



Update on Distributed Solar Generation

Load Analysis Subcommittee
October 19, 2016

Back-Casting Update

- Distributed solar generation:
 - Are not PJM grid- interconnected (i.e. non-wholesale)
 - Does not go through the full interconnection queue process
 - Does not offer as capacity nor energy resources
 - Nets directly with the load in terms of data submissions
 - Either at a customer site or via the distribution system
 - Does not provide metered production data

PJM is using a two-step approach to address distributed solar PV generation (aka BtM solar generation) in the PJM Load Forecast.

- **Step 1:**

To account for the historical impacts of BtM solar generation, PJM is using the BtM solar installation data from the Generation Attribute Tracking System, adjusted for solar insolation based on a 27 degree tilt, cloud cover, efficiency degradations, and DC to AC measurement. The back-casted values are an hourly value by zone. These estimates are then added to the unrestricted load used in PJM load models to generate a forecast that essentially removes BtM solar generation impacts from the load.

- **Step 2:**

For the forecasted value of BtM solar capacity, PJM contracted with IHS Energy to develop a distributed solar generation forecast specific to the PJM region. Last year's full IHS summary report is available via the link below. PJM then uses the state level forecast to determine a zonal level value for the capacity at peak. The zone level capacity value at peak is then subtracted from the forecast with the solar addbacks. Table B-1 reflects this subtraction, and the distributed solar generation forecast values are explicitly shown in the B-8 table.

IHS Forecast Summary Report: <http://pjm.com/~media/committees-groups/subcommittees/las/20151130/20151130-item-04-ihs-pjm-pv-forecast-report.ashx>



Area of Improvement

	Capacity Factor	Average Cloud Cover	Average Temperature
AE	32%	2.2	82
AEP	22%	4.4	81
APS	20%	4.6	83
ATSI	31%	2.7	80
BGE	21%	4.3	84
COMED	24%	4.5	80
DAYTON	25%	4.2	82
DEOK	24%	4.3	83
DLCO	22%	4.5	80
DOM	23%	3.9	86
DPL	29%	2.7	82
EKPC	32%	3.2	82
JCPL	23%	3.6	83
METED	23%	4.2	84
PECO	19%	4.5	84
PENLC	33%	3.2	79
PEPCO	19%	4.7	86
PL	27%	3.3	82
PS	18%	4.7	83
RECO	18%	4.7	83
UGI	25%	3.6	79

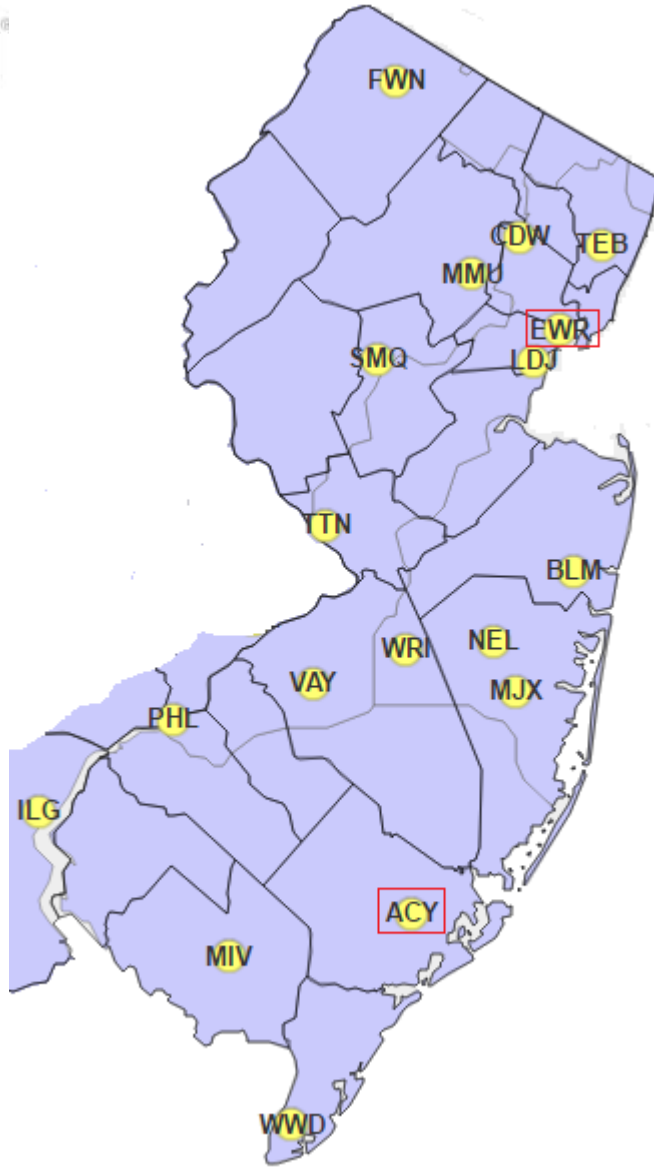
- Capacity Factors at Peak were calculated using the hourly back-casted values divided by the AC value of the GATS installations
- Average of HE 17 in the months June, July, and August

- NREL
 - NSRDB – this is a database of Irradiance values, in Watts/M²
 - Requires assumptions on size of panels and another assumption regarding tilt
 - System Advisory Model (SAM)
 - Default uses Typical Meteorological Year (TMY) – so that would be the same value for every hour of every day of every month
 - Additional work to be completed to feed SAM actual weather data

- RFP Process Conducted
 - Contract awarded to AWS Truepower
 - Initiated discussions with stakeholders
 - Collected static input data from plant owners and coordinated with GATS

- Utilize methodology put in place for last year as interim while we continue work with AWS Truepower
- Update weather values used
 - Use publicly available weather data for all weather stations
 - Use a new methodology for cloud cover
 - Measured as 8 categories, only stored in 5 categories (CLR, FEW, SCT, BKN, OVC)
 - Use only those 5 categories

Map of Weather Stations in NJ



- Publicly available weather data makes it possible to use many more stations throughout a region.
- Previously, the back-casting only looked at EWR and ACY

Weather Station	Average Cloud Cover*
ACY	1.2
BLM	1.2
CDW	1.4
EWR	2.5
FWN	1.5
LDJ	1.4
MIV	1.3
MJX	1.4
MMU	2.2
NEL	1.6
SMQ	1.3
TEB	1.5
TTN	1.3
VAY	1.2
WRI	1.9
WWD	0.9

* Average Cloud Cover is of months June, July, and August in HE 17. Also, note that the scale is now a 0 to 4, where 0 is a cloud-less sky and 4 is overcast

Data available here:

https://mesonet.agron.iastate.edu/request/download.phtml?network=NJ_ASOS

- Using updated weather data the capacity factors for the 3 main New Jersey zones are below
- Represent the average capacity factor over the months of June, July, and August for HE 17

Zone	Capacity Factor
AE	27%
JCPL	24%
PS	27%

Long-term Solar Forecast Update

- Contracted with IHS to develop the 2017-2032 distributed solar generation forecast
 - Based on feedback from last year, worked to create scenario forecasts
 - IHS will be presenting the forecast at the November 18th LAS meeting