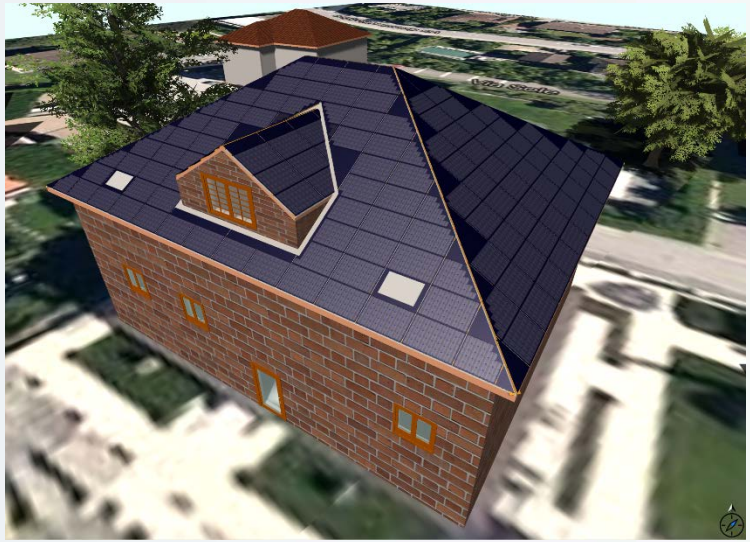
THE MODERN SOLAR SIMULATOR

The Company – inSun SA

A new company with an innovative approach

- Founded in late 2013
- Based in Lugano, Switzerland
- Partnership with SUPSI – ongoing research project on PV plant optimization



The Tool - inSun

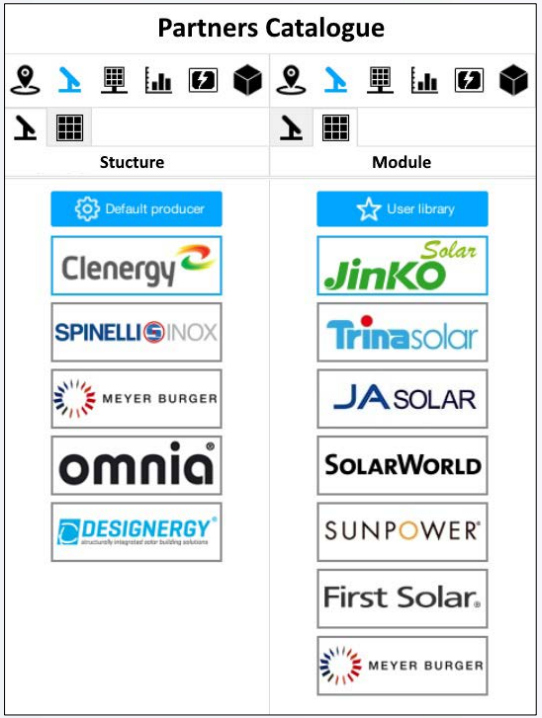
A modern approach to PV design and simulations

- 3D design tool based on a powerful engine
- Full lifecycle of project offering from PV design, technical drawings, bill of material and energy yield
- Integrated by geographical and weather databases
- Considers every mechanical, electrical and structural constraints
- Reproduces easily the built environment with stunning renderings
- Based on Microsoft Cloud, safe,robust and updated

The Tool - inSun

Product oriented

- Integrate every MLPE aspect of modules, bypass diodes, power optimizers, Maxim and micro inverters
- Integrates commercial products empowering their own technical and commercial aspects
- Takes advantage of Artificial Intelligence algorithms for simulation and optimization of PV plants
- Provides marketing data and business intelligence for manufacturers



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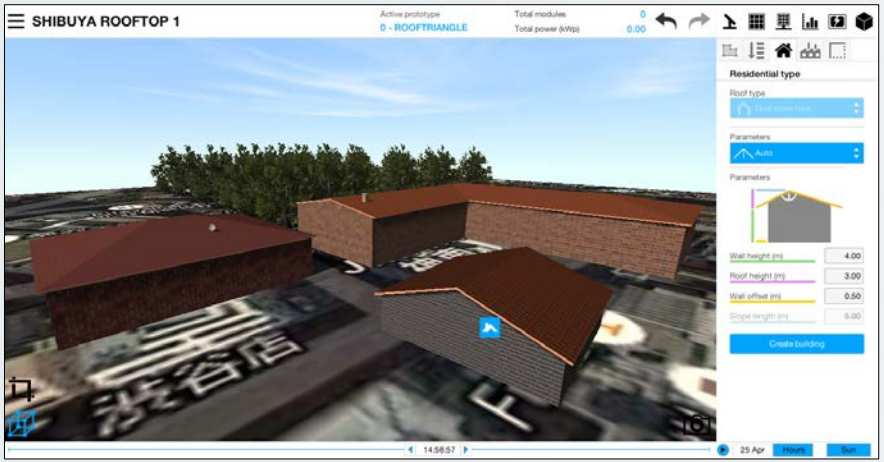
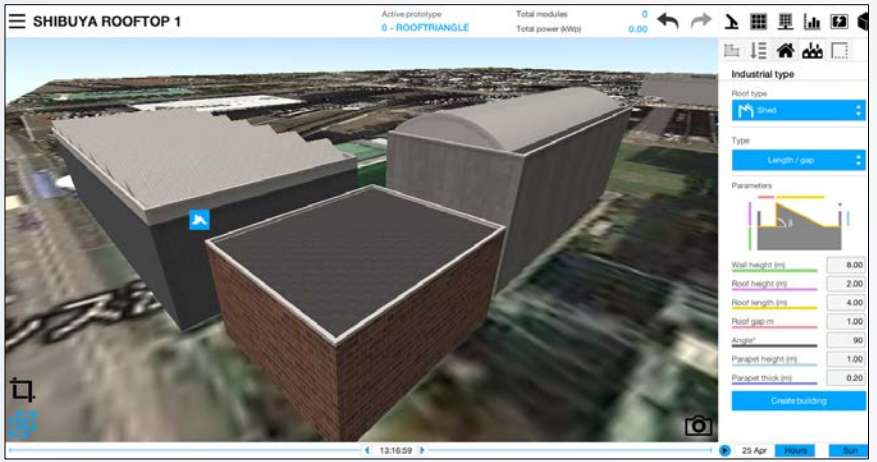
Building design

The tool allows to easily design any kind of residential and industrial building





The Tool - inSun

Ground mounted PV – Utility scale

- ❑ Definition of large PV plants
- ❑ Automatic fitting of available areas
- ❑ 3D Terrain
- ❑ *Positioning of inverters*

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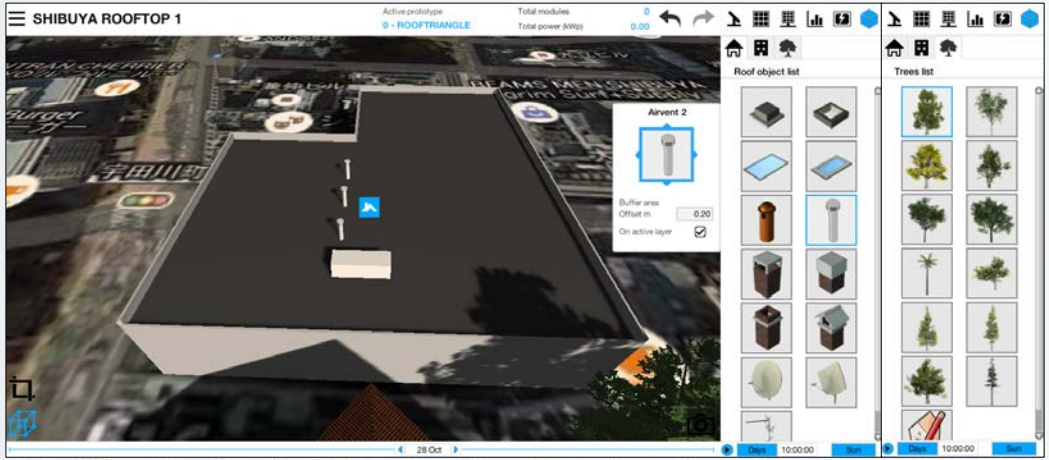
Accurate design of every obstacle

The user can design several obstacles, affecting the shading patterns, such as chimneys, trees and obstructions.



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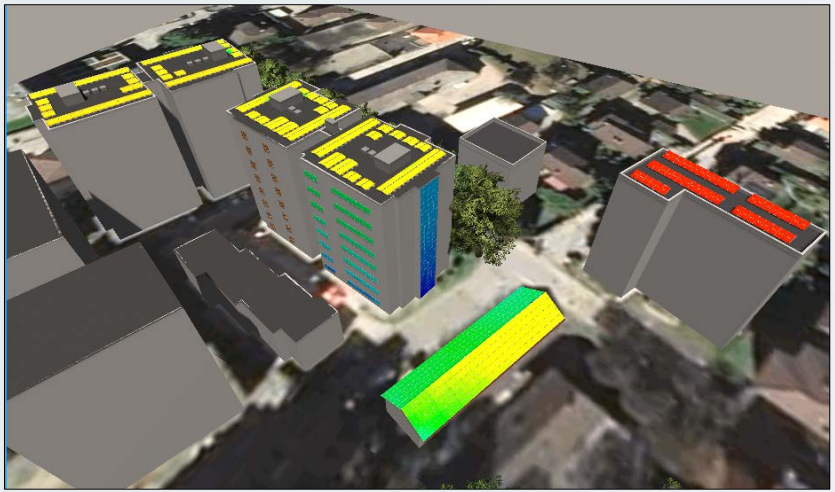
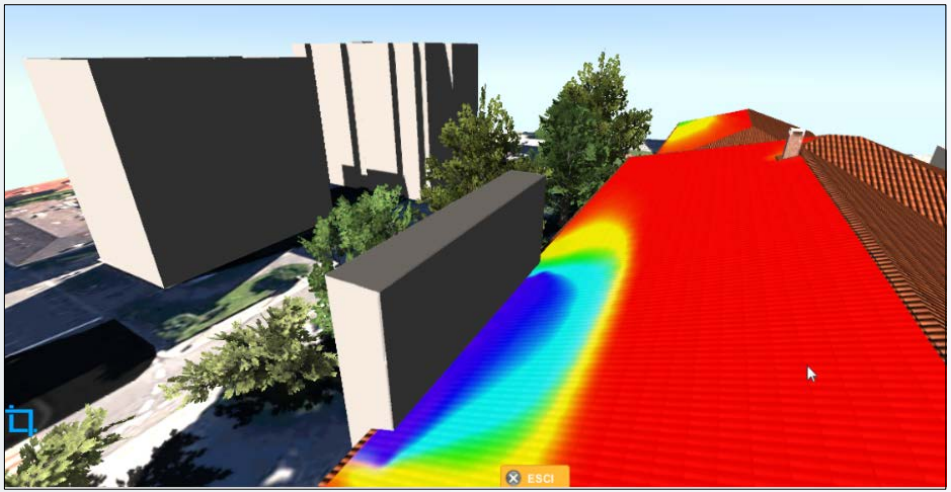
Shading analysis on surfaces

Integrates commercial products empowering their own technical and commercial aspects





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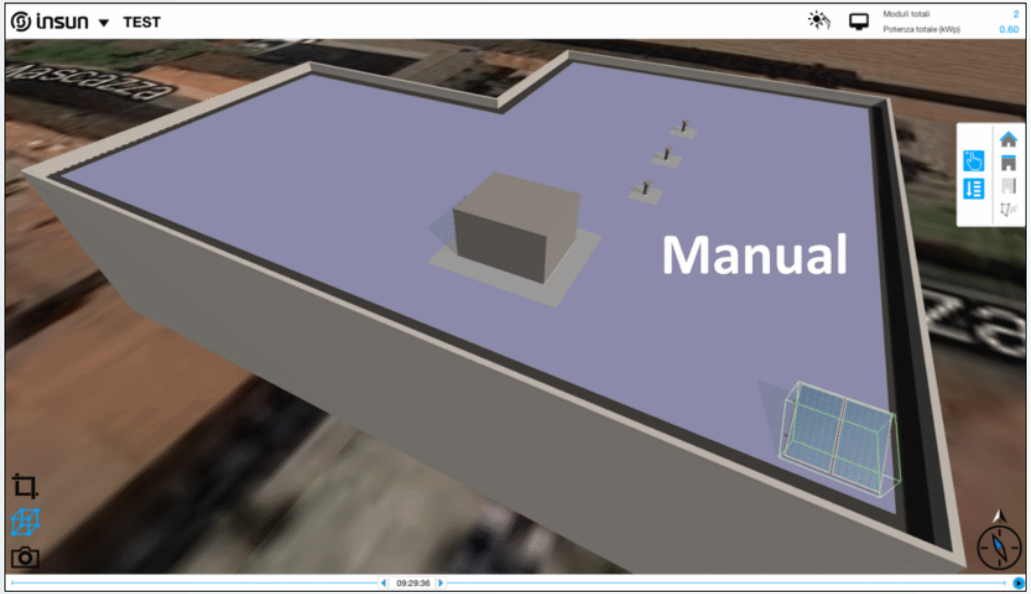
Placement of PV modules

The designer can place PV modules manually or automatically following rooftop geometries, obstacles and irradiation patterns.

The positioning considers constraints of racking systems and optimize the occupation of the surface.



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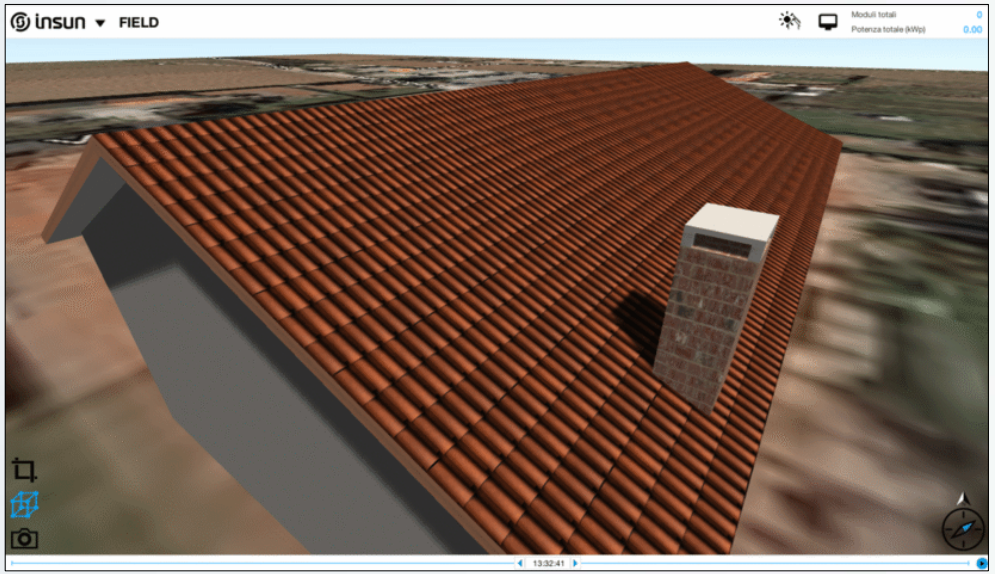
Shading analysis on PV modules

The analysis of irradiation patterns on PV modules and energy yield consider the shadings on each PV cell, includes how cells are connected and every MLPE.

Comparison of different configurations is now simple and very accurate.



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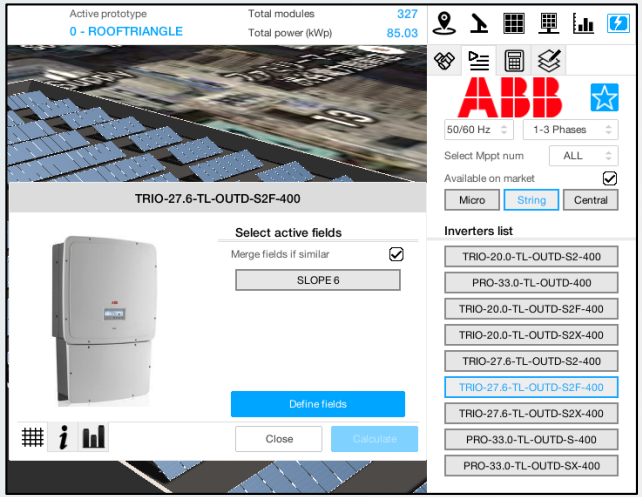
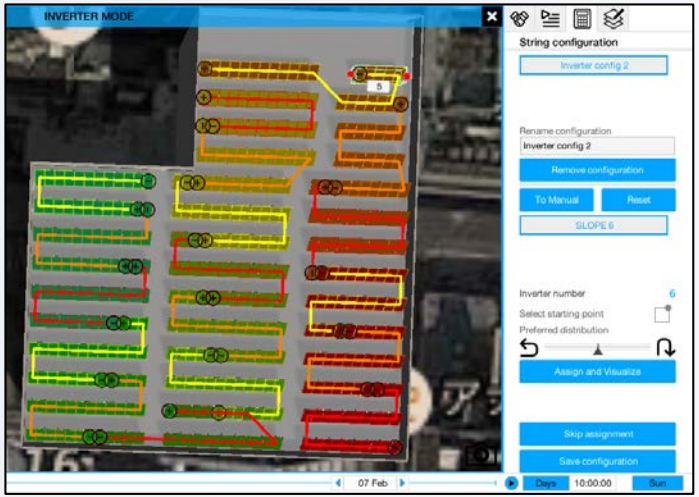
Electrical design

Complete electrical design, strings and MPPTs definition following every inverter constraints





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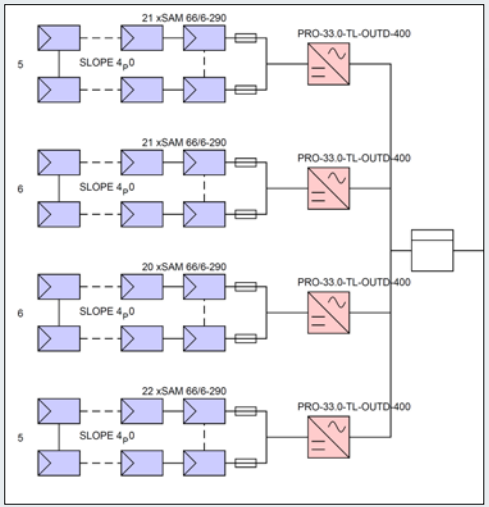
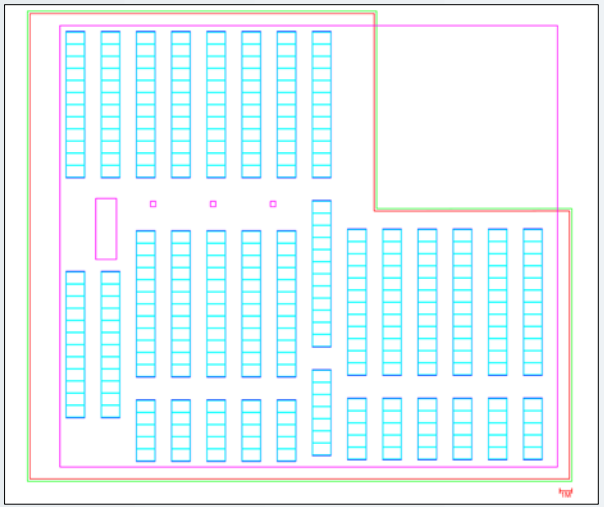
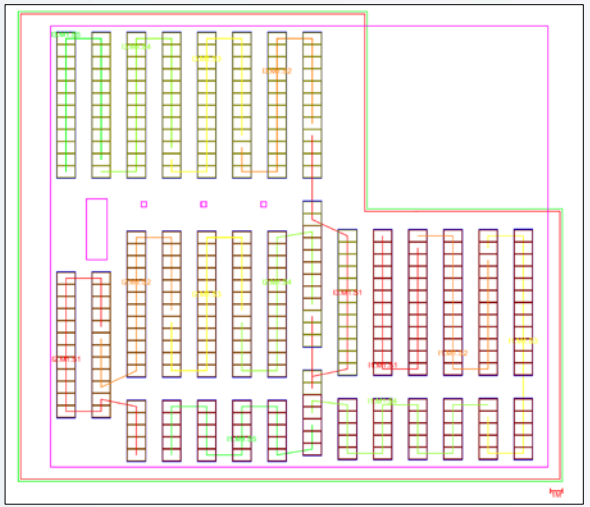
Technical drawings

Single line diagram, electrical schemes and CAD of module placement and cables







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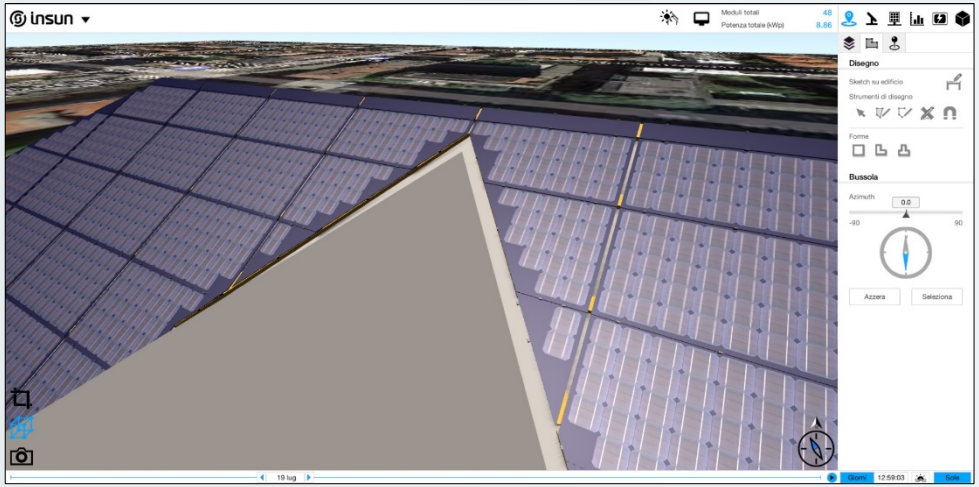
Bill of Material

Automatic Bill of Material, with regional prices connected to manufacturer’s CRM

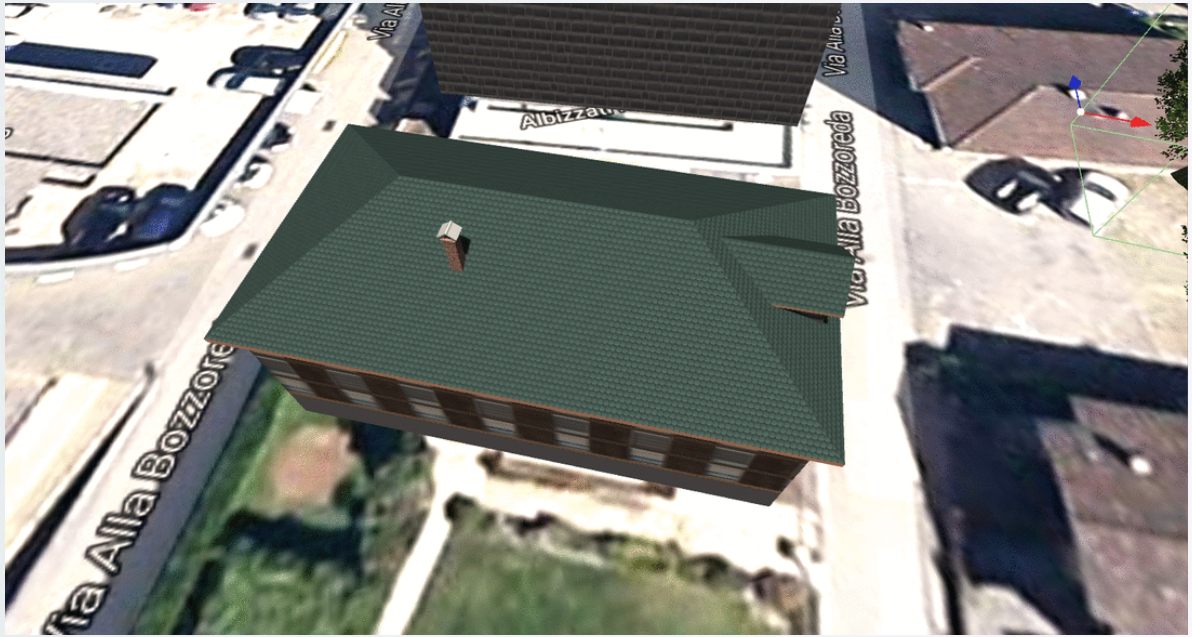


Bill of materials

Code	Description	dimensions	Price	UM	Quantity	Total CHF
500124	Wasserablaufrinne pro Modul L,M		18.90	unit	44	831.60
10093093	MegaSlate® II Haken		5.50	unit	316	1,738.00
500141	MegaSlate® II L OZ	875x1300	100.00	unit	42	4,200.00
10246819	Schraube zur Dachplatte		140.00	unit	144	20,160.00
10245011	MegaSlate L 190	875x1300	259.00	unit	42	10,878.00
10242225	Halbrundkopf SPAX®		32.00	unit	748	23,936.00
307811	MegaSlate® II Abstandhalter		2.00	unit	48	96.00
Y900017	MegaSlate® II Crea MZ		750.00	m2	14.76	11,066.80
Y900015	MegaSlate® II Crea OZ		290.00	m2	11.22	3,252.69
502835	MegaSlate® II Q OZ	720x1300	96.00	unit	4	384.00
502597	Wasserablaufrinne pro Modul Q,S		30.50	unit	4	122.00
10245016	MegaSlate Q 150	720x1300	265.00	unit	4	1,060.00
10244392	MegaSlate® II M OZ	875x985	98.00	unit	2	196.00
10245014	MegaSlate M 140	875x985	226.00	unit	2	452.00

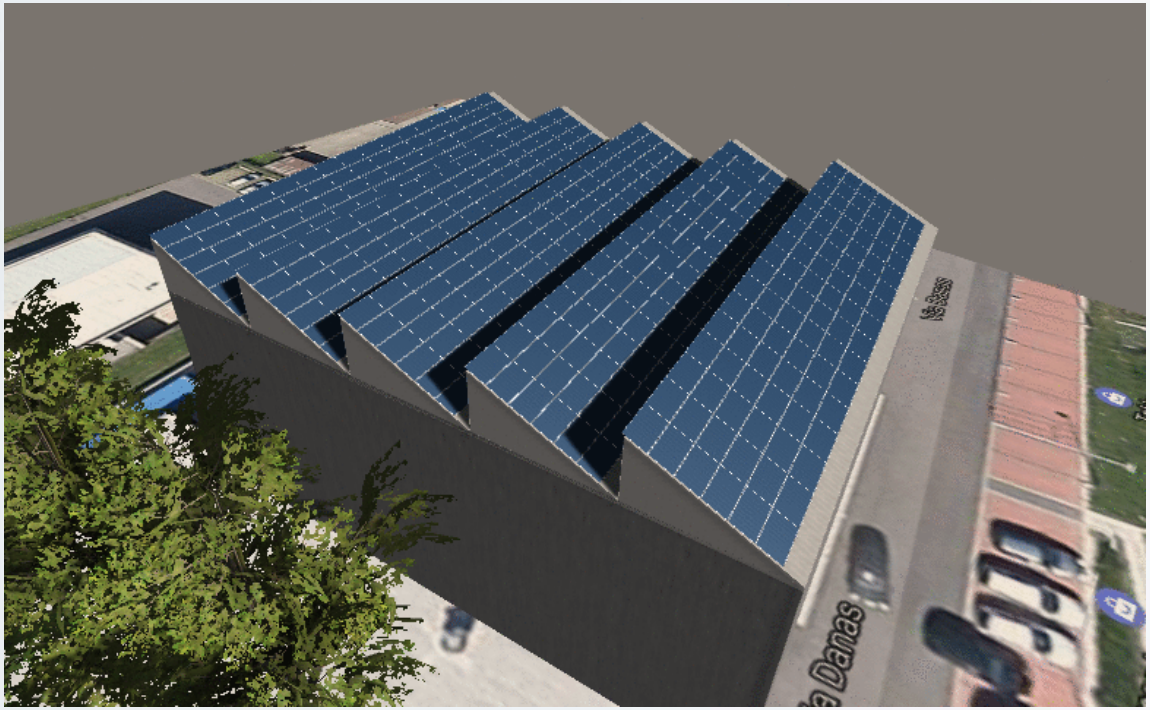
Test case - Residential

House fully covered with BIPV modules and complex shadings due to obstacles and surrounding buildings.
The optimal economic (LCOE) solution is not trivial.



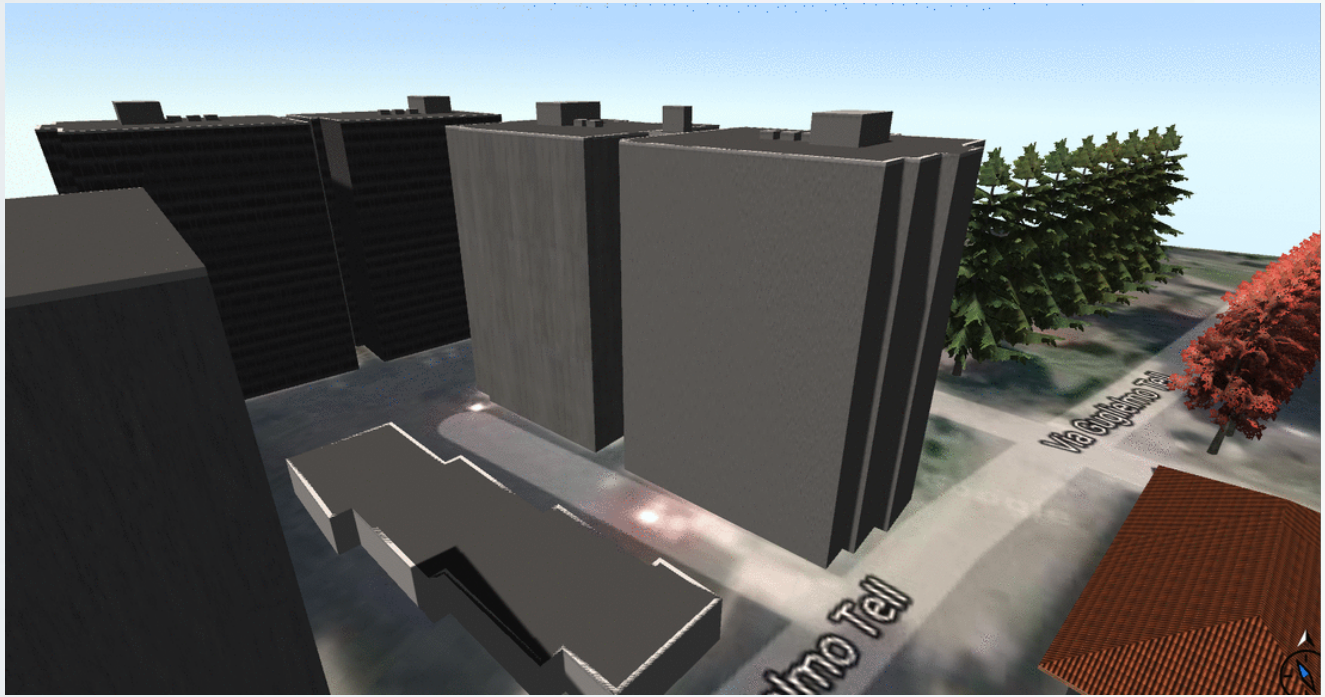
Test cases - Industrial

Industrial building with sheds and trees, a good positioning of modules and cabling into string and MPPTs can improve significantly overall performances.
It could be hard to find the best trade off between cablings and energy yield.



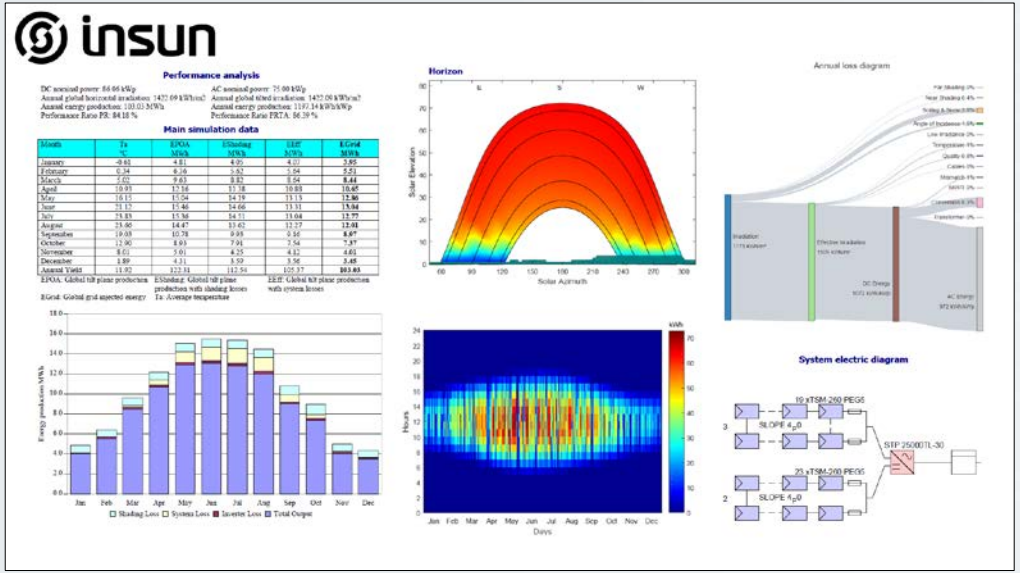
Test case - BIPV

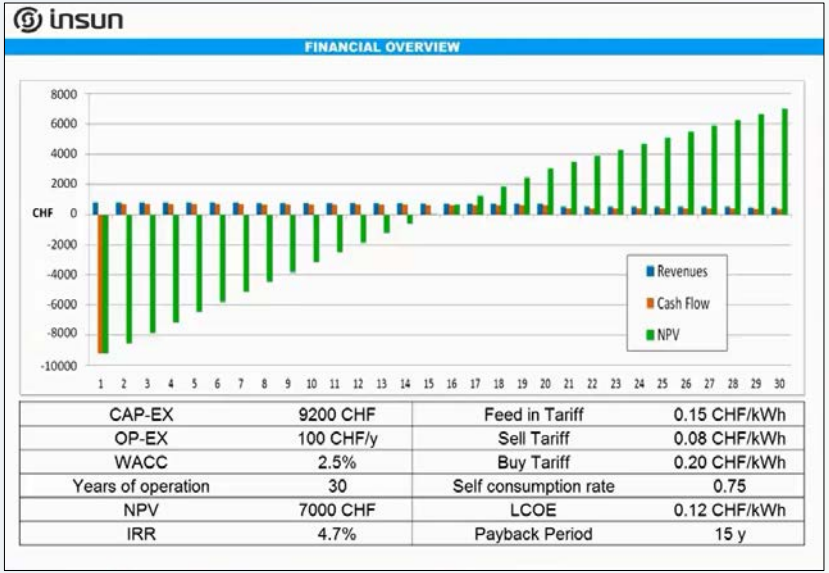
Installation on façade need to have a smart cabling of modules, very hard to design it manually depending on obstacles.



The Tool - inSun

Automatic detailed reporting on energy yield and economics





CAP-EX	9200 CHF	Feed in Tariff	0.15 CHF/kWh
OP-EX	100 CHF/y	Sell Tariff	0.08 CHF/kWh
WACC	2.5%	Buy Tariff	0.20 CHF/kWh
Years of operation	30	Self consumption rate	0.75
NPV	7000 CHF	LCOE	0.12 CHF/kWh
IRR	4.7%	Payback Period	15 y

The Business Model

Three major streams of revenue

- **Base User/Installer licenses**

  User login Software licenses

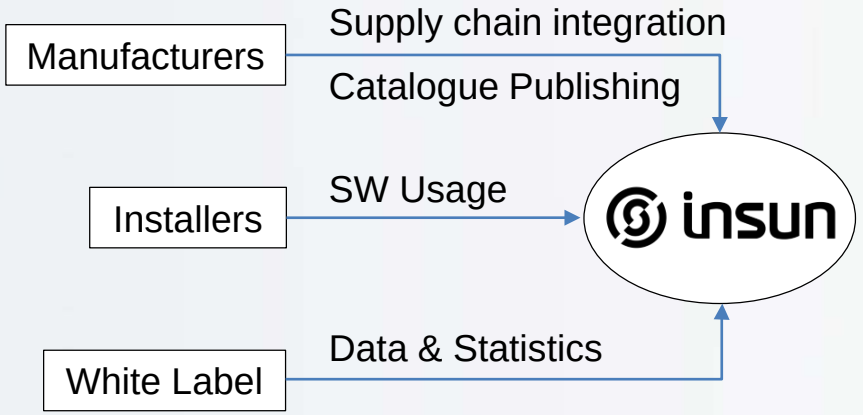
- **PV Manufacturer Partnership**

  Product catalogue with company detailed data

  Sophisticated products price list management

- **White Label Solution (WLS)**

  Platform embeddable into Customer web site



Ongoing Project

DESIGNPV – Optimization tool for PV Design

The project aims to develop a tool for the automatic optimization of the design process:

- Orientation of PV modules and definition of modules' strings
- Minimization of cables length
- Minimization of mismatch losses (accurate simulation)
- Accurate comparison of different MLPE solutions

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SUPSI

- Collaboration with PV Lab and AI Lab of SUPSI
- Financed by the Swiss Commission for Tech and Innovation

KTI/CTI

Thank you for your kind attention