Building Information Modeling (BIM) for solar energy systems

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Motivation and goals

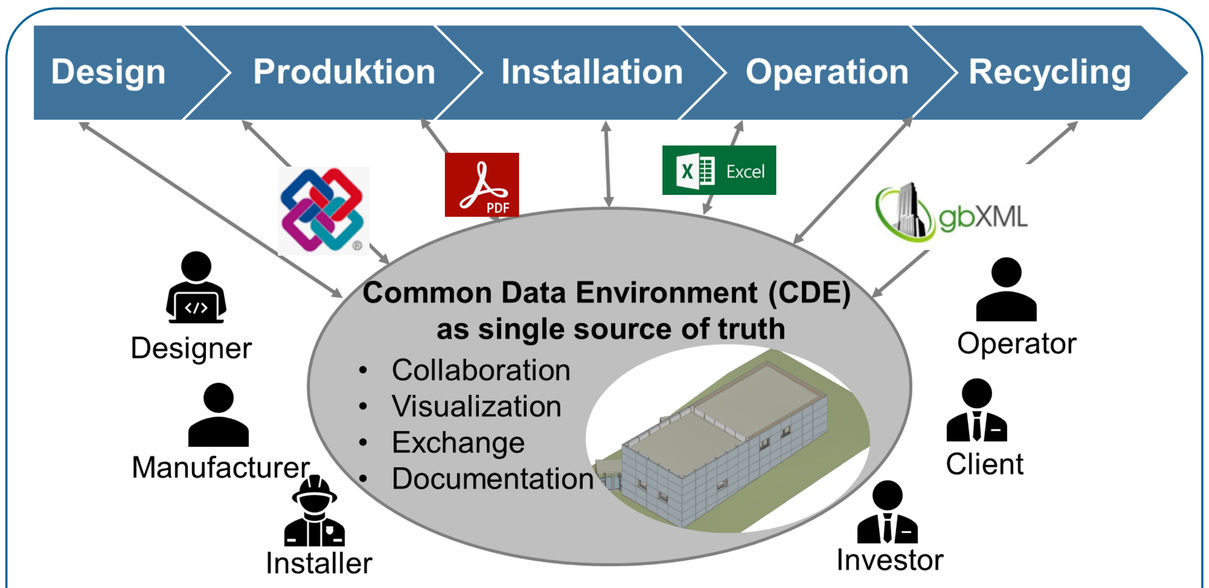
- Building Information Modeling (BIM) method can save time and reduce cost and improve the quality of the building process
- BIM is not yet established for technical building equipment
- There is few experience with BIM method in the field of solar energy technologies
- BIM method has huge potential in the operation stage

➢ **Development of BIM-based models of photovoltaic (PV) and solar thermal (ST) collectors**

➢ **Development of a Python-based intermediate tool for data transfer between BIM-model and TRNSYS**

➢ **Development of a BIM-based monitoring process for the solar facade of a real building**

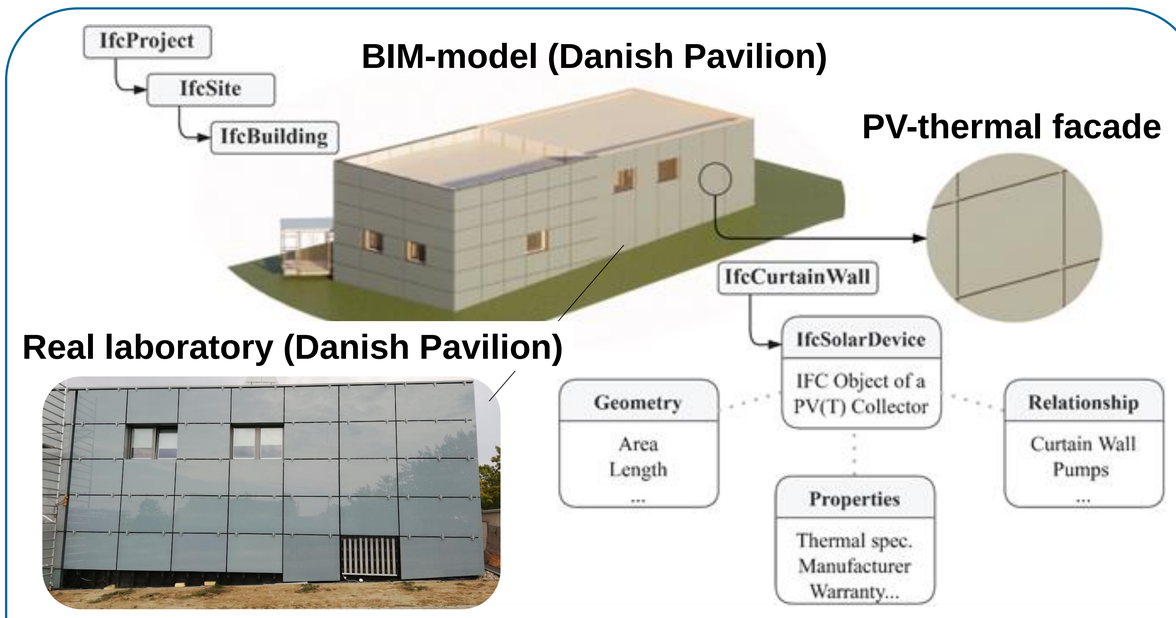
BIM method



- Consistent and digital recording, management, exchange and reuse information and data relevant to the lifecycle of a construction
- **Established BIM data exchange formats**:

IFC by buildingSMART and gbXML **gbXML** by Green Building

BIM-model of a PV thermal collector

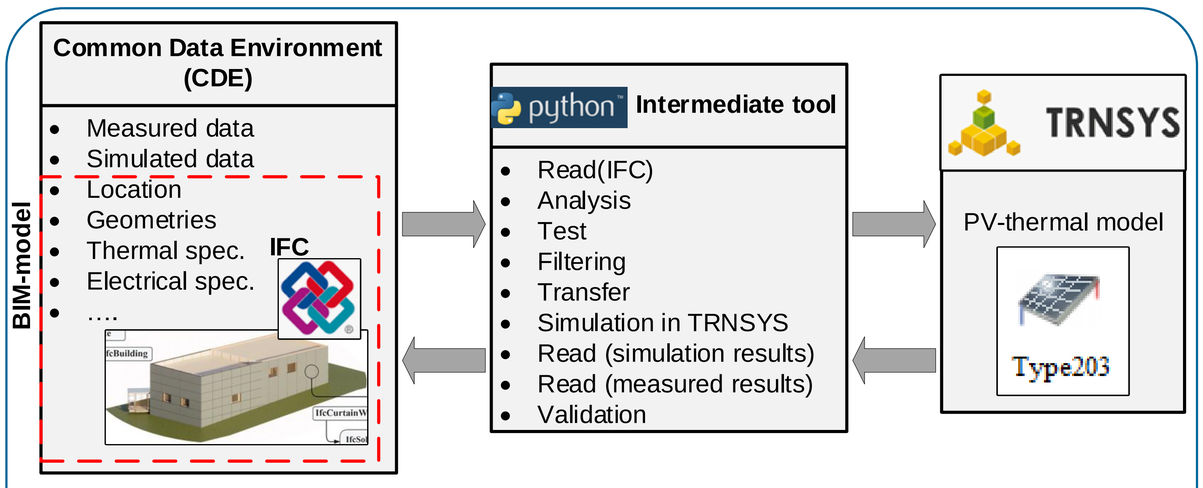


- buildingSMART provides an IFC4 class for solar modules (IfcSolarDevice)
- Green Building doesn‘t provide any specific gbXML class for solar modules
- Available IFC classes don‘t meet the requirements in terms of standardization and completeness

➢ **Parameterization according to buildingSMART, VDI 3805 and IEA SHC Task 60**

➢ **Development of an IFC object with FreeCAD/ Revit**

Development of a Python intermediate tool between BIM-model (IFC) & TRNSYS



- Interoperability issues between TRNSYS and IFC standard

➢ **Development and validation of a python based intermediat tool (interface)**

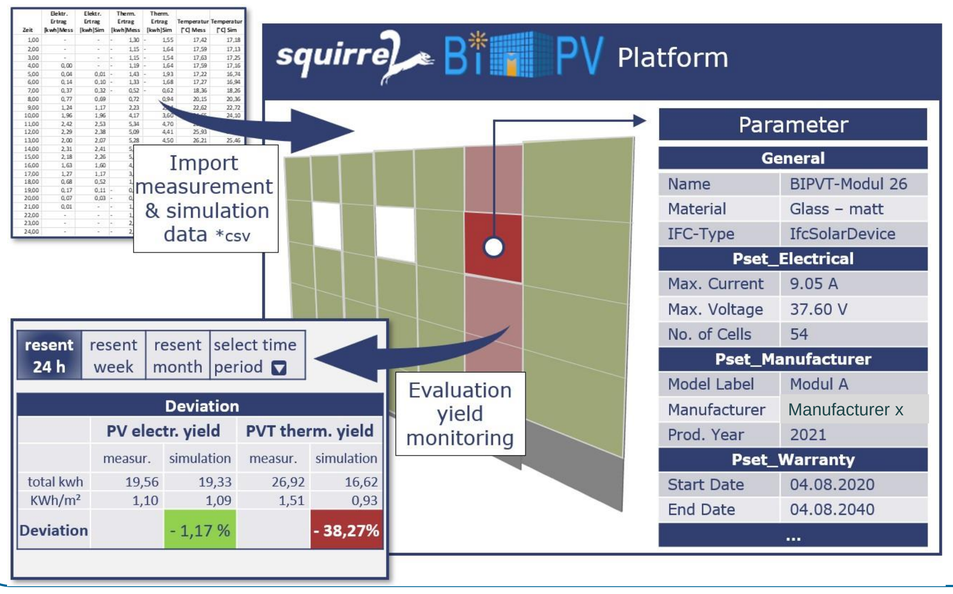
➢ **Bidirectional data transfer between BIM-model and TRNSYS**

➢ **Data comparison and error detection**

Future work:

➢ **Transfer of parameters of entire PV-thermal field**

BIM-based monitoring of the solar facade of a Danish Pavilion



- BIM method has been mainly used for the planning process so far

➢ **Development of a BIM-model of an existing real laboratory (Danish Pavilion) with its PV-thermal facade**

➢ **Dynamical display of the measured thermal as well as electrical yield and comparison with the set data**

➢ **Dynamical update of the set data with the simulation data**

➢ **Identification of possible malfunctions and insuring an efficient system operation**

Future Work:

➢ **Validation of the concept with long-term measurements**

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