WHEN TRUST MATTERS

SolarFarmer: latest developments and insights

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PVPMC – Session 13: Software Updates

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SolarFarmer PV Modeling

- Developed in house at DNV (launched in 2017)
- Bankable yield estimates for **design and operations**
- Built for industrial and utility-scale projects

- **3-D modeling** for complex terrain and shading
- **Automation and SDK** for scale
- Cloud compute with **API** access
- Multi-year runs at any time step

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Latest developments & insights

1	Updates in bankability and validation
2	Performance upscale for 3-D calculations
3	Renewables Component Library
4	SDK for SolarFarmer API integration

Position in Bankability

In North America (US and Canada):

- 80 GWp over 1,000 projects delivered.
- 5 GWp already financed with technical due diligence (TDD) delivered with SolarFarmer yield estimates.
- Developers, EPCs, IPPs and tracker manufacturers are using SolarFarmer in North America, Europe and Asia.
- DNV Advisory Services are progressively rolling out SolarFarmer worldwide.

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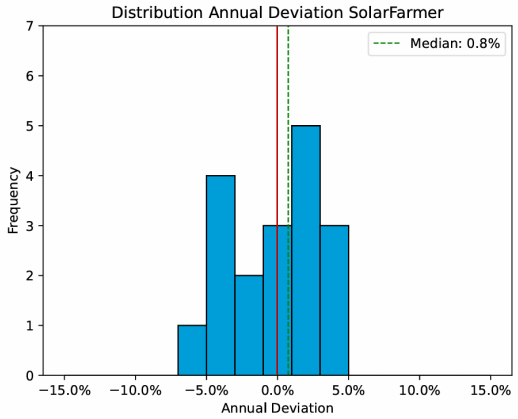
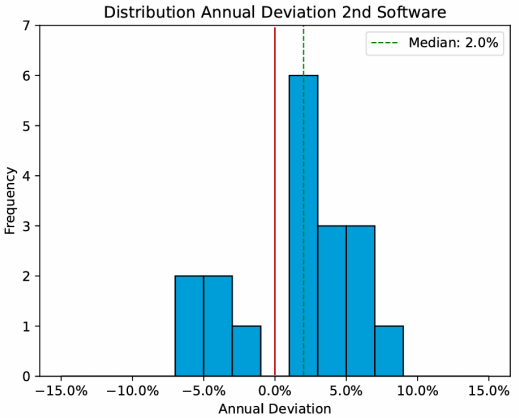
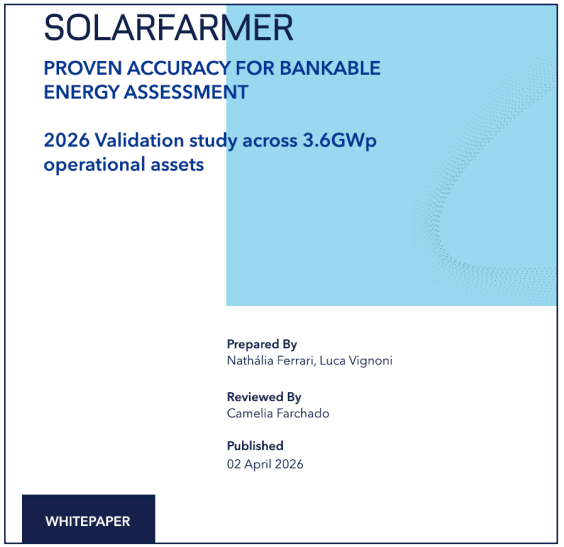
Validation in Latin America, Europe and Middle East

- DNV solar engineers evaluated SolarFarmer against 3.6 GWp of operational PV assets
- 24 plants
  996 months (83 years)
  18 TWh operational data
- Findings
  - Bias / MBE 0.8%
  - RMSE 3.3%
  - SolarFarmer was closer to the operational data (project-year) more than 83% of the times compared to a 2nd software.



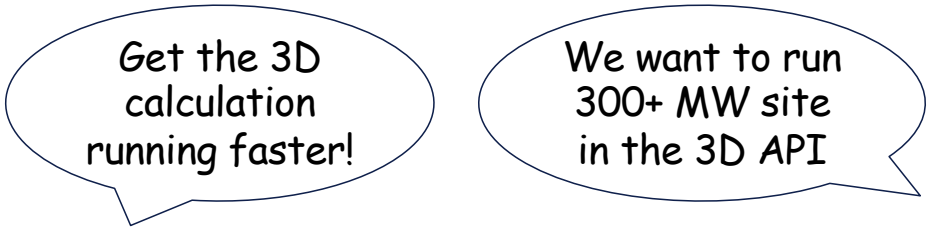




Study available in:
www.dnv.com/publications

3D Cloud compute improvements

- 3D calculation needs → high compute on demand
- Requirement for faster and scalable calculations



- Improvements for flexibility and scalability:
  - ✓ Compute optimizations and parallelization
  - ✓ Compression of intermediate results to avoid memory bottlenecks in the cloud
  - ✓ Same secure DNV cloud: ISO/IEC 27001 certified

SolarFarmer API improvements:

- No project (MW size) limit
- 12x faster per timestep · MW
- Overall: 3-15x faster runtimes

Examples of 3D runtime durations in SolarFarmer API version 6	
10 MW, 1h year	3 – 5 min
100 MW, 1h year	10 – 15 mins
100 MW, 15 min 1 year	12 – 16 mins
200 MW, 1h 10 years	≈ 40 mins

Renewable Component Library (RCL)

New API for accessing finance-grade PAN/OND files on demand

How component files flow today

- OEM provide module (PAN) and inverter (OND) specs for design, which are not always trusted for finance-grade decisions.
- IEs often rebuild component files for project finance.
- DNV has refined this modeling workflow through years of advisory work.

A hybrid path to trust

- Hybrid AI + IE approach: LLMs extract unstructured data; DNV deterministic methods validate and generate models.
- RCL delivers finance-grade PAN/OND models on demand for everyone as a standalone API or integrated into SolarFarmer licensing.

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Python Software Development Kit (SDK)

Use the SolarFarmer SDK to simplify and accelerate both high-level and detailed PV plant definition

Installation

GitHub: DNV OpenSource / solarfarmer-python-sdk

Pypi: *pip install dnv-solarfarmer*

Getting started

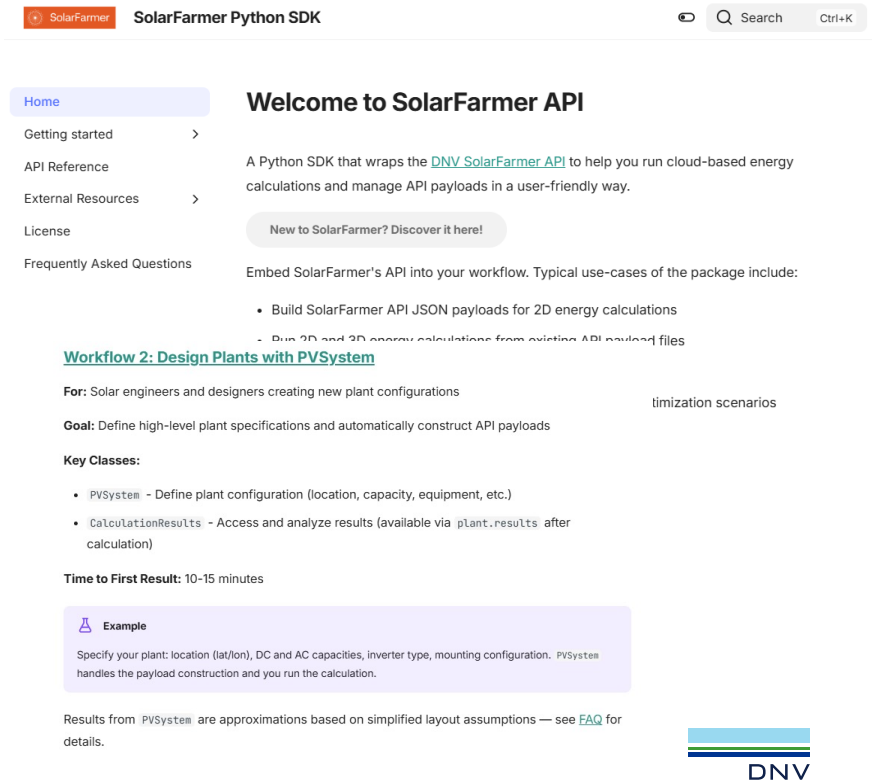
```
import solarfarmer as sf
```

Specific SDK documentation

Distinct workflows / use cases

Sample end-to-end notebooks

Designed for LLM auto-discovery



What's coming: PVCollada 2.0

- SolarFarmer will integrate the new PVCollada 2.0 format once completed by the work group
- Users will be able to import and export ***.pvc2** files
- **Question from day 1 (session 4): How large will the "bloated XML files" be?**
  - The new format copes with geometries, electrical and component elements.

Project capacity (MW)	File size (MB)	Ratio MB/MW
12	9.4	0.74
61.5	31.3	0.50
107	98	0.91
445	415	0.93
885	667	0.75

File sizes depend on the terrain, shading objects and components included.
Range from 0.5 to 0.95 MB/MW

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See more at …

- Software Office Hours. **Today from 13:20h**
- Training Session. **Today from 15:25 (session B)**

API-centric workflow from resource data to energy yield calculations using DNV Green Data Products

SOLCAST a DNV company

Solar Resource Compass
Solar intelligence, on-demand

SolarFarmer

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Thank you!

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