BIM-based software tool for BIPV systems design + simulation

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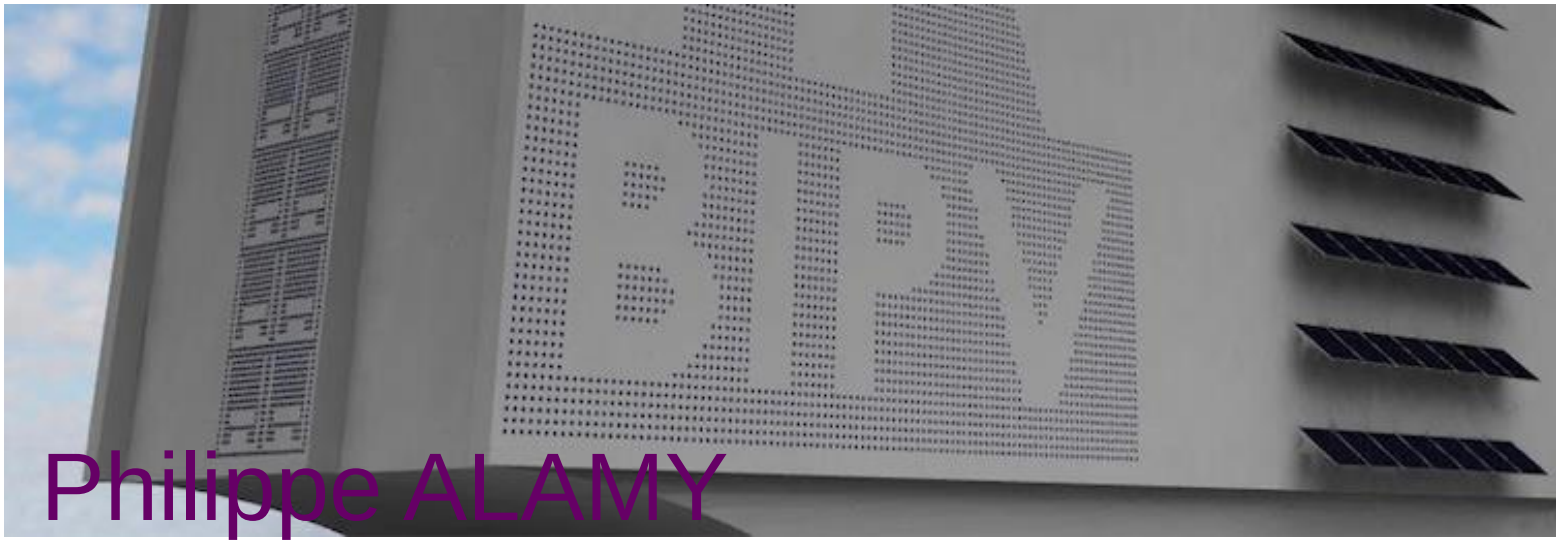

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Introduction

BIM-based software tool for BIPV systems design + simulation

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The PVSITES project

www.pvsites.eu

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 691768

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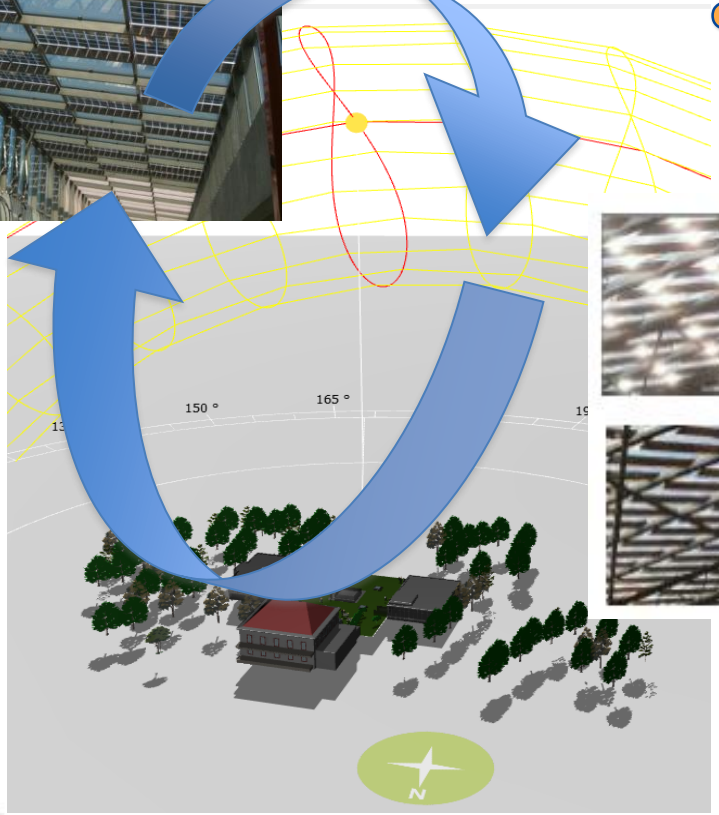
One question

How to merge real-estate asset, architectural design and commercial prescription?



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Targets

Modelling at building level & BIM objectives:

- Make solar architecture virtual reality
- Support the BIPV industry
- Bridge the gap between products and projects

Collaborative design with BIM: the PVSITES roadmap

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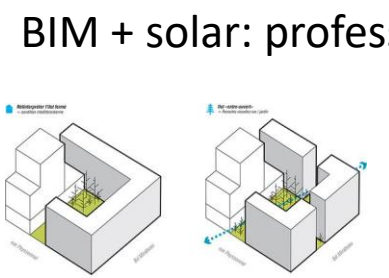
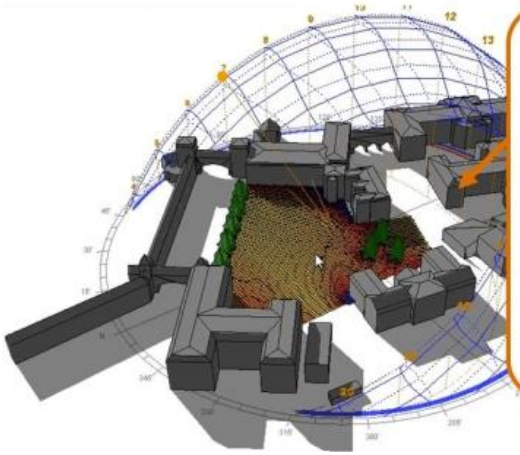
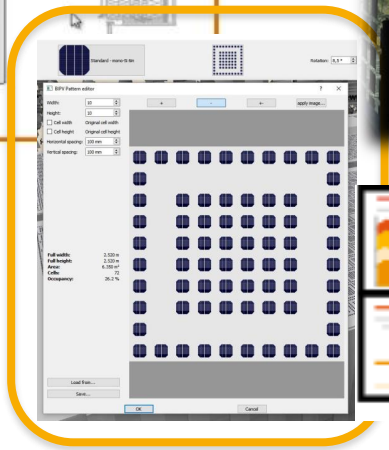
- ✓ BIM: from architectural intent to products and buildings life cycles
- ✓ BIM = collaboration, methodology, horizontal + vertical
- ✓ BIM + solar: professionals miss integrated solutions







1 PRE-DESIGN → 2 CONCEPT DESIGN → 3 DESIGN DEVELOPMENT → 4 FINAL DESIGN → 5 CONSTRUCTION → 6 BUILDING OPERATION

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Definition

- 3D modelling
- PV simulation
- BIM process
- BIM components

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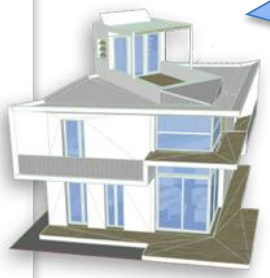
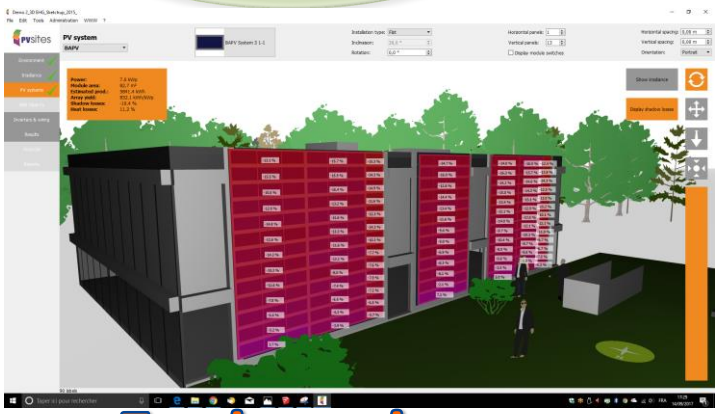
3D

Allplan
ARCHICAD
ArchiTECH.PC
envisioneer
Revit
SketchUp
Vectorworks



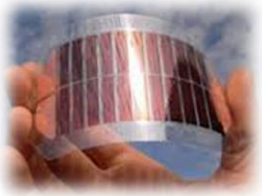
BIM



Engineering
Manufacturing
Exploitation

Architectural DESIGN

feedback



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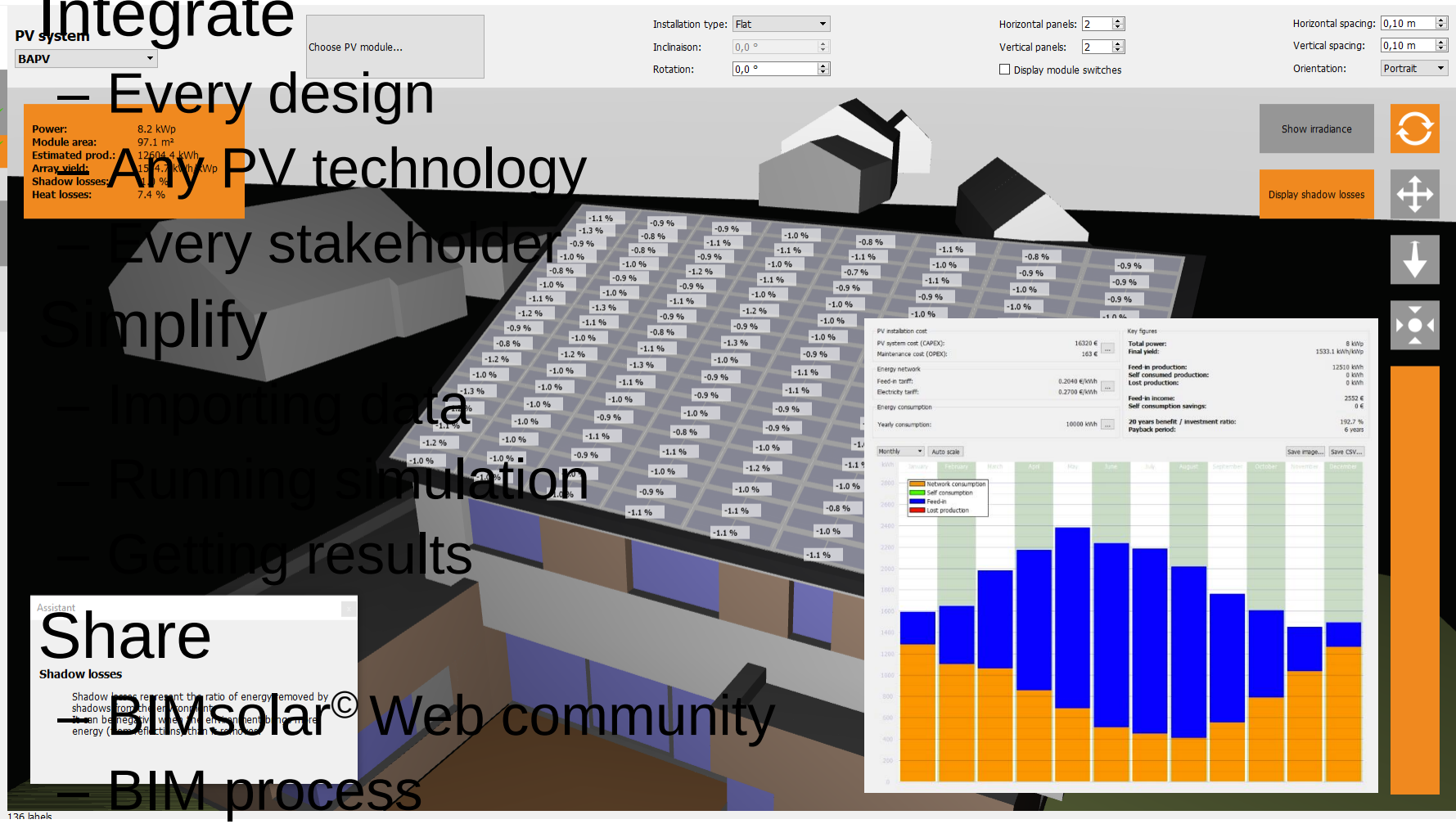
Our issues

- Integrate
  - Every design
  - Any PV technology
  - Every stakeholder
- Simplify
  - Importing data
  - Running simulation
  - Getting results
- Share
  - BIMsolar© Web community
  - BIM process



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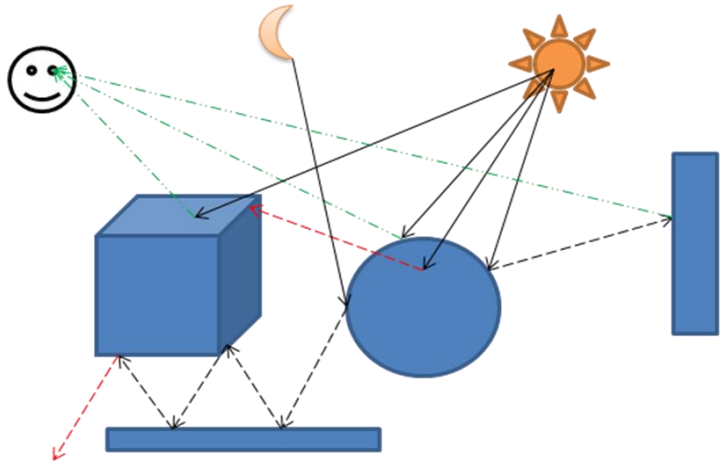
Raytracing technologies and BIM

Raytracing technologies

- Definition - Utility
- Scene analysis from BIM
- Irradiance analysis and energy distribution

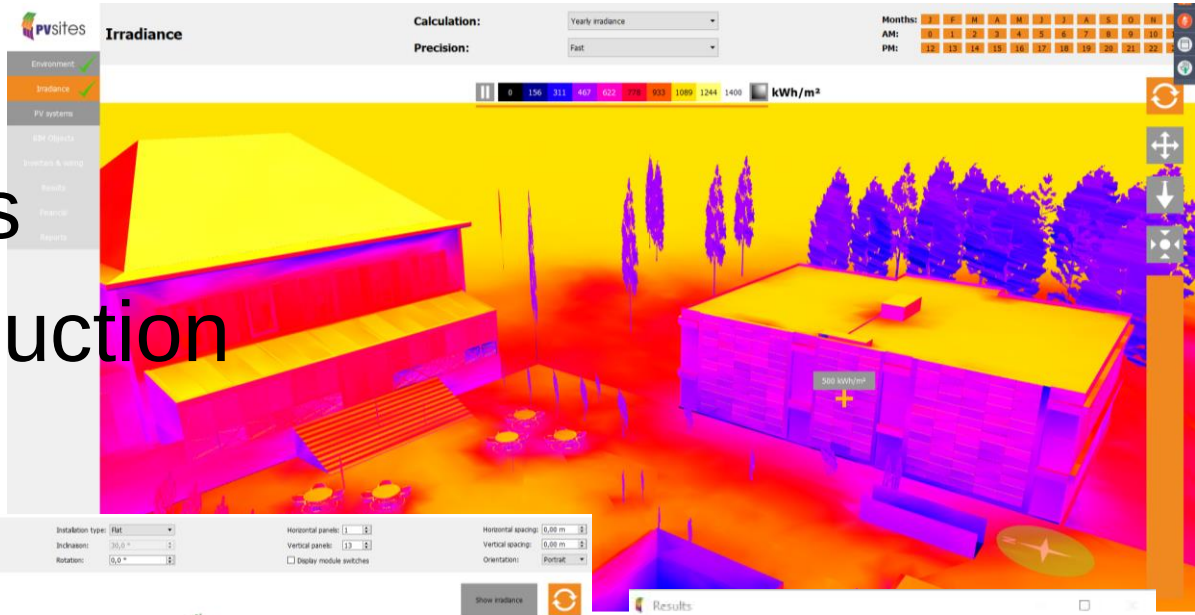


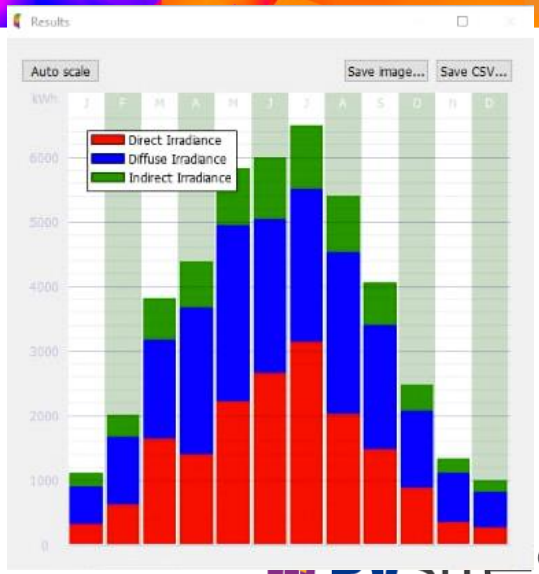
Real time simulation for solar conditions

→ Raytracing technologies
→ Irradiation of surfaces
→ Direct/Diffuse/Reflected lighting
→ Direct/Diffuse/Reflected solar irradiance
→ ALBEDO effects computed
→ 3D interface rendering
→ BIPV is a challenge!

Computations

- Sun effects
- 3D simulations
- Electrical production
- Losses





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Virtualization & BIM

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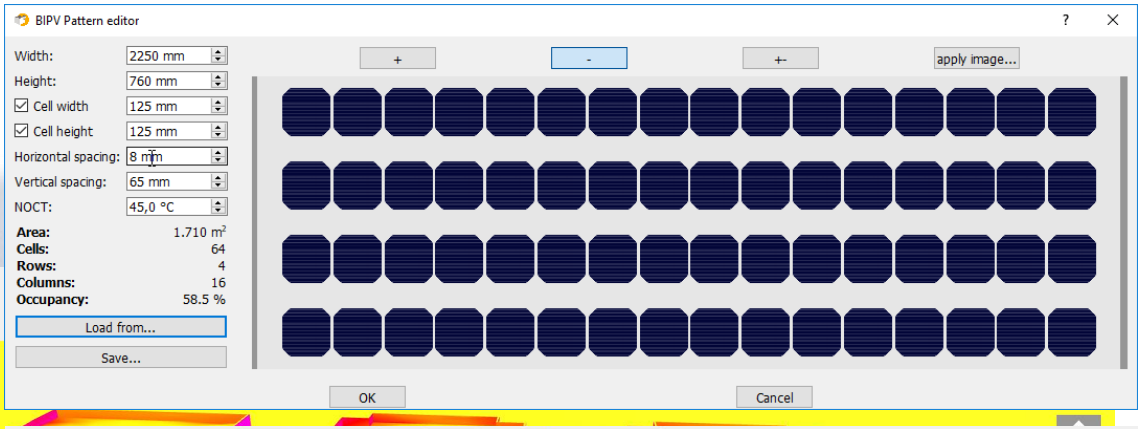
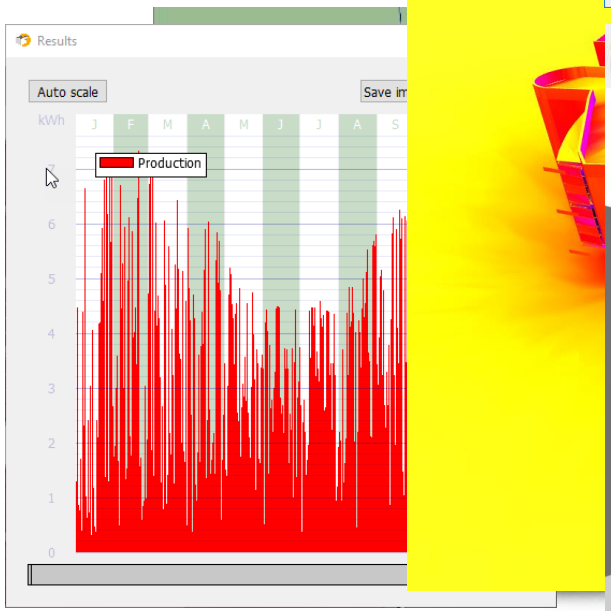
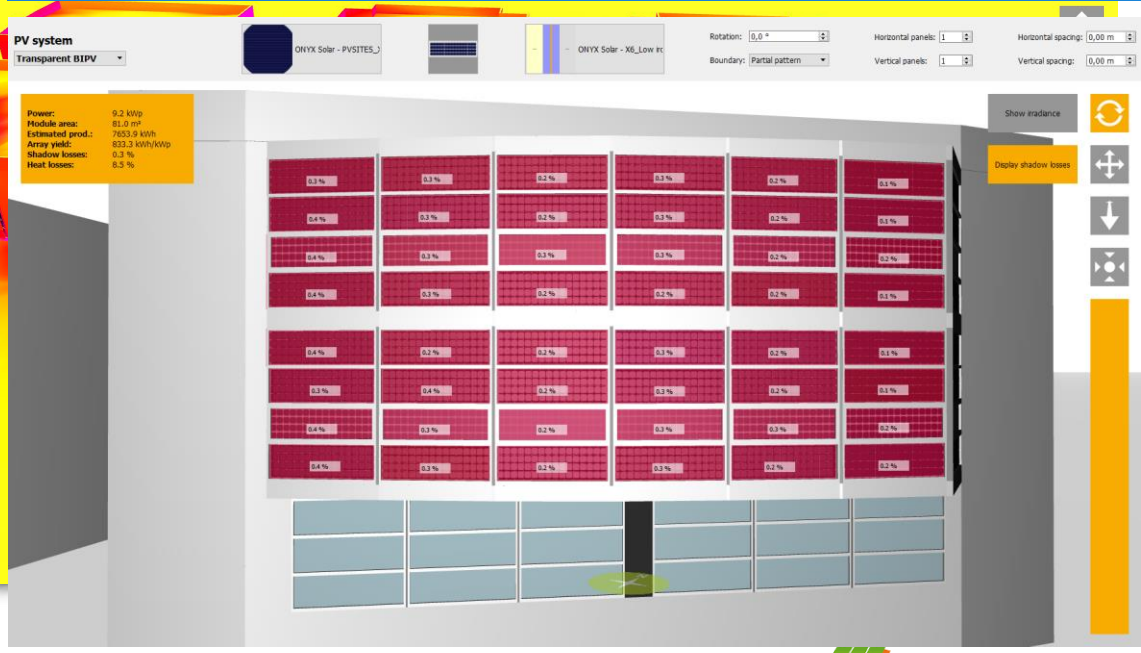
- Full 3D display
- Information
- Modelling







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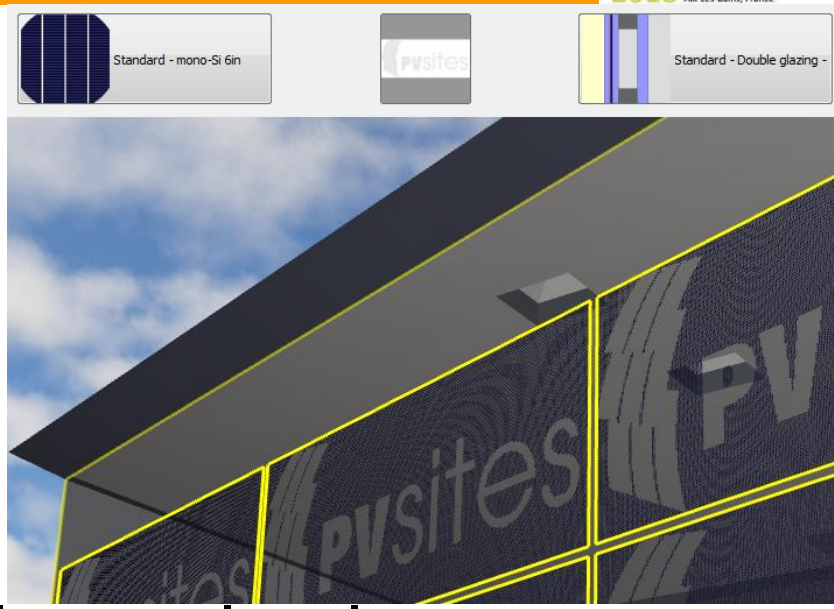
BIM components

PV component as BIM object



- Definition
  - 3D geometric
  - Parametric + dynamic
  - Compatible
- Parametrics
  - Inputs: from database at element level + user-friendly handling
  - Outputs: contextual at building level + BIM ready
- BIM issue: coupling simulation workspace and architectural design (CAD) regardless of products and projects complexity

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Configurators: from editors to PIM

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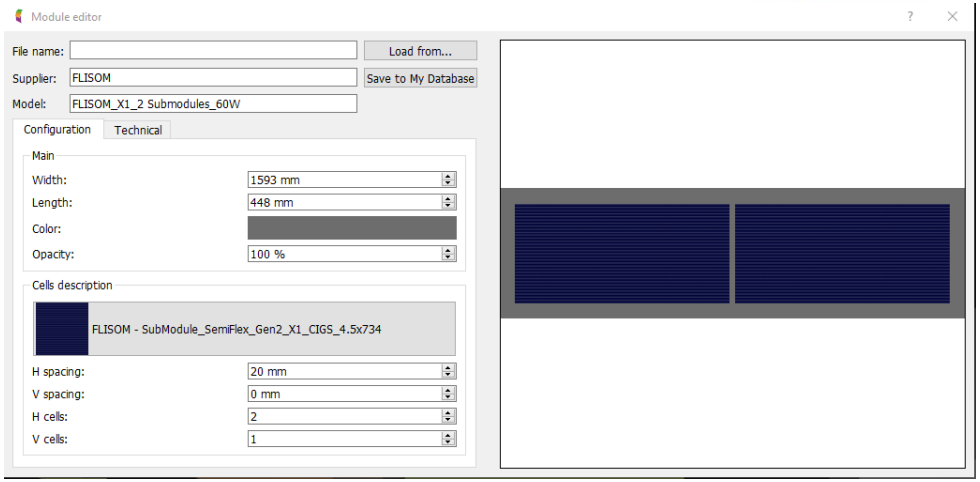
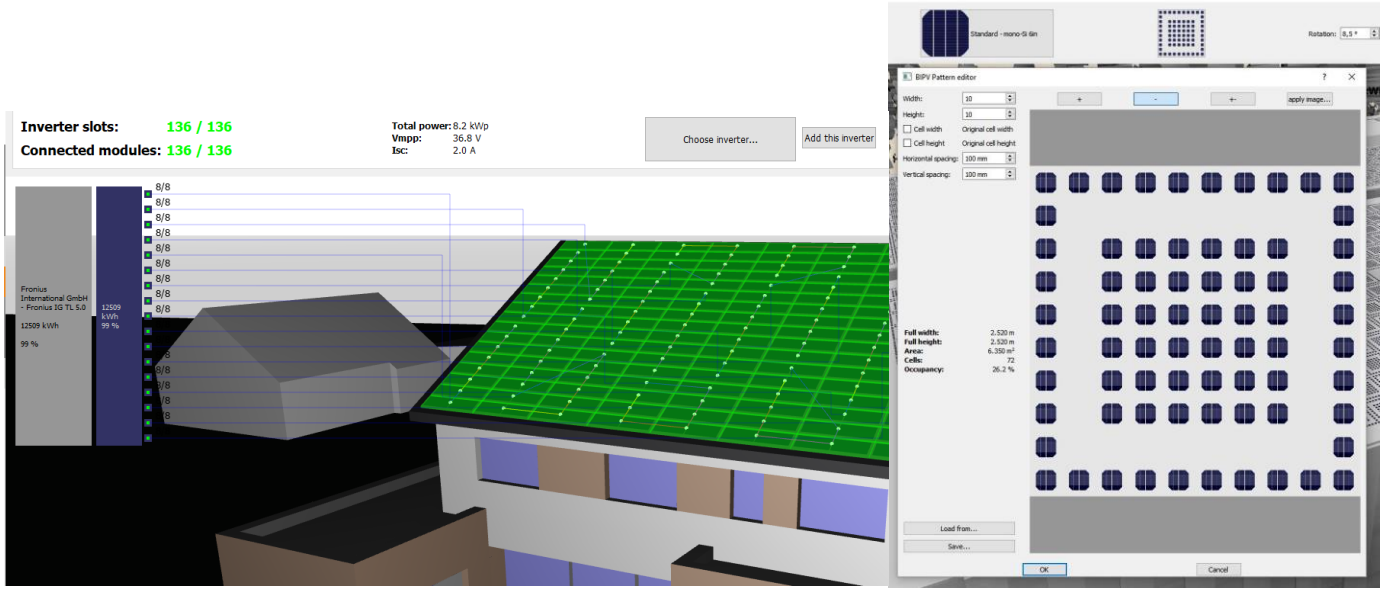
- BAPV modules
  - Cell
  - Module
  - Array
- BIPV patterns
  - Cell
  - Pattern
  - Glazing
- BoS
  - Inverter
  - MPPT
  - Wiring





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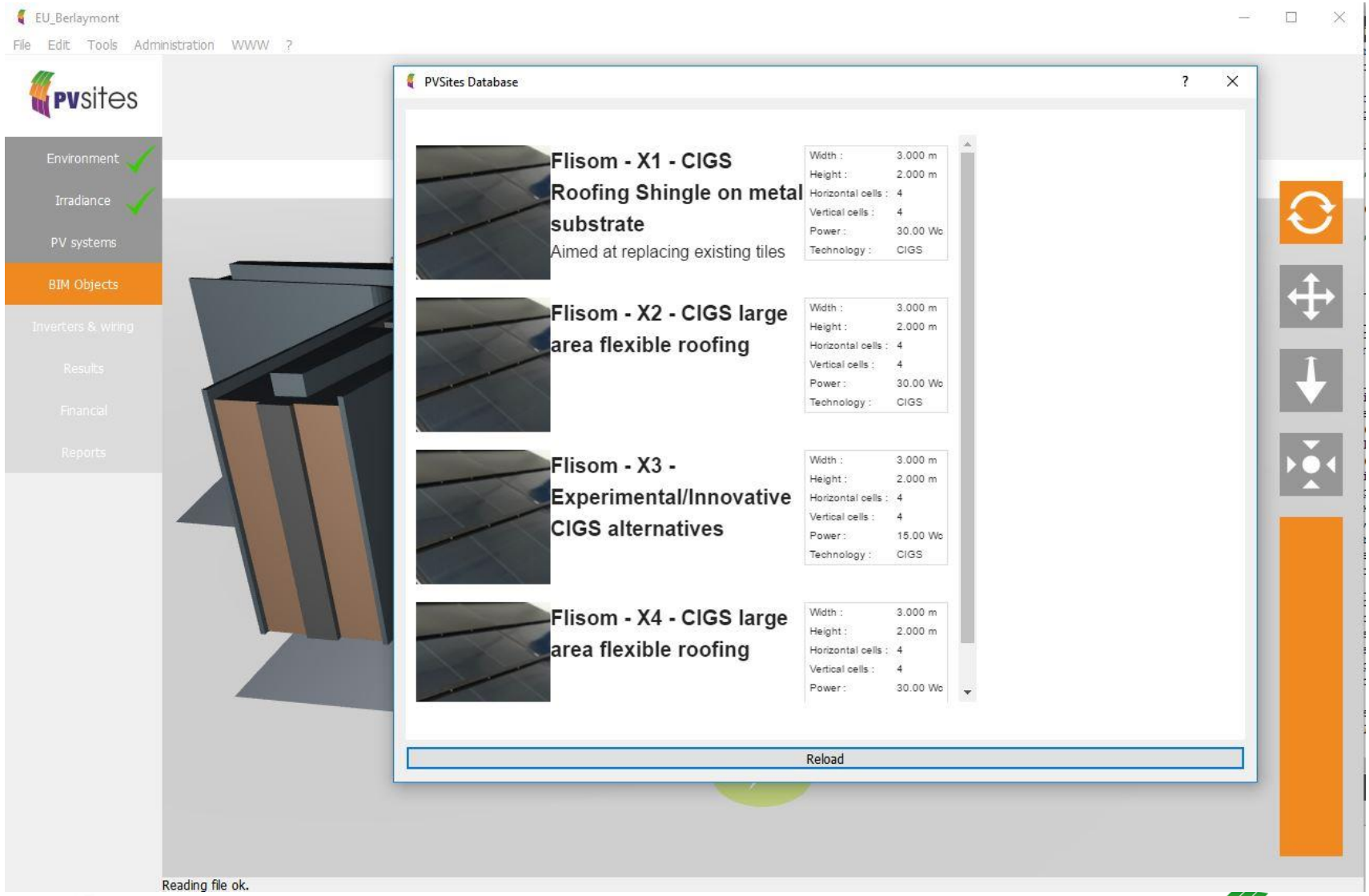
eCatalogs: PIM



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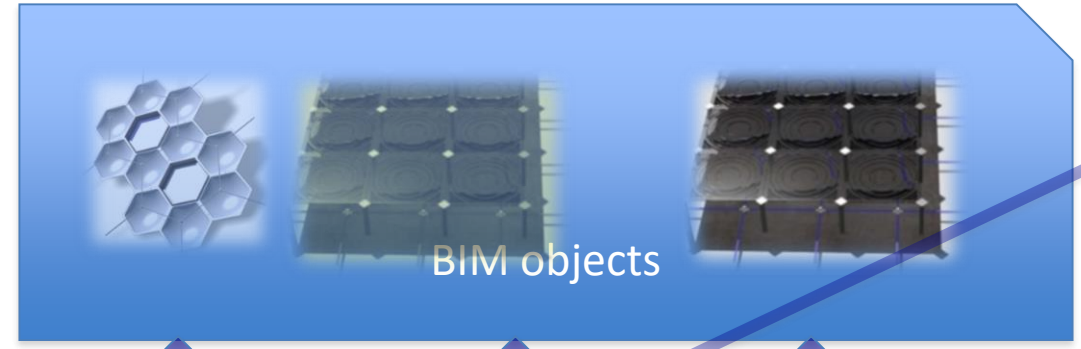
Interoperability

Users (requests)

- Architectural BIM
  - Sources of data: CAD solutions + BIM objects
  - Compatible formats
  - Feedback to direct the design
- Engineering BIM
  - Sources of data: database + expertise
  - New source: architectural BIM
- Performance metrics
  - Contextual dashboards
  - Fit to user's BIM profile

Suppliers (industry)

- Contextual database: level of details
- Technical to commercial prescription



Level Of Details
→ Enrichment
→ Added Value
→ From data to data

B I M

- Sketches/Pre-studies/Options
- Rendering
- Collaboration client<>architect

FEASIBILITY study

B I M

DESIGN

- Studies
- Option selection
- Rendering
- Planning
- PLM

B I M

- Documents
- Commercial Prescriptions

TENDER

ENGINEERING CONSTRUCTION

- Details
- Technical data
- Manuals

delivery

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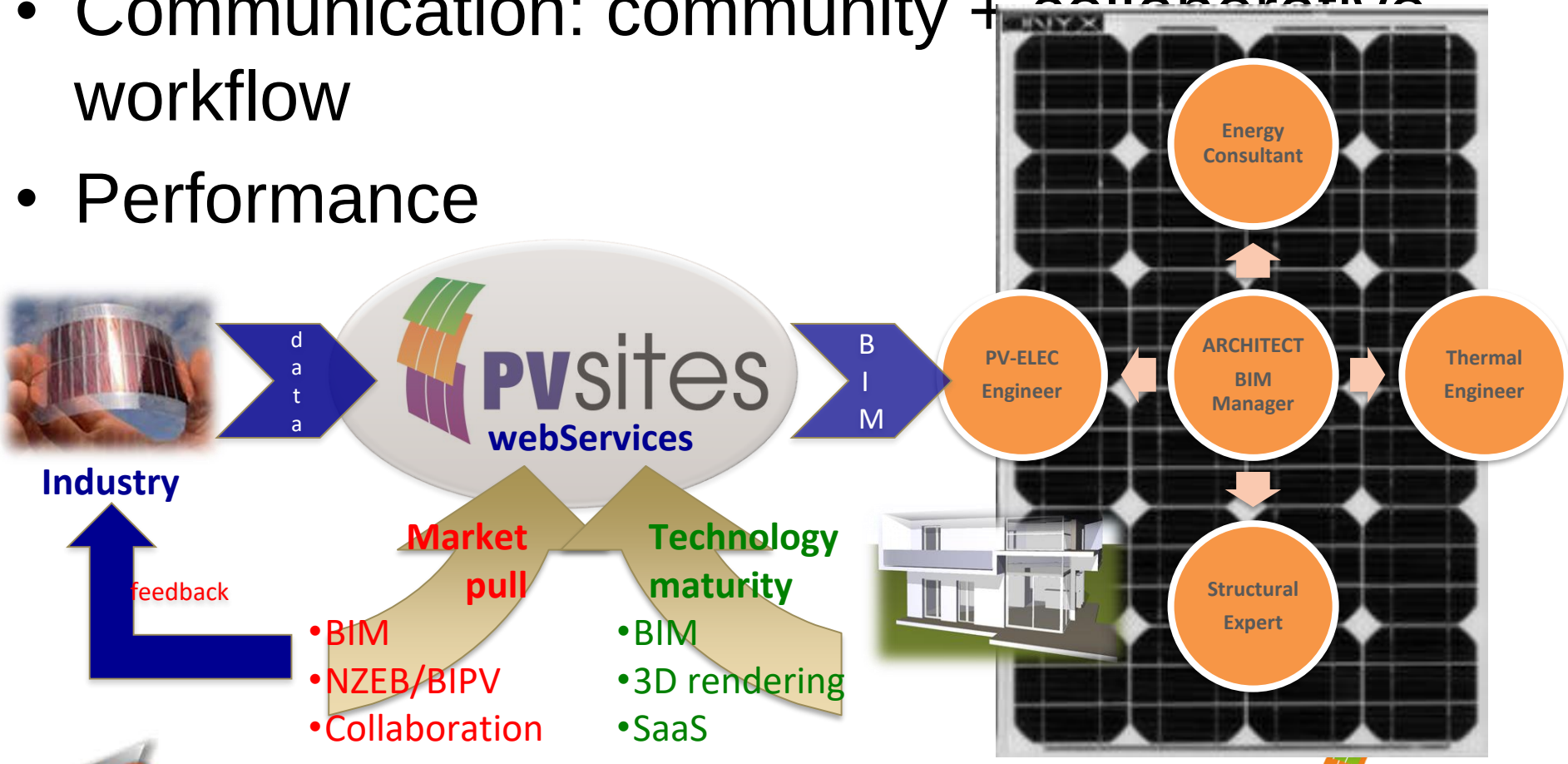
BIM process

- Information: instant-on response to request
- Communication: community + collaborative workflow
- Performance



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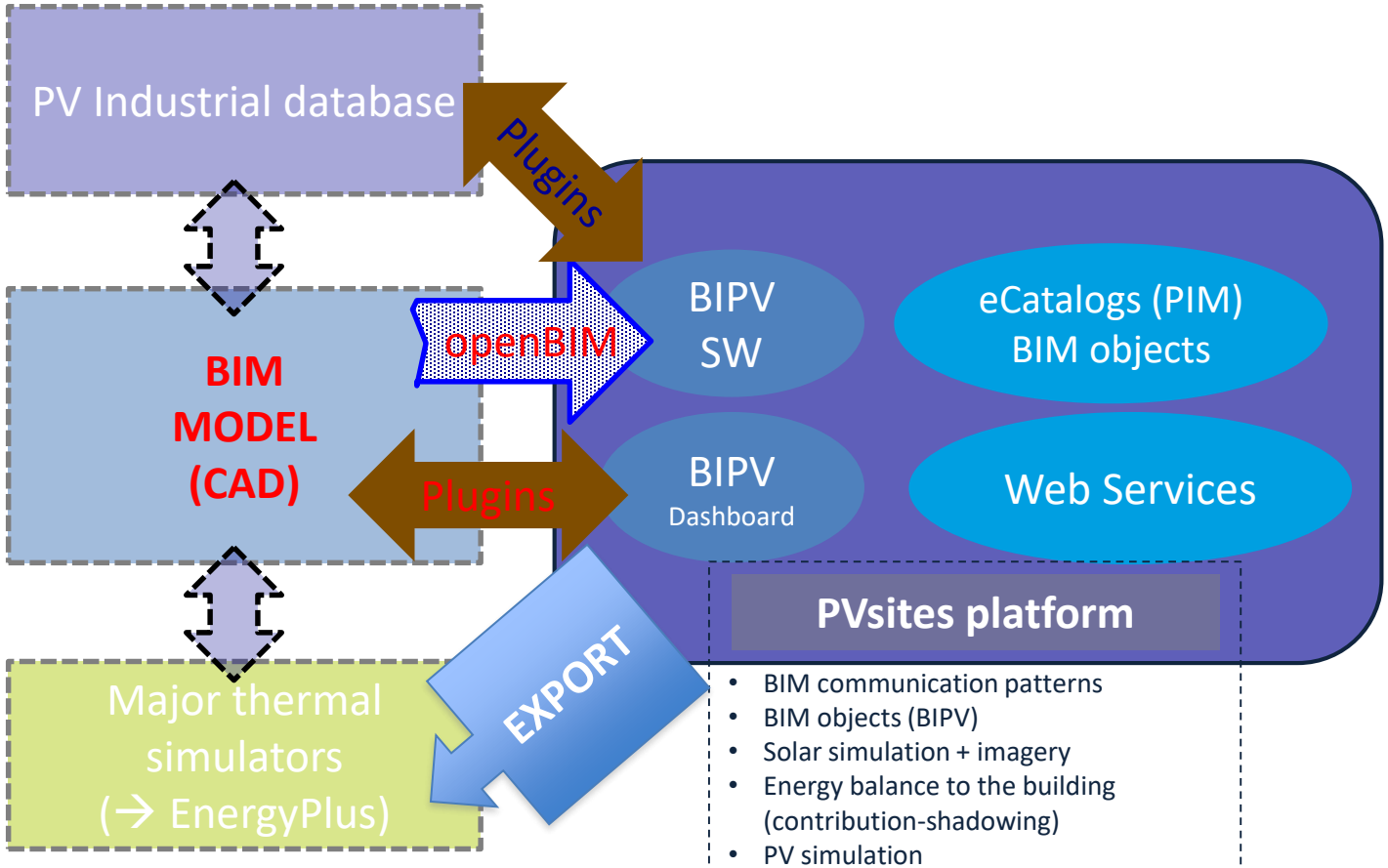
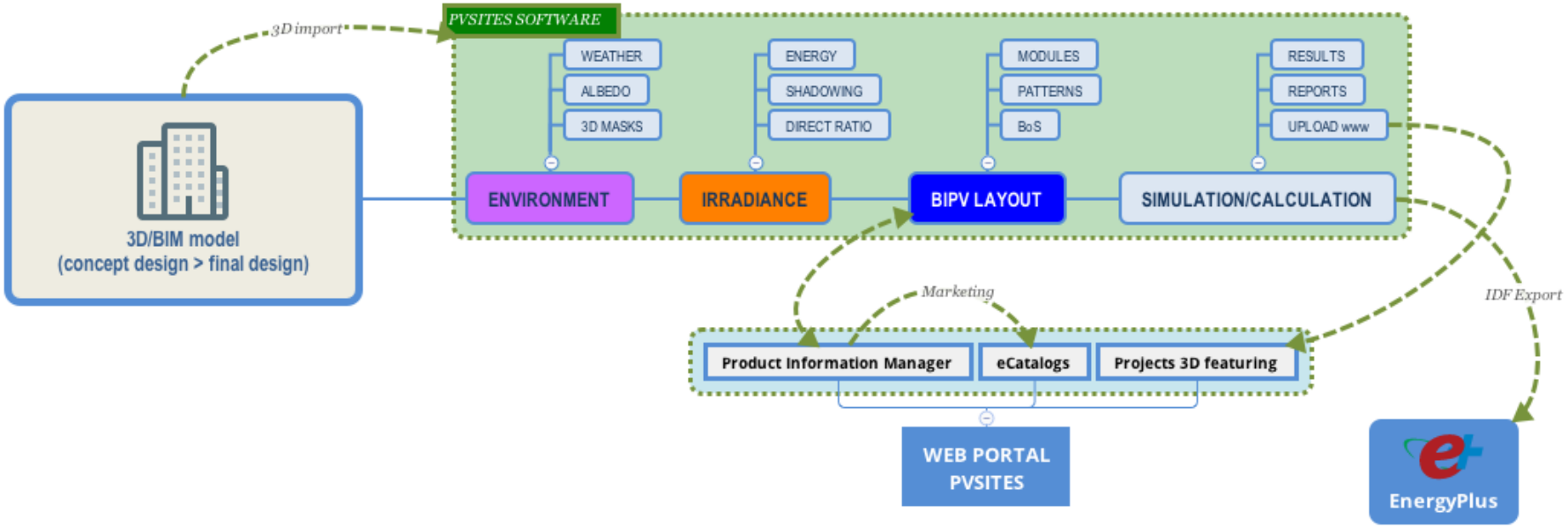
PVSITES: BIM Software



- BIM is a real opportunity to reach the market
- BIM solutions offers better interoperability
- BIM interoperability accelerates access to design teams

- BIM communication patterns
- BIM objects (BIPV)
- Solar simulation + imagery
- Energy balance to the building (contribution-shadowing)
- PV simulation
- SaaS platform construction

PVSITES: BIPV Software



Conclusion

Design < BIM/PIM > Design

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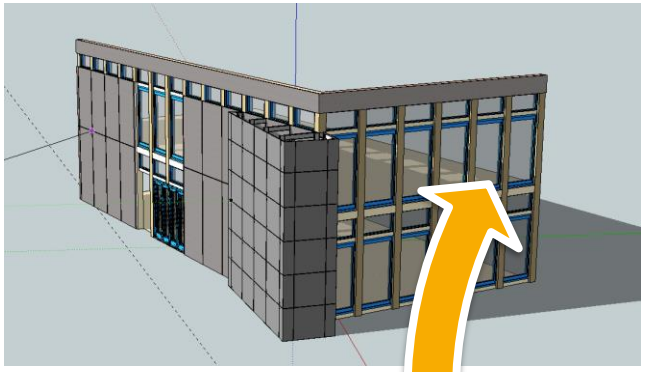
Architecture



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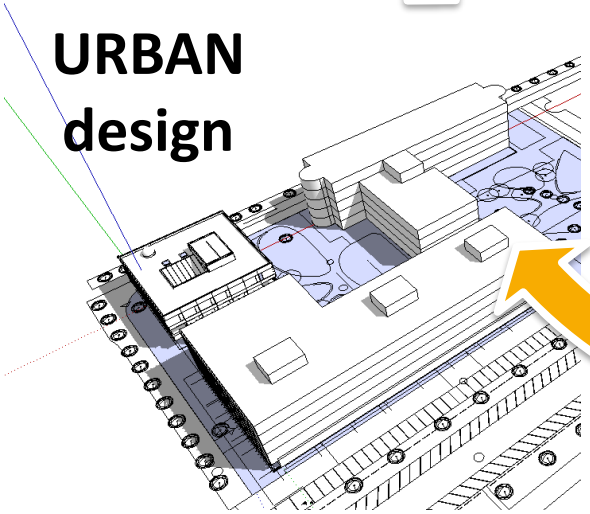
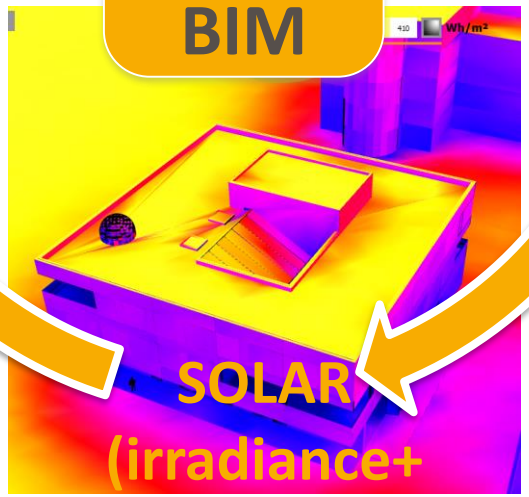
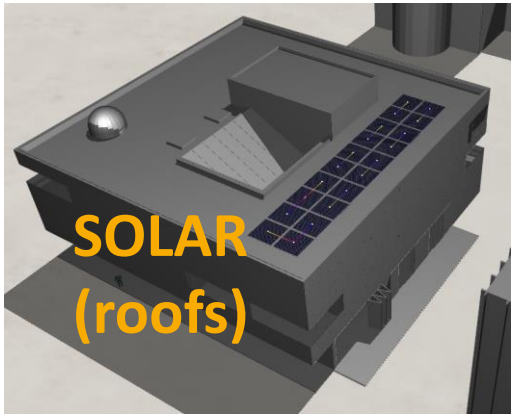
SOLAR + BIM

Industry

URBAN design







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Conclusion

- PVSITES focus & message
  - On the road to develop eCatalogs for PVSITES solutions
  - B2B: Related services solutions to professionals
- Opportunities
  - Commercial uptake for new BIPV solutions
  - BIM to City Information Modelling
  - BIM to support manufacturing: BIPVBOOST

Collaborative design with BIM: the PVSITES roadmap

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THANK YOU FOR YOUR ATTENTION!

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