



Solar Heat in District Heating Systems: Experiences of Western Harbour/Bo01, Malmö

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SDH
solar district heating
1st Conference on
Solar District Heating
Technical solutions,
urban planning and business models
April 9-10, 2013 - Malmö, Sweden



100% Locally Renewable Energy



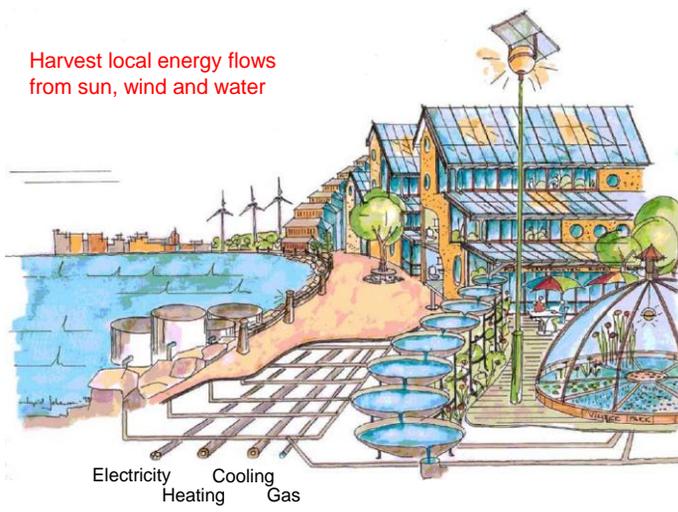
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Western Harbour,
Malmö

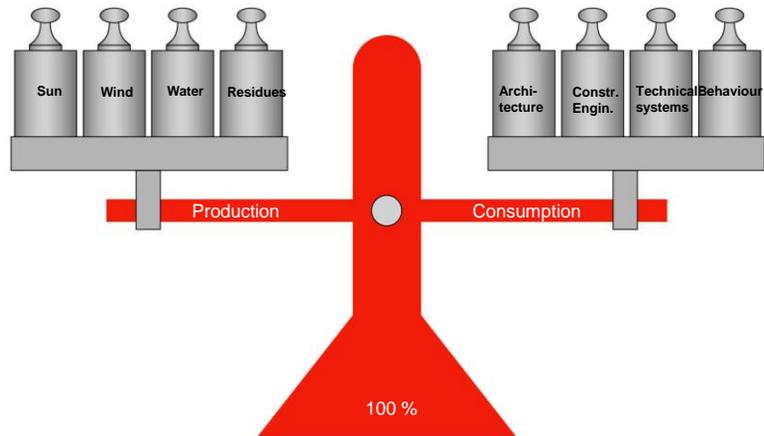


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Harvest local energy flows
from sun, wind and water

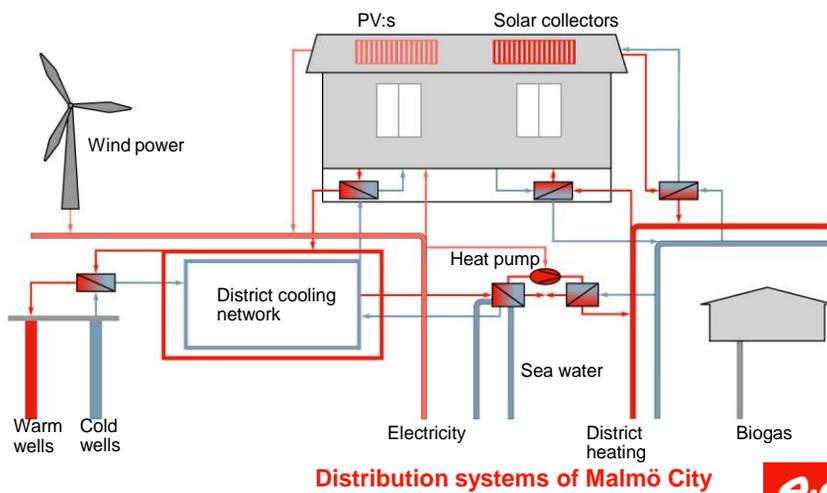


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Distribution systems of Malmö City

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Generation and Storage

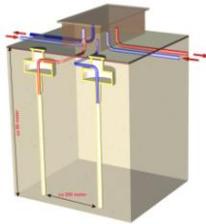
Electricity

- Windmill
- Solar cells



Heat

- Heat pump
- Solar collectors



Cooling

- Heat pump
- Sea water



Seasonal storage of heat & cooling

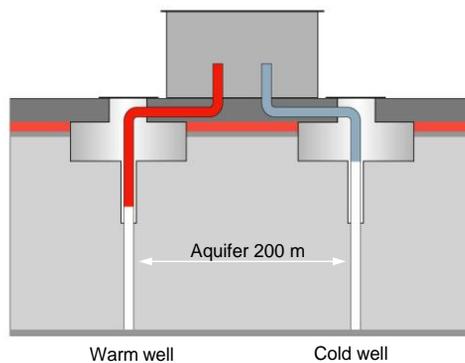
- Natural Aquifer

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Aquifer

- Seasonal storage for heating and cooling
- 5 pairs of wells
- 90 meters deep



Warm well

Cold well

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Solar collectors

- 1 400 m² on 10 buildings
- Two types – vacuum and plane
- Connected to district heating
- Partnership with architects and developer
- Expected output, 15 % of annual heat demand



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Wind power

- 2,0 MW
- Well proven technology, developed from standard machine
- Placed 3 km from the area to avoid disturbances but close enough to "belong" to the area
- Connected to the electrical grid in Malmö
- Sufficient for all the electrical needs at Bo01

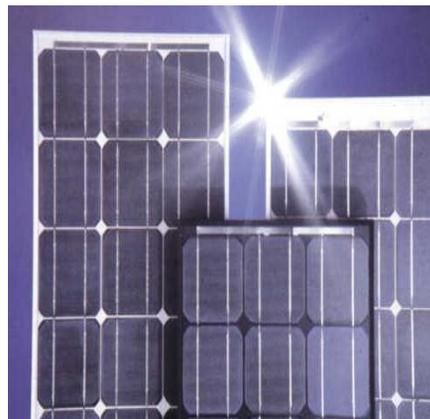


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Solar cells

- 120 m²
- Connected to the electrical grid
- Integrated on one building
- Partnership with architects and developer



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100% Locally Renewable Energy Learnings – Generation and Storage:

There have been problems with local energy production systems

- Seasonal storage/Aquifers OK
- Heat pump Need of total exchange after 4 years
- Solar Collectors connected to the district heating grid
 - Plane collectors - OK
 - Vacuum collectors – Need of total exchange after 5 years
- Solar Cells OK – connection to the electricity grid was problematic
- Windmill OK – after about 10 years of operation in need of large maintenance or exchange

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Total vacuum collector failure



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Learnings – Consumption:

Energy consumption in many buildings are higher than the goal figure of 105 kWh/m²,year
(35 kWh electricity/m²,year and 70 kWh heat/m²,year)

- Household electricity consumption was almost as estimated (25 kWh/m² year) in the beginning, today about twice as high as estimated
- Heat consumption was much higher than estimated in the beginning (up to 300 kWh/m², year) , after a few years of trimming heat consumption target levels have nearly been met today

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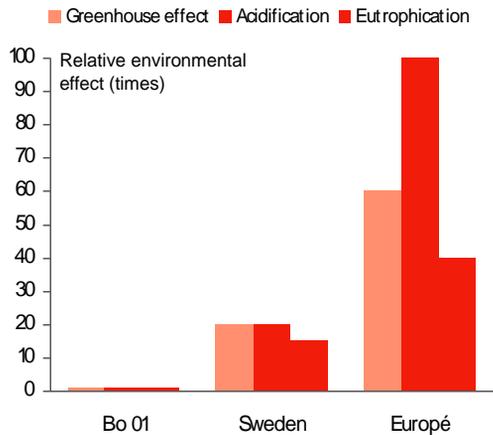
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Apartment 85 m²

35 kWh electricity/m², year

70 kWh heat/m², year



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100% Locally Renewable Energy European and national support

- Campaign for Take off
Malmö – the first nominated city
- EC-5th Framework Programme
City of Tomorrow-Cleaner Energy Systems
Partnership with four other countries
Investment contribution
- Ministry of the Environment
Investment contribution




 REGERINGSKANSLIET
 THE SWEDISH
 GOVERNMENT

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Bo01/Western Harbour – The City of the Future?



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