



WHEN TRUST MATTERS

SolarFarmer: highlights, insights and near-term plans

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PVPMC – Session 12: Software Updates

15 May 2025

SolarFarmer PV modeling



- In-house development at DNV (launched in 2017)
- DNV's PV design software for bankable **pre-construction and operational** yield estimates
- Industrial & utility-scale projects
- **3D**: complex terrain & shading
- Enables scalability via **automation**
- Cloud compute with **API**
- Supports multi-year calculations of any time resolution

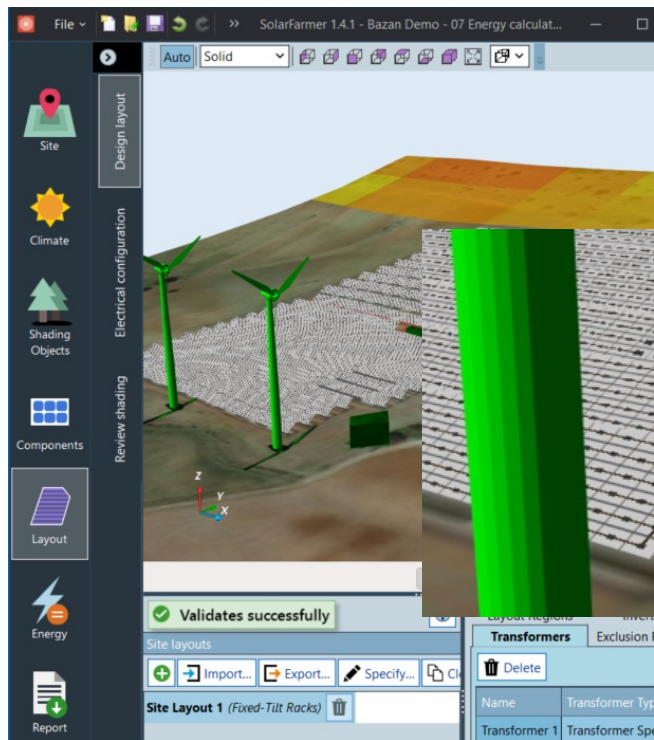


Bankable energy assessments

- During 2024, **over 1.3 GW** of PV projects in the United States were financed using SolarFarmer yield estimates.
- DNV Advisory Services are progressively rolling out SolarFarmer for solar energy assessments worldwide.

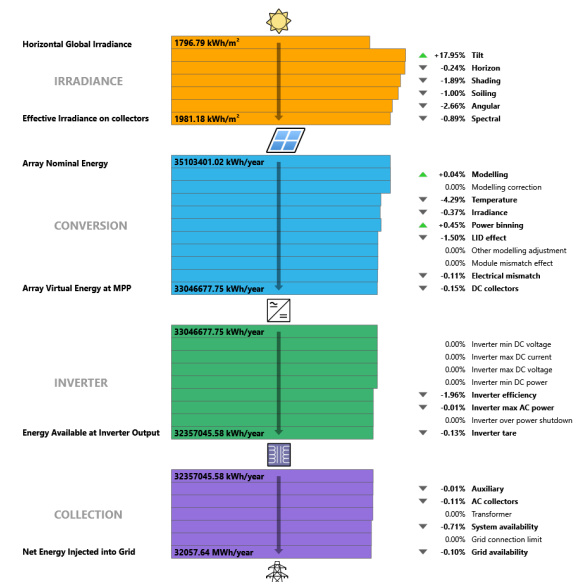
Solar yield software to enjoy

User experience matters 😊



Right down to the stringing

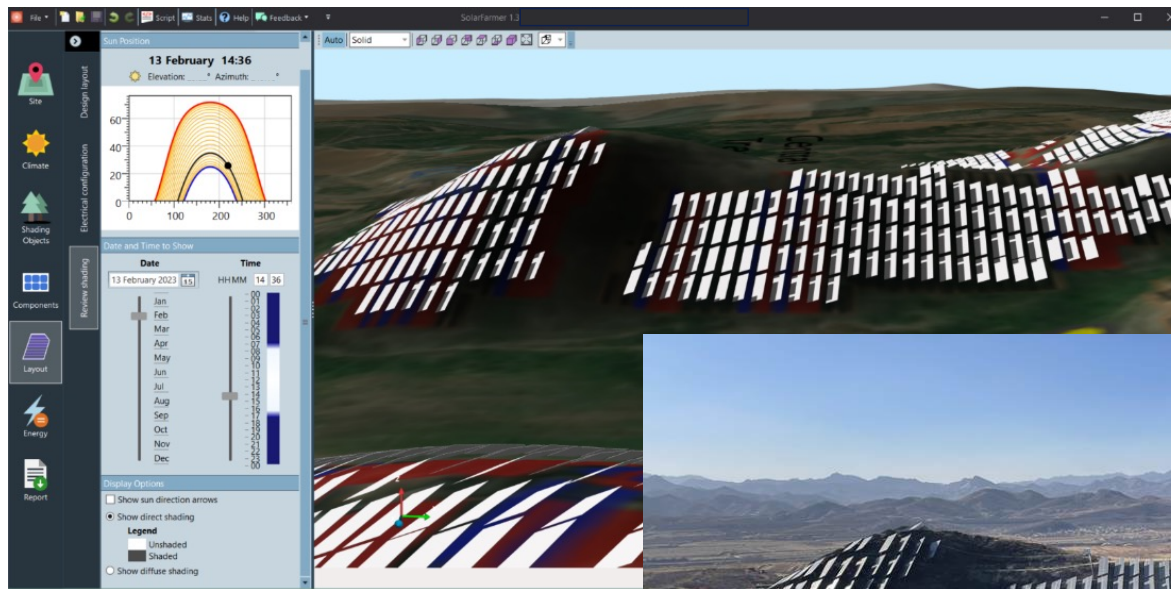
Detailed reporting



8.1.1.1 Monthly Results (Year 2017 Record Count: 8760 Complete 100%)

	GH1	T _a	G _{poa}	G _{eff}	E _{grid}	PR	YF
	kWh/m²	°C	kWh/m²	kWh/m²	MWh	%	kWh/kWp
January	75.73	4.69	133.20	125.89	2113.92	89.57	119.31
February	97.24	5.04	148.55	139.45	2339.21	88.87	132.02
March	141.25	6.98	177.74	166.22	2766.58	87.85	156.14
April	174.24	12.48	186.80	173.88	2832.52	85.58	159.86
May	203.44	14.33	195.38	180.72	2922.26	84.41	164.83
June	221.63	20.01	202.38	187.15	2957.00	82.46	166.89
July	235.15	23.30	219.57	203.66	3172.07	81.53	179.03
August	219.16	24.01	227.13	212.52	3279.80	81.50	185.11
September	143.32	17.12	166.36	156.05	2486.09	84.34	140.31
October	133.13	16.22	192.15	182.19	2114.31	85.60	164.46
November	77.38	8.03	126.33	118.82	2004.34	89.54	113.12
December	75.11	4.67	143.78	134.62	2269.53	89.09	128.09
Total/Mean	1796.79	12.82	2119.38	1981.18	32057.64	85.86	150.77

Solar yield software to enjoy (ii)

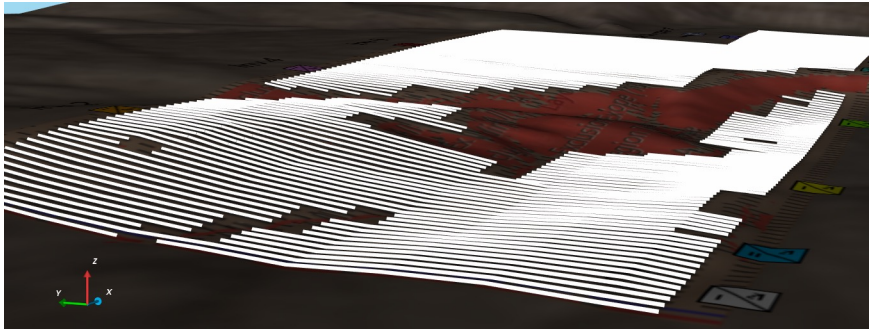


Visualize and model shading in detail



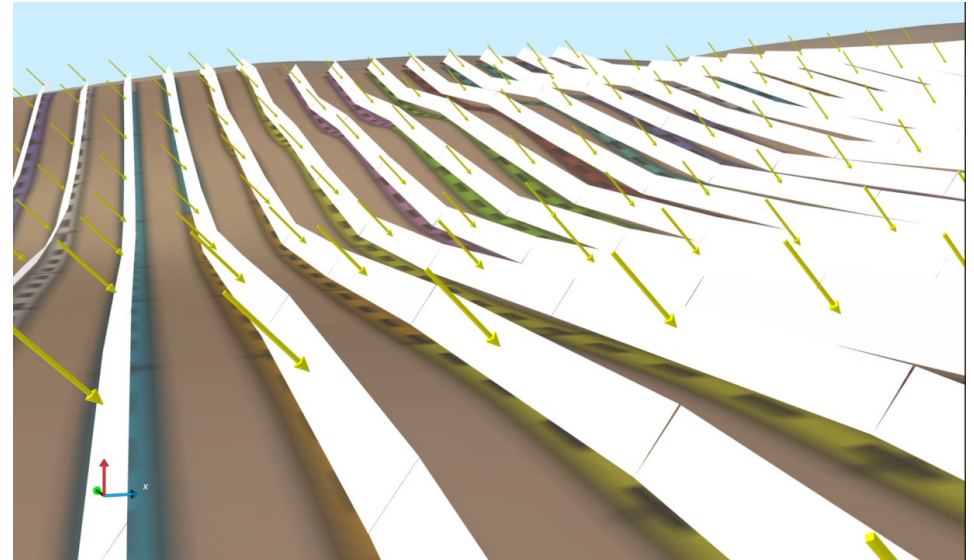
PV design capabilities

Integration of terrain data



Solar plants increasingly built
in irregular terrains

Custom tracking algorithms



PV design capabilities (ii)

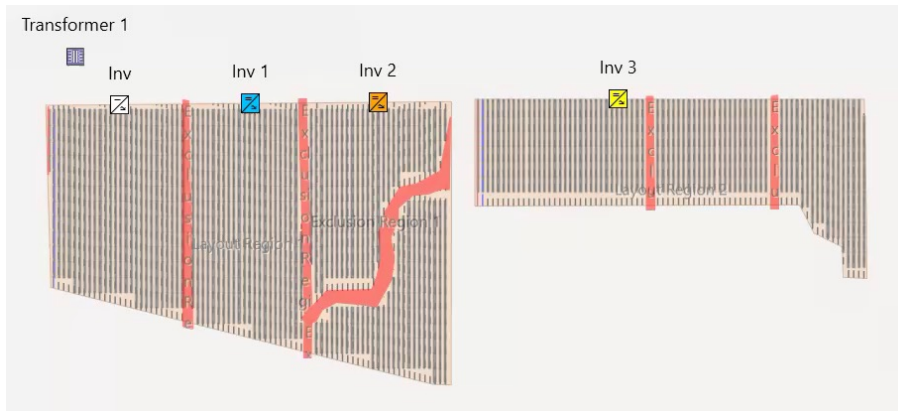
Integration of existing layouts: mounting placement and stringing



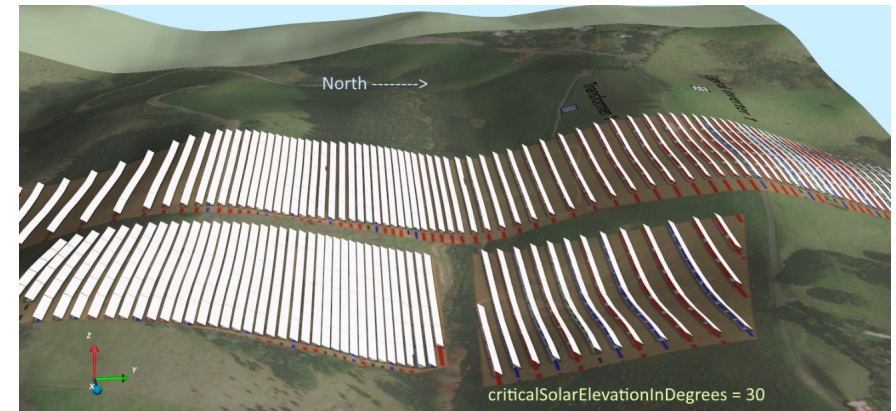
Import and export from PV Collada, Shapefiles, Google Earth KML/KMZ, CSV files

Automate layout design optimization

Use case:
Pitch evaluation enforcing DC/AC ratio



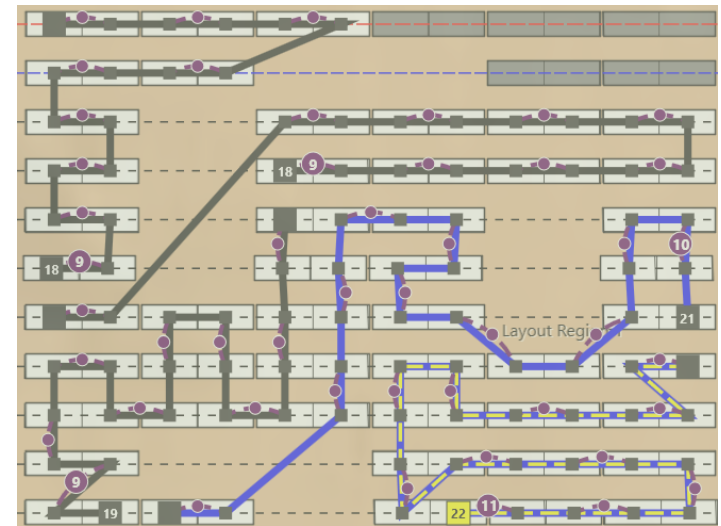
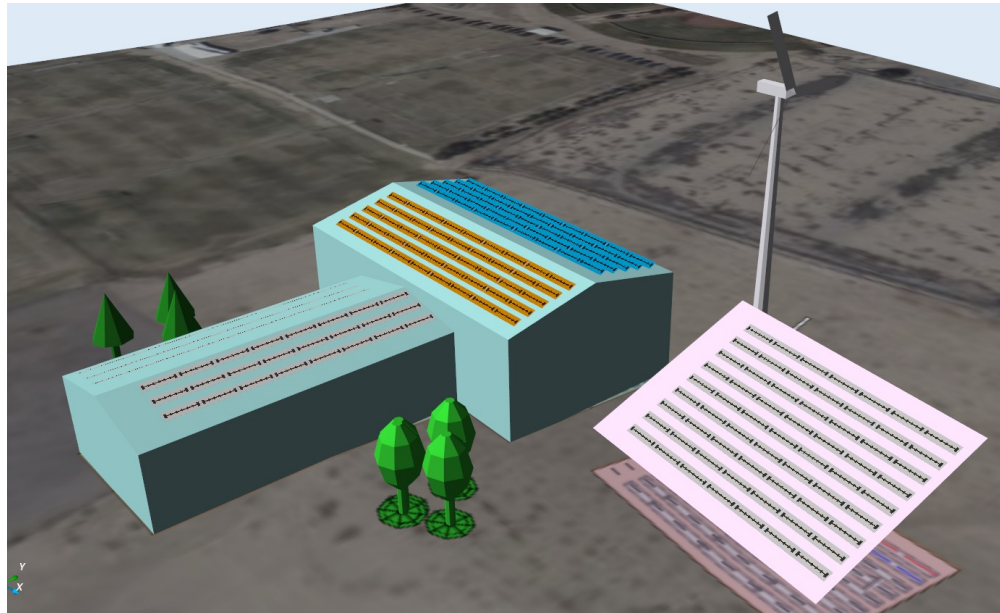
Use case:
Vary pitch with terrain slope



Flexibility to adapt your
workflows and use cases

Recent developments - Enhanced 3D design for DG

Support for power optimizers and custom stringing patterns



Near-term plans

- API platform scaling  faster 3D calculations
- Enhanced integration with other DNV digital tools: *from early stage to operations*



Solar Resource Compass



- SolarFarmer Python SDK

SolarFarmer Python SDK

Wrapper of the SolarFarmer API to assist with simplified and/or detailed definition of PV plants.

1. Import the library

```
import solarfarmer_sdk as sf
```

2. Define a PV plant object

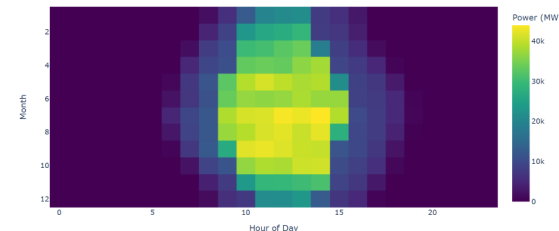
```
# Initiate a PVplant object  
plant = sf.PVplant()
```

```
# Set properties for the project  
plant.name = 'Sample Site'  
plant.latitude = 51.35  
plant.longitude = -1.48  
# Set PV plant design and technology  
plant.ac_capacity_inMW = 50  
plant.dc_ac_ratio = 1.0  
plant.mounting = 'Fixed'  
plant.bifacial = False  
  
plant.module_orientation = 'Landscape'  
plant.modules_across = 1  
plant.gcr = 0.3  
plant.azimuth = 180
```

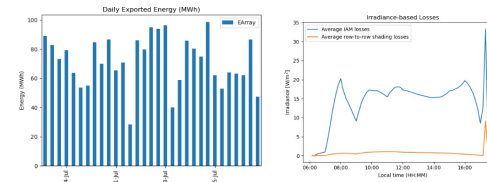
3. Run the energy calculation

```
# Run the energy calculation  
plant.run_calculation(key_metrics = True,  
                      plot_annual_power = True,  
                      save_timeseries = True)
```

4. Visualize and integrate the results in your workflow



General site data:	
2D/3D = 2D calculation	
Mounting type = Fixed-tilt racks	
AC capacity of system = 80 MW	
DC capacity of system = 80.4 MW	
Annual Performance Summary	
Average annual temperature	11.12°C
Horizontal irradiation	1966.57 kWh/m²
Irradiation on tilted plane	2316.69 kWh/m²
Effective irradiation on tilted plane	2189.49 kWh/m²
Energy yield	2032.78 kWh/kwp
Net energy	163435.30 MWh/year
Performance Ratio	0.88



See more at ...

DNV SolarFarmer's table during the Industry Modeling Software Office Hours
(*Parallel Session C*). **Today from 13:15h**

More on solar resource modeling in SolarFarmer at
IEEE PVSC Montreal, June 8-13th



→ *The Role of Solar Radiation Ratios in Photovoltaic
Asset Performance: A Global TMY study*

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Thank you!

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