

I-Box concept, Storelva/Tromsoe, Norway



Photo: Ravn Steinsvik

## I-Box concept, Storelva/Tromsø, Norway

7 dwellings in a row house with solar collectors integrated into the façade

### PROJECT

Multi-family house with passive house standard and solar heated tap water. The project is designed according to the I-Box concept from Steinsvik Architects. The 7 dwellings at Storelva was completed in 2008.

I-Box was the first passive house concept in Norway, and was awarded with the “Nordnorsk Arkitekturpris” in 2007. The dwellings are constructed in massive wood elements and have no conventional heating systems; the entire space heating load is covered by the ventilation system, which is coupled to an earth to air tube collector buried beneath the basement, and a compact heat pump unit with heat recovery. The solar system produces most of the warm water during the spring, summer and autumn seasons.



Photo: Oddmar Ole Steinsvik

Architectural integration of solar thermal energy systems

### Key figures

Living area per house:	96 m <sup>2</sup>
Building costs:	24000 NOK/m <sup>2</sup> (ex.VAT, incl. land costs)
Total energy demand:	62 kWh/m <sup>2</sup> BTA per year (6000kWh per house)
Energy sources:	solar collectors, earth heat collector and heat pump.



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### Heating system

This project is built on the passive house principle, where the aim is just use of passive energy such as sun, heat from the ground/earth and other types of reuse systems.

The house is equipped with an air handling unit with a heat exchanger, a heat pump and a solar collector. The solar collector contributes to pre-heating tap water, mainly during spring, summer and autumn. The heat pump is used to heat the tap water. The supply air is preheated in an earth collector under the house before it is lead into the ventilation systems.

The solar collectors are integrated in the south facade - 2 modules /5 m<sup>2</sup> per unit.

## SOLAR COLLECTOR

Type:  
Flat plate solar collector  
Viessmann Vitosol 100



Model		SV1	SH1
Absorber surface	sq. ft	25.0	25.0
Area	sq. m	2.32	2.32
Optical Efficiency	%	74.3	74.3
<b>Collector Dimensions</b>			
Width	inches	41 ¾	93 ¾
	mm	1056	2380
Height	inches	93 ¾	41 ¾
	mm	2380	1056
Depth	inches	2 ¾	2 ¾
	mm	72	72
Weight	lbs	94.8	94.8
	kg	43	43

[http://www.viessmann.us/en/products/Solar-Systeme/vitosol\\_100.html](http://www.viessmann.us/en/products/Solar-Systeme/vitosol_100.html)

## ECONOMY

Energy use: 60 kWh/m<sup>2</sup> yr  
The heating load for all dwellings is estimated to be below 5 kWh/m<sup>2</sup> yr.

The developer has estimated the total construction cost of the project to about 10 % above typical construction cost.



Photo: Ravn Steinsvik

## GALLERY



### PHOTOS; Ravn Steinsvik

- Built: 2008
- Project designers: Steinsvik arkitektkontor a/s
- Consultants: i NOR as (RIE)
- Project management: Maurstadgruppen
- Entrepreneurs: Passivhus Norge a/s
- Address: Nedre Stovollen 40 B-H
- Location: Storelva
- Project period: 2006-2008
- Type of project: Multi-family house
- Read more: <http://www.nhf2010.ca/docs/POST%20FORUM%5C6%20-%20Northern%20Design%5C3%20-%20Odd%20Steinsvik%5CNorthern%20Housing%20Forum.pdf>

