Example name: The Brundtland Centre

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For installations

BISTS Location: Denmark, 9°E, 55°N

Climate Type: *Cfb*
Building Use: *commercial*

Level of BISTS integration
Determining architectural image

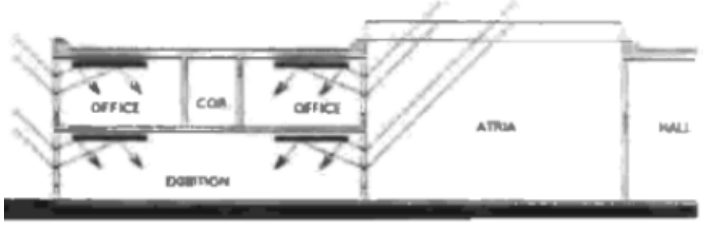
- ⊖ New Build
- O Refurbishment
- O Other: ……

Type of BISTS:

Hybrid

Function(s):
- ⊖ Air heating
- ⊖ Water heating
- O Combi-system
- ⊖ Cooling/ventilation/shading
- O PV/T
- ⊖ linked to another system: *PV arrays*
- O Other: ……

Building element:
- ⊖ Facade
- ⊖ Roof
- O Other: ……



BISTS characteristics:
The Brundtland Centre have energy saving elements such as daylighting systems integrated in sealed glazing, building integrated semi-transparent photovoltaics providing solar shading and an atrium for utilisation of passive solar energy. Active thermal solar energy systems were installed for exhibition purposes. The generated heat is delivered as domestic hot water to the little restaurant in the centre. Environmentally sound measures include a collecting system for rainwater from the roof, which feeds an underground storage. The water is used for flushing toilets, watering of plants and cleaning.
The atrium in the centre of the building has a free vertical façade towards south west and a shed (slanting) roof. Integrated on the south oriented part of the roof are semi-transparent photovoltaic panels. The atrium has direct connections to almost all other rooms, which is an important feature for the ventilation strategy of the building.
Translucent PV glass atrium: 17,16 kW_p
Facade PV: 4,14 kW_p

Stage of Development: **Responsible**: *Toftlundt City*

O	Idea/Patent	……..
O	Prototype	……..
⊖	Demonstration	……..
O	Integral building element	……..
⊖	Commercially available	……..

BISTS description and context

Building was designed to use solar energy by passive and active systems. The building have: glazed atrium, thermal solar energy systems, reflective blinds in window panes and reflective ceilings, lighting control system, low-efluorescent tubes, low-temperature heating, Building Management System, PV cells integrated in the sealed glazing of the atrium roof and in standard panels at the south east facade, rainwater storage system and environmental sound materials.

Total floor area: 1800 m^2 (gross).
Heated surface: 1450 m^2 (net).
Insulation U-value [W/(m^2K)]:
Walls: 0,3
Roof: 0,2
Windows: 1,4
Atrium roof: 1,6
Total solar energy transmission: 60%

System viability

Building costs: 1,376 US dollars/m^2

Provisions and control of daylight, combined with high-efficiency artificial lighting and movement sensors saved approximately 70% of electricity for lighting compared to traditional office lighting designs.
PV arrays produce 13 500 kWh of electric energy per annum.
Unfortunately there is no available information about costs and profits of power generation.

Modelling and simulation tools developed/used

Nothing available

BISTS Performance data	
Based on: O Estimation O Detailed simulation ~~O~~ Measurement/testing ~~O~~ Long-term monitoring	***PV power generation: 13 500 kWh per annum (DC).*** ***PV exported to the grid: 11 000 kWh per annum (AC).*** ***Detailed monitoring data is not publicly available.***
Performance parameters For integrated systems: key performance indicators - *Total solar energy transmittance: 60%* *Building fabric U-values [W/(m^{2}K)]:* *Walls: 0,3* *Roof: 0,2* *Windows: 1,4* *Atrium roof: 1,6* For separate collectors: performance rating coefficients - Other:	

Additional information:

Sources and references:

*IEA Solar Heating and Cooling Task 23 Presents**: Examples of Integrated Design**, Five Low Energy Building Created Through Integrated Design*

*Deo Prasad, Mark Snow: **Designing with Solar Power a source book for building integrated photovoltaics (BIPV),** USA 2005*