PLANTPREDICT UPDATE & SDK DEVELOPMENT FOR API

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2018 PVPM Conference

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LEADING THE WORLD'S SUSTAINABLE ENERGY FUTURE

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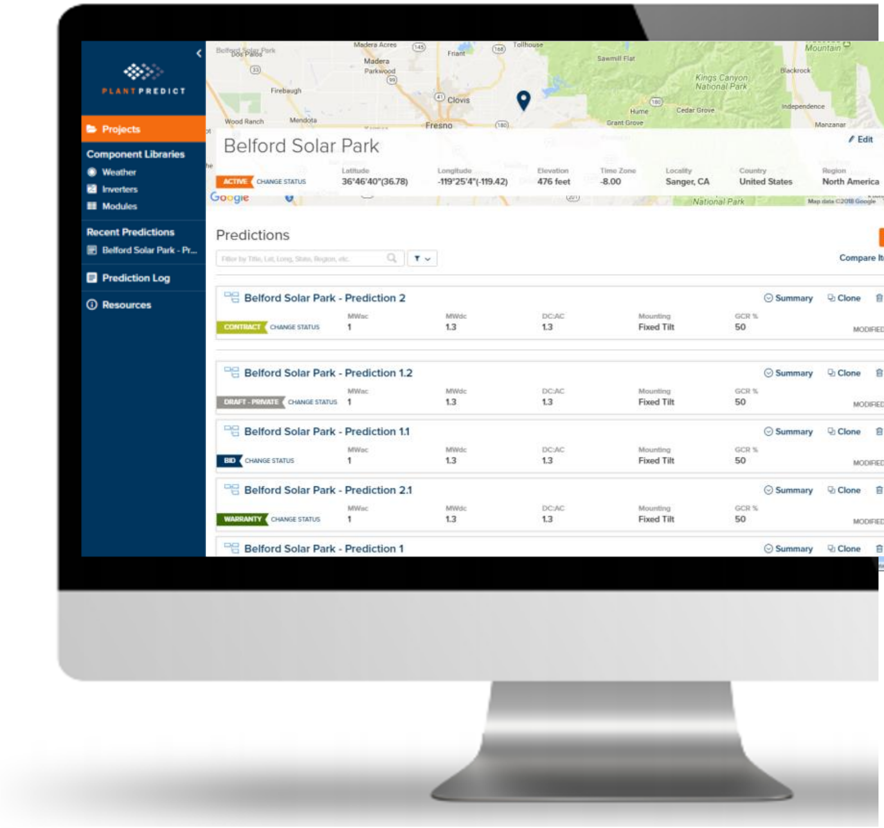
PLANTPREDICT OVERVIEW

INTRODUCING PLANTPREDICT

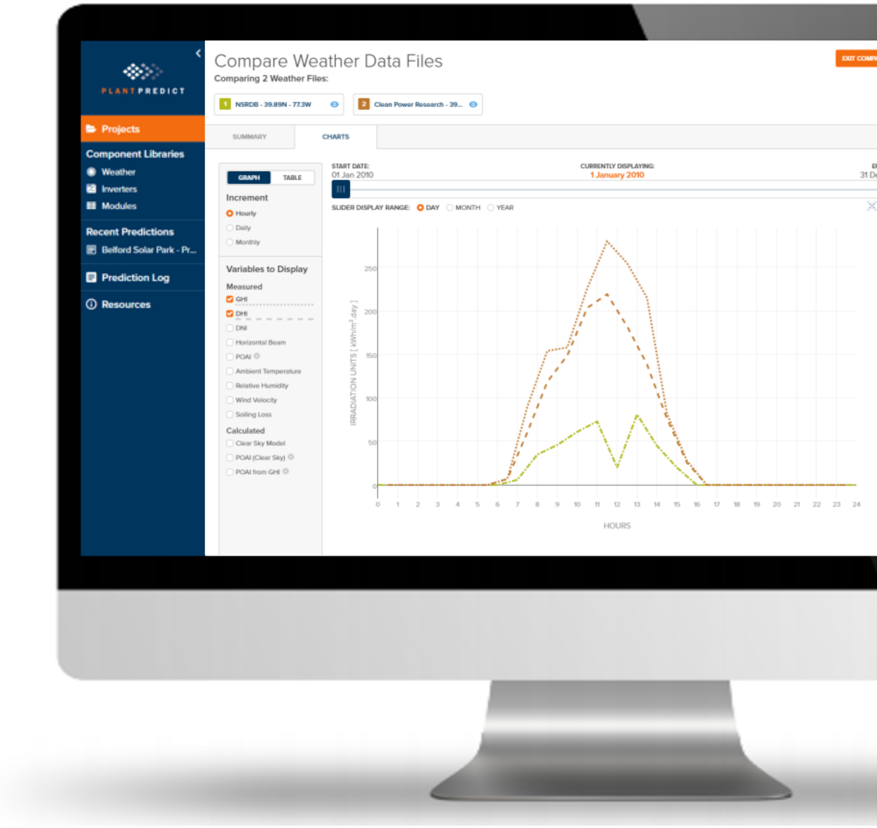
- Designed with the **utility-scale** PV industry in mind
- Free
- Web-based tool
- Reduce prediction time by up to 75%
- Used in over 350 MWAC of contracted utility-scale PV projects
- All algorithms documented and published on www.plantpredict.com
- Independently reviewed and benchmarked against over 1 GW of operating facilities



Reviewed by: DNV·GL, RV, leidos, ICF

PLANTPREDICT FEATURES

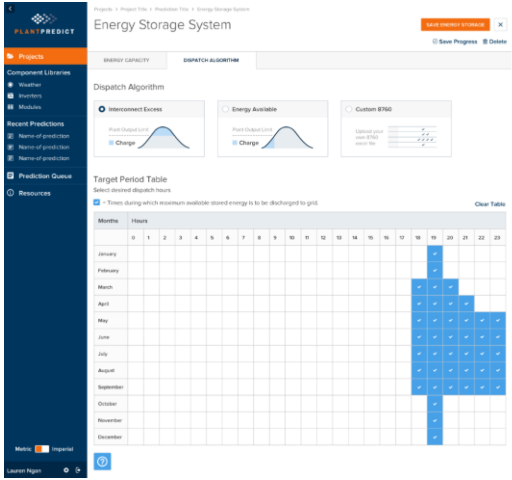
- *End-to-end utility-scale modeling*
  - — Sub-hourly and multi-year predictions
  - — Built-in spectral correction
  - — Built-in MV and HV transformers
  - — Built-in Availability and LGIA losses
  - — No need for pre- or post-processing
- *Everything in one tool*
  - — One-click weather download from leading providers
  - — Pre-loaded with industry-standard weather, module, and inverter files
- *Advanced features, simple interface*
  - — Compare weather and predictions side-by-side
  - — Optimize your design with Batch, Clone, and Quick Edit
  - — Cloud-hosted for ease of sharing and data security
  - — API available for automation

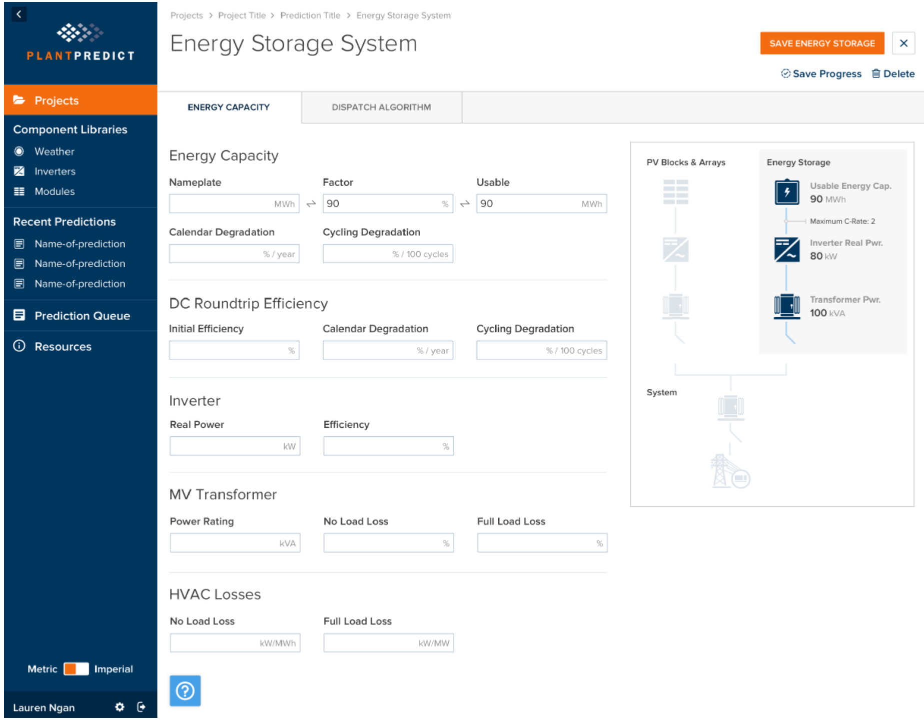


UPCOMING FEATURES

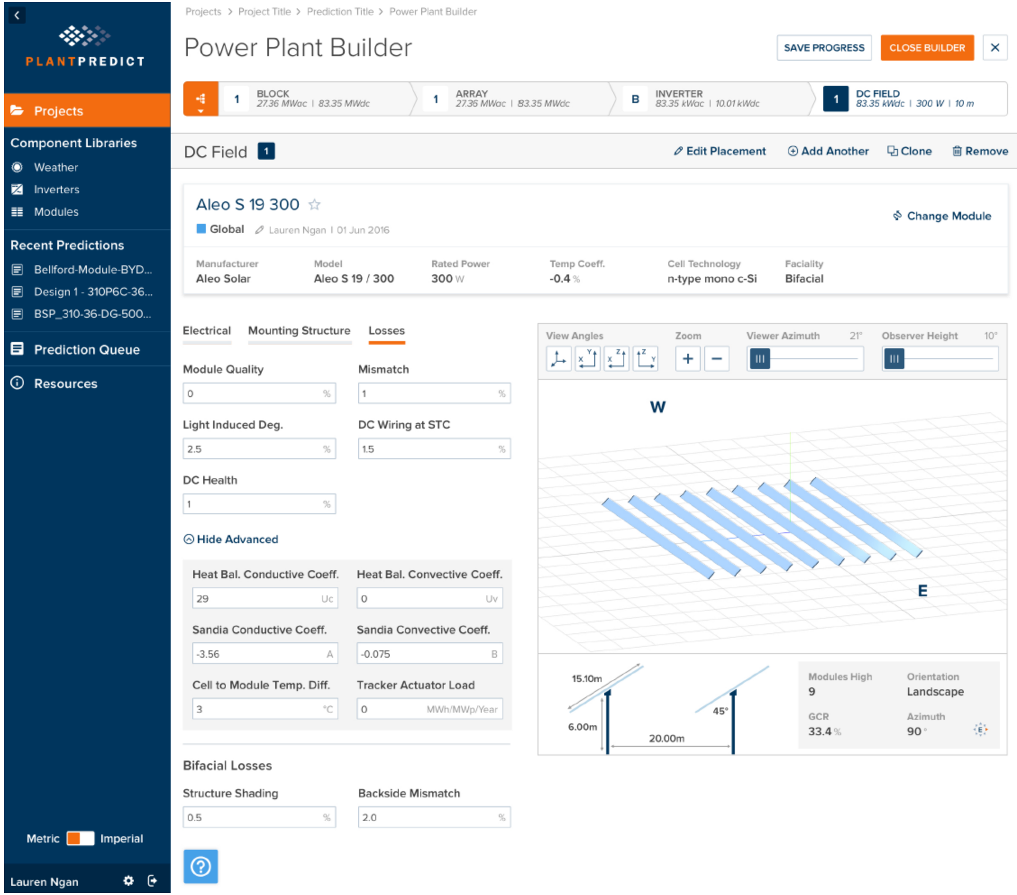
PV Energy Storage | Bifacial PV | Module File Creator

- *3 modeling options*
  1. **LGIA Excess** energy used to charge battery. Energy is discharged during user-defined target period.
  2. **Energy Available** is used to charge the battery until it is full. Energy is discharged during user-defined target period.
  3. **Custom** option allows user to define both charging and discharging.



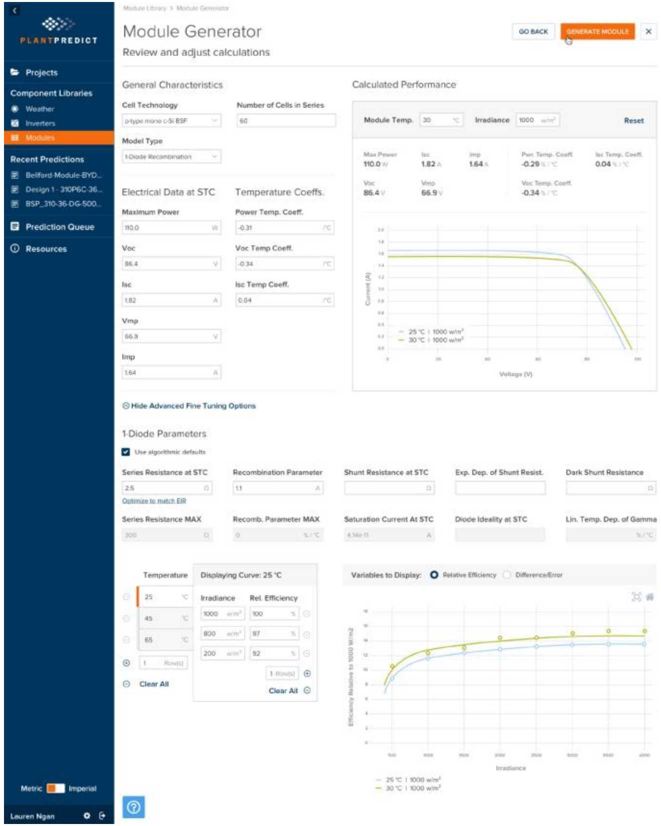


- Characterize modules as “Monofacial” or “Bifacial”.
- Model structure shading and backside mismatch and post height for a DC field.
- Model transmission and bifaciality for a PV module.
- Uses the NREL 2D View Factor model (Marion)

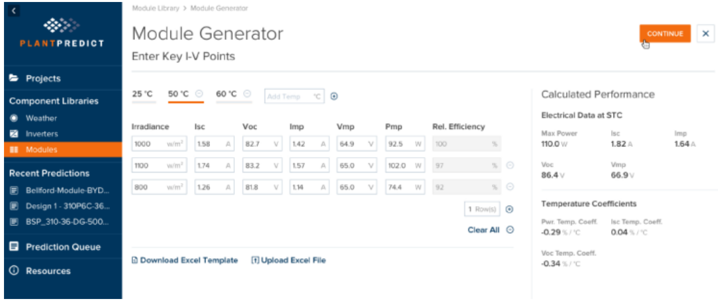


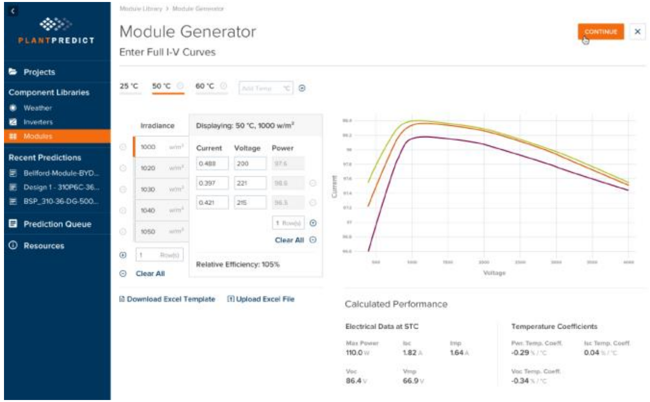
Module File Creator

Calculate single-diode parameters from datasheet parameters and adjust to match a target effective irradiance response.



Input data via IEC61853-type grid or full I-V curves.





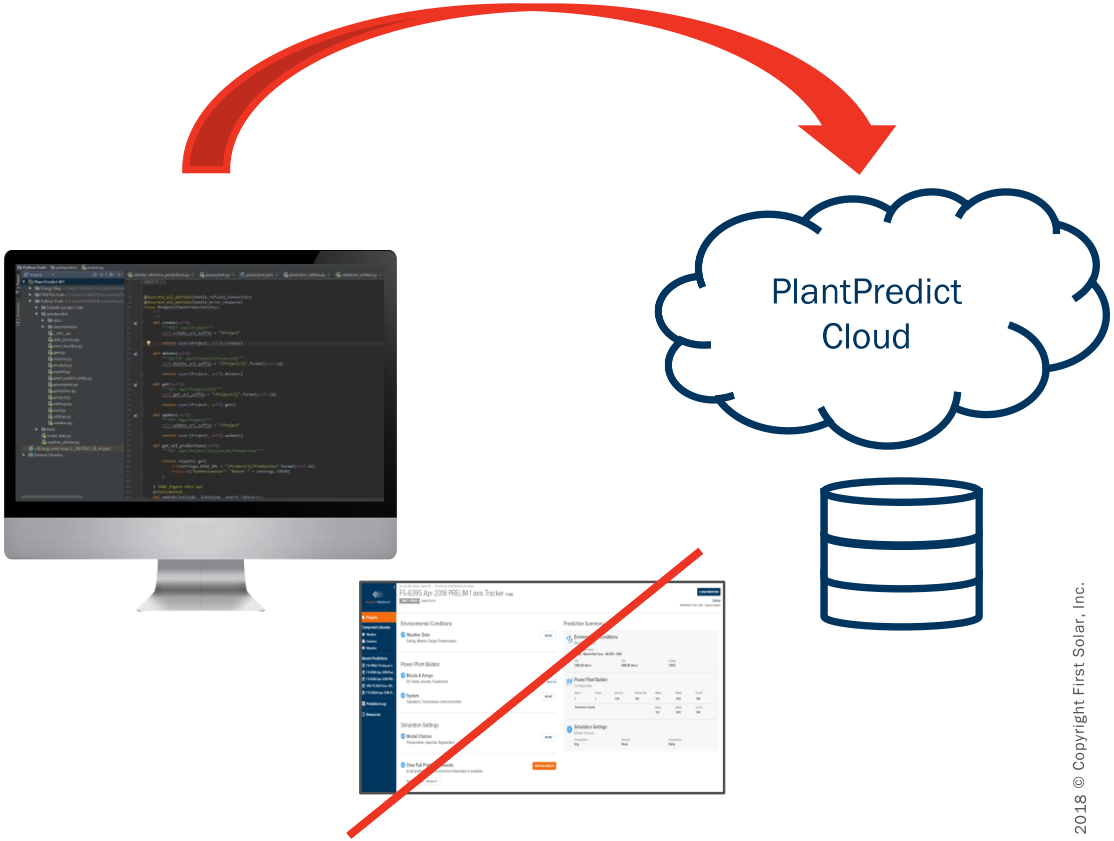
PLANTPREDICT API & CASE STUDY

PlantPredict API

- ***PlantPredict's Applied Programming Interface (API) allows developer access to broad functionality.***

- ***Automate everything***
  - Build power plants, run predictions, upload weather data, and more...

- ***Endless applications***
  - Business/O&M software integration
  - Run batches of predictions with control over *every parameter*
  - Utilize as a weather/module/inverter database for any external application



Python SDK

The Python Software Development Kit (SDK) makes the PlantPredict API even more accessible with a library of functions.

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python™

Run all prediction variants in a project.

```python
# Run all predictions in a project.
import plantpredict


project = plantpredict.Project(id=1)
for p in project.get_all_predictions():
    prediction = plantpredict.Prediction(id=p['id'], project_id=project.id)
    prediction.run()
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Download and retrieve a weather file at a specified location..

```python
# Download and retrieve a weather file from Meteonorm.
import plantpredict


weather = plantpredict.Weather()
weather.download(latitude=30, longitude=-110, provider=plantpredict.WEATHER_DATA_PROVIDER['METEONORM'])
weather.get()
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```

Update module used in energy prediction.

```
# Update module used in simulation.
import plantpredict


power_plant = plantpredict.PowerPlant(project_id=1, prediction_id=2)
power_plant.get()
power_plant.blocks[0]['arrays'][0]['inverters'][0]['dcFields'][0]['moduleId'] = 4
power_plant.update()
```

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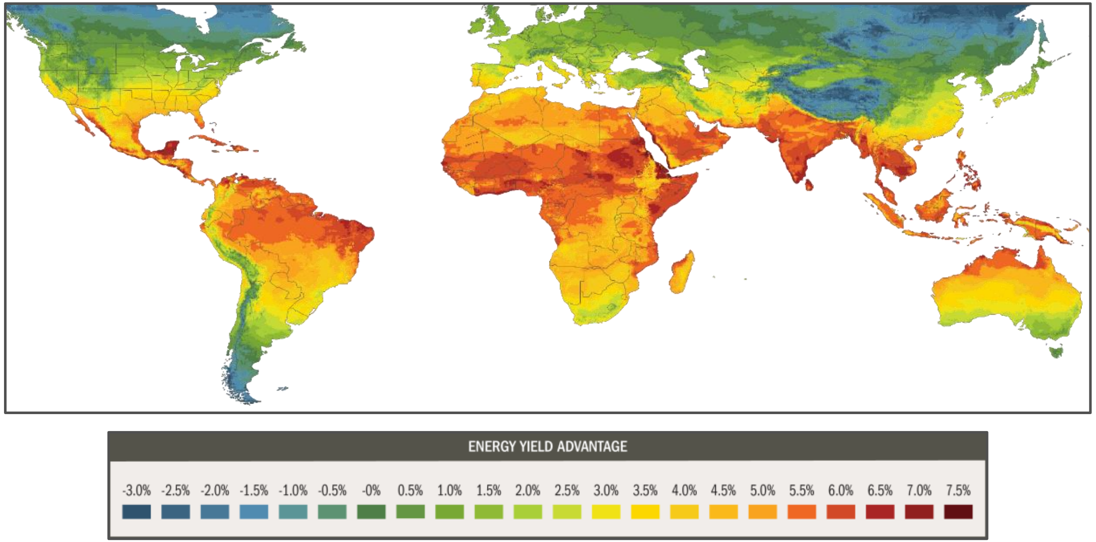
Case Study – Global Module Energy Yield Comparison



Integrated the PlantPredict Python SDK with Python statistics and plotting libraries to generate a global heat map, representing the relative performance of 2 modules.

STEPS

1. Automatically configure and run predictions at 100 representative locations across the globe for 2 modules.
2. Run a regression to correlate weather data with relative energy production.
3. Use a global grid of annual weather data at 0.25º (latitude) x 0.25º (longitude) resolution to calculate relative energy production across the globe.
4. Use graphing library to generate a heat map from the resulting data.

Need an account?

support@plantpredict.com

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