that corporate purchasers and consumers want. And with low electricity demand growth projected for each of those regions in the years ahead, and Federal Energy Regulatory Commission's Order 1000 not yielding new interregional transmission lines, large corporate consumers must engage in transmission planning processes to ensure that the grid is being expanded in a way that facilitates the development of the lowest-cost wind and solar energy.

To that end, this report suggests that corporate consumers **engage at the RTO level to ensure that their renewable energy demand is captured by the planning processes.**

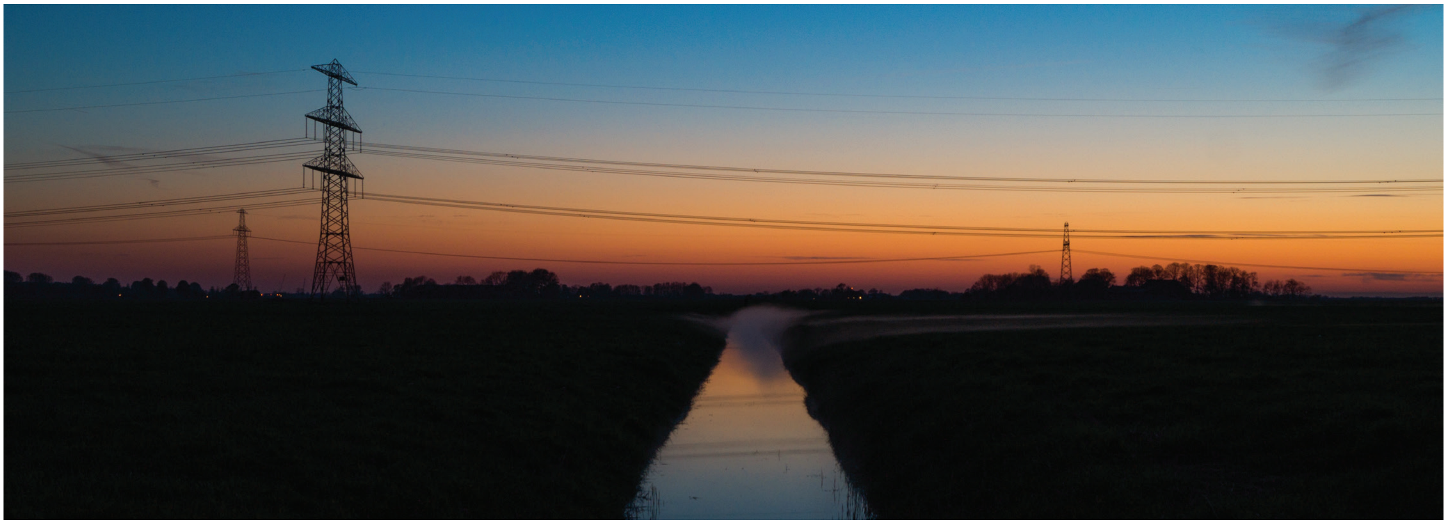
This report expands upon the findings in the previous WEF report, providing more critical detail about the planning processes that have enabled the recent transmission lines in the best wind and solar resource regions, as well as further insight into how corporate energy consumers can become more active in shaping the transmission reforms needed to meet their goals, while also assisting in creating a low-carbon energy future.

I. RECENT MAJOR TRANSMISSION PROJECTS & MARKET DRIVERS

Load forecasting and transmission planning takes several forms, but proposals for expanded transmission in regions with organized markets are most frequently advanced at the regional level by RTOs, provided a RTO overlaps the market.[8] However, while RTOs and utilities model a range of scenarios projecting new demand, retirements of existing generation, and compliance with state and federal policies, changing energy preferences for large energy consumers – which are seen as voluntary and typically acted on via power purchase agreements and increasingly green tariffs – are generally not accounted for.

Moreover, while the time required to build a utility-scale wind or solar project is relatively short (often as little as 3-6 months), the higher-voltage transmission lines that are typically required to move power out of the best renewable resource regions typically take a minimum of five to seven years to build. This discord in development times, combined with the complexity of transmission planning, could leave REBA's goals unfulfilled, as corporates may not have access to all the renewable projects needed without better planning to incorporate their energy preferences.[9]

The following sections provide additional context on how proactive transmission planning and broad cost allocation of new transmission lines in three different grid regions – ERCOT, SPP, and MISO - delivered low-cost renewable resources that enabled corporate consumers to act on their goals and provided all customers in the region with cost savings and a stregthened electricity grid.



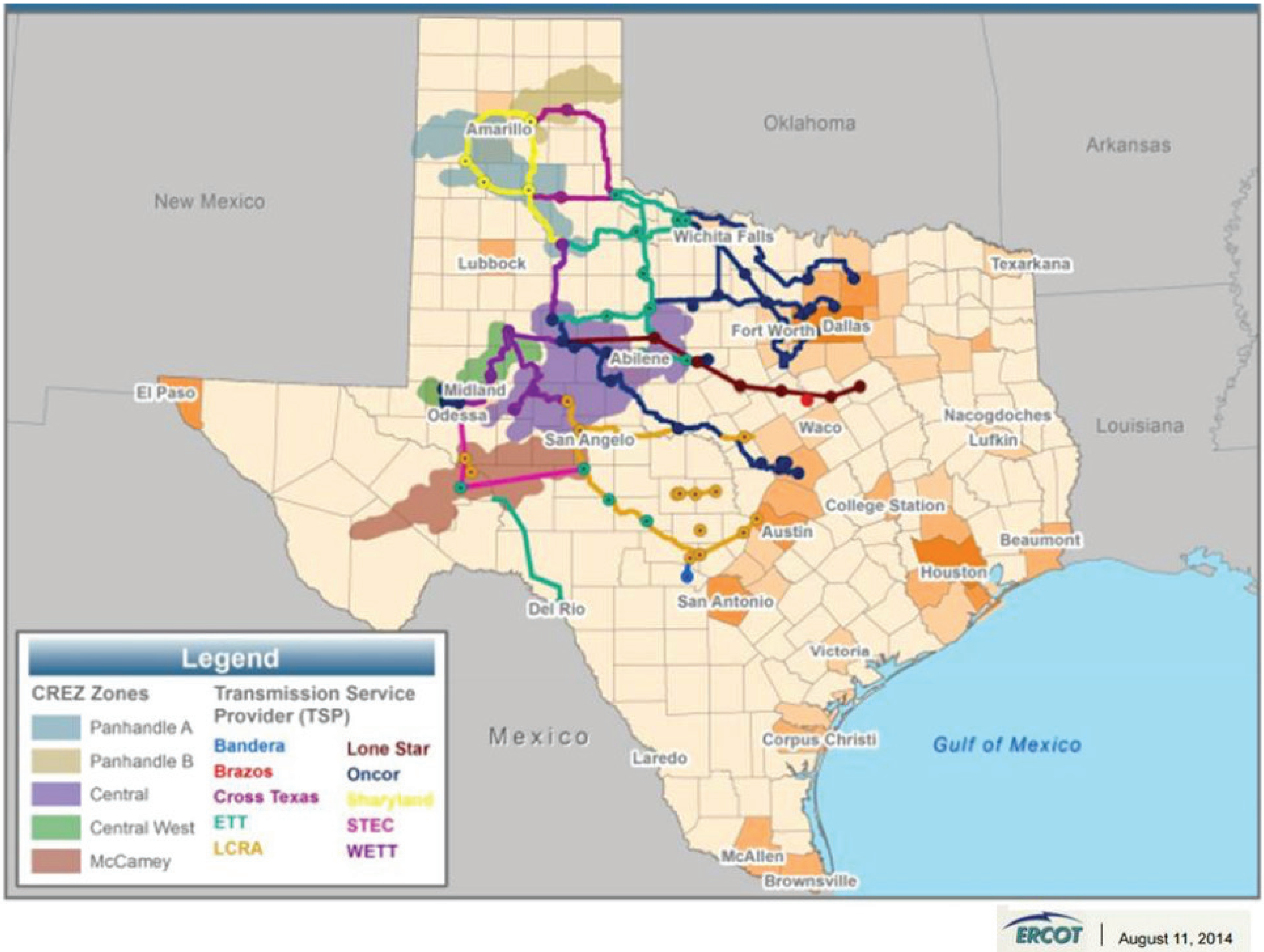
ERCOT: PROACTIVE TRANSMISSION PLANNING AND REGIONAL COST ALLOCATION ENABLED CREZ TRANSMISSION LINES, LOW-COST WIND DEVELOPMENT, AND GIGAWATTS OF CORPORATE PPAS

In the early 2000s, Texas state legislators recognized the economic opportunity that wind energy could provide for West Texas and the Panhandle. Detailed studies by ERCOT suggested that for the new competitive electric markets to deliver lower prices to Texans, it was essential that low-operating-cost power plants, such as wind, have the infrastructure needed to serve interested consumers throughout the state.[10] The challenge was that historically new transmission lines were only built once a generator committed to a project. However, generators would only develop a new project once there was a commitment to build transmission.[11]

To solve this "chicken or the egg" dilemma, in 2005 Republican State Senator Troy Fraser introduced Senate Bill (SB) 20, which directed the Public Utility Commission of Texas (PUCT) to implement a large-scale transmission build with a goal of creating more capacity for renewables while benefiting consumers.[12] The bill received bipartisan support, as rural communities in the West touted the potential for economic development, while urban stakeholders in the East supported the projections for lower electricity prices. A diverse set of energy and electric stakeholders also supported the bill, including Public Citizen, Direct Energy, Texas Public Power Association, FPL Energy, and the Association of Electric Companies of Texas.[13] With overwhelming bipartisan support in the legislature, the bill easily passed in both chambers.[14]

After SB 20 became law, the PUCT tasked ERCOT with identifying wind energy production potential statewide and the possible transmission constraints impeding its delivery.[15] Using ERCOT's study, the PUCT then designated a transmission system to optimize the vast wind resources in West Texas and the Panhandle.

Transmission line construction in the Competitive Renewable Energy Zones (CREZ) identified by ERCOT's study began in 2009, taking five years to complete at a cost of $6.9 billion.[16] Like all transmission lines in ERCOT, CREZ lines are funded by all ratepayers, and any type of generation can use them, including wind, solar, gas, coal and nuclear. Historically, all generators have had needed transmission connection to load centers paid for by ratepayers.[17]



In total, more than 18,000 MW of additional capacity was unlocked by CREZ, while line congestion and curtailment of existing capacity was also reduced.[18] Previously untapped wind-rich regions were now open for business, breeding competition and stimulating development of high-quality projects. In the two years following the completion of CREZ projects, 2014 and 2015, an average of over 2,600 MW of wind capacity was installed, more than triple the average of 738 MW installed in the four years prior.[19]

Those projects, combined with the state's deregulated wholesale energy market, have garnered the attention of many large corporations. To date, at least 22 major corporations have committed to purchase over 2 GW of renewable energy from Texas projects enabled by the CREZ lines.[20]

SPP: INTEGRATED TRANSMISSION PLANNING AND REGIONAL COST ALLOCATION FOR HIGHER-VOLTAGE LINES ARE DELIVERING HUGE CONSUMER BENEFITS, ENABLING GIGAWATTS OF NEW LOW-COST WIND POWER

From 2012 to 2016, SPP completed approximately $5 billion worth of transmission upgrades.[21] A significant portion of this investment was made under SPP's Balanced Portfolio and Priority Projects and a series of new, higher voltage transmission lines were developed to connect higher quality wind resources to load centers in the region.[22] As a result, nearly 9.6 GW of new wind power has come online in the region since 2013, with corporates procuring nearly 2.5 GW of that total.[23]

These lines were made in possible, in part, through SPP's Highway-Byway cost allocation method, where costs for transmission projects 300 kV and above are regionally allocated.[24] Although the new cost allocation process faced some initial opposition, support from the SPP Board, the governors of Kansas and Oklahoma, lawmakers in Kansas, and other stakeholders proved enough to move the new process forward.[25]

The new transmission lines resulting from SPP's Balanced Portfolio have yielded significant benefits greater than initially estimated at the time of construction. Transmission investment between 2012 and 2014 is expected to return benefits exceeding $16.6 billion over the 40-year life of the system — a benefit-to-cost ratio of 3.5, according to a SPP report.[26]

However, as discussed in more detail later in this paper, the region does not attempt to quantify corporate demand in its current planning processes – although it will consider potential corporate renewable purchase deals on a case-by-case basis.

MISO: SHARED COSTS HELPED DEVELOP NEW TRANSMISSION LINES TO MEET RPS GOALS, DELIVER ECONOMIC BENEFITS

With many of its member states passing renewable portfolio standards in the late 1990s and early 2000s, MISO began studying the transmission required to integrate more wind power into the region in 2002.[27] Their analyses continued through subsequent MTEP cycles, with exploratory and energy market analyses.[28] As the demand for renewable energy grew, additional regional studies were conducted to determine the transmission necessary to support these policy objectives.[29]

By 2003, MISO was looking for new "no regrets" transmission that would improve reliability, serve load more cost effectively by making its energy market more efficient, and meet policy needs.[30] But it took until 2007 for MISO staff and stakeholders, including the Organization of MISO States and the Midwestern Governor's Association, to dedicate significant effort over the course of several years to determine the most cost-effective approach to enabling the region's renewable energy mandates and goals to be met.[31] This effort culminated in the multi-value project (MVP) portfolio, approved in 2011.[32]

The MVP portfolio, totaling 17 projects, has allowed the region to add 25 GW of new wind capacity.[33] As of 2017, the MVP lines have produced benefits of 2.6 to 3.9 times their costs and additional value "beyond just the megawatts installed".[34] These projects, like the lines in SPP and ERCOT, were made possible by spreading the costs of the projects throughout the region – known as "postage stamp" pricing, in a reference to all beneficiaries equally sharing costs.[35] However, as of August 2018, one of the originally lines is still not complete, demostrating the lengthy process for permitting and approving each line.[36]

MISO planning timeline for the MVP lines.

II. TODAY'S MARKET: HOW DIFFERENT REGIONS PLAN TRANSMISSION & TREAT CORPORATE RENEWABLE DEMAND

Historically, transmission planners primarily considered changing load in their footprint when planning new transmission lines, including changes in the amount and location of electricity supply and demand. With the rise of state renewable portfolio standards (RPSs), many Regional Transmission Operators (RTOs) also began considering state RPS policies, including voluntary RPS goals in some RTOs.[37]

Today, most transmission planning today is based on load forecasts, which use models to predict load based on population and economic growth as well as climatic conditions across an RTO's territory. Some RTOs, such as SPP and ERCOT, delegate load forecasting to the utilities in their territory, while MISO commissions both top-down and bottom-up forecasts. Additionally, many RTOs take a longer-term look at transmission needs through the creation of various scenarios or futures that include varying amounts of renewable energy. Corporations have several opportunities to influence these processes so that RTOs consider their renewable energy goals in transmission planning, detailed below. Weighing in is necessary, as most RTOs aren't planning major transmission lines that would enable access to more cost-effective wind and solar resources located in neighboring regions, including through interregional transmission lines.[38] The methodologies of four RTOs featured in this report are summarized below.

When evaluating voluntary corporate or utility procurement of renewables, many RTOs such as SPP and PJM only consider generation projects with signed power purchase agreements (PPAs) or interconnection agreements.[39] Others leave the decision of inclusion to their constituent utilities, including MISO and ERCOT.[40] However, as previously noted, higher-voltage transmission lines can take up to 10 years to complete.[41] This is far longer than it takes to construct a renewable energy project. Thankfully many RTOs, even if they only consider a project automatically if it has a signed PPA or interconnection agreement, will often consider other projects or macro trends upon request from stakeholders. Corporations, therefore, have the chance to weigh in during the transmission planning process in order to promote the transmission lines required to unlock low-cost renewable resources.

PJM

The PJM Interconnection (PJM), which serves all or parts of 13 states in the Mid-Atlantic and Washington, D.C., conducts independent load forecasts on behalf of its member utilities.[42] These forecasts look 15 years into the future and inform transmission planning. They are used to create an annual Regional Transmission Expansion Plan (RTEP) Report. The forecasts model macroeconomic changes including GDP growth and population change, as well as predicted weather and consumer energy demand. After the models run, the effects of distributed solar, the predicted growth of high efficiency appliances, and large facility openings and closings are netted from the total load prediction.[43]

Transmission planning in PJM looks 5 to 15 years into the future and is based mostly on North American Electric Reliability Corporation (NERC) guidelines, relying on several assumptions.[44] PJM can also account for regional and local criteria that go beyond and complement the NERC obligations through stakeholder participation in their Transmission Expansion Advisory Committee (TEAC) and Planning Committee and other related stakeholder processes.[45] The TEAC and Planning Committee hold monthly meetings. The TEAC is the primary venue for stakeholders to provide feedback on all aspects of PJM's annual RTEP.[46] TEAC membership and participation is open to all PJM members as well as any interested entities or individuals.[47]

Models only consider increases in demand and congestion, without considering the type of energy demanded. PJM only considers renewables in transmission modeling if an interconnection service agreement for a renewable project has been signed and either a queued generator will aggravate an already overloaded transmission facility or if current generation isn't enough to meet demand.[48] Otherwise, there is no consideration of corporate demand for renewable energy in its modeling. PJM also does not consider public policy-driven transmission lines in its normal planning process. If a state requires transmission lines to meet its RPS, it must rely on PJM's state agreement approach. This process involves states submitting transmission proposals to PJM, which it includes in its RTEP after the state agrees to cover all costs associated with the project.[49]

> "We do not plan or build transmission lines on speculation alone. The developers of new generation of any type are required to pay for the transmission upgrades necessary to deliver the output of their projects. The principle has been that consumers should not pay for transmission required because of generation developers."
>
> – Ray Dotter, Manager of Strategic Communications, PJM.[50]

SPP

SPP serves all of the states of Kansas and Oklahoma, and portions of New Mexico, Texas, Arkansas, Louisiana, Missouri, Iowa, South Dakota, North Dakota, Minnesota, Montana, Wyoming, and Nebraska. SPP begins the transmission planning process by forecasting load 2, 5, and 10 years into the future in its annual Integrated Transmission Plan (ITP). The region uses a bottom-up approach, relying on individual utilities in the region to provide estimated generation growth and retirements as well as predicted changes in electricity demand.[51] After all utility forecasts are compiled, SPP considers state RPSs.[52] However, most states in the SPP region have already met or exceeded their RPSs and have not increased them.[53]

For SPP to include new generation in its planning, a resource must have a signed generator interconnection agreement (GIA) and PPA or ownership agreement.[54] If these requirements aren't met, SPP will consider planned renewable energy generation and purchases upon request, with projects more likely to be considered if they have a planned or interim GIA or an awarded contract from a utility.[55]

For the models projecting 5 and 10 years out, SPP creates up to three future scenarios which incorporate varying amounts of renewables and inform the ITP.[56] SPP solicits stakeholder feedback during the creation of these futures, potentially creating an opportunity for large buyers to weigh in with their renewable energy pledges. Feedback is solicited through a survey sent along with its annual ITP data requests to stakeholders and through stakeholder meetings.[57]

For ITP19, SPP created two futures, a reference case based primarily on the existing fleet and an emerging technologies scenario, which assumes renewables will see increased deployment.[58] The emerging technologies scenario includes 20 to 40 percent more renewables than the reference case, bringing the 2024 total renewable forecast up to 33 gigawatts (GW) and the 2029 forecast to 39 GW of wind and solar.[59] Transmission planning and future development are handled by SPP's Economic Studies and Transmission Working Groups, each composed of SPP members but open to the public.[60]

MISO

MISO serves all or part of 15 states mainly in the Midwest, as well as Manitoba, Canada, and several southern states, including parts of Mississippi, Arkansas, and Louisiana. MISO produces two load models, one a compilation of the predicted load growth of all 140-plus load serving entities (LSEs) looking 10 years into the future and the other a 20-year forecast produced by an independent research group (currently Purdue University).[61] The two scenarios are then compared, with MISO's annual Transmission Expansion Plan (MTEP) based on the Purdue model.[62]

The annual MTEP includes four 15-year future scenarios each year, including limited, continued, and accelerated fleet changes as well as a future with more distributed resources and emerging technologies.[63] MISO then weights the four futures for all benefit-cost calculations used in transmission planning, with limited fleet change weighted at 25%, continued fleet change at 30%, accelerated fleet change at 20%, and distributed and emerging technologies at 25%.[64] For 2018, the weights were decided by stakeholders' prediction of likelihood, with the renewables penetration averaged across all four futures at only 18% region-wide by 2033.[65] The four futures project between 4.8 and 52.8 GW of wind and solar coming online by 2032, with the average across all four futures at 29.3 GW of new wind and solar.[66] There is currently 80 GW of renewable energy in the MISO interconnection queue.[67] MISO's Planning Advisory Committee (PAC) decides the futures and their weighting. There are several opportunities for stakeholder input at the PAC's monthly meetings during the MTEP creation process. The PAC is composed of one member from each constituent group and is open to all MISO stakeholders; proxies are allowed to ensure each constituent group has representation at each meeting.[68]

According to Eli Massey, Senior Advisor of Policy Studies for MISO, the accelerated fleet change scenario, which predicts 30% renewable penetration by 2033, more than accounts for corporate renewable energy demand.[69]

> "Large customer demand for renewable energy is included in alternative modeling futures on an additive basis that range up to 30% penetration of MISO system load. We believe that level of penetration fully captures the stated goals of large customers and still leaves room for additional growth."[70]
>
> – Eli Massey, Senior Advisor of Policy Studies for MISO.

However, this scenario, the most bullish on renewables with 52.8 GW coming online by 2032, is weighted less than any other scenario at only 20% as of 2018.

ERCOT

ERCOT serves most of Texas, representing about 90 percent of the state's load.[71] ERCOT creates its annual load forecast based on a compilation of load forecasts created by transmission or distribution service providers (TSPs) in the ERCOT region.[72] ERCOT does not mandate how load forecasts are created but suggests including factors such as customer trends, conservation, and changes in the end use of electricity.[73] If load forecasts are not submitted on time by TSPs or are incomplete, ERCOT will create its own forecast based on historical data.[74]

ERCOT's Regional Transmission Plan looks 6 years out for summer peak planning.[75] It considers any project on request, pending approval by ERCOT's Regional Planning Group.[76] ERCOT's base cases model generation from existing and planned units only.[77] ERCOT does supplement its base case with a high wind scenario that is based on historical records for wind energy generation.[78] Every other year, ERCOT also creates a Long Term System Assessment (LTSA) with a 20-year outlook, which considers a wide variety of scenarios as a further supplement to its transmission planning.[79] The most-recent completed LTSA in 2016 created eight scenarios, with three recommended by stakeholders for further analysis.[80] All stakeholder engagement happens through the Regional Planning Group, which meets monthly and is open to all stakeholders and the public.[81] [82] Unfortunately, ERCOT's LTSA modeling software has substantially under-forecasted the demand for, and growth of, wind energy over the past several editions. Additional changes to the model – most likely the capital cost assumptions – could be made to better reflect the probable growth in and demand for wind generation in ERCOT. Of note, as discussed earlier, it was the creation of the competitive renewable energy zones (CREZ), built outside of the normal interconnection planning process, that enabled more than two-thirds of the total megawatts of wind power now available on the system.[83]

CREZ was a solution to a unique problem for renewables in that wind and solar projects are built much faster than transmission projects. Those transmission lines are now assets for use in the coming decades, regardless of fuel source. Today, the CREZ lines are proof that transmission investments pay off: Low-cost renewables, including those enabled by CREZ, reduced wholesale energy expenditures in Texas by about $5.7 billion between 2010 and 2017, significantly saving ratepayers.[84] The lines allow wind, solar, and even Permian Basin oil field load to enrich local economies and provide low cost power across the state. Transmission infrastructure will be critical to taking advantage of Texas' tremendous natural resources and meeting customer demands for affordable, reliable, clean energy well into the future.

IV. CONCLUSION

Transmission planning entities in many of the regions with the best wind and solar resources are not holistically considering the significant, near-term renewable energy goals set by corporate consumers. While corporate renewable energy deals have recently surged, that procurement was mostly enabled by recently completed transmission lines.

However, while both corporates and consumers benefitted from those transmission lines, there are no future transmission builds currently planned on the same scale. And with 47 GW of renewables procurement needed over the next seven years to reach the REBA companies' goal, it remains unclear whether these purchasers will have enough low-cost renewable energy options available when they are ready to act.

To ensure those resources are available, there is a clear need for companies with renewable energy goals to communicate their near-term renewable energy demand to RTOs and other transmission planners. Companies seeking to take action can engage with transmission planners in a number of ways, including:

- joining RTOs as voting members; and
- working with advocacy groups that are active at the RTO level.

AWEA has a long history of RTO engagement in the best wind resource regions and SEIA is similarly ramping up their efforts in 2018 with the continued growth of utility-scale solar power. Alternatively, by joining SPP, ERCOT or MISO as some non-utilities have, corporate purchasers could help shape the transmission planning of the future by directly engaging in the stakeholder process.

In short, without the transmission infrastructure to enable access to the nation's best renewable resources, corporations and all energy consumers stand to lose out on significant cost savings and environmental benefits. And like all governance structures, transmission planning only works for those that participate.

ACKNOWLEDGEMENTS

LEAD AUTHOR:

Wind Solar Alliance - **Kevin O'Rourke**

CO-AUTHOR:

Wind Solar Alliance - **Charles Harper**

REPORT REVIEWERS:

American Wind Energy Association - **Betsy Beck, Sari Fink, Hannah Hunt, Susan Sloan**

REPORT DESIGN:

Kate Ross

ABOUT THE ORGANIZATION

WIND SOLAR ALLIANCE

The Wind Solar Alliance (WSA) is a 501(c)(3) nonprofit organization dedicated to accelerating the transition to renewable energy as a means of strengthening the U.S. economy and reducing the environmental impacts of our energy use. WSA uses research, communications, and advocacy to raise awareness of the benefits of renewable energy and the need for energy and infrastructure policies that recognize and reward those benefits. To learn more, visit: **www.windsolaralliance.org.**

A Renewable America (ARA), a campaign to educate on the economic benefits of the growing wind and solar industries and the transmission and storage technologies that support them, is a project of the Foundation. To learn more, visit: **www.arenewableamerica.org.**

SOURCES

[1] Business Renewable Center (BRC), Corporate Renewable Deals (2013-2018), http://businessrenewables.org/corporate-transactions/.

[2] Id. (3.86 GW procured through August 2018, 3.12 GW procured in 2015).

[3] Michelle Froese, WINDPOWER ENGINEERING & DEVELOPMENT, Apple, Etsy and partners invest in U.S. wind & solar energy, August 6, 2018, available at https://www.windpowerengineering.com/business-news-projects/apple-etsy-and-partners-invest-in-u-s-wind-solar-energy/.

[4] See, e.g., Tina Casey, Corporate Behemoths Break Down Clean Power Barrier With 60 GW Pledge, TRIPLE PUNDIT, May 17, 2016, https://www.triplepundit.com/2016/05/corporate-behemoths-break-clean-power-barrier-60-gw-pledge/.

[5] See BRC supra note 1, http://businessrenewables.org/corporate-transactions/.

[6] See, e.g., Alexander E. MacDonald et al., Nature Climate Change (2016), available at http://www.nature.com/nclimate/journal/vaop/ncurrent/full/nclimate2921.html; Climate Institute, North American SuperGrid, (2017) available at http://cleanandsecuregrid.org/wp-content/uploads/2017/11/supergrid_top.pdf.

[7] MISO, MTEP17 MVP Triennial Review (September 2017), available at https://cdn.misoenergy.org/MTEP17%20MVP20Triennial%20Review%20Report117065.pdf.

[8] See, e.g., Gibson Dunn, RTO/ISO Competitive Transmission Programs, available at https://www.gibsondunn.com/wp-content/uploads/documents/publications/RTO-ISO-Competitive-Transmission-Programs.pdf.

[9] Wind Energy Foundation, Transmission Upgrades and Expansion: Keys to Meeting Large Customer Demand for Renewable Energy (2018), available at https://windsolaralliance.org/wp-content/uploads/2018/01/WEF-Corporate-Demand-and-Transmission-January-2018.pdf at 22-23.

[10] See, e.g., Public Utilities Commission of Texas, Order on Rehearing, Docket No. 33672 (October 2008)

[11] Ernest E. Smith & Becky H. Diffen, Winds of Change: The Creation of Wind Law, 5 Tex. J. Oil Gas & Energy L. 165, 167, 201 (2009-2010).

[12] See generally, Kathryn B. Daniel, Competitive Renewable Energy Zones and the Emerging Regulatory Structure of Texas Wind Energy, 42 Tex. Tech L. Rev. 157 (2009).

[13] Texas State Legislature, Senate Committee Report - Witness List, June 2005, http://www.capitol.state.tx.us/tlodocs/791/witlistbill/html/SB00020S.htm.

[14] Texas State Legislature, State Senate Vote – SB 20, July 2005, http://www.journals.senate.state.tx.us/sjrnl/791/pdf/1sj07-12-f.pdf#page=6 at 6.

[15] Oncor Energy Deliver, CREZ Implementation Background, http://www.oncor.com/EN/Pages/CREZ- Implementation-Background.aspx.

[16] Greening the Grid, Renewable Energy Zones: Delivering Clean Power To Meet Demand, May 2016, https://greeningthegrid.org/resources/factsheets/renewable-energy-zones.

[17] See, e.g., the South Texas Nuclear Project and Monticello Steam Electric Station.

[18] Public Utility Commission of Texas, Commission Staff's Petition for Designation of Competitive Renewable-Energy Zones, Docket No. 33672, available at http://ettexas.com/Content/documents/PUCTFinalOrderonCREZPlan100708.pdf.

[19] Anthony D. Teixeria, Transmission Investments Affect the Value of Your Wind PPA, Rocky Mountain Institute, March 2017, http://businessrenewables.org/wp-content/uploads/2017/05/BRC_ValueofWindPPA_InsightBrief_Final.pdf at 5.

[20] See Appendix A.

[21] Himali Parmar and Shankar Chandramowli, Wind in SPP is Not So Simple, 2017, ICF International, available at https://www.icf.com/resources/white-papers/2017/wind-in-spp-is-not-so-simple at 5.

[22] Id.

[23] American Wind Energy Association, proprietary data, available upon request.

[24] Parmar and Chandramowli, supra note 21; see also, SPP, New Member Cost Allocation Review Process, October 24, 2016, available at https://www.spp.org/documents/43938/new%20member%20cost%20allocation%20review%20process%20final%20review%2020161024.pdf.

[25] Herman K. Trabish, 3 transmission projects that illustrate the importance in modernizing the grid, UTILITY DIVE, June 24, 2016, https://www.utilitydive.com/news/3-transmission-projects-that-illustrate-the-importance-in-modernizing-the-g/420333/.

[26] SPP, The Value of Transmission, January 26, 2016, available at http://www.spp.org/documents/35297/the value of transmission report.pdf.

[27] Rosy Lum, MISO staff include 17 MVP projects in recommended portfolio, TRANSMISSION HUB, November 22, 2011, https://www.transmissionhub.com/articles/2011/11/miso-staff-include-17-mvp-projects-in-recommended-portfolio.html.

[28] Id.

[29] Id.

[30] Trabish, supra note 25.

[31] Matt Prorok, MISO's Triennial Review of Regional Transmission Lines in the Midwest Shows Worthwhile Investment, GREAT PLAINS INSTITUTE, http://www.betterenergy.org/blog/misos-triennial-review-regional-transmission-lines-midwest-shows-worthwhile-investment/.

[32] Id.

[33] Trabish, supra note 25.

[34] Id.

[35] Id.

[36] MISO, Proposed Multi Value Project Portfolio, September 11, 2011, available at https://nocapx2020.info/wp-content/uploads/2014/04/20110919-MVP-Proposed-Portfolio-Business-Case.pdf.

[37] SPP, Integrated Transmission Planning Manual (ITPM), September 7, 2018, available at https://www.spp.org/Documents/22887/ITP%20Manual%20version%202.2.docx at 13 (SPP, for example, considers voluntary RPS).

[38] Interregional transmission lines could help enable the development of more wind and solar energy by connecting grid regions with higher energy costs and the physical locations of corporate facilities with renewable demand to the regions where low-cost wind and solar resources are available. See also, Trabish, supra note 25.

[39] See SPP and PJM sections generally.

[40] See methodology for MISO and ERCOT below.

[41] Warren Lasher, The Competitive Renewable Energy Zones Process, ERCOT, August 11, 2014, https://www.energy.gov/sites/prod/files/2014/08/f18/c_lasher_qer_santafe_presentation.pdf at 3, 8.

[42] PJM, Load Forecasting Model Whitepaper, April 27, 2016, http://www.pjm.com/~/media/library/reports-notices/load-forecast/2016-load-forecast-whitepaper.ashx at 7.

[43] Id., at 23.

[44] PJM, PJM Manual 14B: PJM Region Transmission Planning Process, August 23, 2018, http://www.pjm.com/~/media/documents/manuals/m14b.ashx, at 20, 22.

[45] PJM, Committees, last accessed October 9, 2018, http://pjm.com/committees- and-groups/committees.aspx.

46 PJM, Interconnection / Upgrade Requests, last accessed October 9, 2018, https://www.pjm.com/planning/rtep-development/stakeholder-process/developers.aspx.

47 PJM, Transmission Expansion Advisory Committee (TEAC) charter, https://www.pjm.com/-/media/committees-groups/committees/teac/postings/teac-charter.ashx?la=en.

48 PJM, supra note 44 at 64, 82.

49 PJM, State Agreement Approach, https://www.pjm.com/-/media/committees-groups/task-forces/rpptf/20120907/20120907-state-agreement-approach.ashx.

50 Rich Heidorn Jr., Is RTO Tx Planning Hampering Green Corporate Goals?, RTO INSIDER, April 2, 2018, https://www.rtoinsider.com/decarbonization-transmission-planning-renewable-energy-89711/.

51 SPP ITPM, supra note 37.

52 Id. at 13.

53 Id. at 18.

54 SPP, 2017 Integrated Transmission Plan 10-Year Assessment Report ("10-YR Plan"), January 6, 2017 https://www.spp.org/documents/51179/2017_itp10_report_board%20approved_april2017_final.pdf at 28.

55 Id.; see also, SPP ITPM, supra note 37.

56 SPP ITPM, supra note 37 at 11.

57 Id.

58 SPP, 2019 Integrated Transmission Planning Assessment Scope (ITPAS), available at https://www.spp.org/documents/56206/2019%20itp%20scope%20final.docx at 4.

59 Id.

60 Id.

61 MISO, Planning for Transmission and Generation, available at https://www.misoenergy.org/stakeholder-engagement/learning-center/transmission-basics/; see also, Amanda Durish Cook, MISO Looks to Align Load Forecasting, Tx Planning, RTO INSIDER, January 22, 2018, https://www.rtoinsider.com/miso-load-forecasting-transmission-planning-84614/, and Amanda Durish Cook, MISO Nixes LSE Load Forecast Plan, RTO INSIDER, June 18, 2018, https://www.rtoinsider.com/miso-load-serving-entities-load-forecasts-94639/.

62 Id.

63 Id.

64 Id., at 19. (All weights are for MTEP18. Beginning in MTEP19, MISO will apply equal weights to all futures, but the weights are typically debated each year.).

65 Id., at 20.

66 MISO, MTEP18 Futures Resource Forecast and Siting Review, available at https://cdn.misoenergy.org/20170927%20PAC%20Item%2003d%20MTEP18%20Futures%20Results%20Review89925.pdf at 5.

67 Durish Cook, supra note 21.

68 Constituent groups include eligible end-use customers. The full list is available on the MISO website, available at https://cdn.misoenergy.org/2018%20AC%20Members-Alternates81890.pdf.

69 Heidorn Jr., supra note 50.

70 Id.

71 ERCOT, About Page, available at http://www.ercot.com/about.

72 Id.

73 ERCOT, ERCOT Planning Guide Section 6: Data/Modeling, September 1, 2018, available at http://www.ercot.com/content/wcm/current_guides/53526/06-090118.doc, at 8.

74 Id., at 9.

75 Id.

[76] ERCOT, ERCOT Planning Guide Section 3: Regional Planning, July 2, 2018, available at http://www.ercot.com/content/wcm/current_guides/53526/03-070218.doc, at 7.

[77] ERCOT, ERCOT Steady State Working Group Procedure Manual, April 6, 2017, available at http://www.ercot.com/content/wcm/key_documents_lists/27292/SSWG_Procedure_Manual_ROS_APPROVED_20180301.docx, at 20.

[78] Id., at 21.

[79] ERCOT, supra note 76 at 1.

[80] Id.

[81] ERCOT, ERCOT Transmission Planning Assessments, available at http://www.ercot.com/content/wcm/lists/114740/LTSA-Dec2016-FINAL.pdf at 2.

[82] ERCOT, ERCOT Regional Planning Group Charter, July 1, 2018, available at http://www.ercot.com/content/wcm/key_documents_lists/27283/ERCOT_Regional_Planning_Group_Charter.docx.

[83] Math showing total wind in ERCOT enabled by CREZ divided by total ERCOT wind; data available upon request.

[84] Joshua D. Rhodes, Ideasmiths, Impacts of renewables in ERCOT, Fall 2018, available at http://www.txrenewables.org/, at 2

A Renewable
America