

2nd SKIN - Soendalaan, Vlaardingen, Netherlands

Renovation of 12 porch houses on the Soendalaan into 'Zero Energy' by applying a plug & play Second skin on the outside integrating the MultiBoiler heat pump concept for space heating and hot water.

Key facts

Building

Location	Vlaardingen, Netherland
Construction	2017
Heat distribution	individual system with convectors
Heated area	75 m ² living/apartment
Level of insulation	Excellent

Heat pump and source

Number of heat pumps	12
Installed capacity	5 kW
Operation mode	monoenergetic
Heat source	closed loop groundsources
Brand and type	ITHO Daalderop

[WP4G](#)

Refrigerant	R134a
Sound level	48 dB

Heating system

Heat demand	
Heating temperature	35°C

Domestic hot water

Type of system	MultiBoiler system
Max. Temperature	60°C
Circulation system	individual
Legionella measures	thermal
Storage size	150 litres/apartment
Number of storage tanks	12
Storage losses	40Wh
Temperature control	storage tank heated once per day

Other information

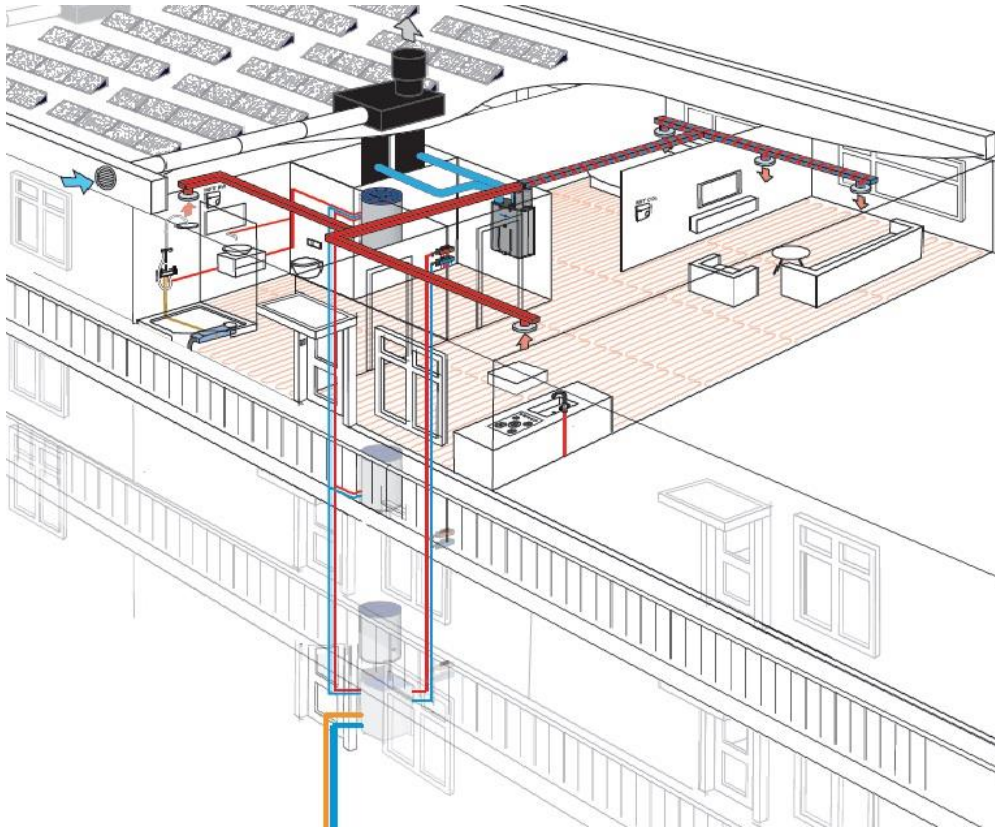
Electric energy	
Consumption year kWh	
Investments costs	unknown
PV installation	10m ² /apartment
Solar thermal	none



Waterweg Wonen, BIK bouw and TU Delft are working together on a unique renovation project in Vlaardingen. In this pilot, 12 porch houses on the Soendalaan are being renovated into 'Zero Energy' zero on the Meter homes. After renovation, the complex generates as much sustainable energy as its residents need. Zero Energy houses are more common in new buildings, but for renovation this is one of the first projects in the Netherlands. Making the housing stock sustainable in this way contributes not only to the climate objectives, but also to the affordability and the usability of the homes in the long term. The residents are involved from the start, are very enthusiastic about the project and are happy to cooperate.

The 12 porch houses on the Soendalaan date from 1952. They no longer meet the current standard and must therefore be renovated. This pilot is looking for a good balance in the area of sustainable renovation, living comfort and affordability for the tenant and Waterweg Wonen. Thanks to the efforts of Waterweg Wonen and European and Dutch subsidies, the financial feasibility of the pilot is guaranteed. All parties involved want to learn from this pilot, so that such interventions become financially feasible, thus making the energy-efficient and comfortable living possible for the rest of the housing.

Soendalaan, Vlaardingen, Netherlands, Technical details



The Multi-boiler concept, used in the 2nd Skin concept, is an installation total concept in which a collective ground source heat pump provides space heating, cooling and domestic hot water for two to four apartments. If apartments are connected to a central heat pump system or district heating, the heat pump does not provide the space heating, but does provide the cooling and hot tap water.

All apartments have an individual storage tank of 150 litres. These are loaded sequentially by the heat pump, once a day. If desired, the resident can easily get an additional hot water.

Part of the concept is also the [QualityFlow ventilation system](#), which is demand-driven and works with heat recovery. PV panels are used for energy generation.

Description of the technical concept

A second skin is constructed as Plug & Play frame on the complex. The 2nd skin provides good insulation and crack sealing. The new frames has three-layer insulating glass and the roof is covered with solar panels. These provide sufficient energy for all installations domestic use. In the Plug & Play concept three apartments are served with one individual double function ground source heat pump (ITHO-Daalderop) providing space heating and Domestic Hot Water, with a 150 litres storage tank for each individual apartment. The overall building is not connected to the gas grid anymore.

For the occupants of the apartments the energy performance is guaranteed for 25 years to have zero energy bill. If a housing corporation wants to request an energy performance fee for a NOM home, the property must meet all kinds of administrative requirements and it must be guaranteed that it will not consume energy for the next 25 years. Legislation should be changed here.

A number of measures are taken when 2nd Skin® is applied. For example, a new façade construction is placed on the existing façade. In addition, the installation is arranged and maintained from the outside. Innovative is that this optimization method including the installation from outside takes place with modular techniques. These are lightweight and can therefore be used without modification of the existing construction of the façade or foundation and without refurbishing the interior. By placing the installation on the outside of the house, it is not necessary to reduce the space within the house through this sustainable energy installation. By disconnecting the installation from the home, various options for energy supply and ventilation are created.

In addition, the outer façade will be insulated at all times with a façade insulation system from Sto, for example [StoTherm Classic](#).