**PROJECT NO. 40000**

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| **COMMISSION PROCEEDING TO ENSURE RESOURCE ADEQUACY IN TEXAS** | **§** | **PUBLIC UTILITY COMMISSION OF TEXAS** |

## COMMENTS OF THE SOLAR ENERGY INDUSTRIES ASSOCIATION

The Solar Energy Industries Association ("SEIA") offers these comments related to Project No. 40000, a proceeding to ensure resource adequacy in Texas.[1]

## OVERVIEW

SEIA respectfully submits these comments to provide the Public Utility Commission of Texas ("Commission") with guidance on how solar can assist ERCOT with maintaining system reliability in a cost-effective manner. SEIA also provides recommendations that it will submit to ERCOT to improve how ERCOT evaluates solar's valuable resource contribution as part of its resource planning efforts.

## BACKGROUND

Established in 1974, SEIA is the national trade association of the U.S. solar energy industry. As the voice of the industry, SEIA strives to provide effective advocacy and education to strengthen the U.S. solar energy industry, including solar photovoltaic ("PV") and

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

concentrating solar power ("CSP") systems of all sizes.[2] SEIA is comprised of 1,100 member companies that conduct business throughout the solar energy industry supply chain.[3] SEIA works with its member companies to make solar a significant mainstream energy resource by expanding markets, removing market barriers, and educating the public and key stakeholders about the benefits of solar energy.

As SEIA stated earlier in the Commission's resource adequacy discussions,[4] solar offers a variety of important and unique benefits that enable solar to effectively help maintain near-term and long-term system reliability in ERCOT in a cost-effective manner. These important and unique benefits, in combination with the state's abundant solar resource potential, high peak electricity demand, and enormous land and rooftop potential, make Texas ideal for solar development. According to both the State Energy Conservation Office in Texas[5] and a recent National Renewable Energy Laboratory ("NREL") study,[6] Texas has the highest potential for solar in the nation. The state accounts for roughly 14% (38,993 TWh) of the entire estimated U.S. technical potential for utility-scale solar PV and 20% (22,786 TWh) for utility-scale CSP.

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2 For purposes of these comments, SEIA defines "utility-scale" as a solar system connected on the utility-side of the meter and "distributed solar generation" ("solar DG") as a system connected on the customer-side of the meter. Solar PV systems, in both categories, can vary in terms of size. For example, a utility-scale solar PV system can range from 5MW to 150MW and a solar DG system can range from 5kW to 5MW.

3 *See* Appendix A for a map of solar energy companies currently operating in Texas.

4 *See* "Comments of the Solar Energy Industries Association," Project No. 40268 (June 15, 2012) ("SEIA's Comments in Project No. 40268").

5 *See* "Solar Energy in Texas," House Research Organization Focus Report, Texas House of Representatives, No. 81-13 (July 20, 2010).

6 *See* "U.S. Renewable Energy Technical Potentials: A GIS-Based Analysis, NREL Technical Report" at 8, NREL/TP-6A20-51946 (July 2012) ("NREL Technical Potentials Report"), *available at* http://www.nrel.gov/docs/fy12osti/51946.pdf.

While solar production in ERCOT increased by 33% in 2013 to 178,326 MWh,[7] Texas installed only 75 MW of solar last year, bringing the cumulative installed solar capacity in the state to 213 MW, ranking it 13th in the nation.[8] These comments are provided to further demonstrate that the state should take advantage of its tremendous solar resource potential given the fact that solar is a predictable, reliable and cost-effective generation resource that can help maintain near-term and long-term system reliability in ERCOT.

## SPECIFIC COMMENTS

### I. Solar Will Help ERCOT Maintain Reliability

#### a. Today's advanced weather forecasting technology and geographically dispersed solar generation systems allow solar to provide reliable, predictable power in ERCOT.

Advancements in weather forecasting technology have significantly improved the predictability of solar generation output over time. This predictability allows ERCOT to reliably manage solar generation across the grid. Along with this improved predictability, the geographically diverse location of solar PV power plants throughout ERCOT significantly reduces potential system variability in solar generation output that could result from localized cloud coverage over individual solar PV power plants.[9] On an aggregated, ERCOT-wide basis,

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7 *See* "Quarter/Annual Renewable Energy Generation in Texas by Technology Type," ERCOT (May 19, 2014), *available at* https://www.texasrenewables.com/publicReports/rpt8.asp.

8 *See* "U.S. Solar Market Insight Report: 2013 Year in Review," GTM Research and SEIA at 9 (March 2014) ("SMI 2013 YIR"), and "U.S. Solar Market Insight Report: Q1 2014," at 49 (June 2014) ("SMI Q1 2014") *available at:* http://www.seia.org/research-resources/us-solar-market-insight

9 As a recent example, in a study by General Electric International ("GE") on the integration of wind and solar generation in the PJM territory, GE found that PJM's large geographic footprint significantly reduces the magnitude of variability-related challenges and noted that an individual solar PV power plant's variability is significantly reduced when solar is located in a geographically diverse manner throughout PJM. *See* "PJM Renewable Integration Study," General Electric International, Inc. at 12 and 15 (Feb. 28, 2014) ("GE Study"), *available at* http://pjm.com/~/media/committees-groups/task-forces/irtf/postings/pris-executive-summary.ashx.

utility-scale and distributed solar generation ("solar DG") provide dependable, predictable benefits to the ERCOT grid, even in the event that solar generation output varies at a few individual locations due to localized cloud coverage.

In recognition of solar as a reliable generation resource, ERCOT's Emerging Technologies Working Group ("ETWG") is currently evaluating best practices for solar PV generation resource forecasting. Given the fact that there is over 2.8 gigawatts ("GW") of solar PV generation at various stages of the interconnection process at ERCOT,[10] ETWG recently introduced Nodal Protocol Revision Request ("NPRR") 615[11] to establish a standardized, centralized and coordinated forecasting methodology for solar PV generation resources that will provide ERCOT with greater visibility of expected system conditions for system reliability purposes. ERCOT is expected to issue a request for proposal ("RFP") this summer for a vendor to assist with the development of the forecasting and related telemetry requirements. ERCOT anticipates that it will have the new solar PV generation resource forecasting tool in place before the summer of 2015. SEIA applauds ERCOT's recognition of the importance of having solar generation resource forecasting to more fully integrate solar generation into the ERCOT market and believes that the new forecasting tool will further improve the predictability of solar generation in ERCOT. Greater predictability of solar generation will enable ERCOT to fully optimize solar as a generation resource that can effectively contribute toward ERCOT system reliability.

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[10] Currently, there are 3,457 MW of solar generation in various stages of ERCOT's interconnection process. *See* ERCOT System Planning Monthly Status Report (April 2014).

[11] NPRR 615, PVGR Forecasting, was filed on April 16, 2014 and was recommended for approval by ERCOT's Protocol Revision Subcommittee ("PRS") at its June 11, 2014 meeting.

**b. Solar generation output in Texas closely aligns with ERCOT's peak electricity demand, providing significant reliability benefits to the ERCOT Grid.**

As noted by SEIA earlier in the Commission's resource adequacy discussions,[12] as a generation resource, utility-scale solar PV power plants have a high peak capacity value because their generation output closely aligns with ERCOT's peak demand. For example, as illustrated

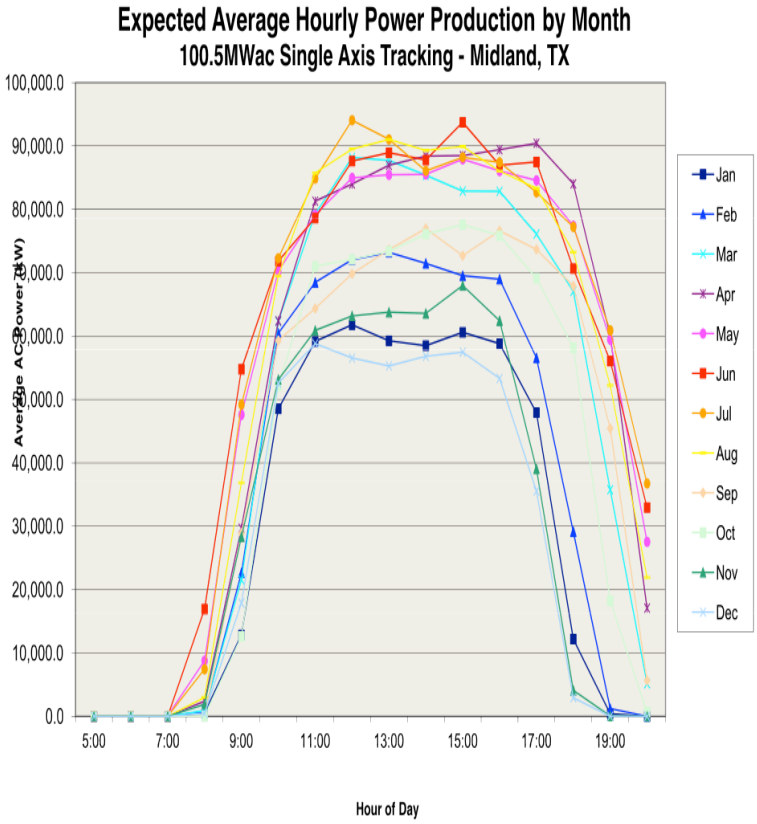


**FIGURE A**

in Figure A, ERCOT reached a summer peak demand of approximately 68.7GW between 4pm and 5pm on August 3, 2011. During this time, solar PV power plants in West Texas were at or near peak production. The yellow line in Figure A shows that solar PV's peak production was closely aligned with ERCOT's summer peak demand on that day.

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[12] *See* "Comments of the Solar Energy Industries Association," Project No. 40000 at 10-11 (Oct. 22, 2012).

As shown by Figure B below, solar resources in Texas closely align with ERCOT's peak demand, indicating that solar energy technologies can effectively reduce peak load in Texas and contribute to grid reliability during peak demand periods. Figure B models the impact that 8 GWdc[13] of solar PV generation, deployed in each zone in proportion to that zone's share of non-coincident peak load, would have on peak load during four days in August 2010. Both utility-scale and solar DG PV systems provide this significant peak reduction benefit.[14] Due to solar PV's close alignment with ERCOT peak demand, solar has a high peak capacity value of approximately 65% to 80%.[15] Additionally, when combined with on-site firming resources, such

[13] The DC size of a system is a function of the measured output of all the panels under standard test conditions. The AC size of a system is defined by the maximum output of all the inverters (there may be one or many inverters on a system). The DC size is almost always larger than the AC size, because even though inverters are extremely efficient (95%-98.5%), some energy is lost so there is always more energy going into the inverter than coming out of the inverter.

[14] Please note that this measures a plant with 65% fixed panels and 35% single-axis tracking with zero tilt panels. The Y axis is in MWac.

[15] Looking at data from the peak load hour in August 2010, fixed tilt would be about 66% of its AC capacity rating and 55% of its DC capacity rating. Single axis tracking would be about 84% of its AC capacity rating and 70% of its DC capacity rating.

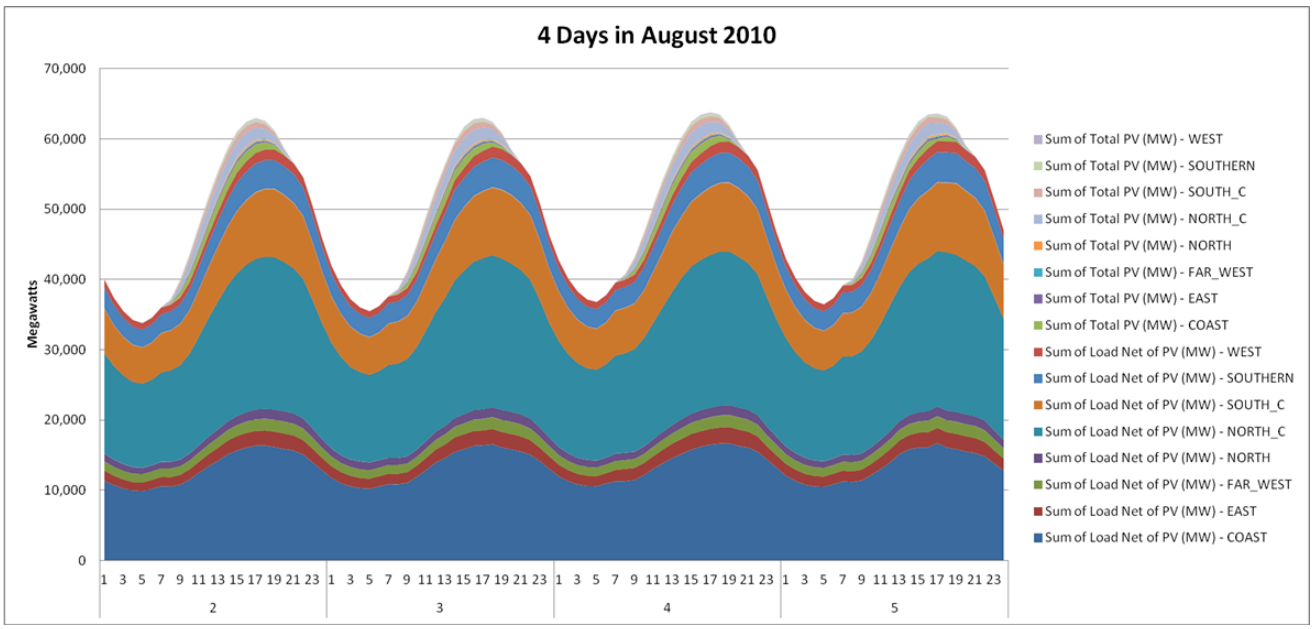


**FIGURE B**

as battery storage or standby generation, solar PV power plants can align with ERCOT system demand to increase their capacity value to the level of a non-peaking resource.

As a distributed resource, solar DG can help ERCOT meet overall system demand by reducing peak demand from residential and small commercial customers. Residential and small commercial customers account for a significant percentage of ERCOT's peak demand. For example, on August 3, 2011, residential and small commercial customers accounted for 72% of ERCOT's peak demand, which was a significant increase from the 52% that residential and small commercial customers typically account for during off-peak, low-load periods.[16]

As stated in the Brattle Group's initial June 2012 study, ERCOT could potentially reduce peak demand by 8-15% if load-side resource penetration, such as demand response, is increased among residential customers.[17] The Brattle Group also stated that the most important demand

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16 *See* "ERCOT Investment Incentives and Resource Adequacy," Brattle Group, Project No. 40000 at 92, Figure 31 (June 2012).

17 *See id*. at 90.

response opportunities are those achievable during summer peak demand periods.[18] Therefore, increased penetration of load-side resources, such as solar DG, that can reduce summer peak demand from residential and small commercial customers can also help ERCOT maintain reliability by achieving the significant peak demand reductions envisioned by the Brattle Group.

**c. Solar power plants, both utility-scale and DG, can be built quickly to meet ERCOT's load growth.**

Utility-scale solar power plants and solar DG can be built in a much faster timeframe than conventional power plants to meet the state's load growth. Compared to a gas plant that requires a construction timeline of approximately 3 years, a solar power plant, on average, can be built in approximately 18 to 30 months, and in some cases, depending on its size, a solar PV power plant can be built in a shorter 6 to 10 month timeframe.[19] A solar DG installation can be built in approximately two months.[20]

**d. Solar PV power plants, both utility-scale and DG, and CSP plants can be deployed in a targeted manner to reduce congestion in specific areas of the ERCOT grid.**

Along with a shorter construction timeline, unlike conventional power plants, solar PV utility-scale and DG power plants and CSP plants can be scaled up or down to meet load growth in a specific congested area. For instance, solar PV utility-scale and DG power plants can be used to meet increased demand in West Texas where oil and gas drilling and exploration have resulted in significant spikes in electricity demand, or in densely populated urban areas, such as the Houston and Dallas-Fort Worth areas, where less land is available for new generation plants

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18 *See id.* at 91.

19 *See* SEIA's Comments in Project No. 40268 (SunEdison's 30MW Webberville project with Austin Energy was built in approximately 10 months. First Solar's 21MW Blythe project in California was built in approximately 6 months).

20 *See id.*

and expanded transmission-distribution infrastructure. The targeted deployment of solar PV utility-scale and DG power plants in congested areas could also provide cost relief to customers experiencing high electricity prices in these areas, defer costly new transmission upgrades and new transmission line construction, and provide relief to the overall ERCOT transmission system, thereby helping ERCOT maintain grid reliability particularly during the strained summer months.

**e. CSP plants, with thermal energy storage ("TES"), can help maintain the stability and reliability of the ERCOT grid.**

CSP is a utility-scale generation resource that produces electricity by using mirrors to concentrate the thermal energy of the sun, producing high temperatures to generate the steam that drives conventional turbines. The heat can either be used immediately to generate steam and produce electricity, or when combined with TES, to "charge" a thermal storage system that can be used later to make the steam and produce electricity. The addition of TES enables CSP plants to operate like gas plants, but without the need to buy fuel to produce power.

CSP plants, with TES, are dispatchable generation resources that can provide significant operational flexibility and help maintain grid stability and reliability in ERCOT by providing ancillary services, such as ramping regulation and responsive reserve service. CSP plants, with TES, provide predictable, firm power, which can be counted on with near certainty on a day-ahead basis, at any time of the day or night by ERCOT. CSP plants, with TES, can also provide ERCOT and utilities with the ability to shift power production to whenever it is needed to meet system demand or rapid generation supply changes.

## II. Solar PV is a Cost-Effective Resource

### a. Recent declines in installed costs of solar PV make solar a cost-effective resource.

As shown in Figure C, the U.S. solar PV industry has experienced rapid price declines (green line) over the past several years as solar capacity (blue bars) has increased in the U.S.

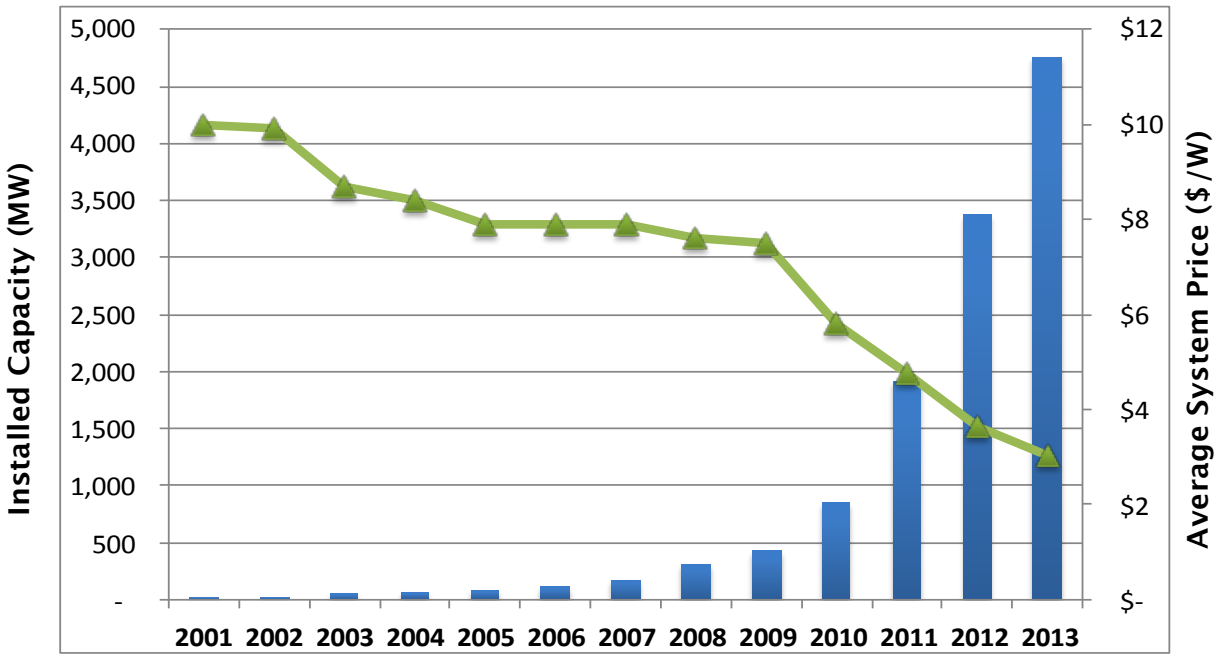


**FIGURE C**

The price to install solar PV in all Texas market segments - residential, commercial, and utility-scale - has also declined significantly. Over the past four years, the average price to install a residential system has fallen by over 40% (from $6.02/W to $3.59/W), a non-residential system by over 40% (from $5.09/W to $3.05/W), and a utility-scale PV system by more than half (from $4.05/W to $1.85/W).[21] Recently, Recurrent Energy announced that it was awarded a

[21] *See* SMI 2013 YIR at 67, *available at* http://www.seia.org/research-resources/us-solar-market-insight.

contract by Austin Energy for a 150MW capacity solar installation in West Texas. Austin Energy said its best offers were around 5 cents/kwh with a long-term contract, making it one of the least-cost solar power deals in the country to date.[22]

Lawrence Berkeley National Lab's ("LBNL") recent "Tracking the Sun VI" report confirms the dramatic price declines in residential and commercial PV system installations as shown in Figure D.[23]

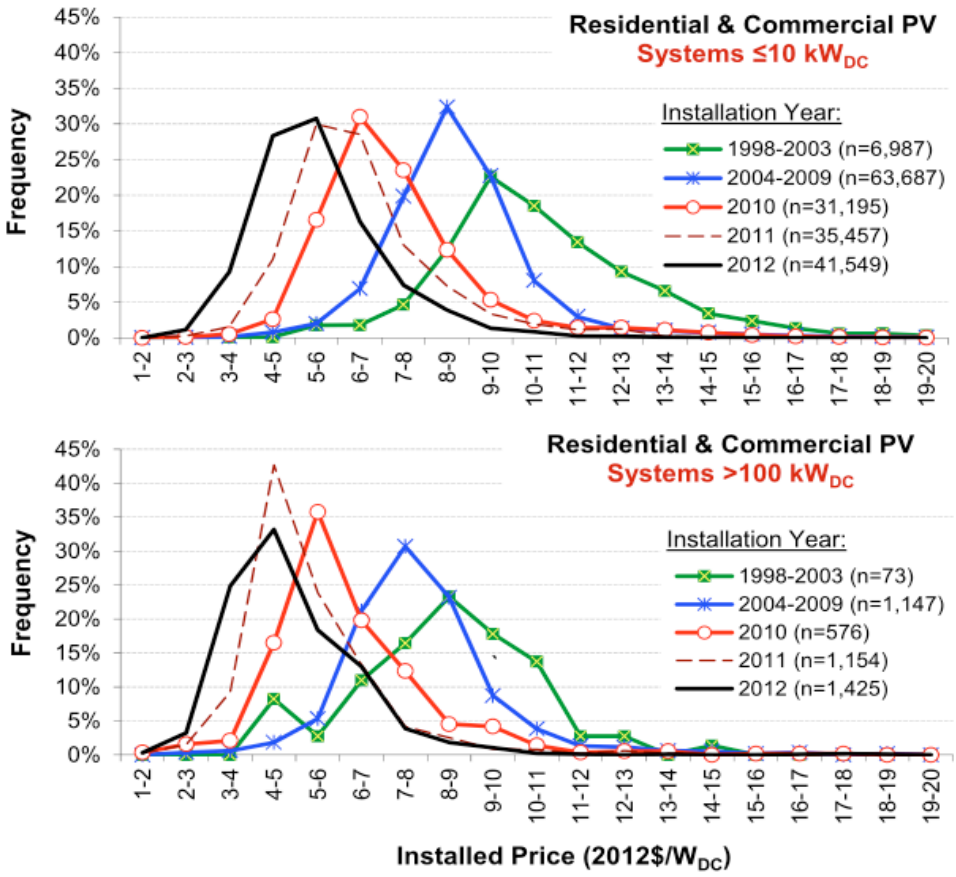


**FIGURE D**

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22 *See* "Recurrent Energy Set to Build Largest Texas Solar Plant," Collin Eaton, Fuel Fix (May 15, 2014), *available at* http://fuelfix.com/blog/2014/05/15/recurrent-energy-set-to-build-largest-texas-solar-plant/.

23 *See* "Tracking the Sun VI: A Historical Summary of the Installed Price of Photovoltaics in the United States from 1998 to 2012," G. Barbose, N. Darghouth, S. Weaver, and R. Wiser, NREL at 22 (July 2013), *available at* http://emp.lbl.gov/sites/all/files/lbnl-6350e.pdf.

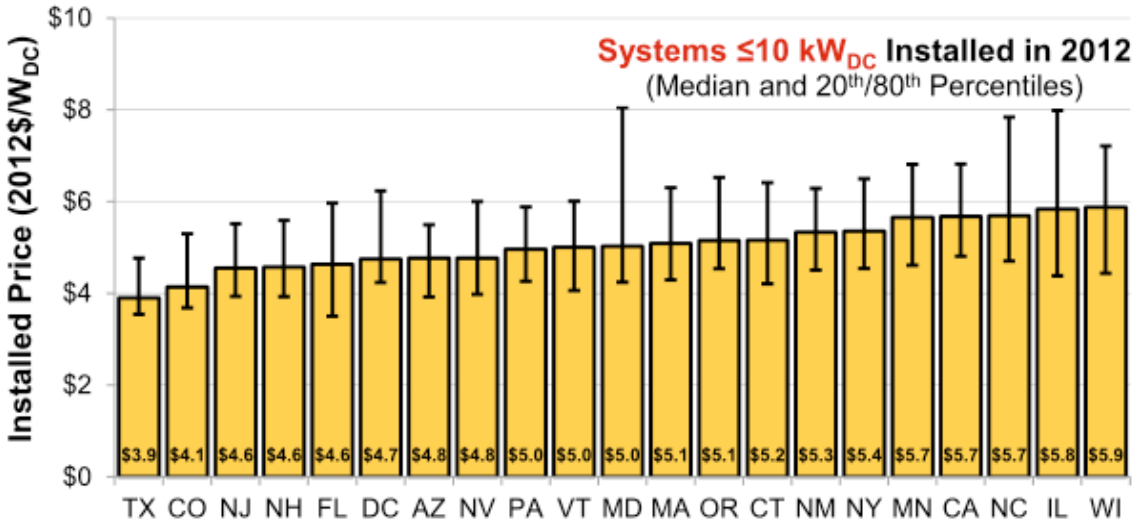


**FIGURE E**

In addition, Figure E shows that Texas leads the nation in low-cost solar system installations under 10kW (typically residential systems).[24]

**b. Solar generation provides important financial hedging benefits**

Solar generation's lack of fuel costs and minimal operating costs will ensure that the cost of producing solar power remains stable over time. Because solar power plants and solar DG do not rely on market-priced fuel to produce power, solar generation can serve as a financial hedge against volatile fuel prices by mitigating the financial risk inherent in solely relying upon conventional power generation plants that use fuel to produce power.

Due to the lack of fuel costs and minimal operating costs, the predictability of solar generation's long-term costs enable residential, commercial, and utility customers to avoid the inherent price volatility associated with market-priced fuel costs that are incurred with conventional power plants. Solar generation can help asset owners de-risk their investments with a better predictability of market returns. Solar generation, therefore, can serve as a market

[24] *See id.* at 25.

insurance product - a financial instrument to hedge investment and the purchase of electricity and a technical reliability instrument that effectively contributes toward system reliability during peak periods in ERCOT.

## ERCOT RECOMMENDATIONS

SEIA greatly appreciates the various solar-specific analytic and market initiatives that ERCOT is currently undertaking that will improve how solar generation is integrated into the ERCOT market.[25] However, due to the continued importance of accurately accounting for the capacity value of generation resources to ensure adequate planning reserve margins in ERCOT, SEIA respectfully suggests that the Commission take into consideration the following recommendations that SEIA will be providing to ERCOT to improve how ERCOT evaluates solar's valuable resource contribution in its resource planning efforts.

### I. ERCOT Should Change how it Calculates the Capacity Value of Solar in its Resource Planning.

SEIA recommends that ERCOT use separate solar PV profiles for single-axis tracking PV power plants and fixed-tilt PV power plants when it evaluates the capacity value of solar PV power plants. Single-axis tracking PV power plants have a significantly higher capacity value than fixed-tilt PV power plants.[26] SEIA, however, recommends that ERCOT use aggregated solar generation profiles comprised of the capacity values of all solar PV system configurations to accurately account for solar PV's total capacity value contribution. As the Commission and

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[25] Aside from ERCOT's current efforts to develop a solar PV generation resource forecasting tool in NPRR 615, evaluation of a solar-specific effective load carrying capability ("ELCC") for future ERCOT CDR reports, and recently established methodology for estimating solar capacity for purposes of ERCOT's planning reserve margin calculations, the ERCOT Board of Directors recently approved NPRR 588, which establishes a formal definition for PV Generation Resources ("PVGR") in the ERCOT Protocols, at its June 10, 2014 meeting.

[26] Single axis tracking would be about 84% of its AC capacity rating and 70% of its DC capacity rating. Fixed tilt would be about 66% of its AC capacity rating and 55% of its DC capacity rating.

ERCOT are aware, it is very important that ERCOT accurately characterize the capacity value of generation resources, such as solar, so that ERCOT can ensure a sufficient planning reserve margin to meet projected load growth.

SEIA notes that ERCOT recently passed NPRR 550 that established how solar capacity is estimated for purposes of calculating ERCOT's planning reserve margin.[27] Protocol Section 3.2.6.2.2 provides that 100% of the nameplate capacity for operational solar units will be included in ERCOT's planning reserve margin calculations until installed solar capacity reaches a 200MW threshold. After installed solar capacity reaches the 200MW threshold, SEIA believes that ERCOT should include approximately 70% to 80% of an operational solar unit's nameplate AC capacity in its planning reserve margin calculations, instead of the assumed 60% of an operational solar unit's nameplate capacity previously considered by ERCOT.[28] ERCOT's solar capacity value estimate should reflect solar's ability to effectively serve peak demand in ERCOT.

SEIA appreciates ERCOT's evaluation of a solar-specific effective load carrying capability ("ELCC") for future CDR reports. SEIA believes a solar-specific ELCC is an important step toward accurately capturing solar's valuable capacity value contribution in ERCOT's planning reserve margin calculations and distinguishing solar from variable resources that have a lower capacity value contribution than solar. Consistent with ERCOT's current

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[27] NPRR 550, Modifications to Planning Reserve Margin Inputs, was approved by the ERCOT Board of Directors on November 19, 2013.

[28] *See* "Long-Term System Assessment for the ERCOT Region," ERCOT at 8 (Dec. 30, 2010), *available at* http://www.ercot.com/content/news/presentations/2010/ERCOT%202010%20Long%20Term%20System%20Assessment.pdf.

capacity availability evaluation of wind,[29] SEIA, however, encourages ERCOT to consider other methods for estimating the capacity availability of solar, such as a historical 12-month rolling average of solar's capacity value, to more regularly and accurately account for solar in future CDR reports.[30] For instance, during the first year after the 200MW threshold of installed solar capacity is reached, ERCOT could use a capacity value of 70% to 80%, and then, ERCOT could use a 12-month historical rolling average on a going forward basis for the years thereafter.

## II. ERCOT Should Include Both Utility-Scale and Solar DG in its Resource Planning.

It is imperative that ERCOT have accurate solar cost data for its resource planning models so that ERCOT can have an accurate picture of likely near-term and long-term solar penetration in ERCOT for planning purposes. SEIA has been working with ERCOT to provide more accurate solar cost data for utility-scale solar PV power plants and solar DG in ERCOT's current Long-Term System Assessment ("LTSA") review process. SEIA will continue to work with ERCOT to ensure that ERCOT has the most accurate solar cost data for planning purposes.

At this time, there are approximately 62 MWdc/54 MWac of installed solar PV DG in Texas, producing an estimated cumulative 90 GWh per year.[31] Solar DG penetration, however,

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29 Executive Summary, ERCOT CDR Report (Feb. 28, 2014) ("Note that capacity for all wind generation resources are being included in the report at 8.7 percent of the total nameplate capacity. ERCOT acknowledges that the 8.7 percent peak load capacity availability is conservative. Recent analysis indicates that wind generation resources in ERCOT can be expected to serve peak demand at levels of approximately 27 percent of nameplate capacity for wind generation resources located along the Texas Gulf Coast, and 14 percent of nameplate capacity for other wind generation resources. ERCOT is also considering other methods of estimating the capacity availability of wind, such as using historical operational availability, and will adopt the most desirable method for future CDR reports.").

30 *See id*.

31 As stated above, the DC size of a system is a function of the measured output of all panels under standard test conditions. The AC size of a system is defined by the maximum output of all the inverters (there may be one or many inverters on a system). The DC size is almost always larger than the AC size, because even though inverters are extremely efficient (95%-98.5%), some energy is lost so there is always more energy going into the inverter than coming out of the inverter.

could increase considerably in the coming years due to continuing cost reductions and other key contributing factors, such as upcoming U.S. Environmental Protection Agency ("EPA") regulations, ongoing drought conditions, and continued economic and population growth in the state. Given solar DG's significant potential peak demand reduction benefits, therefore, it will become increasingly important for ERCOT to have visibility of all solar DG on its system for near-term and long-term resource planning purposes.

Solar DG installations that are connected to the distribution system and participate in the ERCOT wholesale market are visible to ERCOT for wholesale settlement purposes and are included in ERCOT's CDR reports and Demand and Energy reports. On the other hand, solar DG installations that are connected to the distribution system, but do not participate in the ERCOT wholesale market, are not visible to ERCOT. SEIA recommends that ERCOT explore ways to obtain information for all solar DG on its system to more accurately account for solar DG in its near-term and long-term resource planning efforts.

## III. ERCOT should take into Consideration the fact that Solar is a Predictable, Reliable Peak Generation Resource in its Current Ancillary Services Market Re-Design Efforts.

SEIA applauds ERCOT's current efforts to proactively evaluate its existing ancillary services market to determine what specific types and amounts of ancillary services will be needed to reliably integrate existing and new generation resources and emerging new technologies into the ERCOT market in the future for the benefit of all Texas ratepayers. ERCOT's ancillary services market re-design will provide ERCOT with a more specific, responsive ancillary service tool set that will enable ERCOT to maintain system reliability in a more cost-efficient manner in the future. SEIA appreciates ERCOT's recognition that increased

solar penetration in the ERCOT market should be included in ERCOT's evaluation of its future ancillary services market as solar penetration is likely to significantly increase in the near future due to continuing cost reductions and other key contributing factors, such as upcoming EPA regulations, ongoing drought conditions, and continued economic and population growth in the state.

SEIA believes that ERCOT's future ancillary services market re-design will require ERCOT to buy a smaller quantity of specific ancillary services to reliably integrate more solar generation into the ERCOT market. Solar is a predictable, reliable peak generation resource that can help ERCOT maintain system reliability by producing power output during peak periods from a solar PV and CSP wholesale plant perspective, reducing peak demand during peak periods from a solar DG demand-side perspective; and providing ancillary services in ERCOT's future ancillary services market.

SEIA is aware that ERCOT believes that some new resources that will be added to the ERCOT market in the future will bring with them additional challenges, but at the same time, ERCOT recognizes that some of these new resources have the capability to provide ancillary services in ERCOT's future ancillary services market.[32] Therefore, while ERCOT's ancillary services market re-design will enable ERCOT to more efficiently procure specific types of ancillary services needed to reliably integrate specific types of new generation resources and emerging technologies into the ERCOT market in the future, ERCOT's changes to the ancillary

[32] *See* "ERCOT Concept Paper: Future Ancillary Services in ERCOT" at 5 (Nov. 1, 2013) ("Some of the new Resources expected to be added to the ERCOT system bring with them additional challenges and at the same time, some of them bring with them new capabilities in providing AS.").

services market will also enable new generation resources and emerging technologies to provide cost-effective ancillary services in the future.[33]

SEIA recommends that ERCOT establish requirements for future ancillary services that will enable solar generation to participate in ERCOT's future ancillary services market. CSP plants, with TES, are dispatchable and can contribute toward the stability and reliability of the ERCOT grid by providing ancillary services, such as ramping regulation and responsive reserve service. CSP plants, with TES, provide predictable firm power that can be counted on with near certainty on a day-ahead basis at any time of the day or night by ERCOT. CSP plants, with TES, also provide ERCOT and utilities with the ability to shift power production to whenever it is needed to meet system demand or rapid generation supply changes.

In addition, today's solar PV power plants include advanced technical features, such as voltage regulation, active power controls, ramp-rate power controls, fault ride-through, and frequency controls, which enable these power plants to have the same characteristics of synchronous generation resources and actively contribute toward the predictability and reliability of the ERCOT grid.[34] These advanced technical features enable solar PV power plants to provide ERCOT with additional system flexibility with solar generation output that is more responsive to grid controls, including frequency response and down regulation.[35] As storage costs decline, solar PV can also be paired with storage to provide added system reliability benefits.

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33 *See id.* at 9 ("ERCOT has strived to propose a revised AS framework that is based on the fundamental needs of the power system to maintain frequency control, is as neutral as possible to the technology types that are able to provide the services, and avoids unnecessary restrictions that limit the provision of the fundamental AS requirements by as broad a set of resources as possible.").

34 *See* Comments of First Solar, Whitepaper: "Grid-Friendly Utility-Scale PV Plants," Project No. 40000 (Jan. 9, 2014).

35 *See id.*

## CONCLUSION

Given the state's vast solar resource potential, abundant land resources and robust transmission infrastructure, SEIA strongly believes that solar can effectively contribute toward the reliability of the ERCOT grid in a cost-effective manner. Texas has successfully harnessed its abundant low-cost natural gas and wind resources to lead the world in oil and gas production and installed wind generation capacity, now it is time for the state to harness its low-cost abundant solar resources to lead the nation and world in solar production.

SEIA applauds the Commission for its hard work and dedication in addressing the state's resource adequacy needs. SEIA respectfully recommends that the Commission take into consideration the recommendations stated above which will ensure that solar's valuable resource contribution is more accurately reflected in ERCOT's resource planning efforts.

Respectfully submitted,

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