



NORDIC
BUILT

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NEARLY ZERO ENERGY BUILDING SOLUTIONS



Photo: Bjørn Grubbe Rasmussen © Gaia Solar

Steni durable facade and roof plates combined with Gaia Solar matching PV modules

The Nordic Built “Active Roofs and Facades” project, coordinated by Cenergia, has received support from Nordic Innovation, EUDP (DK), Energimyndigheten (SE) and Rannis (IS) allowing strong development of leading Nordic competences in the area of building renovation.

This is achieved by the creation of transnational Public Private Partnership models to support the development of nearly zero energy building solutions and associated performance documentation - which is required in the EU building directive.

The proposed cooperation with the building industry on developing models and the demonstration of “Active House” based sustainable renovation is creating a strong Nordic alliance.

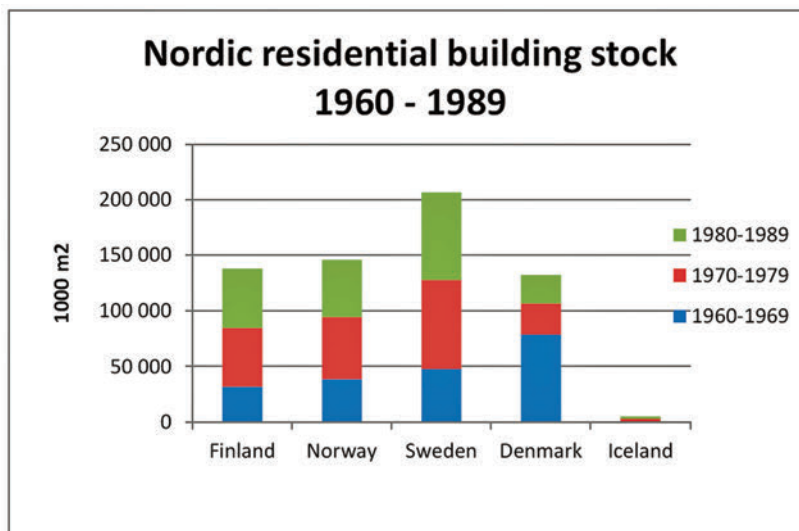
The project runs from 2014 to 2017 and involves companies which are represented in the Nordic countries and companies from the international Active House Alliance (www.activehouse.info). The development will use the best transnational competences and networks, creating greater possibilities to export technology.

The Active House Radar



The Active House Radar is used to label qualities concerning energy, comfort and sustainability, and includes a focus on “Performance documentation”

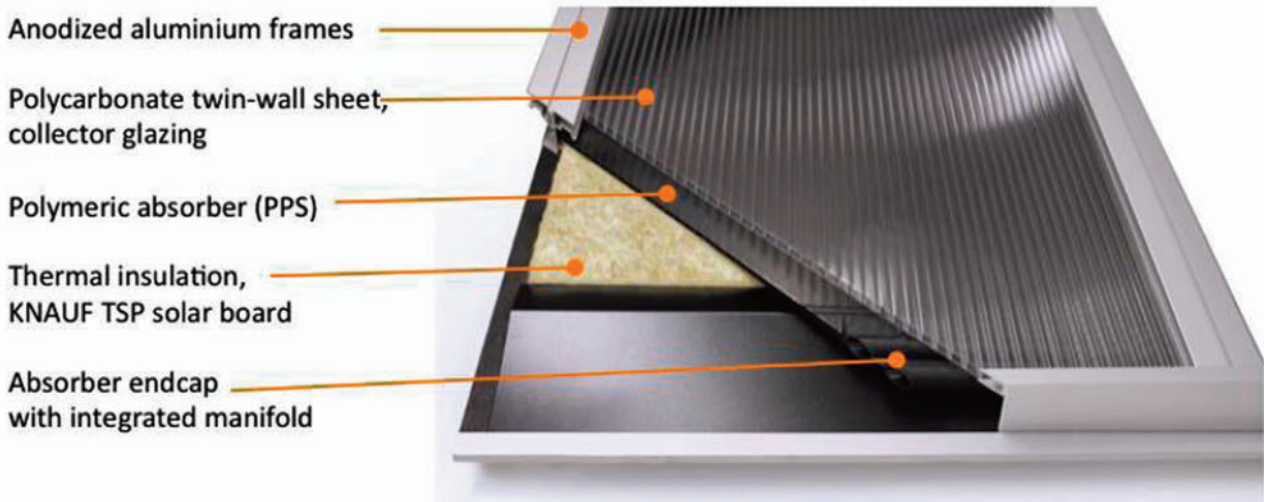
Nordic Residential Building Stock



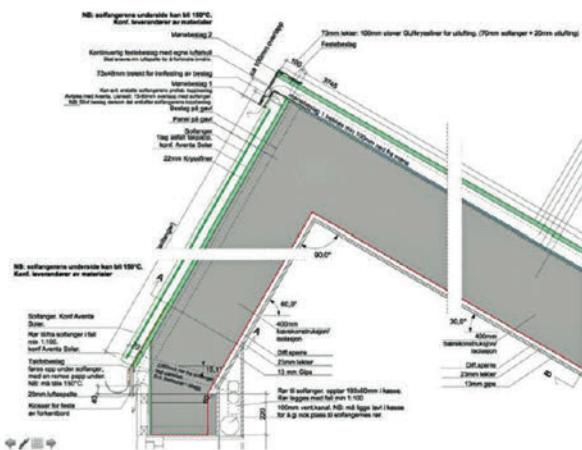
Nordic Residential buildings by country, constructed floor area and construction decades

JUST SOME OF BEST PRACTICE TECHNOLOGIES IN FOCUS IN THE NORDIC BUILT ACTIVE ROOFS AND FACADES PROJECT.

AventaSolar collector roof panels

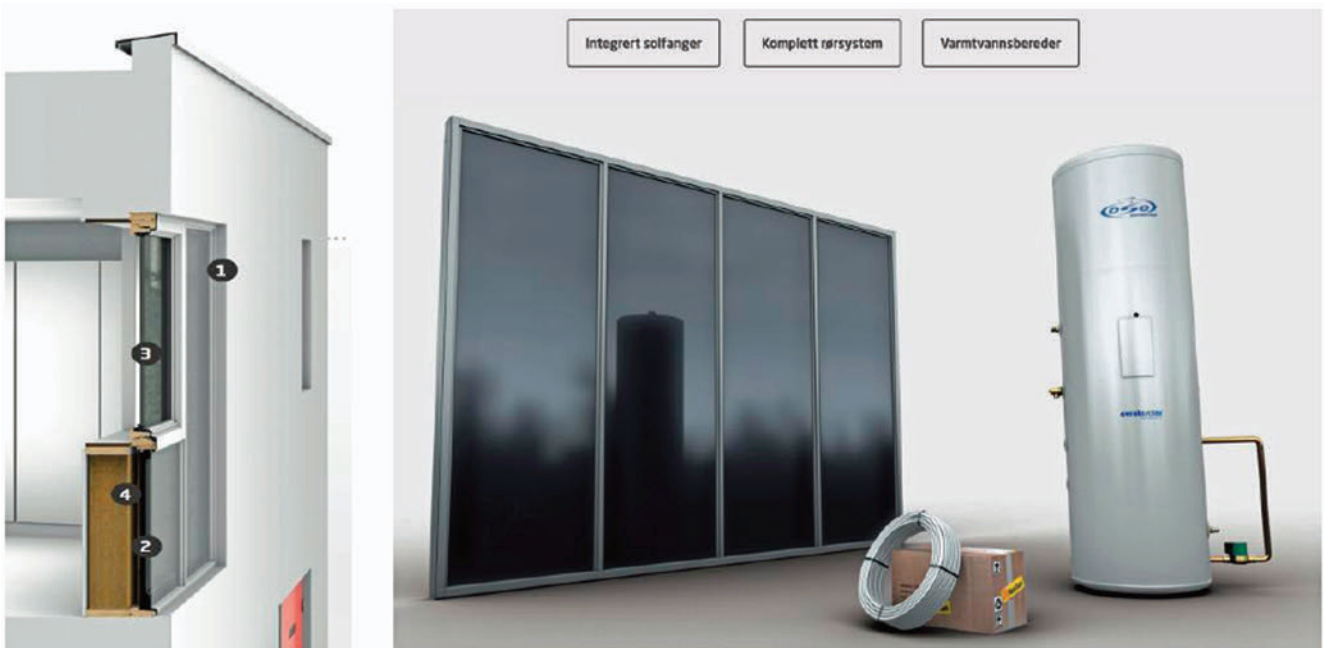


Cross section of the lower part of the AventaSolar collector showing individual components



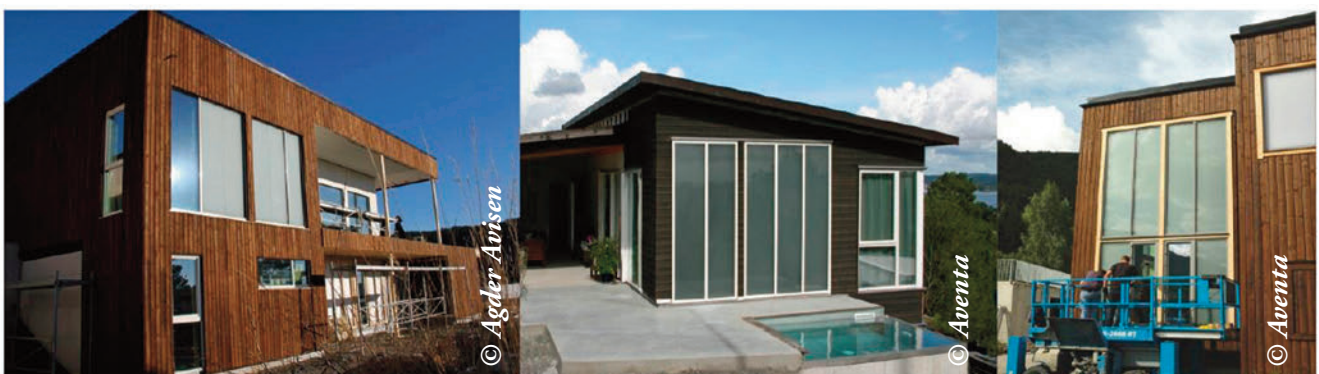
AventaSolar collectors integrated in the tilted roof

The NorDan Solar concept



Left: Cross-section of the collector facade with 1) long and 2) short collector window, 3) standard window combined with collector window, 4) The wall behind a collector window is as thermally insulated as a standard wall.

Right: Standardised NorDan Solar delivery package: Collector window, 300 l AventaSolar OSO heat store, solar pump and controller, Uponor pipes with quick-and-easy connectors.



The NorDan Solar concept: First three installations of NorDan Solar in Norway

BUILDER:

OBOS

DEVELOPMENT:

**STENBRÅTLIA,
OSLO (NORWAY)**





Roof terrace with approx. 14m² Aventa Solar Thermal collector. This technology has a far better yearly COP (coefficient of performance) than outdoor air heat pumps



Roofs consisting of Aventa Solar Thermal collectors



The Aventa Solar Thermal collector can be delivered in all chosen lengths, so it fits into a building

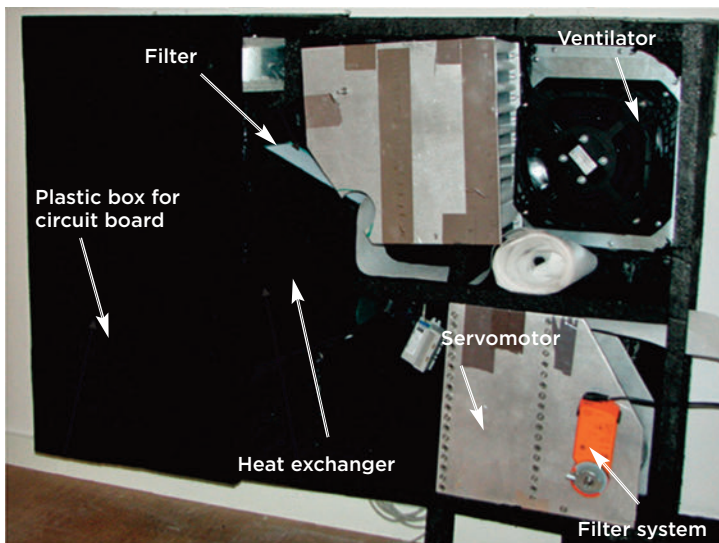


Heat recovery ventilation system

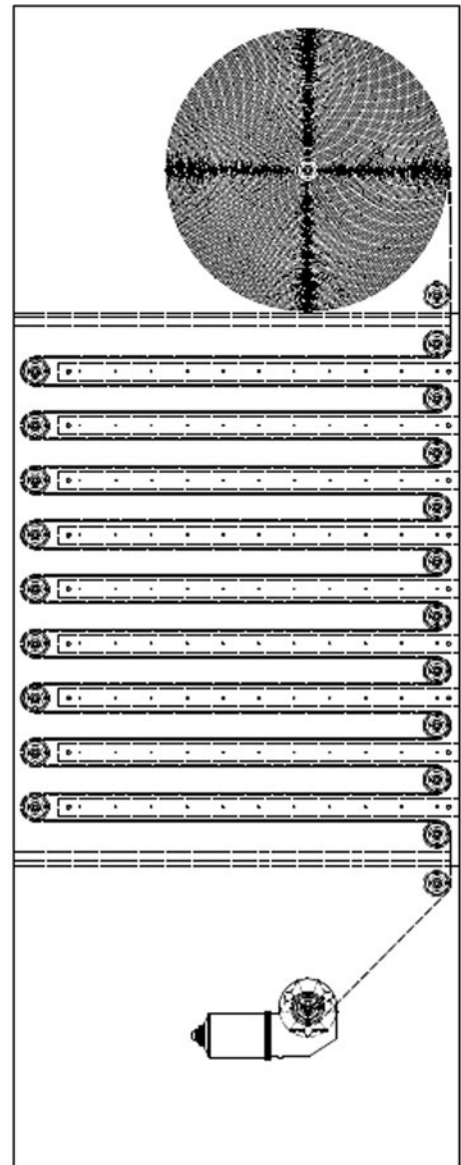
Innovative heat recovery ventilation design development including window integrated HRV units and integrated automatic filter exchange box.



Ecovent window or wall integrated HRV unit in situ



Inside the Ecovent HRV unit



Unifilter

As an option, EcoVent RT300 can be supplied by our patented Unifilter where there is a plug & play module.

M5 is the standard filter class, but other filter classes are available on request.

UNIFILTER consist of two coils between which the filter medium passes over the smooth rollers, forming a bag filter with 15 in the bags. One reel contains new filters while the other coil is used to roll up the used filters – enough for 10 to 15 years of operation.

The coils are placed in closed cylinders which separates the pure and the used filter from the air stream. When the control system informs the coil motor a new filter will be fed.

The control system also notifies the user of the remaining life of the filter.



Experiences from “Trianon” renovation in Lindängen in Malmö, Sweden



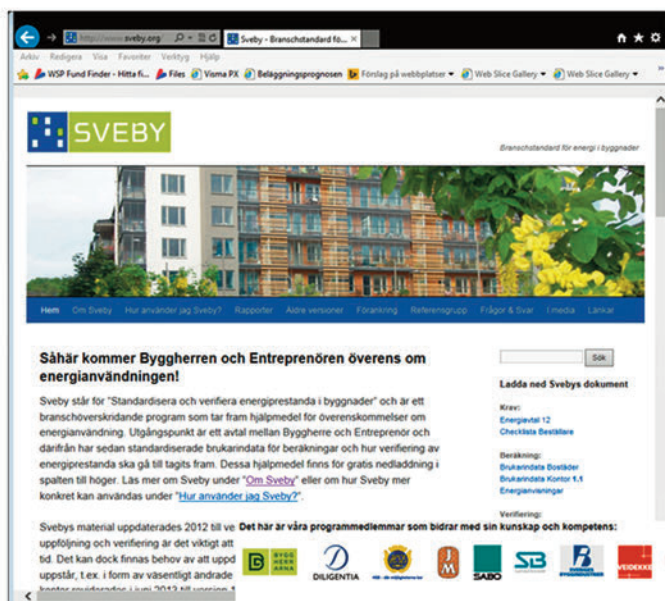
Energy Efficiency Directive Article 9 – Metering



- Boverket has investigated cost-effectiveness and technical feasibility for individual metering of heat and domestic hot water, for
 - New construction
 - Renovation projects
 - Unaltered projects
- **Boverkets investigation shows poor cost-effectiveness in relation to technical feasibility**



Measures to enhance Performance Documentation

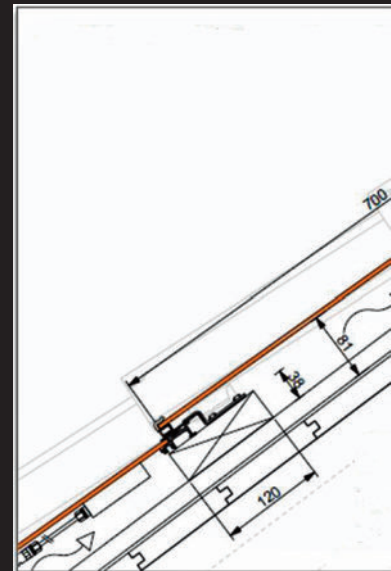
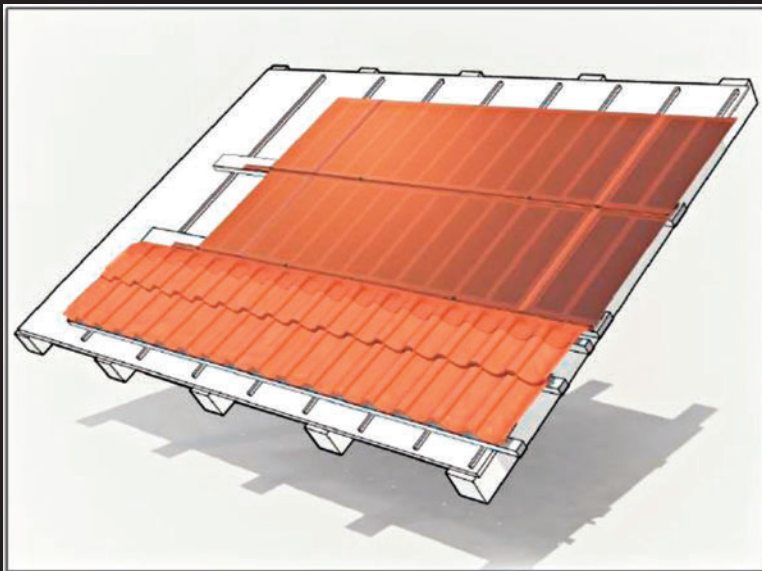


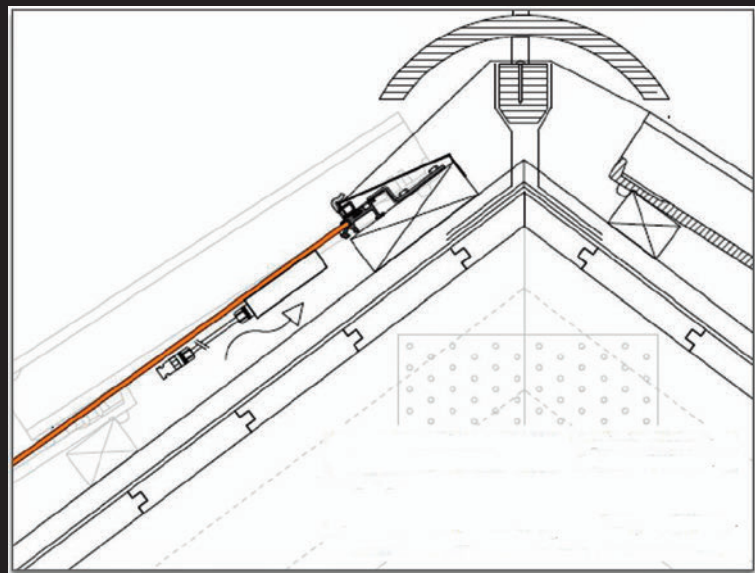
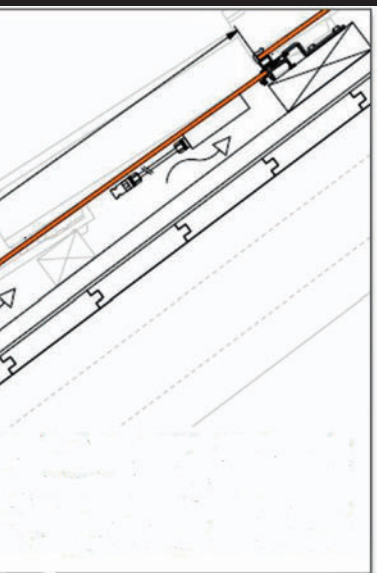
- Common grounds for property owners and builders
- Standardized data for calculations
- Interpretations and clarifications of building regulations and requirements
- Measures to facilitate and coordinate energy management in construction stage
- Quality assurance, for both the builders, property owners and end users









INNOVATIVE USE OF BUILDING INTEGRATED PV SYSTEMS BIPV







Performance documentation by IC-meter:

Energy Balance for the Entire Building

	Central heat actual indoor temp.	5,602 kWh
	Savings if 20 °C indoor	1,326 kWh (24%)
	Passive solar:	177 kWh
	Specific heat losses:	514 W/°C




Energy label and yearly consumption

	Energy label:	A 2015 (Calculated after BE10 - Denmark)
	Energy Supply:	85,055 kWh/year (22 kWh/m ² *year)

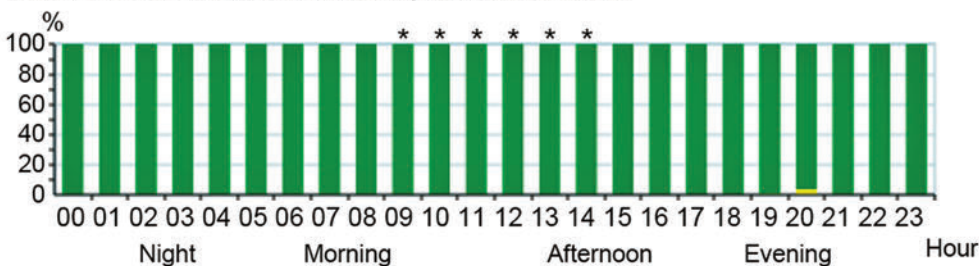
- Measured data calibrated to 20 °C indoor and standard DK-Weather conditions

CO₂ - Workdays

Relative distribution on the three climate classes for the period




Average CO ₂	Good	Less good	Bad
480 ppm	 100 %	 0 %	 0 %

Relative distribution for time of the day and climate classes

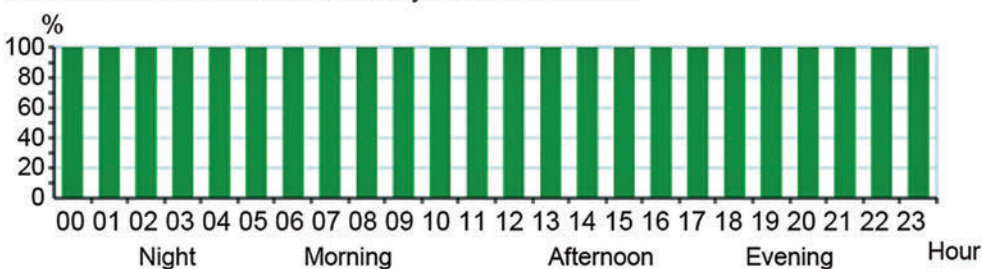


CO₂ - Weekends

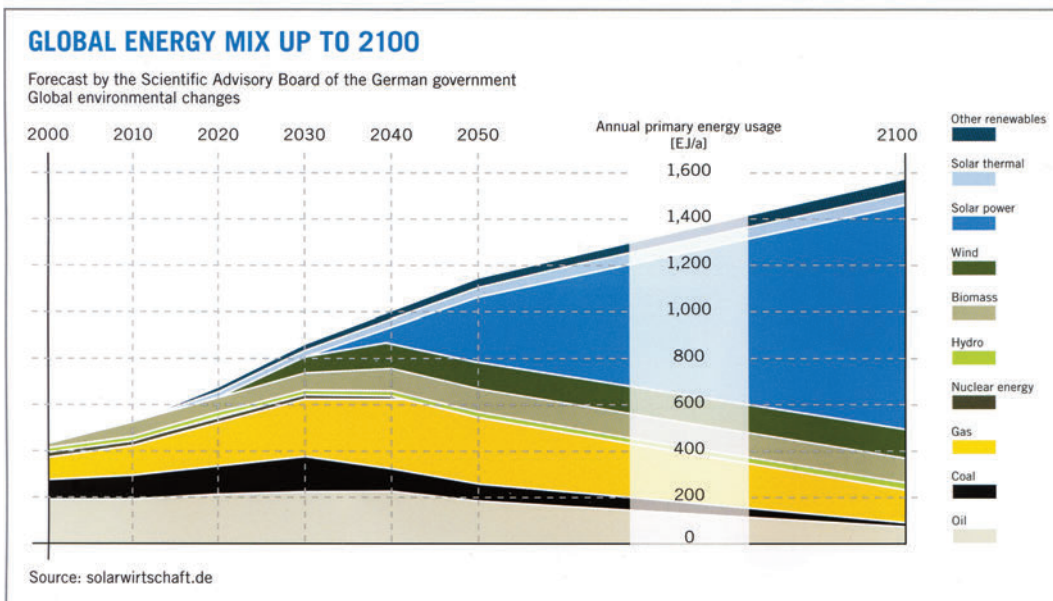
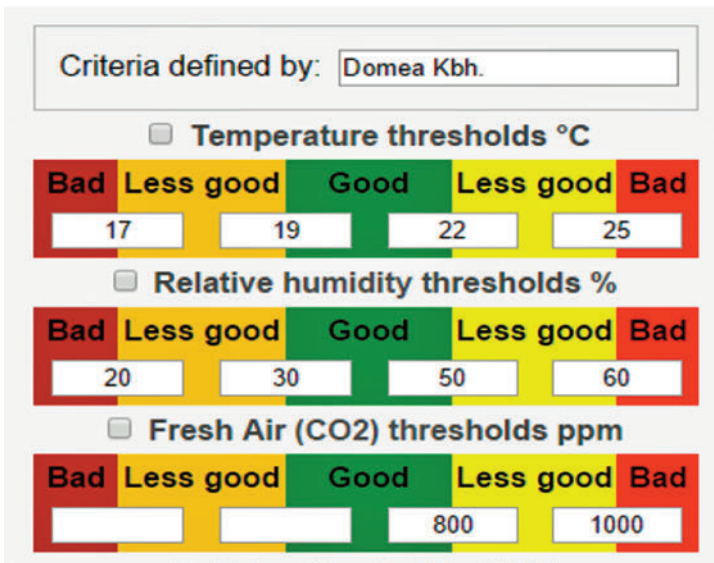
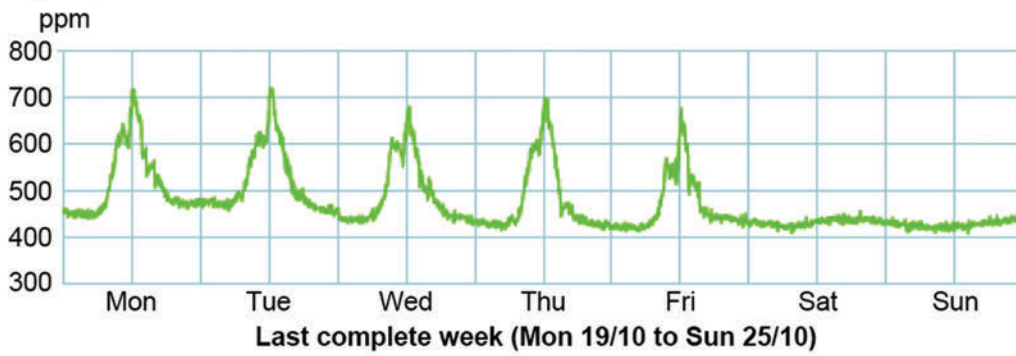
Relative distribution on the three climate classes for the period

Average CO ₂	Good	Less good	Bad
435 ppm	 100 %	 0 %	 0 %

Relative distribution for time of the day and climate classes



CO₂- October 2015



In the long term solar energy will be very important on a global scale.



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