

PROJECT SETTING



- Built in the 1950's;
- Urban plan from architect Peutz;
- 3200 dwellings in apartment blocks and single family houses;
- 2500 corporation owned, 700 private;
- Presently energy label F/G;
- Heating with gas stoves;
- Poor comfort levels.



- Restructuring process 2005 – 2015;
- Preservation of Peutz' urban plan;
- Demolishing of 650 houses, renovation of 650 houses and new built for total 950 dwellings;
- CO₂ reduction target is 45% (in 2015);
- Improvement of comfort levels and indoor air quality;
- Involvement of neighbourhood group in planning and ambition setting;
- Other investors need to agree on ambitions.



AMBITIONS & AGREEMENTS

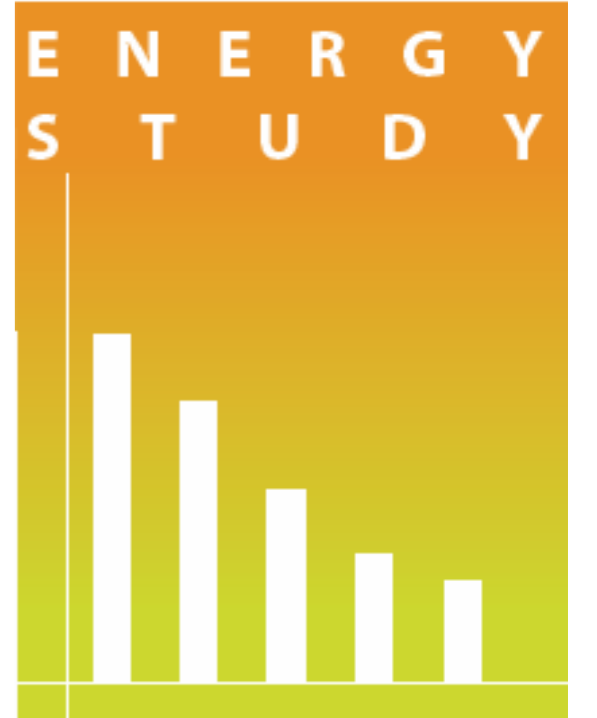
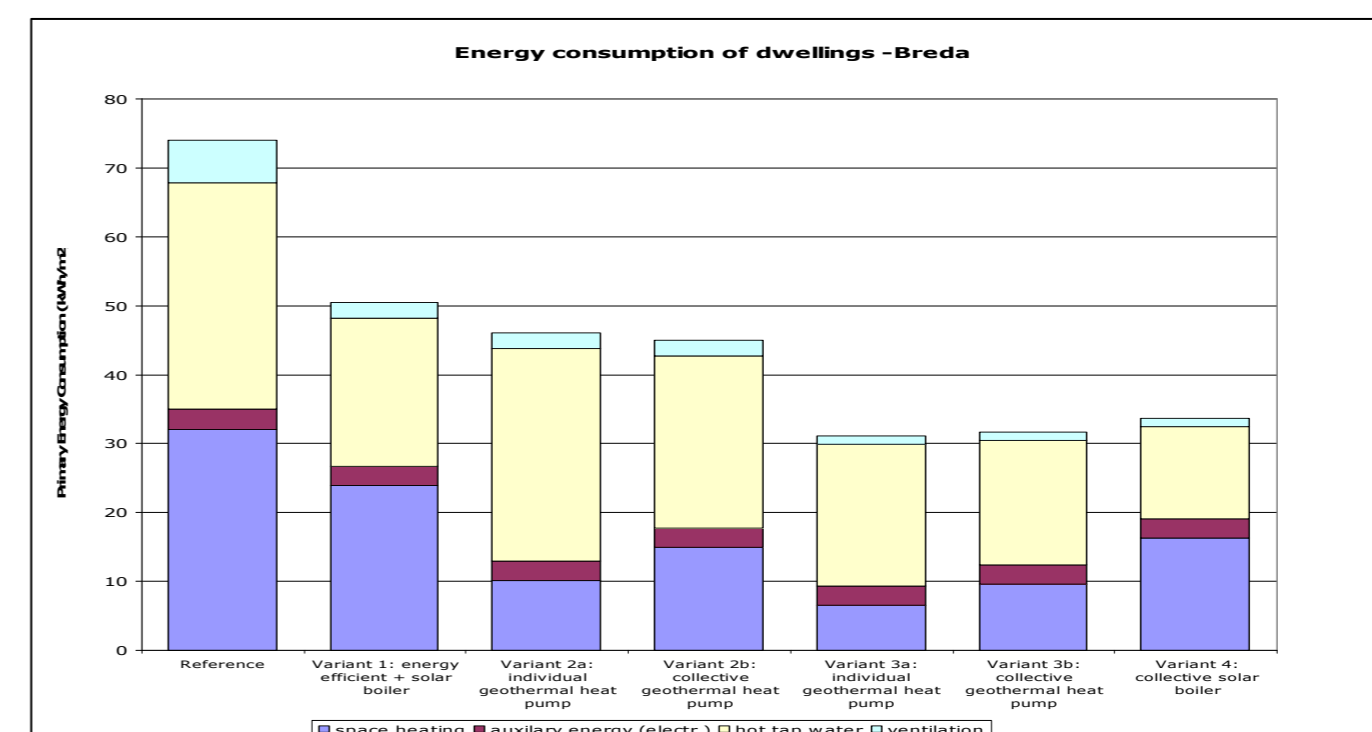
Covenant between corporation, municipality and neighbourhood council:

- Ambition for "higher quality level with respect to comfort, indoor climate, flexibility towards the future and the environment".

- Energy Performance on Location*: EPL = 7,0-7,4 for new buildings; EPL = 5,6 for conserved buildings.

- Guarantee for tenants that total housing cost will remain the same, although cold rent increases.

*) EPL is a relative measure for carbon emission of **entire** building project:
EPL= 10 is carbon neutral;
EPL= 6,6 is Building Code level



	Reference	Variant 1: energy efficient + solar boiler	Variant 2a: individual geothermal heat pump	Variant 2b: collective geothermal heat pump	Variant 3a: individual geothermal heat pump	Variant 3b: collective geothermal heat pump	Variant 4: collective solar boiler
Investment per residence	€ 6.250	€ 12.900	€ 13.850	€ 10.850	€ 16.250	€ 13.250	€ 19.100
User cost [€/year]	€ 1.074	€ 857	€ 667	€ 1.072	€ 490	€ 908	€ 968
Primary energy consumption [kWh/m²]	74	51	46	45	31	32	34
CO ₂ -emission [kg/m²/year]	15,3	10,4	11,5	10,9	7,8	7,6	7,0
CO ₂ mitigation (€/kg CO ₂)	0	14	20	10	13	9	15

Conclusions energy study:

- Collective system for underground heat/cold storage and electric heat pump seems most promising option;
- Possible combination with soil clean-up operation;
- Heat pump option is less suitable for existing dwellings.

REALISATION



- No decision on investments yet;
- Corporation may take role as energy company, this offers solution for "split incentive" problem;
- Combination of heat/cold storage in underground with soil remediation is under investigation.



- Initiator role of **municipality** is important;
- **Energy Performance on Location** is useful tool for setting (policy) ambitions;
- Seek active role for **neighbourhood** group;
- Housing **comfort** level as part of ambition;
- **Broad support** for ambitions is necessary as there is no way to enforce them;
- Guarantee on **total housing costs** eases acceptance of rent increase by tenants;
- Comparison of **integral energy concepts** instead of individual measures provides better insight.

