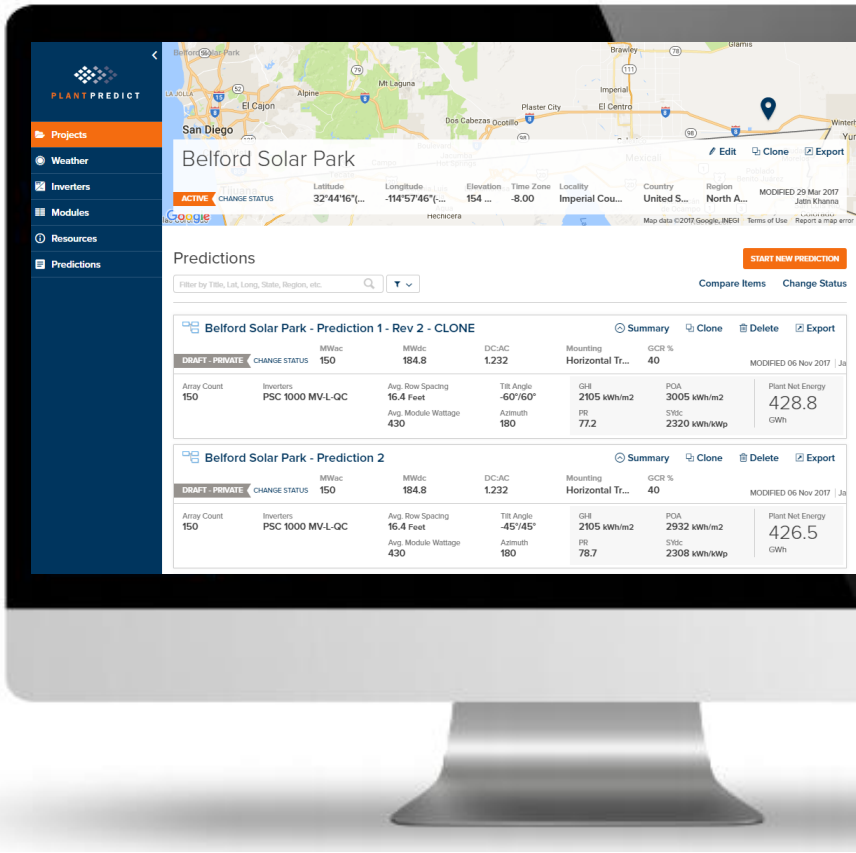
PLANT PREDICT

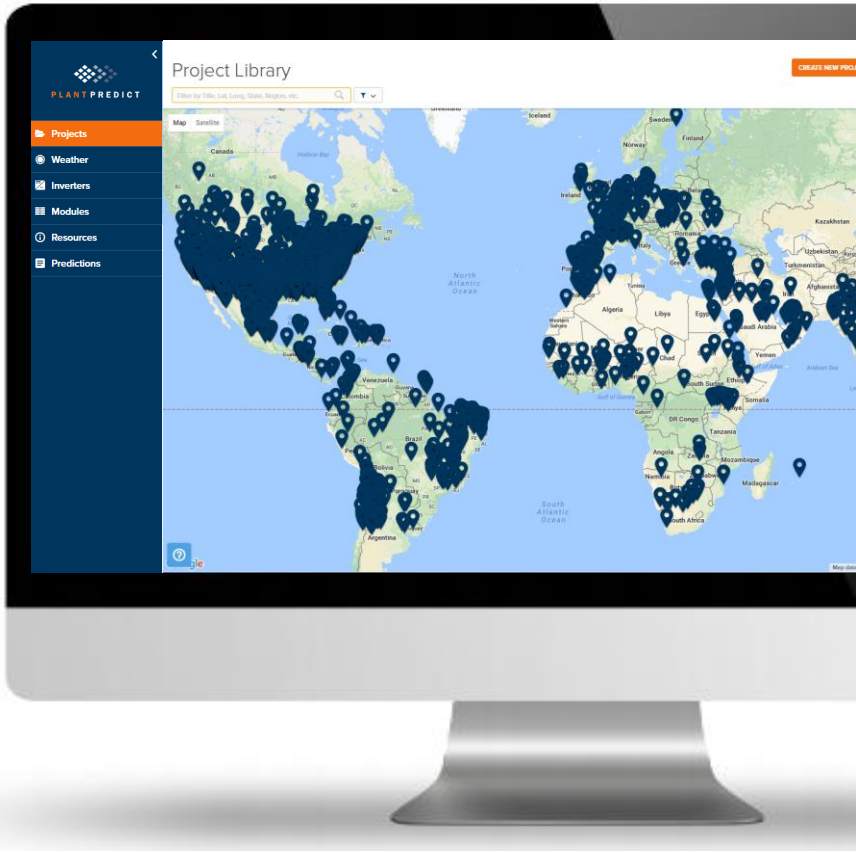
PlantPredict:

Solar Performance Modeling Made Simple



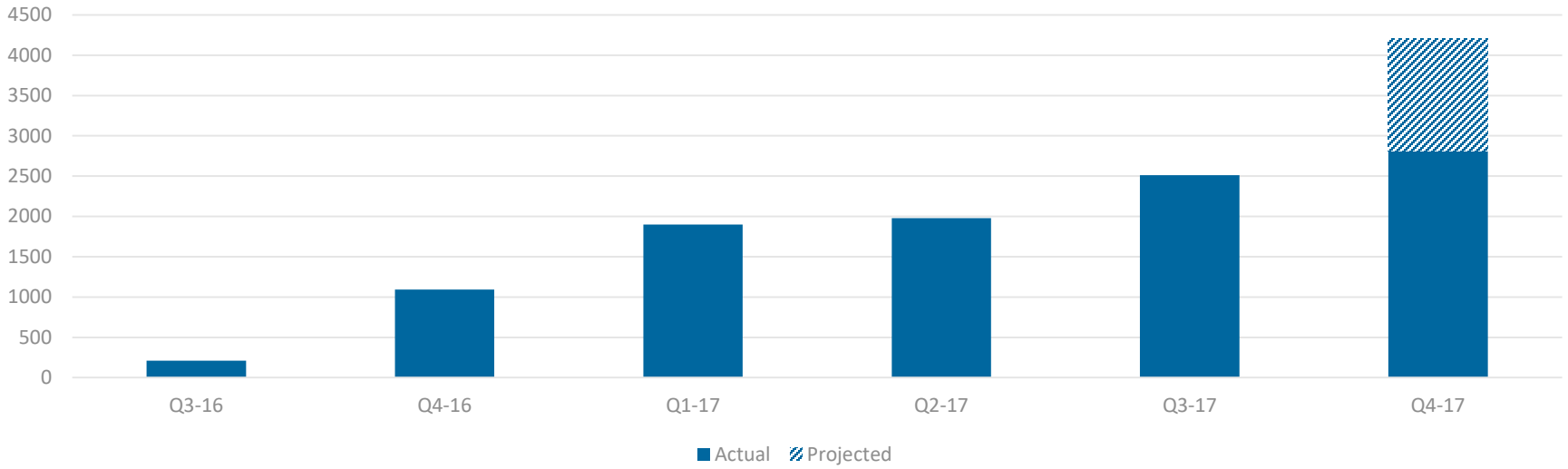
Introducing PlantPredict

- Generate *quick, contract-grade predictions* via a streamlined user interface
- Designed *specifically for utility-scale solar*
  - Sub-hourly and multi-year predictions
  - One-click weather download
  - Built-in spectral correction
  - Cloud-based application
- *Independently reviewed and benchmarked* against more than 1 GW of operating facilities



Reviewed by: DNV·GL, RV, leidos, ICF

PlantPredict's Growth Story



- Over 7,000 predictions run in first year since launch
- Current user base: 130+ active users, 60+ companies, across all five continents
- PlantPredict was used in the sale of *350+ MW of utility-scale PV projects*
  - "A review of PlantPredict's capabilities by independent engineering firm Leidos found that the application provided modeling accuracy equivalent to other energy prediction modeling tools currently used in the industry."

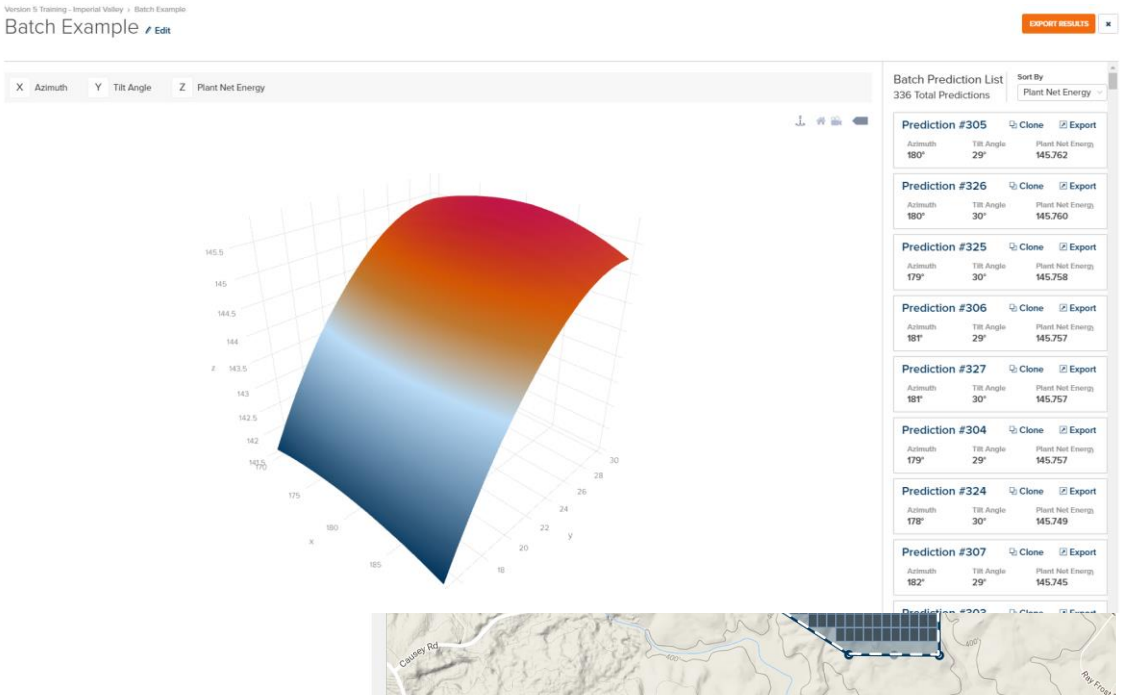
Modern Features to Move Utility-Scale PV Forward

Current

- Slope Shading
  - Model uneven terrain
- POAI Import
  - Reduce prediction uncertainty with measured POA
- Map Builder
  - Understand site capacity in an instant
- Batch Processing
  - Optimize your site for maximum returns

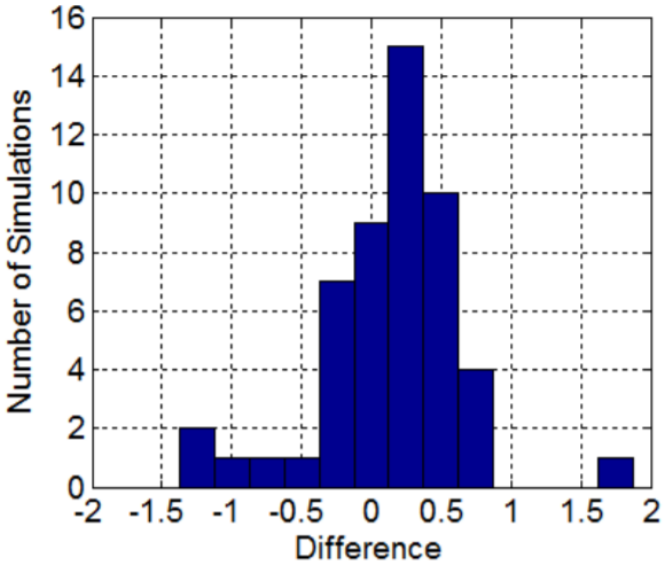
Upcoming

- *Developer Portal for API*
- *PV + Storage Modeling*
- *Bifacial Modeling*



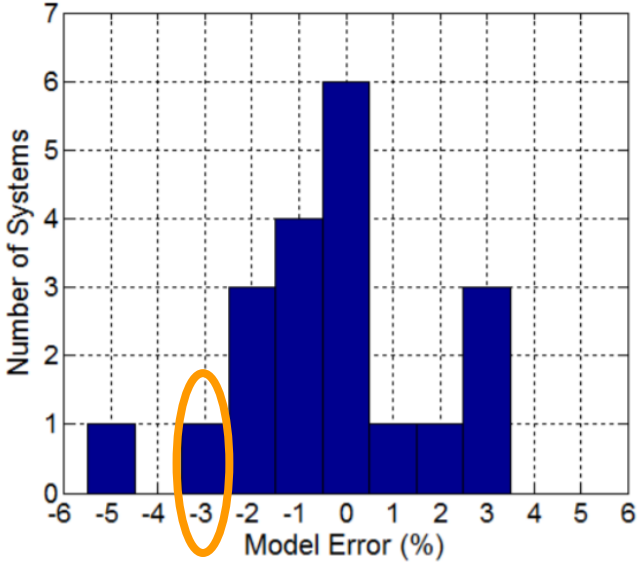
Proven Accuracy

PlantPredict vs. PVsyst:
Comparison of 51 Simulations



Mean energy yield difference of 0.13%*

PlantPredict vs. Measured Data:
Comparison of 20 Plants



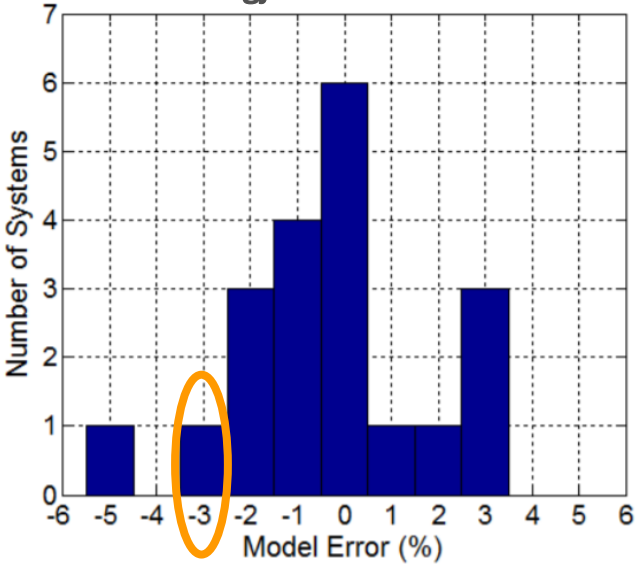
Average energy meter error of -0.41%**

*Measurement error of ± 0.52% ** Measurement error of ± 2.01%

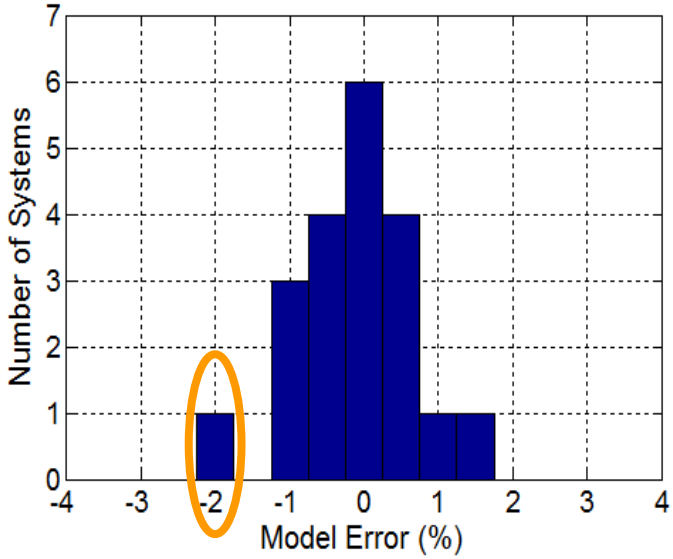
K. Passow, L. Ngan, B. Littmann, M. Lee, and A. Panchula, "Accuracy of Energy Assessments in Utility Scale PV Power Plant using PlantPredict," *42nd IEEE Photovoltaic Specialists Conference* (2015).

POA Import Feature Improves Accuracy: Desert SW Tracker Case Study

PlantPredict vs. Measured Data: Energy Meter Error

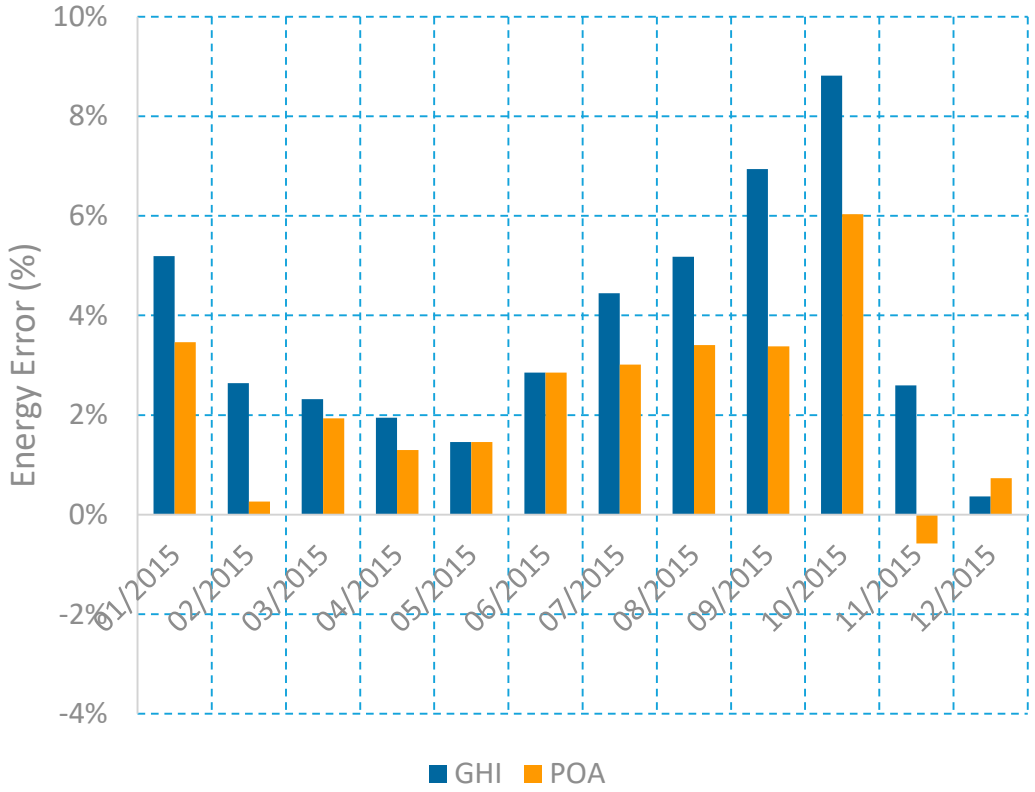


PlantPredict vs. Measured Data: POA Error



Energy meter error appears to be correlated with POA error at this site

POA Import Feature Improves Accuracy: Desert SW Tracker Case Study



Energy Error

GHI import (Hay/Erbs): -3.40%

POA import (GTI DIRINT): -2.13%

Plot shows excerpt period from January 2015 – December 2015. Entire analysis period included July 2014 – December 2016.

Batch Processing Improves Efficiency – Demo!

Location: Weihai, China

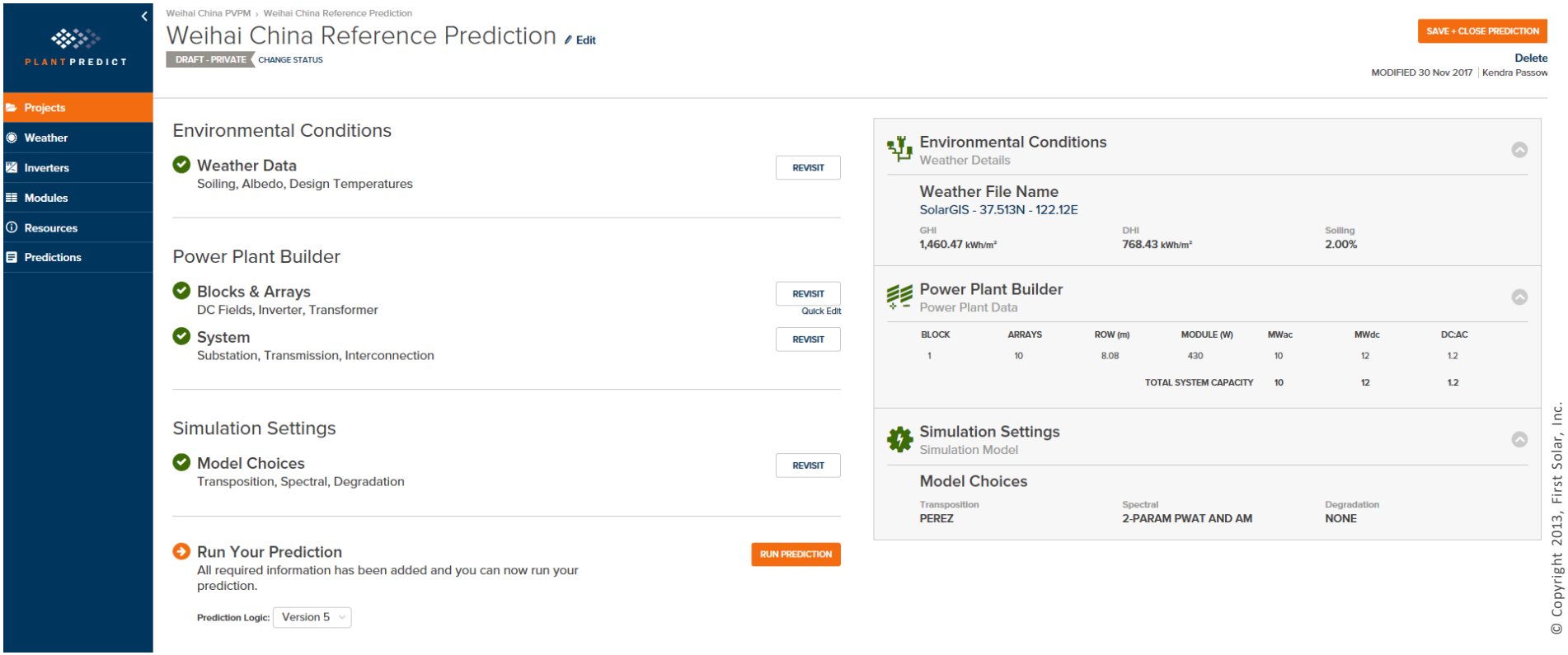
Target AC Capacity: 10 MW

DC:AC Ratio: 1.2

Tilt Angle: ?

GCR: ?

Batch Processing Improves Efficiency – Demo!



Batch Processing Improves Efficiency – Demo!

Weihai China PVPM › Batch Quick

Batch Quick ✎ Edit

DRAFT - PRIVATE CHANGE STATUS

VIEW RESULTS | RUN PREDICTION

MODIFIED 30 Nov 2017 | Kendra Passow

Set Batch Constants

Base Settings

PlantPredict Default Values Edit Clear Selection

Copied: 29 Nov 2017 At 4:04PM

Weather

SolarGIS - 37.513N - 122.12E ⇄ Change

GLOBAL

GHI 1460.47 kWh/m²

DHI 768.43 kWh/m²

Inverter

GE ProSolar 1 MW ⇄ Change

ACTIVE

Manufacturer GE

Rated PWR 1000 kW

Module

FS-6430A CdTe Aug2017 ⇄ Change

GLOBAL

Manufacturer FIRST SOLAR

Rated Power 430 W

Maximum Desired MWdc	Mounting Type
12 MWdc	Fixed Tilt
DC:AC Ratio	**Tilt Angle**
1.2	Varied °
GCR	**Azimuth**
Varied %	180

Choose up to 2 Variables to Iterate

Variable	Start	Stop	Step	Total Steps
☐ *DC:AC Ratio*				
☑ GCR %	30	60	5	7
☐ *Azimuth*				
☑ Tilt Angle	20	50	5	7

Prediction Queue

View Prediction Variation Queue

Available	Ready
301	49

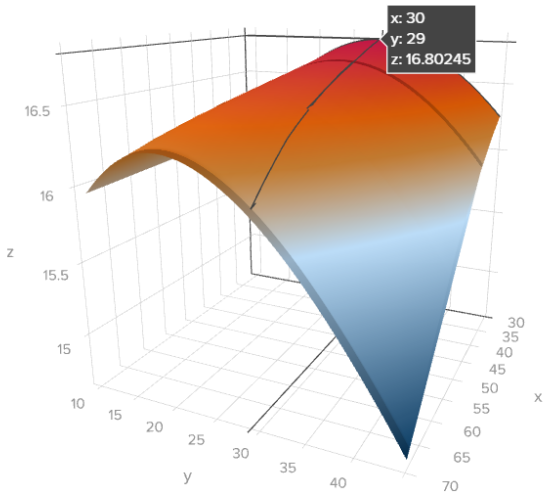
Batch Processing Improves Efficiency – Demo!

Weihai China PVPM › Batch Test 2

Batch Test 2 Edit

EXPORT RESULTS

X GCR % Y Tilt Angle Z Plant Net Energy



Batch Prediction List
324 Total Predictions

Sort By: Plant Net Energy

Prediction #20 Clone Export
GCR % 30 | Tilt Angle 29° | Plant Net Energy 16.802

Prediction #21 Clone Export
GCR % 30 | Tilt Angle 30° | Plant Net Energy 16.800

Prediction #19 Clone Export
GCR % 30 | Tilt Angle 28° | Plant Net Energy 16.800

Prediction #22 Clone Export
GCR % 30 | Tilt Angle 31° | Plant Net Energy 16.794

Prediction #18 Clone Export
GCR % 30 | Tilt Angle 27° | Plant Net Energy 16.793

Prediction #23 Clone Export
GCR % 30 | Tilt Angle 32° | Plant Net Energy 16.783