ERCOT EWTG
Tracking “Excess Generation” from DG solar PV (and related data)

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Texas Solar Energy Society (www.txses.org)

- State Chapter of the non-profit organization American Solar Energy Society (www.ases.org)
- Texas Solar Energy Society (TXSES) Mission
  - *Educate citizens on the value of solar energy for their homes and in their communities, empower them to make informed decisions, and encourage them to connect with professional Texas solar businesses.*
- **TXSES Annual Meeting, Saturday, January 31, 1-4pm, Texas A&M Renewable Energy Lab**
  - Join us for the TXSES Annual Meeting. This is open to anyone interested in solar. We will start at Rudder Tower on the Texas A&M campus with presentations and then move over to the lab. Read the full details with driving and parking instructions here. (http://www.txses.org/solar/content/txses-annual-meeting-january-31-1-4-texas-am-renewable-energy-lab)

DG “excess” Generation Threshold’s

- At Nov 2014 ETWG meeting, discussion about ***current*** rooftop solar PV penetration is probably in the “noise” regarding grid impacts

- Suggest regular ***monitoring*** and ***establishing thresholds*** for when the excess generation from distributed solar PV moves from being "noise" to being a measurable impact of energy being delivered in the distribution grid

Background/Notes

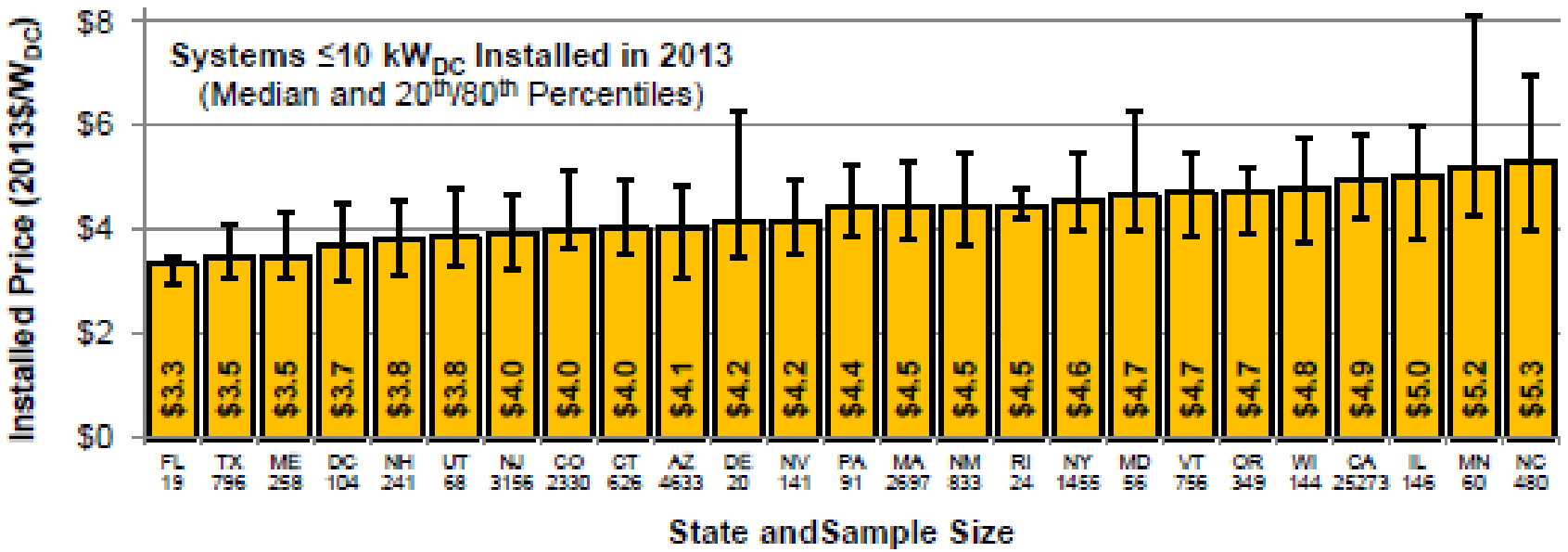
- Explored available ERCOT data including
  - Operations and System Planning Reports, 2013 Demand and Energy Report
  - Profile Type Counts Report
- July 2014
  - Opportunity to meet with Randy Roberts, Calvin Opheim at ERCOT
  - Randy prepared sample data extract “ERCOT res solar” that was reviewed and discussed
- Sept 2014
  - Opportunity to meet Brad Jones at the Renewable Energy Roundup
  - Discussed growth of distributed solar PV in Texas and the need to track this growth
  - Suggested participating in ETWG

Growth of Rooftop Solar PV

- Some Texas stats
  - 5,300 solar PV installations in de-regulated ERCOT area as of Dec 2014, up from 2,300 in early 2013
  - Adding recent figures from SA (2,000+) and Austin (3,372), Texas has surpassed *10,000 installations*

Ref(s) :
- ERCOT load profile count data
- Solar San Antonio website
- Austin Energy Aug FY14 Solar Rebate Program Participation Report

Texas Residential Solar Costs Near Lowest



Notes: Median installed prices are shown only if 15 or more observations were available for a given state.

Figure 16. Installed Price of Residential & Commercial PV Systems by State (≤10 kW Systems)

- Extract from "**Tracking the Sun VII: The Installed Price of Photovoltaics in the United States from 1998 to 2013", Sept 2014**

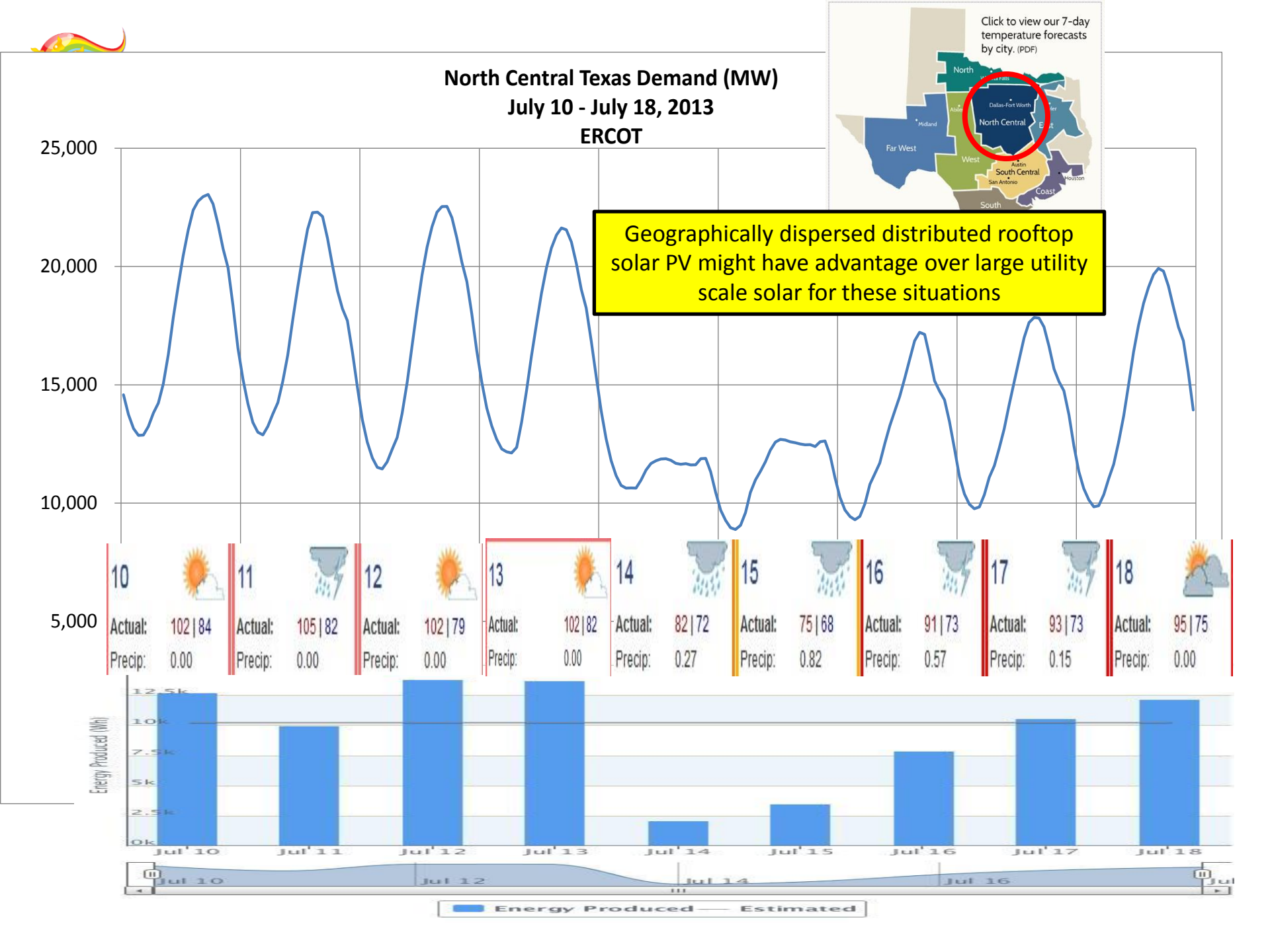
Potential PV Solar Energy in Texas

- Utility Scale PV Solar
  - 20,000 GW in Rural Areas
  - 154 GW in Urban Areas

- Distributed Generation on Rooftops – Residential and Businesses
  - 60 GW

Ref: NREL 2012

What if the summer sun doesn’t shine?


North Central Texas Demand (MW)
July 10 - July 18, 2013
ERCOT
25,000
20,000
15,000
10,000
5,000
Click to view our 7-day temperature forecasts by city. (PDF)
North
Dallas-Fort Worth
North Central
Far West
West
South Central
Austin
San Antonio
Coast
South
Geographically dispersed distributed rooftop solar PV might have advantage over large utility scale solar for these situations
10 Actual: 102 | 84 Precip: 0.00
11 Actual: 105 | 82 Precip: 0.00
12 Actual: 102 | 79 Precip: 0.00
13 Actual: 102 | 82 Precip: 0.00
14 Actual: 82 | 72 Precip: 0.27
15 Actual: 75 | 68 Precip: 0.82
16 Actual: 91 | 73 Precip: 0.57
17 Actual: 93 | 73 Precip: 0.15
18 Actual: 95 | 75 Precip: 0.00
Energy Produced (Wh)
12.5k
10k
7.5k
5k
2.5k
0k
Jul '10
Jul '11
Jul '12
Jul '13
Jul '14
Jul '15
Jul '16
Jul '17
Jul '18
Energy Produced
Estimated

DG “excess” Generation Threshold’s

- Suggestion for data to track and generate regular reports to post on ERCOT website (e.g. monthly)
- Subtotaled by weather zone, TDSP, load profile type (*and request zipcode*)
  - **# of solar PV (DG) installs** (*currently available in load profile report*)
  - **installed solar PV (DG) capacity** (*not currently available, but may be possible to obtain from using data provided from TDSP as specified in the Load Profiling Guideline, Appendix D in the "DG" worksheet that indicates for Distributed Generation Profile Segment Assignment)*
  - **“excess” generation into the grid from grid-tied solar PV (DG) systems** *(not currently available, but example data provided in spreadsheet provided by Randy Roberts, July 2014)*
- Distribution Grid thresholds from excess generation – TBD?

Appendix D Profile Decision Tree v1.6

Distributed Generation Profile Segment Assignment

For ESI IDs that have a Distributed Generation (DG) capacity less than or equal to the DG registration threshold, have signed an interconnection agreement with the TDSP, and are not otherwise required to be assigned the IDRRQ Profile Segment, the TDSP is required to provide ERCOT (ERCOTLoadProfilingDepartment@ercot.com) with documentation, either electronic (preferred) or hard copy, of the following for each applicable ESI ID:

1. Affirmation from the TDSP that the Customer has signed an approved Interconnection Agreement with the TDSP
2. Information as requested on the ERCOT approved form to include:
   a. ESI ID
   b. Generation type, e.g., PV, wind, other (specify)
   c. Interconnection Agreement effective date
   d. Total inverter capacity (if applicable and available)
   e. The inverter's published peak efficiency rating (if applicable and available)
   f. If PV generation is present:
      Total PV generation capacity in kW (DC)
   g. If wind generation is present:
      Total wind generation capacity in kW (DC)
   h. If generation other than PV or wind is present:
      I. Type(s) of units
      II. Total generation capacity in kW (DC)

TDSPs are welcome to submit relevant information to supplement any of the above.

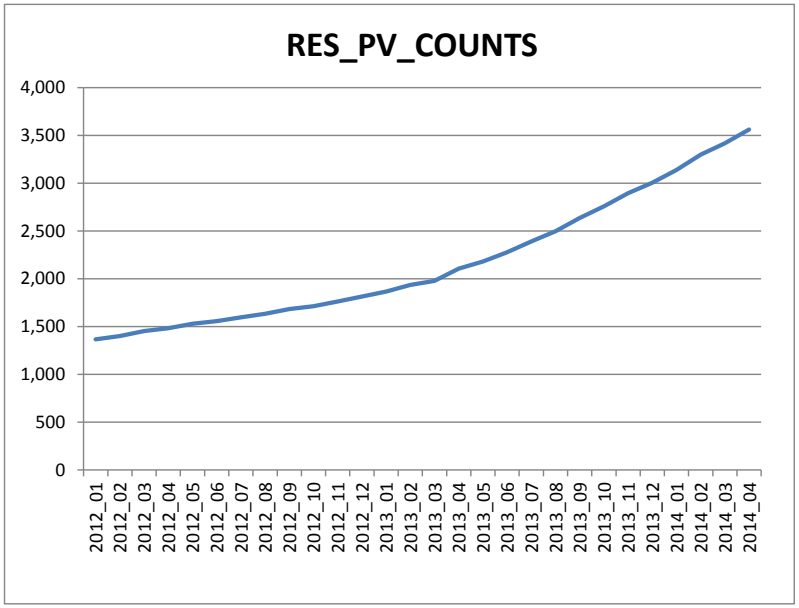
If the generator produces DC power, the AC capacity is defined as the sum of the DC nameplate capacity ratings of the modules installed, multiplied by the inverters' published peak efficiency rating if available, otherwise 95%.

TDSPs shall submit appropriate documentation (as listed above) to ERCOT to initiate a change to the Profile ID assignment. ERCOT shall provide a summary of its review of the requests to the TDSPs within five (5) business days of receiving the documentation. For each approved ESI ID, ERCOT shall then request (via e-mail or other mutually acceptable means) that the TDSP change the Profile ID to reflect the appropriate Distributed Generation Profile Segment for the specified ESI ID, via the normal Texas SET process.

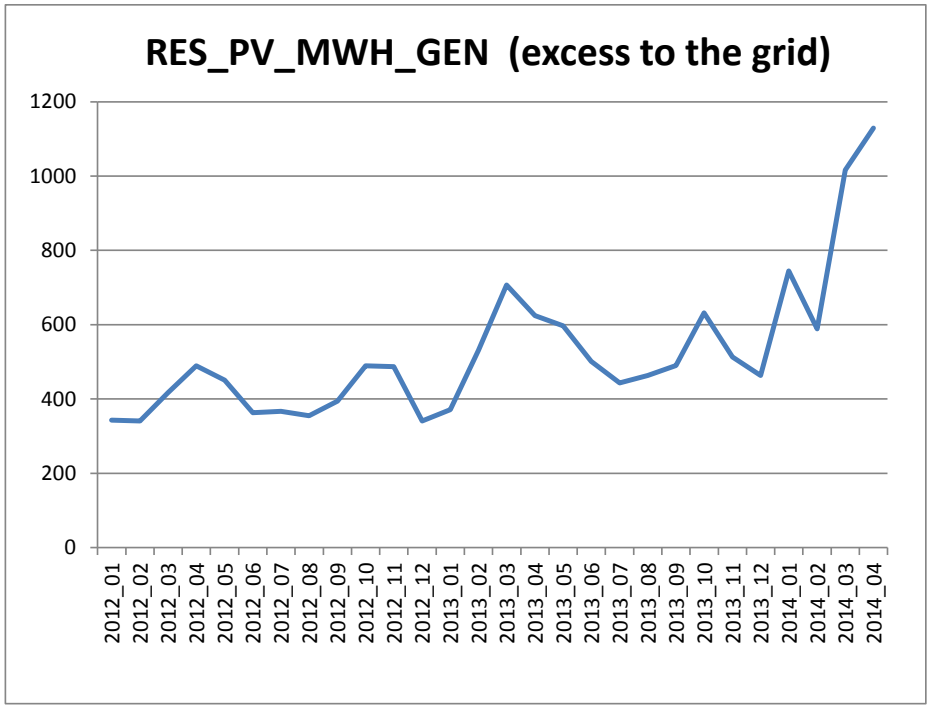
DG Profile Segment assignments shall not change due to a switch in CRs.

If a REP of record discovers that a previously approved ESI ID has become ineligible to be served under a DG Profile Segment, the REP of record shall notify the TDSP and ERCOT that a Profile Segment change is required. If a TDSP discovers that a previously approved ESI ID has become ineligible to be served under a DG Profile Segment, the TDSP of record shall notify ERCOT and also change the Profile Segment to the appropriate default Profile Segment as if the ESI ID represented a new premise without DG. TDSPs shall make reasonable effort to effect the change using the appropriate Texas SET process as soon a possible after they become aware that the premise is no longer eligible to be served under a DG Profile Segment.

Data from “ERCOT res solar-3.xlsx”



- As of 12/5/14, RES_PV_Count at 4,767
- Total including BUS PV profiles, 5,307



- As “excess” generation into the distribution grid increases, it also represents a corresponding decrease in demand side usage
- E.g. *could assume* for residential rooftop solar PV, 60% of PV production is consumed behind the meter, 40% flows back into the grid

Summary

- Suggest regular monitoring and establishing threshold for when the excess generation moves from being "noise" to being a measurable impact of energy being delivered in the distribution grid
- Suggestion - track and generate regular reports/data sets to post on ERCOT website (e.g. monthly)
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Questions ?

- Reference separate spreadsheet “ERCOT res solar-3.xlsx”