



Sustainable care  
in Vijverstate

## Care home estate Vijverstate – Municipality of Koggenland

**Client:** Cooperative building society Intermaris Hoeksteen  
**Partner:** Municipality of Koggenland  
**Surface area:** 825 m<sup>2</sup>  
**Location:** Public road near care houses estate Vijverstate at Avenhorn, The Netherlands  
**Completed:** 2005

### Sustainable generation and use of energy at Vijverstate

In 2001 the municipality of Koggenland was far ahead of its time taking sustainable and energy saving measures to reduce emissions. They wanted to create a CO<sub>2</sub>-friendly care home estate in the municipality. For this development they sought the expertise of the cooperative building society Intermaris Hoeksteen. The care home estate Vijverstate in Avenhorn, completed in 2005, is the result of this cooperation. The estate has a care and welfare component for the inhabitants and consists of 67 private and rented apartments.

### The road as a source of energy

The municipality had two important conditions for the care home estate and its 55+ aged inhabitants. A CO<sub>2</sub>-friendly energy management and a healthy & comfortable indoor climate. Both of which had to meet the private and rented market requirements. To meet the energy saving challenge Ooms Avenhorn Groep was contacted. During the design phase Ooms, together with cooperative partner Schouten



Techniek, integrated her Road Energy Systems® (RES) in the care home estate. RES was installed in the road surface at the South-East side of the apartment building. All rooms are thus CO<sub>2</sub>-friendly heated and cooled. The most important aspect is the use of solar energy and so-called heat-cold storage (HCS); there is no need for a gas connection. In particular the cooling aspect of RES in summer provides for a considerable CO<sub>2</sub> reduction compared to (expensive) conventional air-conditioning.

#### Energy from asphalt

The Road Energy Systems® asphalt solar collector measures 825 m<sup>2</sup> and is located in the asphalt of the surrounding local road. The asphalt part works in combination with HCS, which in this case consists of two open ground sources with underground aquifers at a depth of 140 meter. The most important contribution of RES at Vijverstate is the regeneration of heat in the ground, which provides for an optimal balance of energy in the long-run. This again contributes to an optimal durable efficiency of the heat pumps. Finally, this way of creating the balance meets the license requirements of the Province for the use of energy storage in the ground.

#### Comfort for the inhabitants

The water heated during the summer is stored in the heat source underground. Through pipes and heat exchangers the heat is distributed to the apartments.

In winter an individual heat pump per apartment takes care of the power for the so-called Low-Temperature Floor and Ceiling Heating, combined with hot tap water supply through a storage boiler. After use, the cooled off water is stored in the cold 'source' underground. The apartments can be cooled according to personal needs with ceiling cooling during the summer. The result is that via this pipe work in the floor and ceiling, super heating of the living and occupied areas is prevented in an efficient way without the need for purchasing energy hungry traditional air-conditioning systems. In this way dust problems are also prevented.



#### Road Energy Systems® figures

##### Project details

- Care home estate Vijverstate at De Goorn
- Completed: 2005
- Size: 67 apartments for target group age 55+ with care needs
- 32 three-room private apartments
- 35 2½-room rented apartments
- 700 m<sup>2</sup> care and health rooms
- 8,814 m<sup>2</sup> gross floor area
- Client: Cooperative building society Intermaris Hoeksteen
- Care provider: Care institution Wilgaerde
- Partner: Municipality of Koggenland
- Subsidy: CO<sub>2</sub> incentive subsidy through municipality and CO<sub>2</sub> Service point of the Province of North Holland

##### Technical description

- 825 m<sup>2</sup> solar collector applied in public road and parking places
- 2 open ground sources with aquifers at a depth of 140 m below the earth surface
- 68 ltho heat pumps
- COP 5.2 for heating in design phase (COP = Coefficient Of Performance) and 7.1 realized in practice
- COP for top cooling and hot tap water respectively 20 and 2.5 in the design phase; 32 and 4.5 in practice

##### Results in practice

Energy monitoring in the apartments, in comparison to conventional heating and air-conditioning, provides the following results (based on 67 apartments):

- CO<sub>2</sub> reduction when heating and using hot tap water:
  - 54% less CO<sub>2</sub> emission
  - 72.6 metric tonnes reduction in CO<sub>2</sub> emission
 This is equal to
  - CO<sub>2</sub> absorption by 3,617 trees
  - CO<sub>2</sub> emission in case of 382,436 driven car kilometers
- CO<sub>2</sub> reduction when cooling:
  - 81% CO<sub>2</sub> reduction
  - 64.9 metric tonnes less CO<sub>2</sub> emission
 This is equal to
  - CO<sub>2</sub> absorption by 3,283 trees
  - CO<sub>2</sub> emission in case of 342,236 driven car kilometers

Specifically in the case of cooling, Road Energy Systems® thus provides a considerable CO<sub>2</sub> reduction.

##### Monitoring

Status September 2007	Regeneration
Obtained from the ground source	1,490 GJ
Restored into the ground source	1,591 GJ

The asphalt solar collector has generated 914 GJ, which is about 57% of the total restored amount. This finding provides evidence of long-term regeneration of the energy balance in the ground via Road Energy Systems®.