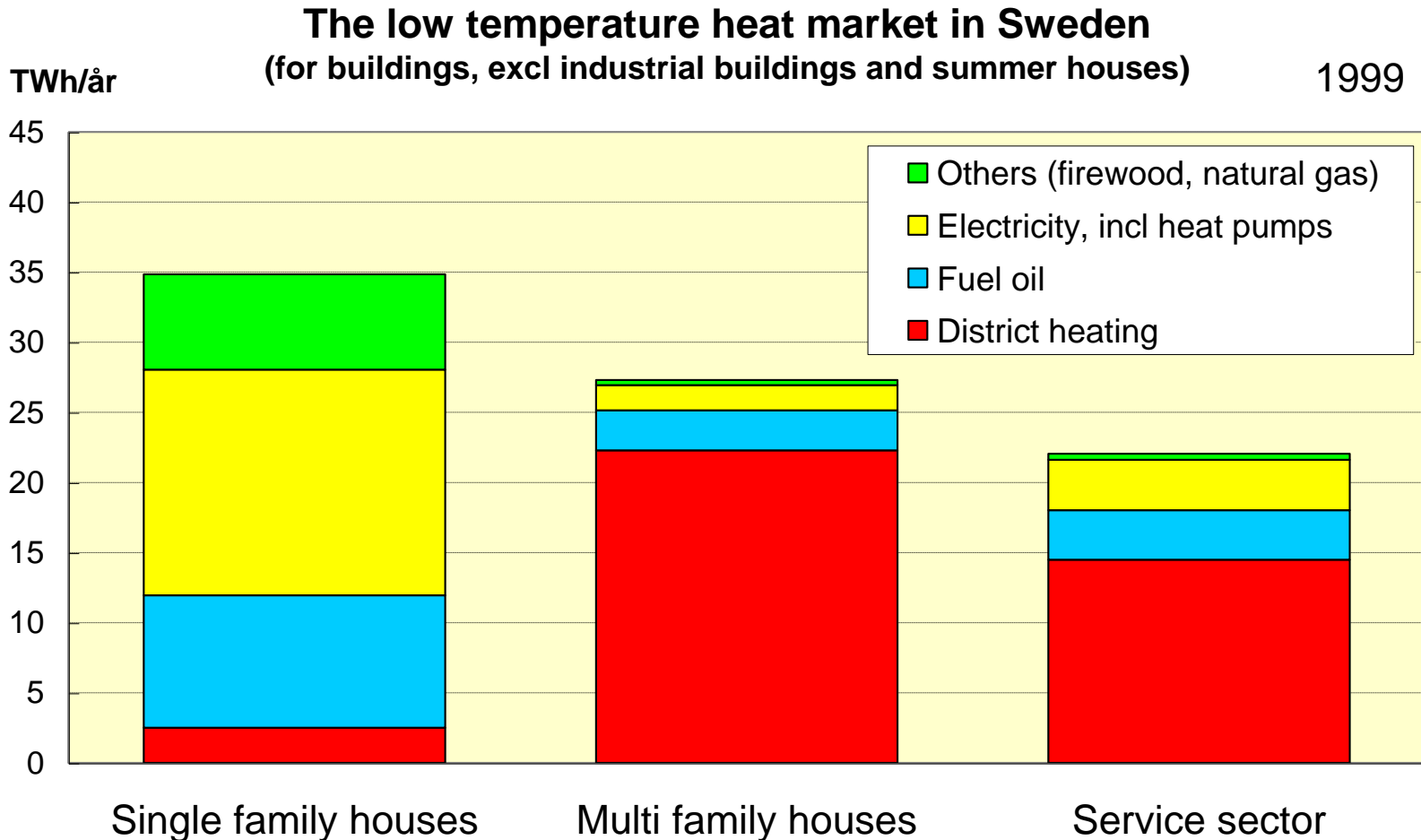


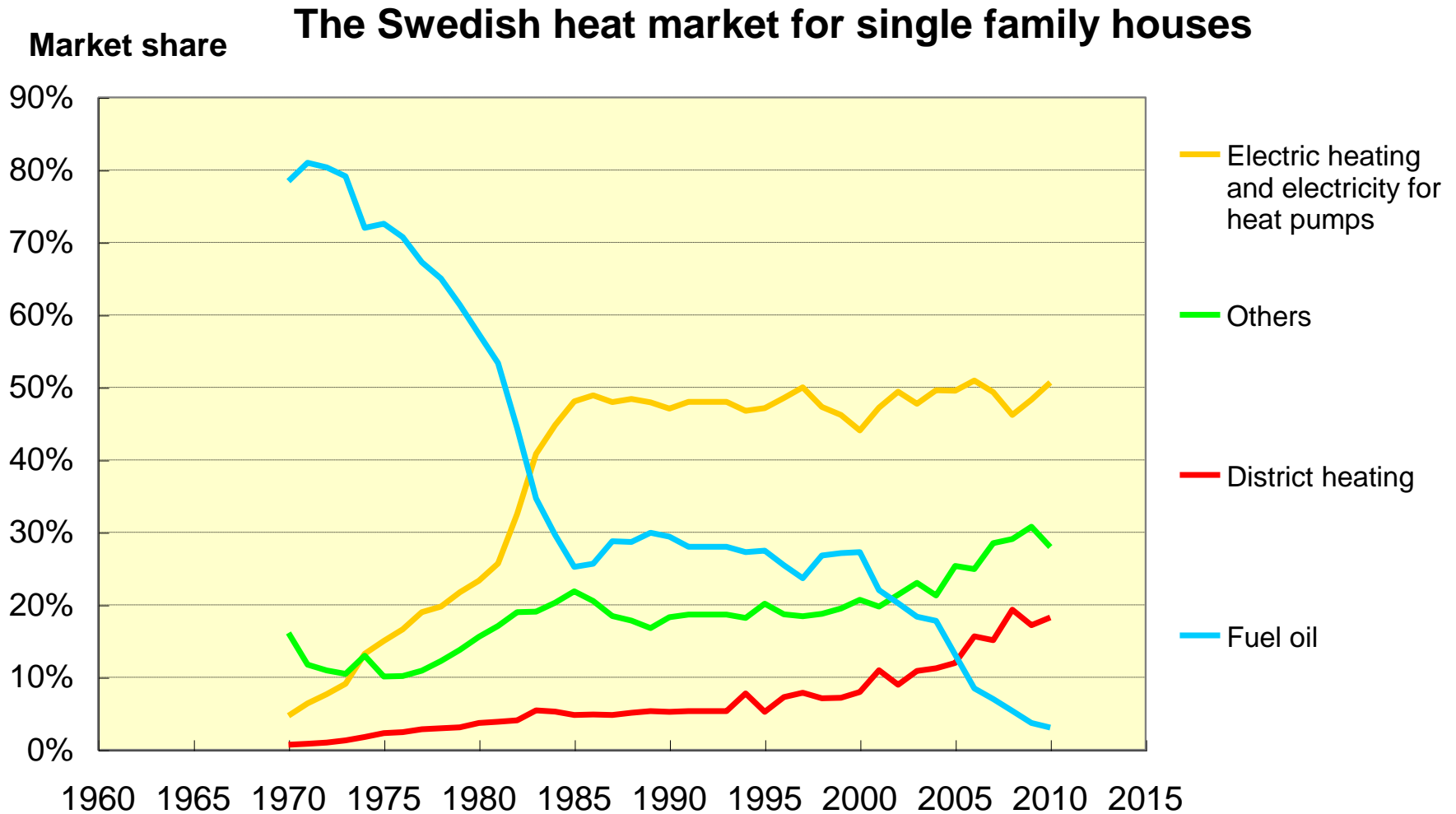
Results from the Swedish Sparse District Heating project 2002-2006

Sven Werner
Halmstad University

Heat market for Swedish buildings in 1999



The market situation for single family houses



Share of single family houses connected to district heating in some countries during 2000

- Iceland 85 % (geothermal heat)
- Denmark 48 % (zoning and high fuel taxes)
- Finland 11 % (no strong incentives)
- Sweden 10 % (high fuel taxes)
- Netherlands 5 % (mainly new houses)

High distribution costs at low linear heat densities

Specific capital
cost, EUR/GJ

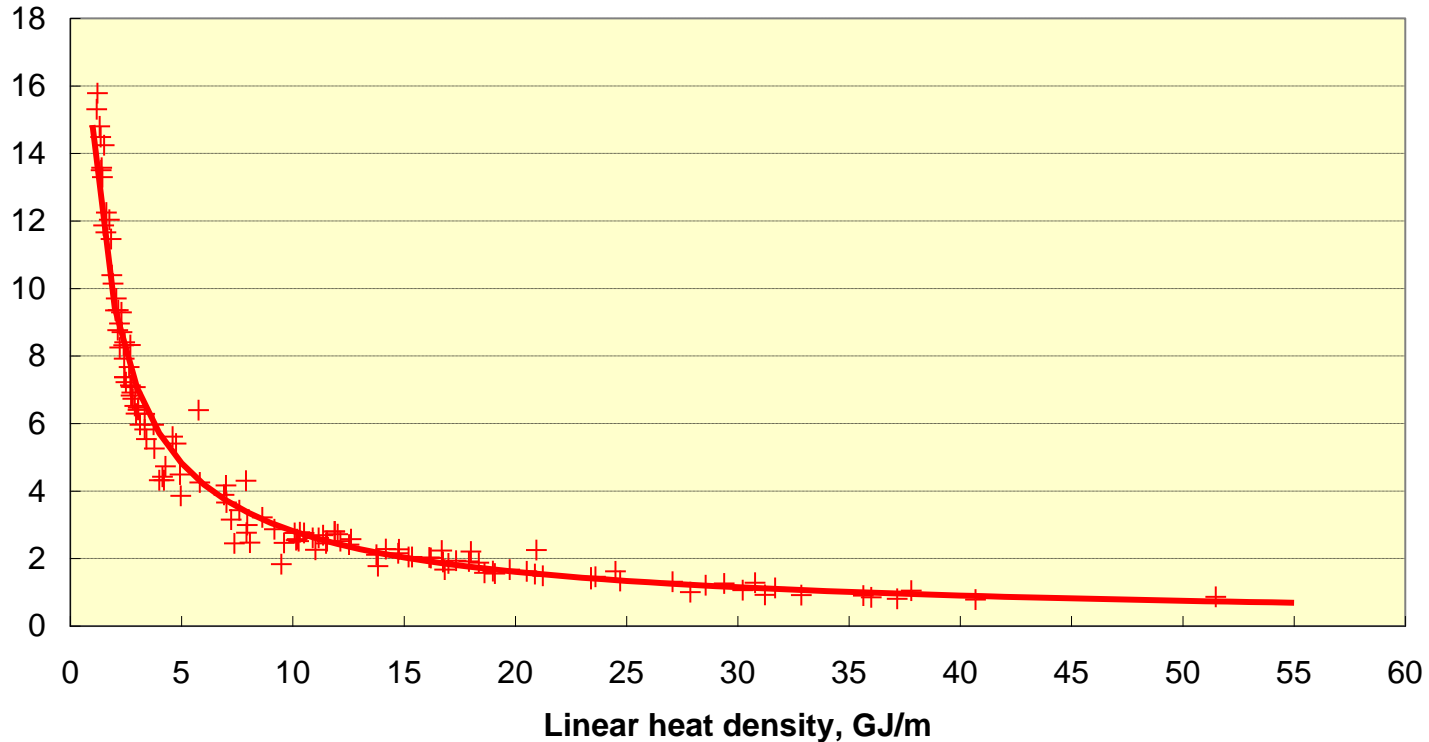


Figure 11-9. Specific capital cost for district heat distribution for the parameter combinations (134 cases and the corresponding average cost line) presented in Figure 11-8. The capital costs were estimated with an annuity of 0.064 (4% and 25 years) and the construction cost level represented by outer city areas in Figure 11-6 with $C_1 = 230 \text{ €/m}$ and $C_2 = 1860 \text{ €/m}^2$.

The Sparse District Heating Program

- During 4 years, 2002-2006
- 3,6 million €
- Project board of 7 persons and 2 project managers
- 86 project proposals from 33 parties
- 46 projects for management (3), analyses and development (30) and demonstration (13)
- 2 PhD projects related to the program
- Ending September 30, 2006

The Sparse District Heating Programme

Four specific objectives:

1. The installation of district heating in one house should cost no more than € 5,400 (SEK 50,000) in residential areas with typical heat densities.
2. A connection rate of 70 % should be reached in each area, and this should be sufficient to meet the economic requirements.
3. It should be possible to supply all heat demands in a single-family house with district heating, including hot water for dishwashers and washing machines, etc.
4. The customers should be able to choose from various price models.

No uniform cost structure

562

S.F. Nilsson et al. / Applied Energy 85 (2008) 555–564

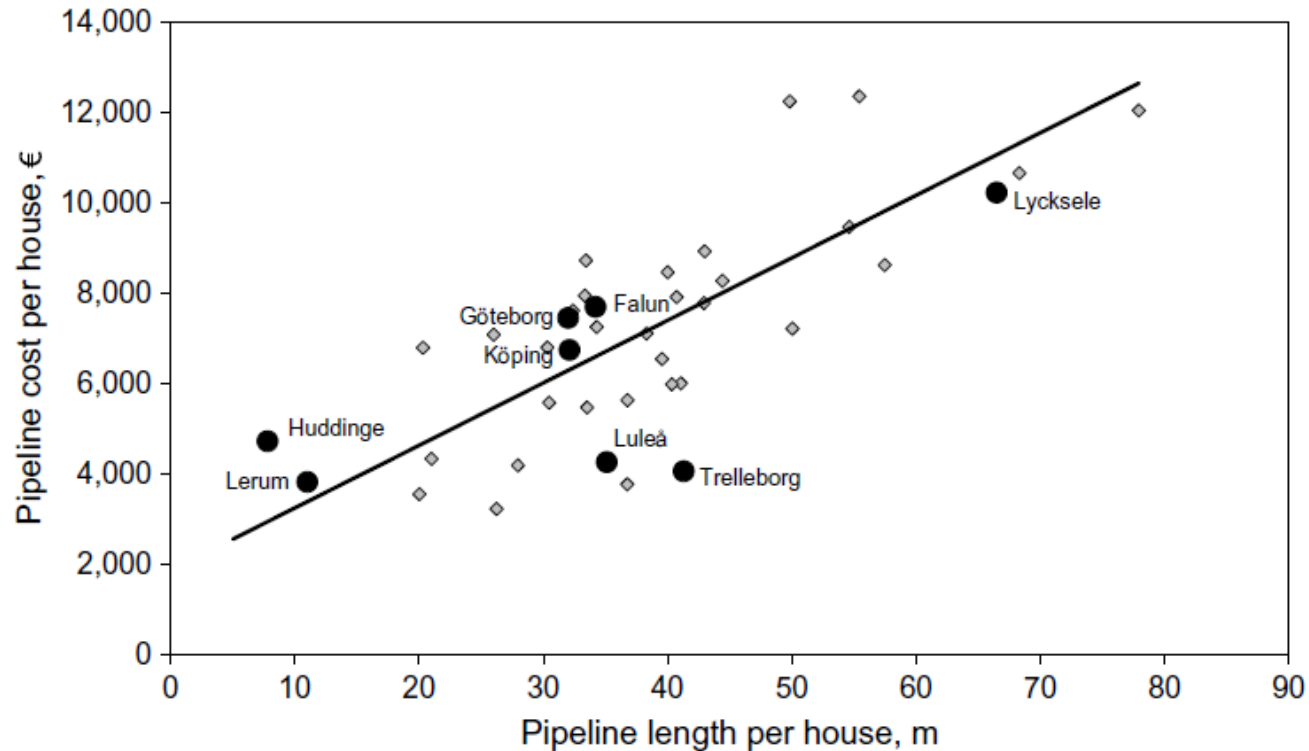
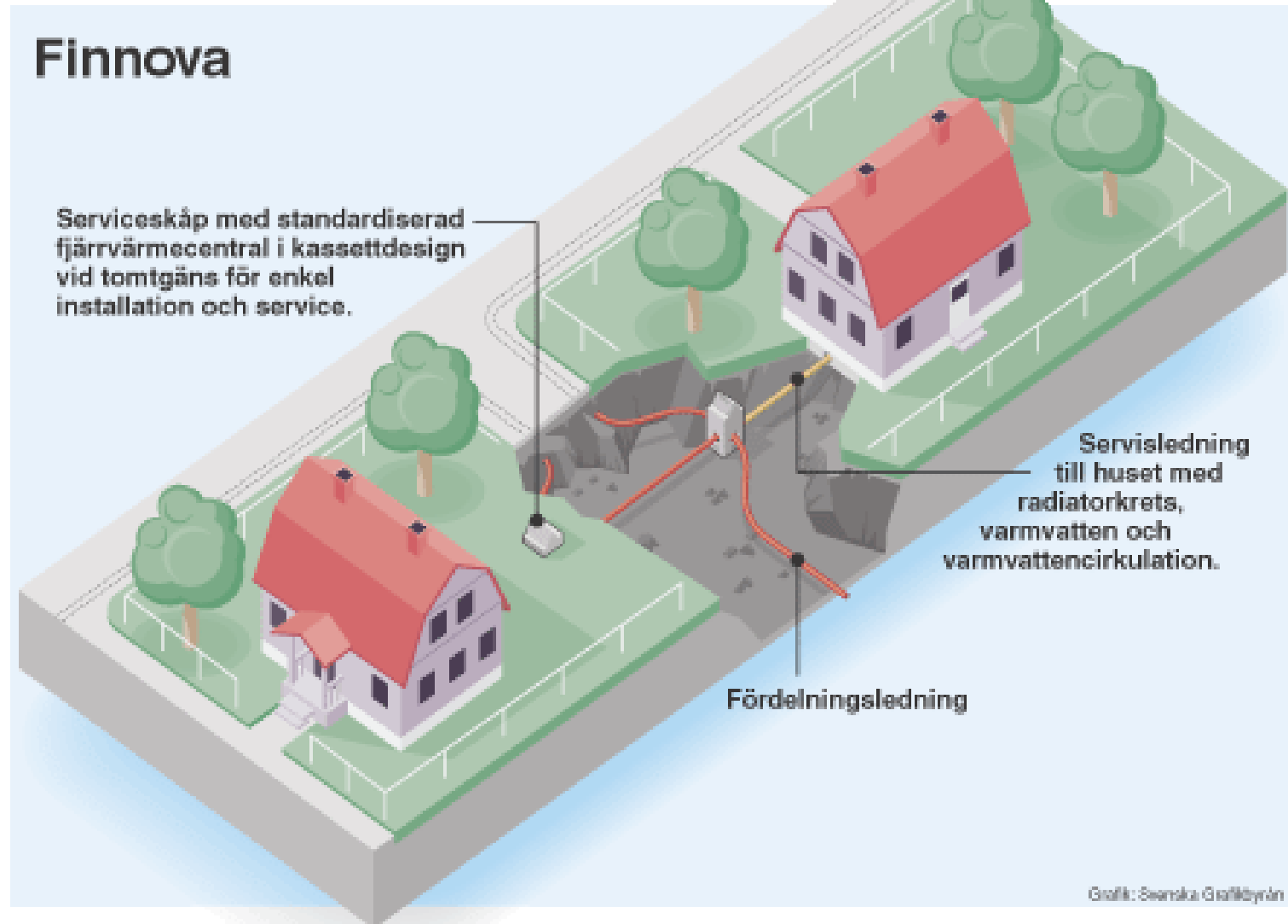


Fig. 4. Cost for pipeline as a function of the pipeline length per house for the demonstration projects (black dots) and the 36 projects comprising the State of the Art 2006.

The Finnova project



The Sparse District Heating Programme

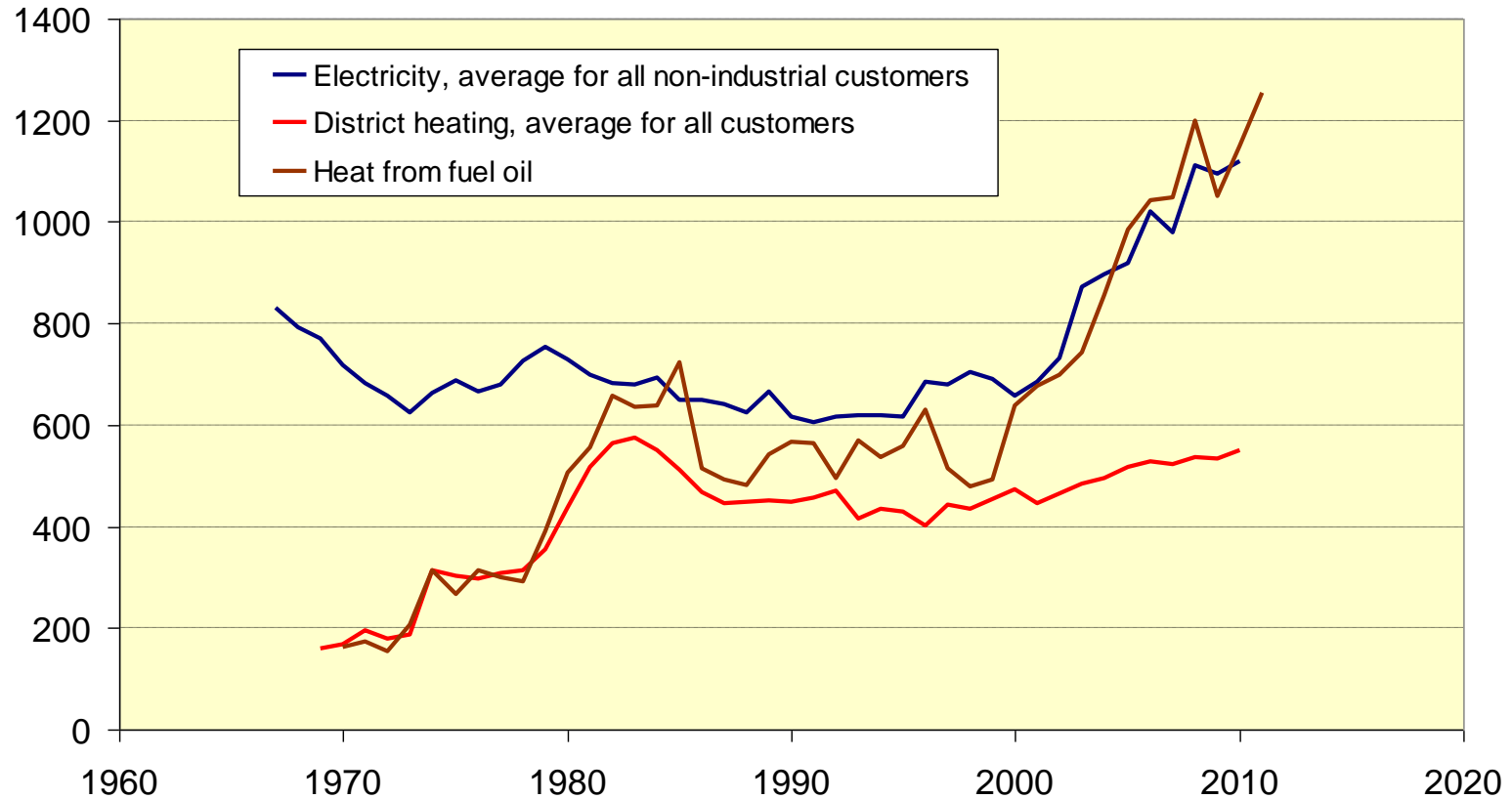
Results and conclusions:

1. The Finnova project showed a significant higher productivity.
2. Selling district heat to private households is different from professional customers.
3. The special character of sparse DH need a focused commitment from the DH company with respect to communication, pricing, and marketing.

More DH in single family houses due to higher electricity and oil prices?

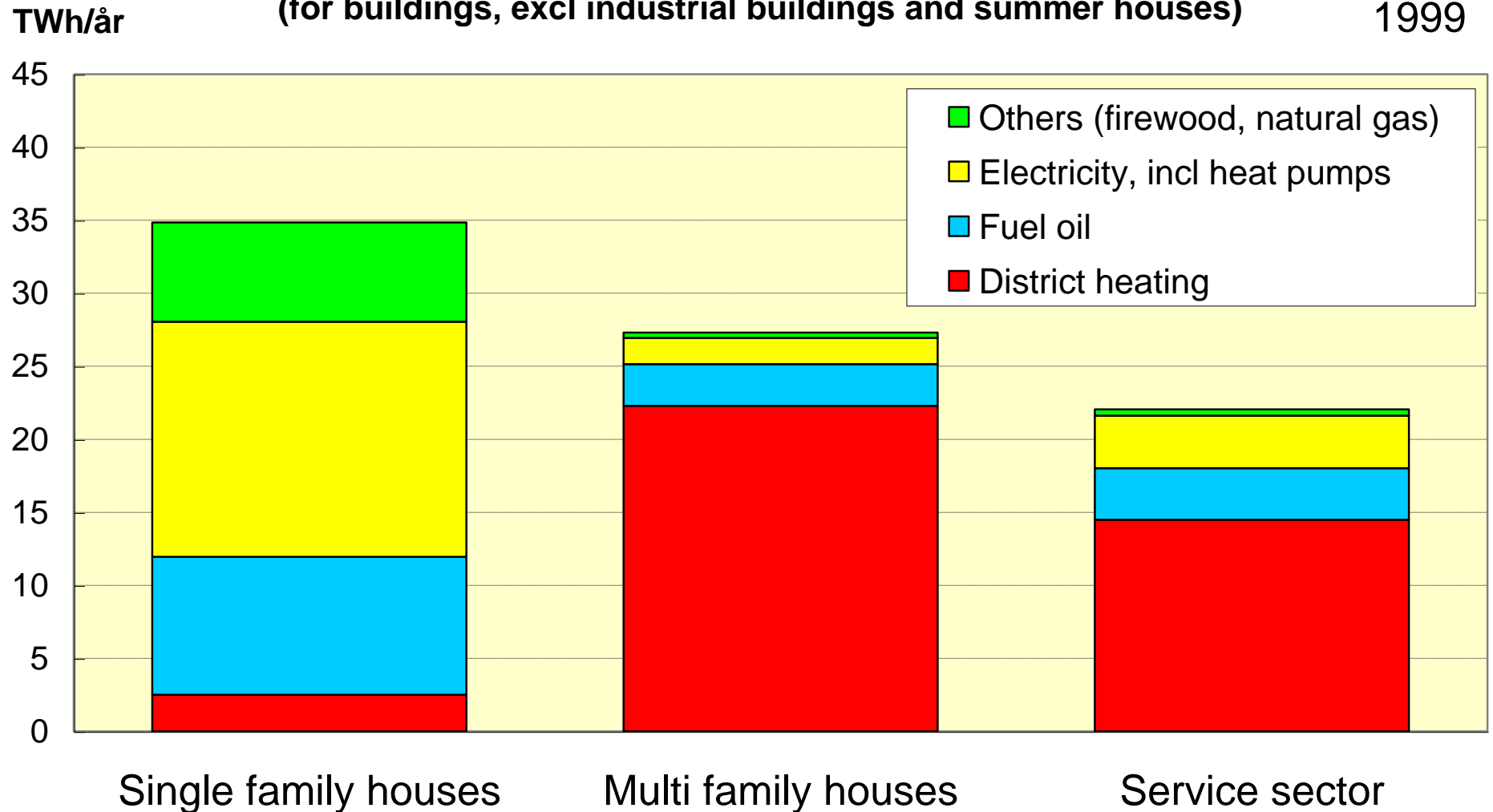
SEK/MWh
(exkl VAT)

Real energy prices in Sweden including excise taxes
for the price level of 2010



Heat market for Swedish buildings in 1999

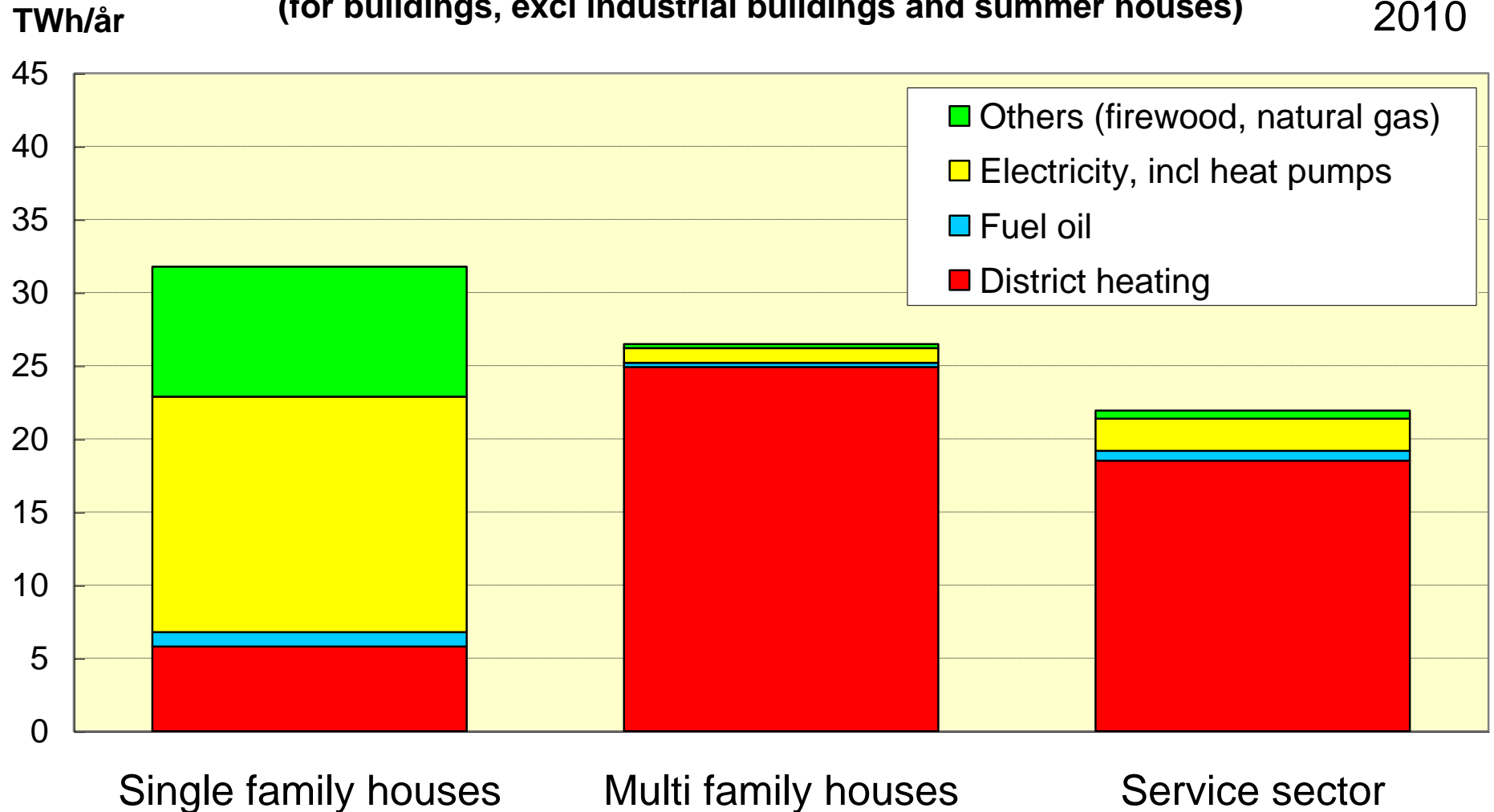
The low temperature heat market in Sweden
(for buildings, excl industrial buildings and summer houses) 1999



Heat market for Swedish buildings in 2010

The low temperature heat market in Sweden
(for buildings, excl industrial buildings and summer houses) 2010

2010



More info in research reports

In total, 49 reports were published from the program:

- 35 research reports
- 10 reports about demonstration projects
- 4 summary reports

All reports from the program can be downloaded here:

<http://www.svenskfjarrvarme.se/Forskning-och-utveckling/Avslutade-program/Varmegles/>

More info in one summary article

Applied Energy 85 (2008) 555–564

www.elsevier.com

Sparse district-heating in Sweden

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Kristina Lygnerud ^c, Sven Werner ^d

The End

Any questions?