



Introduction to the **catalogue of products 3**

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Introduction to the webinars

- 23 July 2020 (BEAR 20 minutes)
 - Introduction to the catalogue of products
 - Overview of commercial products and demonstration
 - Product catalogue (pdf)
- 24 July 2020 (BEAR 10 minutes)
 - Introduction to the catalogue of products
 - Overview of non-commercial products and test benches
- 25 July 2020 (BEAR 10 minutes)
 - Introduction to BIPV design - need of digital tools to support design
 - Design process and use of software

Introduction

- Within the PVSITES project a portfolio of 10 BIPV products and 2 inverters is developed.
- Software is developed
 - to support the design process and
 - to apply the products in building projects.

Free printable download available at www.pvsites.eu
after 15 July 2020.



Design process

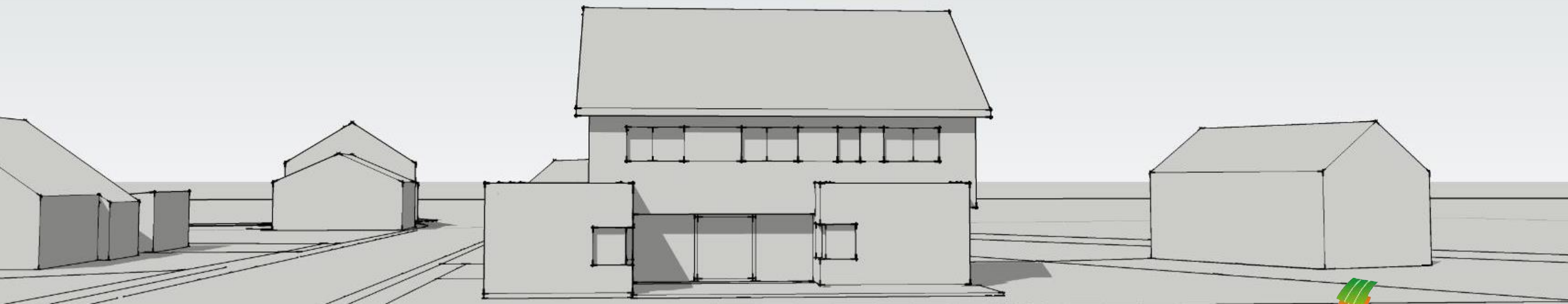
The design process in different countries

	Spain	France	Belgium	Switzerland
Brief	Programa	Programme	programma van eisen	Grundlagenermittlung
Concept design	Diseño conceptual	Concept de design	voorlopig ontwerp	Vorplanung
Preliminary design	Diseño final	Conception finale	definitief ontwerp	Entwurfsplanung
Detailed design	Planos de construcción	Conception détaillée	constructie tekeningen	Ausführungsplanung
Tender	Oferta	Appel d'offre	aanbesteding	Vergabe
Construction	Construcción	Construction	uitvoering	Konstruktion
Commissioning	Entrega	Mise en service	oplevering	Inbetriebnahme

1. Brief

The brief from the client is important as start of the design process.

The architect will make his design based on **brief** from the client, the **location** and the **regulation**.



1. Brief

BIPV aspects:

1. Does the brief have a goal for the building like
 - nZEB - nearly Zero Energy Building,
 - Passive House or
 - Energy Neutral;
2. Does the brief have requirements like sustainability or green design or an assessment like BREEAM or LEED;
3. Does the brief have the requirement for the installation of PV.

Impact for the design:

1. The architect has to make an energy balance and calculate from the beginning how much PV is required;
2. In this case the total energy production of PV is less important than the image and integration of the PV in the building;
3. In this case more details are needed about the use of the PV system
(can be 1. or 2. or other reasons like self-supporting or remote).

2. Concept design

- The concept design is the **most critical** phase of the design process to apply BIPV (Building Integrated Photo Voltaic).
- The architect has to make design proposals how to integrate the PV system. Will it be a roof system or a facade system. Or maybe some building components.
- In the next stage of the design, this will be **more complicated**.
- **Huge design changes** can be the result if the design does not fit for BIPV.
- The cost for BIPV can be **higher** if there are many changes in the design needed or if tailor made PV modules are needed.
- For grid connection, consult the utility as early as possible.

2. Concept design

BIPV aspects:

1. The energy balance has to be made in the concept design;
2. The surface for BIPV (roof or facade) should match the dimensions of the PV system.
In this stage the design can be easily adjusted to meet the dimensions of standard modules.
3. Indication of inverters and space needed.

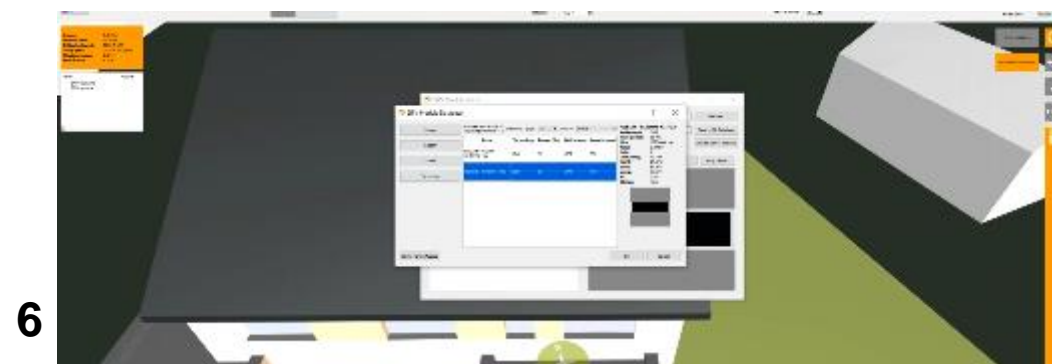
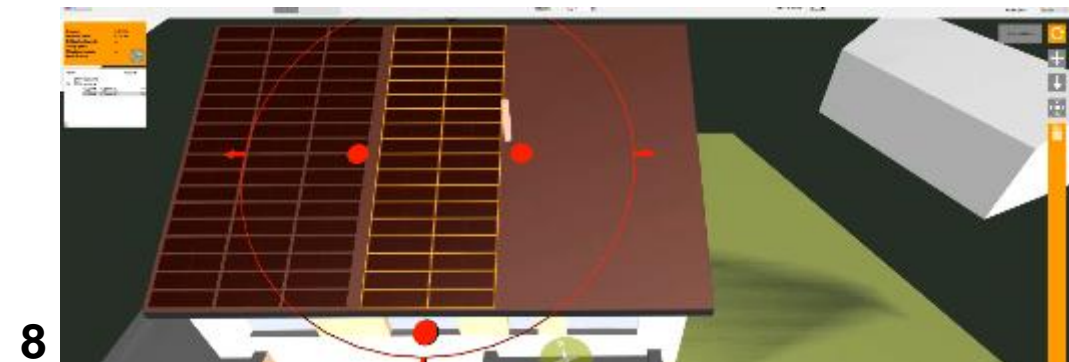
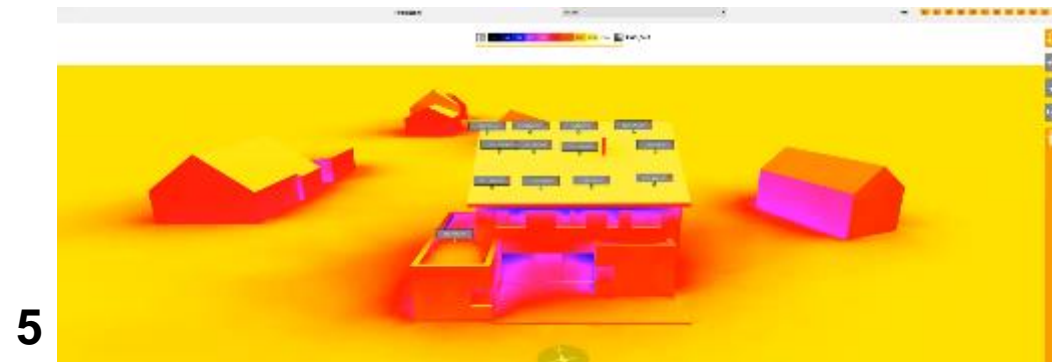
Impact for the design:

1. The architect will use some rules of thumb to get to know roughly the surface of BIPV that is needed.
2. After the concept design is drawn in 2D or 3D, **energy calculations** need to be done (**PVSITES software**).
Outcomes have to match with the energy balance and the requirements from the brief.
3. A logical space for inverters has to be reserved in the concept design.

2. Concept design

First use of the PVSITES web tool

1. Create a 3D model (sketchup)
2. Import it in the software
3. Choose the location
4. Import the weather data
5. Next are Irradiance simulations and shadow influence.
6. Select modules from the eCatologue
7. Add the chosen modules to the roof
8. Copy it over the whole roof
9. Values for each module can be seen



2. Concept design

Many values are visible now:

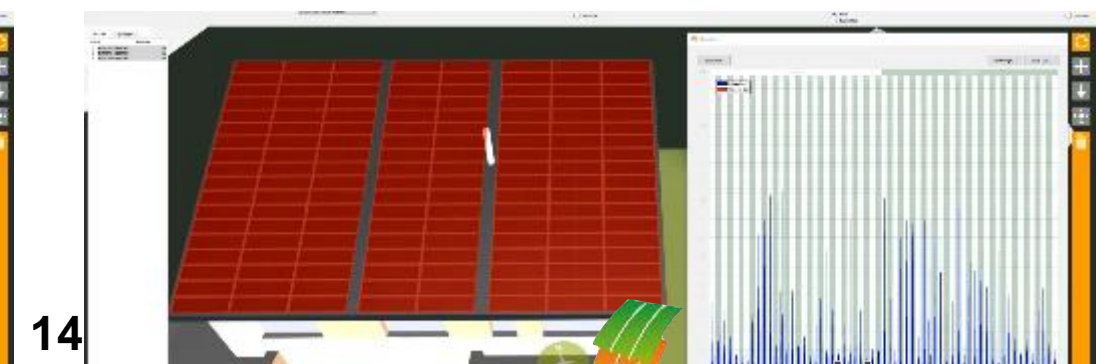
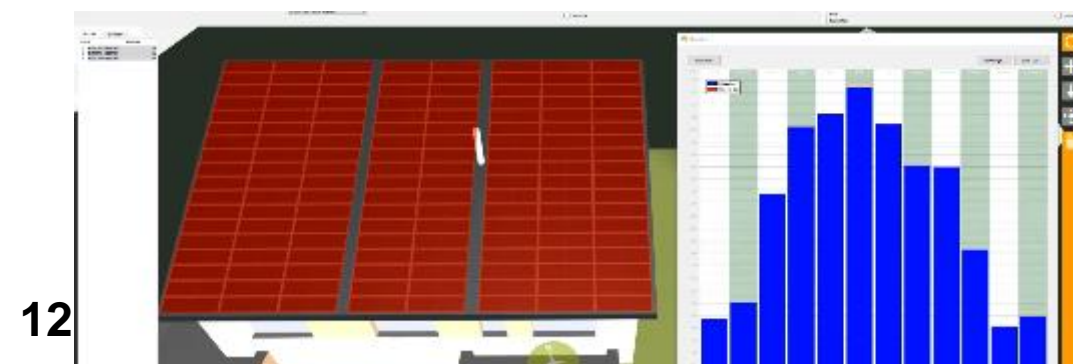
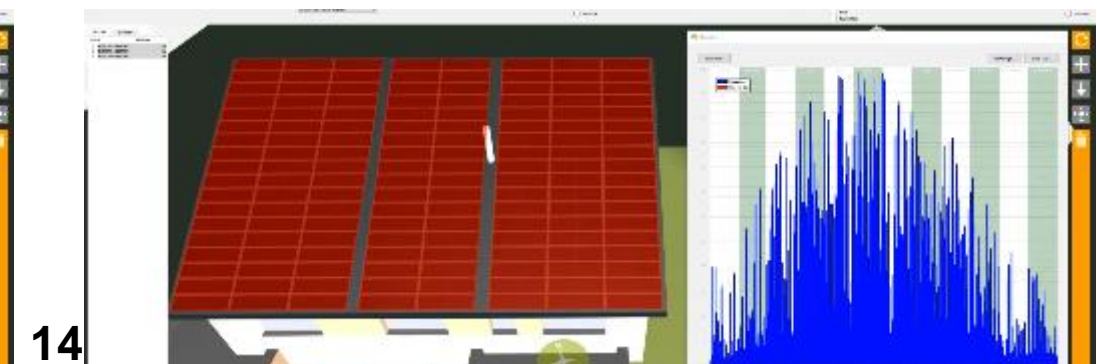
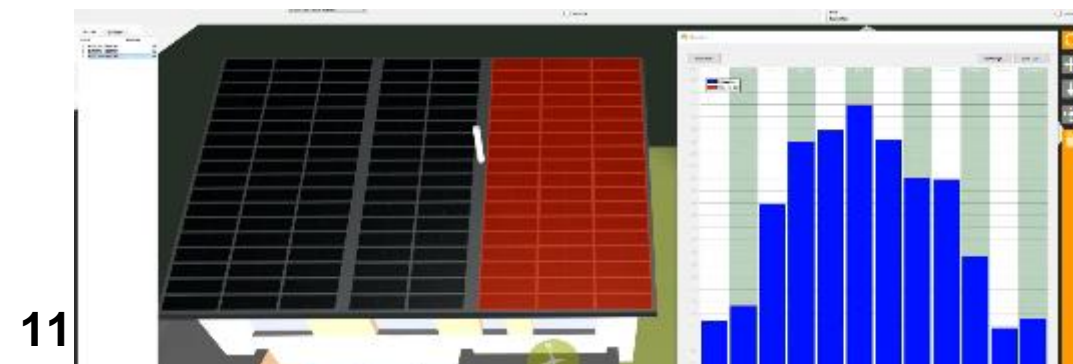
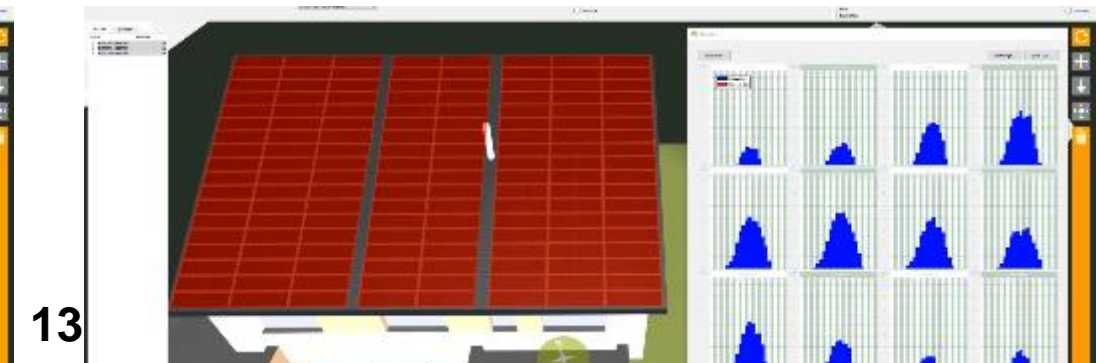
10. Output for one module.

11. Output for one string

12. Output for the whole roof

13. Output for each month

14. Detailed output



3. Preliminary design

Some consultants became part of the team in the concept design, other will join in the preliminary design.

In this stage the design will be made final, materials will be chosen, technical details and a description will be made, cost calculations will be done and the client will apply for the **building permit**.



3. Preliminary design

BIPV aspects:

- The BIPV system has to be designed and detailed.
- Final choice of modules is made.
- Wiring lay-out and choice for inverters have to be made.
- Building permit documents will be produced.

Impact for the design:

- Match between module and building dimensions.
- Detailing of the connection between modules and other building materials.
- Ventilation behind the modules.

3. Preliminary design

Process:

- The architect will probably switch from sketch software (SketchUp) to **BIM software** (REVIT)
- Export the REVIT BIM model (**IFC format**) and run the PVSITES software again to fine-tune the design.
- Selection of modules and inverter by the architect and electrical consultant. This can be the main contractor, installer, supplier or manufacturer as well.
- Preferable is to have the main contractor in the design process and make the BIPV system as part of the total building design. The responsibility for the system is under the main contractor..
- If the BIPV system is not in the package of the main contractor but is done with a separate tender (not preferred), the responsibility will be for the client, the supplier or the installer.

In this situation a very clear discussion is needed about responsibilities between parties to avoid future problems in case of damage or disfunction of the system.

4. Detailed design

Process:

- In this stage all information has to be available and clear.
- In general the contractors are chosen.
- Production drawings are needed for each sub-contractor.
- Changes are not allowed in this stage (and if so can be costly and delay the process).



5. Construction

Thank you for your attention