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PROJECT NO. 40268

RULEMAKING TO AMEND PUC SUBST.R.25.505, RELATING TO RESOURCE ADEQUACY IN THE ELECTRIC RELIABILITY COUNCIL OF TEXAS POWER REGION	§ § § § §	BEFORE THE PUBLIC UTILITY COMMISSION OF TEXAS

COMMENTS OF THE SOLAR ENERGY INDUSTRIES ASSOCIATION

The Solar Energy Industries Association ("SEIA") offers these reply comments related to Project No. 40268, a rulemaking to amend PUC Subst.R.25.505.[1]

OVERVIEW

SEIA applauds the Public Utility Commission of Texas ("PUCT" or "Commission") and ERCOT's recognition that resource adequacy is a serious concern for Texas and its ratepayers. SEIA suggests that solar's characteristics make it an ideal resource for ERCOT's current and long-term planning efforts. As a generating resource, solar has a high effective peak capacity value, is quick to market, can be located in a geographically targeted manner, is highly modular and scalable, uses little to no water, has minimal operating and maintenance costs, and has no fuel costs thereby mitigating exposure to commodity price risks.

However, aside from greatly increasing solar capacity in Texas, the Commission should develop additional pricing mechanisms to monetize the unique reliability services and investor risk mitigation solar generation provides. While SEIA agrees that increasing the system-wide offer cap and peaker net margin threshold could catalyze investment in new capacity, the PUCT

[1] The comments contained in this filing represent the position of SEIA as an organization, but not necessarily the views of any particular member.

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should consider whether these modifications are sufficient to address the resource adequacy issue identified by the PUCT, while also achieving ERCOT's "1-in-10" reliability target.

BACKGROUND

Established in 1974, SEIA is the national trade association of the U.S. solar energy industry. Through advocacy and education, SEIA is working to build a strong solar industry to power America. As the voice of the industry, SEIA works with its 1,100 member companies to make solar a mainstream and significant energy source by expanding markets, removing market barriers, strengthening the industry and educating the public on the benefits of solar energy.

With its abundant solar resources, generation shortages, and enormous land and rooftop installation potential, Texas is ripe for solar electric development. Increasing solar capacity in Texas will give the state's electricity consumers access to power when it is needed most over the long term. Plus, solar adds a new dimension to Texas's competitive market and leadership in energy production.

According to Texas's State Energy Conservation Office, the State is first in the nation in solar resource potential.[2] This resource is virtually untapped with less than 80 MW of installed solar to date, making it only 12th in the country for installed solar.[3] However, the Texas solar market grew rapidly in the past year with 47 MWs installed in 2011 alone—a 153% increase in

2 "Solar Energy in Texas," House Research Organization Focus Report, Texas House of Representatives, No. 81-13 (Jul. 20, 2010).

3 SEIA Texas Solar Fact Sheet, *available at* http://www.seia.org/galleries/pdf/2012_TX_Solar_Fact_Sheet.pdf; *see also* "U.S. Solar Market Insight Report: Year-in-Review 2011," GTM Research and SEIA (Jan. 2012) ("SMI Year-in-Review 2011"), *available at* http://www.seia.org/cs/research/SolarInsight.

solar generation over the past year.[4] In addition, 2 MWs of solar was installed in the first quarter of 2012 bringing the cumulative solar photovoltaic capacity in Texas to 76.6 MWs as of the end of Q1 2012.[5]

While 2011 was a year of steady growth for the Texas solar industry, given Texas's unique energy market and resource adequacy issues, there is vast opportunity for expanded solar development in Texas. In the past few years, a significant amount of generation has exited Texas's market, and the state's utilities will continue to retire older generation, worsening reliability issues in the Region. At the same time, Texas's electric demand has risen, with new peak demand records driven by the combination of strong, economic growth and hot summer months. As a result, since 2010, the state's reserve margin has declined precipitously. In 2011, ERCOT's reserve margin was only 13.75%, as compared to 15.5% in NYISO and 17.4% in MISO.[6] Last summer, ERCOT came close to implementing rolling outages due to a lack of generation supply. In its newly revised "Capacity, Demand and Reserves Report," ERCOT predicts a reserve margin of 9.8% as soon as 2014, which is significantly below ERCOT's 13.75% target for electric generation capacity that exceeds the forecasted peak demand on the grid.[7] By 2015, ERCOT expects reserves to drop to 6.9%, with 76,623 MW of resources

4 "Texas Posts 13 Percent Increase in Energy from Renewable Sources," ERCOT Press Release (May 16, 2012), *available at* http://www.ercot.com/news/press_releases/show/517.

5 Of that, 50.1 MWs is utility, and the remainder is residential and commercial. This capacity comes from 2,459 residential systems, 371 commercial systems and 3 utility systems (2,833 systems total). "U.S. Solar Market Insight Report: Q1 2012," GTM Research and SEIA, *available at* http://www.seia.org/cs/research/SolarInsight.

6 "Report on the Capacity, Demand, and Reserves in the ERCOT Region," ERCOT (Dec. 2011), at p. 6 *available at* http://ercot.com/content/news/presentations/2012/CDR_2011WinterUpdate.pdf.

7 "Report on the Capacity, Demand, and Reserves in the ERCOT Region," ERCOT (May 2012), at p. 7 ("CDR 2012 Report") *available at* http://www.ercot.com/content/news/presentations/2012/CapacityDemandandReserveReport-2012.pdf. The 13.75% target planning reserve margin, approved by the ERCOT Board in 2010, is set to ensure enough power is available for contingencies such as extreme weather and unplanned power plant outages.

available to serve peak demand of 71,692 MW.[8] By 2020, under average weather conditions, ERCOT forecasts a peak demand of 82 GW.[9]

In its 2011 Long Term Reliability Assessment Plan, NERC expressed apprehension with ERCOT's reliability, noting that, "In ERCOT, the NERC Reference Margin Level is not projected to be met by 2013, raising significant concerns of resource adequacy."[10] In addition, "Because these issues are reflected in the relatively short-term and the isolated nature of the Texas Interconnection, ERCOT may face challenges building or acquiring new resources over the next two years."[11] Thus, new generation capacity is critical if ERCOT wants to avoid brownouts and reliability concerns, and solar electric generation is an ideal resource to meet the state's growing needs.

SPECIFIC COMMENTS

I. Solar Is a Necessary Component of a Balanced, Reliable Generation Portfolio

In Project Nos. 40268 and 37897, the Commission highlights a shrinking reserve margin and the state's very near-term resource adequacy concerns. SEIA applauds the PUCT for the recent and ongoing efforts to address resource adequacy.[12] However, evaluating resource adequacy[13] is only half of the solution, and system quality[14] must also be considered in order to

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8 *Id.*

9 "2012 ERCOT Panning Long-Term Demand and Energy Forecast," ERCOT (Dec. 2011), at p. 9, *available at* http://www.ercot.com/content/news/presentations/2012/2012%20Long-Term%20Hourly%20Peak%20Demand%20and%20Energy%20Forecast.pdf.

10 "2011 Long-Term Reliability Assessment," NERC (Nov. 2011), *available at* http://www.nerc.com/files/2011LTRA_Final.pdf, at p. 5.

11 *Id.*

12 Some examples of existing PUCT resource adequacy efforts include: ERCOT NPRR427, ERCOT NPR435, ERCOT NPR442, ERCOT NPR428, ERCOT NPR434, and ERCOT NPR451.

13 Resource adequacy is defined as having enough of the right kinds of resources to match supply and demand across time and geography to ensure reliability.

achieve ERCOT's target reliability standard of "1 loss of load event in 10 years."[15] This currently translates into a 13.75% reserve margin.[16]

Representing less than 1% of ERCOT's peak resource mix today[17], solar could provide important reliability services unique to the resource over the next few years, and is therefore a necessary component in accelerating investment in a balanced, dependable ERCOT resource portfolio. In fact, solar can deliver more than just energy and capacity to Texas electricity markets. Studies across various electric service territories all recognize additional benefits unique to solar generation, including generation diversity, fuel price mitigation, outage risk protection, extreme weather impact[18] and long-term economic growth components. When studying the impacts of solar penetration on the western grid, the National Renewable Energy Laboratory ("NREL") found that solar contributes to resource adequacy, and with up to 20% penetration, NREL observed no adverse grid impacts (given proper balancing area cooperation).[19] As a generating resource, solar has a high effective peak capacity value, is quick to market, can be located in a geographically targeted manner, is highly modular and scalable, uses little to no water, and has minimal operating and maintenance costs, and has no fuel costs

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14 System quality is defined as the short-term, reliable operation of the power system as it moves electricity from generating source to retail customer by providing balancing and ancillary services.

15 ERCOT (2010a).

16 When the Loss of Load Expectation (LOLE) model is updated to include 2011 weather data, ERCOT's model reflects a need for 15.75% reserve margin in order to maintain 0.1 LOLE. *See* "ERCOT Investment Incentives and Resource Adequacy," The Brattle Group (Jun. 2012) ("ERCOT Brattle Group Report"), *available at* http://www.ercot.com/content/news/presentations/2012/Brattle%20ERCOT%20Resource%20Adequacy%20Review%20-%202012-06-01.pdf

17 CDR 2012 Report at p. 42.

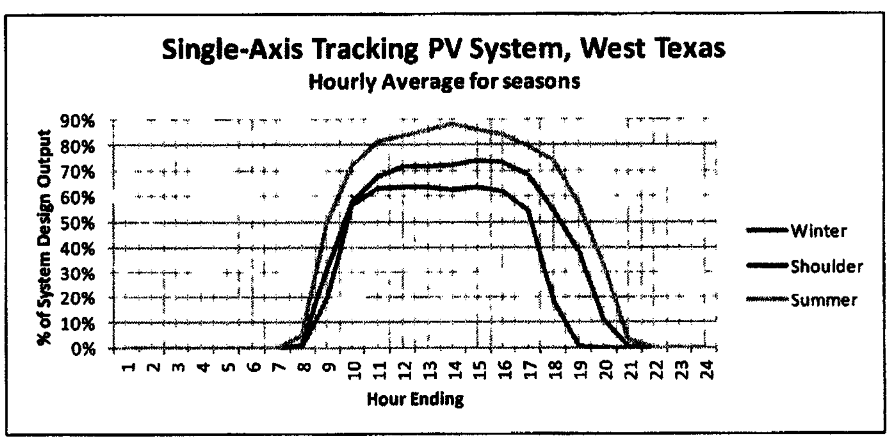
18 Extreme weather impact refers to extremely above normal temperatures like those experienced on August 3, 2011.

19 "How Do High Levels of Wind and Solar Impact the Grid? The Western Wind and Solar Integration Study," National Renewable Energy Laboratory (Dec. 2010), *available at* http://www.nrel.gov/docs/fy11osti/50057.pdf.

thereby mitigating exposure to commodity price risks. These resource characteristics make solar an ideal resource for ERCOT's current and long-term planning efforts.

A. Solar energy production coincides with peak demand

On August 3, 2011, the ERCOT system reached a peak demand of ~68.7 GW between 4 and 5 p.m. At this same time, photovoltaic systems in west Texas were at near peak production. As indicated by the green line in Figure 1 (below), solar's peak production is closely aligned with ERCOT's summer system demand. Because of this, solar has a high coincident peak factor and an effective capacity value of 33%.[20] Concentrating solar plants with thermal energy storage have capacity values in the range of 90% to 95%, similar to conventional thermal generating plants.[21] This coincidence helps reduce the need to run older, expensive peaking units, reduces the risk of emergency events during high demand periods and reduces the need to drop industrial load. Further, when solar is paired with on-site firming resources such as battery storage or standby generation, system demand and generation can be aligned and the effective capacity value of solar can be improved to be a non-peaking resource, too.



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20 "ERCOT Long-Term Seasonal Assessment," ERCOT (Dec 2010), at pg 39.

21 *Id.*

Figure 1

Single-Axis Tracking PV System Plant Production in West Texas

B. Solar energy is highly scalable and quick to market

Solar energy is unique in that it can be installed at the same rate as load growth, which, when combined with solar's quick development timeline, means solar can go online and meet load faster than any other resource. Unlike almost all other generation resources, solar is scalable and can be effectively deployed at both a residential, commercial and utility scale, which allows solar to provide ancillary services at both transmission and distribution service levels. Due to the modular nature of solar installations, as long as the space exists to expand, solar plants can continue to grow in concert with load growth, rather than having to wait for the sporadic deployment nature of central-station, conventional power plants.

Solar generation is also able to respond to grid needs quicker than any other resource. The average construction time[22] for a utility-scale solar electric plant in ERCOT has been 18 to 24 months; however, much faster solar development timelines have been realized in the field, and are certainly possible in Texas.[23] The average construction time for a smaller installation on a home or business is approximately two months. Arizona, which has similar solar resources as Texas, deployed more than 270 MW of PV in 2011.[24] A combine-cycle gas turbine takes approximately 36 months to construct and come online.[25]

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22 Construction time is defined as the period from the date of contract execution to when the plant is interconnected and online.

23 SunEdison's *Webberville* (30 MWac) project with Austin Energy was constructed in approximately ten months. FirstSolar's *Blythe* (21 MWac) project in California was constructed in approximately 6 months.

24 SMI Year-in-Review 2011 at p. 53.

25 "Natural Gas Combined-Cycle Plant," DOE/National Energy Technology Laboratory (May 2007), at pg 3

In the PUCT-created Competitive Renewable Energy Zones ("CREZs"), solar power plants could be sited especially fast given the transmission resources already in place or under construction. The CREZ projects are designed to move electricity generated by renewable energy sources (primarily wind today) from the remote parts of Texas (i.e., West Texas and the Texas Panhandle) to more heavily populated areas of Texas. Facilitated by the readily-available transmission and expeditious siting process, the Texas CREZ alleviates this and other issues, enabling large solar plants to come online quickly, serving peak loads in Houston, Dallas and other high population centers during periods of low wind production in West Texas. New solar generation in West Texas would contribute to near term resource adequacy needs improving utilization of transmission resources, and provide for a quicker return on investment on the already dedicated construction costs of building transmission in the CREZs.

C. Solar energy can be sited in a targeted geographic region

Solar PV allows for very targeted generation deployment, even down to a precise location on an identified feeder. Conventional power plants do not have the capability to be installed in such a refined, geo-targeted way.

For instance, the Houston and Dallas load pockets are stressed areas of ERCOT's nodal system. Because of land restrictions, challenging permitting processes and "not-in-my-backyard" ("NIMBY") objections, construction of new conventional plants near the load pockets in Harris and Dallas Counties is limited. In both of these counties, utility-scale and DG solar deployment can help bridge near-term resource adequacy needs for both Houston and Dallas load pockets and mitigate west-to-north transmission constraints.[26]

In addition, distributed solar plants are often sited near load, which results in reduced distribution line losses (in addition to transmission losses) that can occur when moving power from central-station plants to load. A study conducted by Austin Energy demonstrated these line savings were 5-10% of generation.[27] Another study on the state of New York shows that the value of the avoided transmission losses due to DG can be greater than the locational-based marginal price ("LMP") "because solar energy naturally coincides with periods of high LMP."[28]

D. Solar energy requires little to no water to operate

Reliability extends beyond the capacity of the generation fleet, and includes the critical supply chains relied upon for proper operation of the fleet. Drought conditions, if severe enough, could impact the water needs of existing generation resources. ERCOT has wisely taken several actions to manage the impact of the drought on generation resources, including selecting generators that are designed to conserve, reuse and recycle water.

In general, all solar power technologies use a modest amount of water (approximately 20 gallons/MWh for cleaning the panels). For comparison, a typical family uses about 20,000

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26 Harris County reflects only 1.8 GW of new generation being constructed in the county through 2016 while Dallas County currently has no plans for new conventional plants. CDR 2012 Report at tab Summer Capacities.

27 "The Value of Distributed Photovoltaics to Austin Energy and the City of Austin," Clean Power Research LLC (Mar. 2006) at p. 26 ("Austin Energy Study"), *available at* http://www.austinenergy.com/about%20us/newsroom/reports/PV-ValueReport.pdf.

28 "Solar Power Generation in the US: Too expensive, or a bargain?" R.Perez, K.Zweibel, T.Hoff (2011) at p.6, *available at* http://www.asrc.cestm.albany.edu/perez/2011/solval.pdf.

gallons of water each year.[29] Photovoltaic solar plants use no water to generate power since sunlight is converted directly to electricity; water use is limited to semi-annual panel cleaning. If water-hungry conventional power plants are given development preference over solar, water allocated for electric generation will become even more scare, further limiting electric generation development. As illustrated by these figures, ERCOT's support of solar as a reliability resource is aligned with other ERCOT initiatives designed to conserve water.

E. Solar energy serves as a hedge against volatile conventional fuel costs

Finally, solar energy has minimal operations and maintenance costs, and no fuel costs, which eliminates the risks inherent in commodity prices. For instance, the Austin Energy Study quantified the value of PV as a hedge against volatile fuel to be approximately 50% of the current cost of generation (~$0.03-$0.05 per kWh).[30]

In fact, the levelized cost of energy ("LCOE")[31] for solar has markedly decreased in the past few years. Since 2008, the solar market has rapidly commoditized as global installed capacity has reached 26.5 GW in 2011, of which only 7% was in the United States.[32] Similarly, the commodity price dropped 35% between 2008 and 2010 for solar while conventional generation plants only saw a 3%-5% decline in generation capital costs.[33] It is projected that the capital costs for a commercial rooftop solar installation could be reduced by 40% (to $1.70 per

29 "Concentrating Solar Power Commercial Application Study: Reducing Water Consumption of Concentrating Solar Power Electricity Generation." Report to Congress," U.S. Department of Energy, *available at* http://www.nrel.gov/csp/pdfs/csp_water_study.pdf.

30 Austin Energy Study at p. 62.

31 LCOE is defined as the price at which electricity must be generated from a specific source for the owner to break even on its investment.

32 *See* SMI Year-in-Review 2011.

33 "Cost and Performance Data for Power Generation Technologies: Prepared for the National Renewable Energy Laboratory," Black & Veatch (Feb. 2012) at p. 39, *available at* http://bv.com/docs/reports-studies/nrel-cost-report.pdf.

watt) by 2015 and approximately an additional 30% by 2020 (to $1.20 per watt).[34] With an expected 35-year lifespan, solar resources put into service in the very near future will be cost-effective components of diverse supply portfolios, while conventional fuel plants might be burdened with high, volatile fuel costs and expensive environmental mitigation requirements.

II. New Pricing Mechanisms Are Necessary to Maintain Reliability in ERCOT

SEIA agrees that increasing the system-wide offer cap and peaker net margin threshold could catalyze investment in new capacity. However, SEIA and its members believe that the Staff should consider whether these modifications are sufficient to address the resource adequacy issue identified by the PUC, while also achieving ERCOT's "1-in-10" reliability target. Specifically, additional pricing mechanisms should be developed to monetize the unique reliability services and investor risk mitigation provided by solar generation. These benefits of solar generation provide more refined solutions to ERCOT's specific resource adequacy and system quality issues and are consistent with recommendations prepared for ERCOT by The Brattle Group in the recent *ERCOT Investment Incentives and Resource Adequacy* report ("ERCOT Brattle Group Report").[35]

In its proposal, Staff questioned whether the use of the peaker net margin ("PNM") is an appropriate trigger for new capacity in an energy-only market or whether there is a more appropriate metric to trigger the system-wide offer cap ("SWOC") being reset.[36] The current PUCT requirements and proposed revisions to the scarcity pricing mechanisms will not facilitate

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[34] "Solar Power: Darkest Before Dawn," McKinsey & Company (May 2012) at p. 4, *available at* www.mckinsey.com/Client_Service/.../Latest.../SRP_solar.ashx.

[35] ERCOT Brattle Group Report at p. 4.

[36] "Staff Recommendation: Proposal for Publication of Amendments to § 25.505 for Consideration at the April 12, 2012 Open Meeting," PUCT Project No. 40268 (Apr. 5, 2012), at p. 4.

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solar deployment. In the ERCOT Brattle Group Report, ERCOT is projected to "experience an annual average of 0.9 loss-of-load events, and is exposed to the risk of experiencing more than 30 loss-of-load hours under extreme 2011 conditions."[37] Even under the highest price caps this is not aligned with ERCOT's "1-in-10" reliability target. Given the merits of solar described above, more consideration needs to be paid to diversifying the ERCOT generation fleet by introducing new market pricing mechanisms to maintain adequate system reliability; the resource adequacy solutions proposed in this Project alone are not enough.

By creating a prudent pricing mechanism that sends clear signals to the market and facilitates increased deployment of solar in ERCOT, incremental solar could significantly reduce short-term wholesale energy prices. Specifically, in a soon-to-be-released study, the Brattle Group estimates that adding 1,000 MW of solar could have reduced the average wholesale energy prices by approximately $0.60 per MWh[38]. Further, if more solar had been deployed during summer 2011, the Brattle Group suggests that the "added solar PV generation could have had a value to consumers of between $155-$281/MWh during the summer of 2011."[39]

The peak generation profile coupled with rapid distribution or transmission-level deployment of solar makes it a necessary solution to ERCOT's near-term resource adequacy concerns and long-term reliability planning efforts. With the near-term resource adequacy concerns, enhancing pricing offers may stimulate construction but will not necessarily speed-up the construction timeline. Thus, the PUCT and ERCOT should encourage development of quick-to-market resources, such as solar. With the consideration of additional pricing

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[37] ERCOT Brattle Group Report at p. 64.

[38] Forthcoming report from the Brattle Group, "The Impact of Solar PV on Electricity Markets in Texas," (Jun. 19, 2012), Executive Summary, p. 1. SEIA will provide a final copy to the PUCT.

[39] *Id.*

mechanisms to capture multiple elements of ERCOT's reliability needs (e.g. near-term peaking capacity), solar could be deployed and begin increasing the reserve margin quickly. Industry average for concept to start-up is 18 months, with permitting being the major factor.

CONCLUSION

SEIA respectfully requests that the PUCT broaden the resource adequacy conversation to include market enhancements that provide for ERCOT system reliability. Similarly, SEIA requests that in the new project that Chairwoman Nelson has directed Staff to open[40], the PUCT consider additional pricing mechanisms to facilitate deployment of reliable resources, including solar. In the meantime, the PUCT should increase the system-wide offer cap and peaker net margin threshold to catalyze investment in new capacity.

Respectfully submitted,

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ATTORNEYS FOR THE SOLAR ENERGY INDUSTRIES ASSOCIATION

[40] PUCT Project No. 37897- *P.U.C. Proceeding Relating to Resource and Reserve Adequacy and Shortage Pricing*. Item No. 153 (Jun. 2012).