

BIM- A driver for Energy transition and Building-integrated photovoltaics technologies adoption

PVSITES purpose

The deployment of building-integrated photovoltaics (BIPV) is driven in the EU, amongst other factors, by the increasingly demanding legislation related to energy performance in buildings. However, several demands from the market stakeholders remain to be answered by the BIPV value chain in order to ensure the technology's successful take-off.

The objective of the PVSITES project is to drive BIPV technology to a large market deployment by demonstrating an ambitious portfolio of building-integrated solar technologies and systems, giving a forceful, reliable answer to the market requirements identified by the industrial members of the consortium in their day-to-day activity.

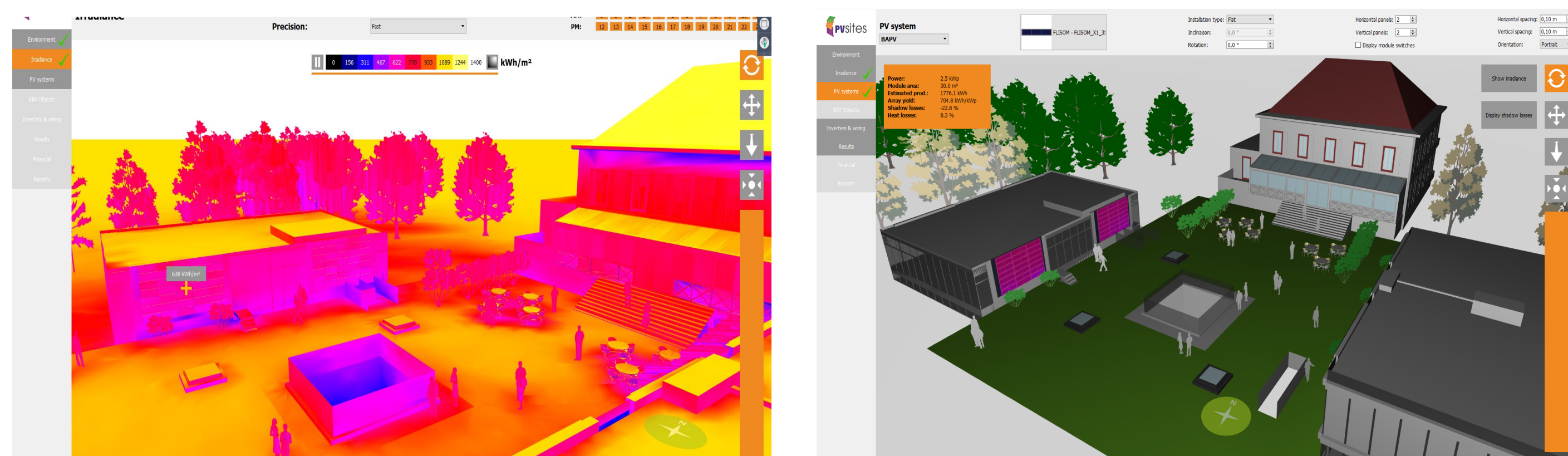
Funded by the European Union under the Horizon 2020 research and innovation programme, PVSITES is active from 2016 to 2019. All public results are published on the project website www.pvsites.eu, where you can also register to be informed of future activities and achievements.

Latest results

BIPV Design software towards the integration with digital twin model based on BIM AEC process

The attractiveness of BIPV is to large extent depending on **aesthetical aspects that are closely linked to performance output**. During the design stage of the PVSITES project, the following recommendations were noted in order to fully capture both considerations:

- Consider energy efficiency while assessing **other functional aspects such as shading or daylighting impact on buildings**.
- Give fully attention to **geometrical arrangement** of modules and profiles. Make fixtures as invisible as possible. The detailing of surface edges and rims is paramount to ensure an harmonious integration with surrounding elements.
- Make clever use of **transparency** in BIPV materials.



The PVSITES software has been developed taking into consideration: design, customization and planning aspect of BIPV projects. The project has released a fully-functional **beta version** of the PVSITES software. It has been designed as an enhanced website accessible for free to all users on a dedicated webServices platform available at www.pvistes.eu

Features include:

- Import of building 3dBIM compliant models** from various formats, including: .skp (TRIMBLE SketchUp), ifc. (openBIM), gbXML (Green Building) and .idf (EnergyPlus). Autodesk™ Revit™ plugin
- Selection of project location** and built-environment of corresponding weather data.
- Visualization of irradiance** on all surface of the 3D model.
- Import of existing BIPV products as BIM objects** in the software, or assisted self-design of products.
- Easy, flexible layout of BIPV modules** and surfaces in various configurations (roof, façade, canopies, etc.)
- Inverter selection and stringing of modules**, either manual or automated.
- Precise simulation of PV performance** including losses by shadowing and other factors.
- Financial analysis** to evaluate the project viability under different scenarios, including net-metering and self consumption electricity.

Demonstration sites

	Single House	Educational	Carports	Industrial building	Apartment building	Office building
Responsible partner	FormatD2	Flisom	Flisom	Cricursa	Vilogia	Tecnalia
Location	Stambruges Belgium	Geneva Switzerland	Zürich Switzerland	Barcelona Spain	Wattignies France	San Sebastián Spain
Product(s)	Roofing shingles (CIGS on steel)	Large tiles on façade (CIGS on metal substrate)	Roof tiles (CIGS on metal sheets)	Large roofing shingles (CIGS on metal substrate)	Ventilated façade (c-Si modules with hidden bus bars)	Ventilated façade (Glass-glass back contact c-Si cells)
Manufacturer	Flisom	Flisom	Flisom	Flisom	Onyx Solar	Onyx Solar
Orientation	SSW	E + W	Horizontal	Horizontal	SSE	SSE
Surface	75 m²	136 m²	145 m²	225 m²	130 m²	170 m²
Installed power	8 kWp	4 + 8 kWp	7 + 7 kWp	19 kWp	17 kWp	10 + 10 kWp
Use for electricity	Self-consumption + Grid	Self-consumption + Grid	EV chargers + Grid	Grid	Self-consumption + Grid	Self-consumption + Grid

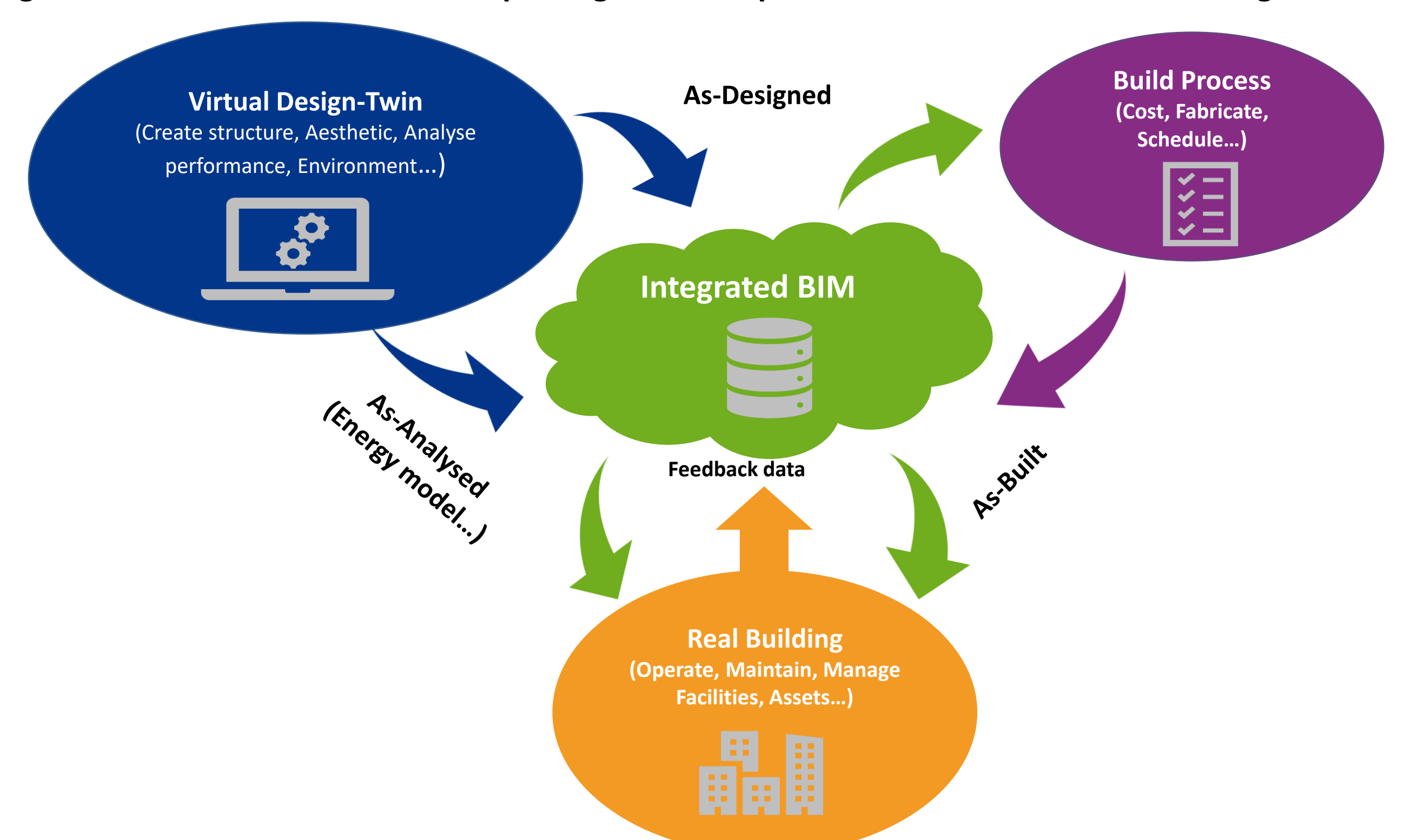
Main activities

- Analysis of the BIPV market and regulatory framework to identify appropriate collaborative business models** for different BIPV products and services across market actors
- Demonstration of a wide portfolio of BIPV products in real buildings and experimental facilities throughout Europe**, based on crystalline silicon and CIGS photovoltaic technologies
- Development of a new inverter technology and building energy management systems** to ensure efficient and grid-friendly integration of the BIPV generation
- Development of a user-friendly, integrated software tool** for the joint simulation of BIPV electricity production and building energy performance
- Life-cycle assessment** of the developed products and installations
- Organization of installation courses** for the developed BIPV products, **guided visits at the demonstration sites** and offering of **online training for the BIPV software tool**

Project partners



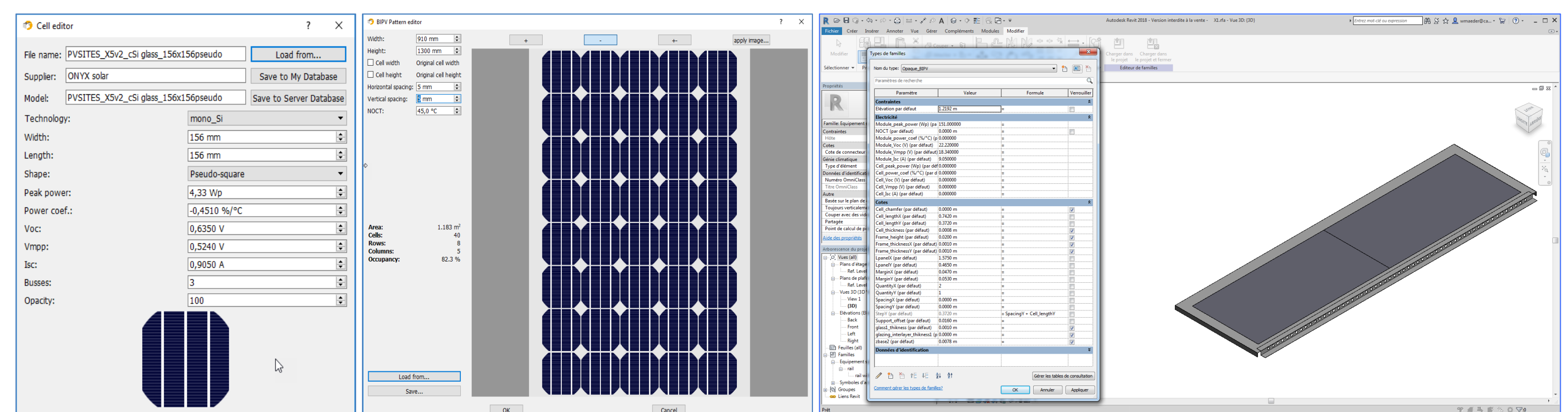
Integrated and connected BIM encompassing the three phases to allow enriched data and greater knowledge



BIPV Product Information Manager (PIM)

PVSITES products has been designed as BIM objects embedded within the simulation software. A pre-commercial version of PVSITES eCatalog is open to public use as a BIPV Product Information Manager (PIM) through web access. The PIM aims at configuring virtual BIM objects with:

- Geometrical data:** cell configurator, module configurator, pattern of cells configurator, module spacing, strings arrangement and inverter localization to generate 3D pathways for strings into the 3D model.
- Electrical data:** I, V, Power values, diodes, busses.
- Thermal data:** Nominal Operating Cell Temperature (NOCT), power losses coefficients, thermal conductivity, thermal transmittance, thermal emissivity.
- Optical data:** solar and visible transmittance, solar and visible reflectance, color.
- Layout features:** horizontal/vertical cells and modules arrangement, mounting and fixing devices, framing.



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Find us on:



www.pvsites.eu

#PVSITES
BIPV group



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