Project Profile

Combining groundwater energy and groundwater remediation during the redevelopment of an industrial complex in Eindhoven
Philips’ Strijp-S in Eindhoven

- 27 hectares in Eindhoven city centre
- In use since 1915
- Fully built in 1930
- At peak 10,000 employed (“Forbidden City”)
- Cradle of many Philips innovations
Philips’ Strijp-S in Eindhoven

- Redevelopment as of 2005
- Mix housing, business & leisure
- Maintain historical buildings
- New housing areas and offices
- Stringent criteria for sustainability
- In 2003, Philips indicates it prefers to use groundwater energy
Major groundwater contamination

Chlorinated solvents cisDCE and VC In aquifer from 30 to 60 m-bgs
Can we do this

The client:
Park Strijp Beheer and Philips

The question: Is it possible to use groundwater energy at this site, and to combine this with the remediation of groundwater?
The first energy remediation system worldwide

ARCADIS role

- Design groundwater system and Installations
- Impact Assessment
- Groundwater and temperature modeling
- Permitting
Energy and remediation combined

Technical issues
- Traditional Heat-cold storage will spread contaminants: containment is required
- Seasonal variations in energy demand
- On-going developments

Permit issues
- Groundwater regulations
- Soil Protection regulations
- Environmental Impact Assessment
Our solution: recirculation system, no storage
Stimulating natural degradation
What about sustainability?

<table>
<thead>
<tr>
<th>Per year</th>
<th>Gas (m³)</th>
<th>Electricity (kWh)</th>
<th>CO₂ (ktonnes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traditional heating</td>
<td>2.900.000</td>
<td>2.400.000</td>
<td>6,0</td>
</tr>
<tr>
<td>Sanergy</td>
<td>570.000</td>
<td>5.300.000</td>
<td>3,0</td>
</tr>
</tbody>
</table>

CO₂ reduction of 3.0 ktonnes for heating/cooling!
No extra emission for remedial activities in groundwater!
Financial perspective

Construction of Sanergy 20-40% more expensive.
No additional remediation costs - which compensate for the higher construction costs.
Sanergy in exploitation period equals normal energy system
Break-even point in 7-10 years, lifetime of system 30 years.
Sanergy: Sustainable and innovative solution

- Out of the box thinking
- Clear CO2 reduction
- Less use of non renewables (gas)
- Remediation creates no additional environmental burden
- Cost-effectiveness
- ARCADIS design fits client’s perspective:

  Sense and Simplicity!
Imagine the result