

Intelligent Energy  Europe

I G E I A

Estonia – Role of Geothermal Energy in Energy Consumption



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EnPro Engineers Bureau

Estonia

Energy Conservation and Heat Pumps in Industry

Setubal 5-6 June 2008



Estonia

Population: 1.34 million (01.01.2008)

Population density: 30 inhab./km²

Total area: 45 227 km²

Administrative division:

15 counties, 227 municipalities

Currency: Estonian kroon (EEK)

Introduced in 1992

1 EUR = 15.65 EEK

GDP per capita: 9846 EUR (2006)

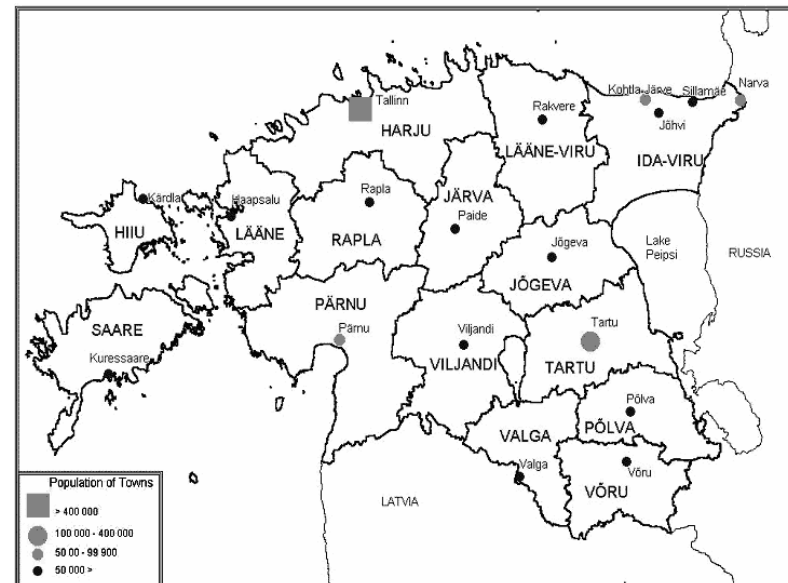
GDP annual growth: 11.2% (2006)

Average daily temperatures (2006):

annual mean: +6.7 °C

in January: -4.6 °C

in July: +18.9 °C

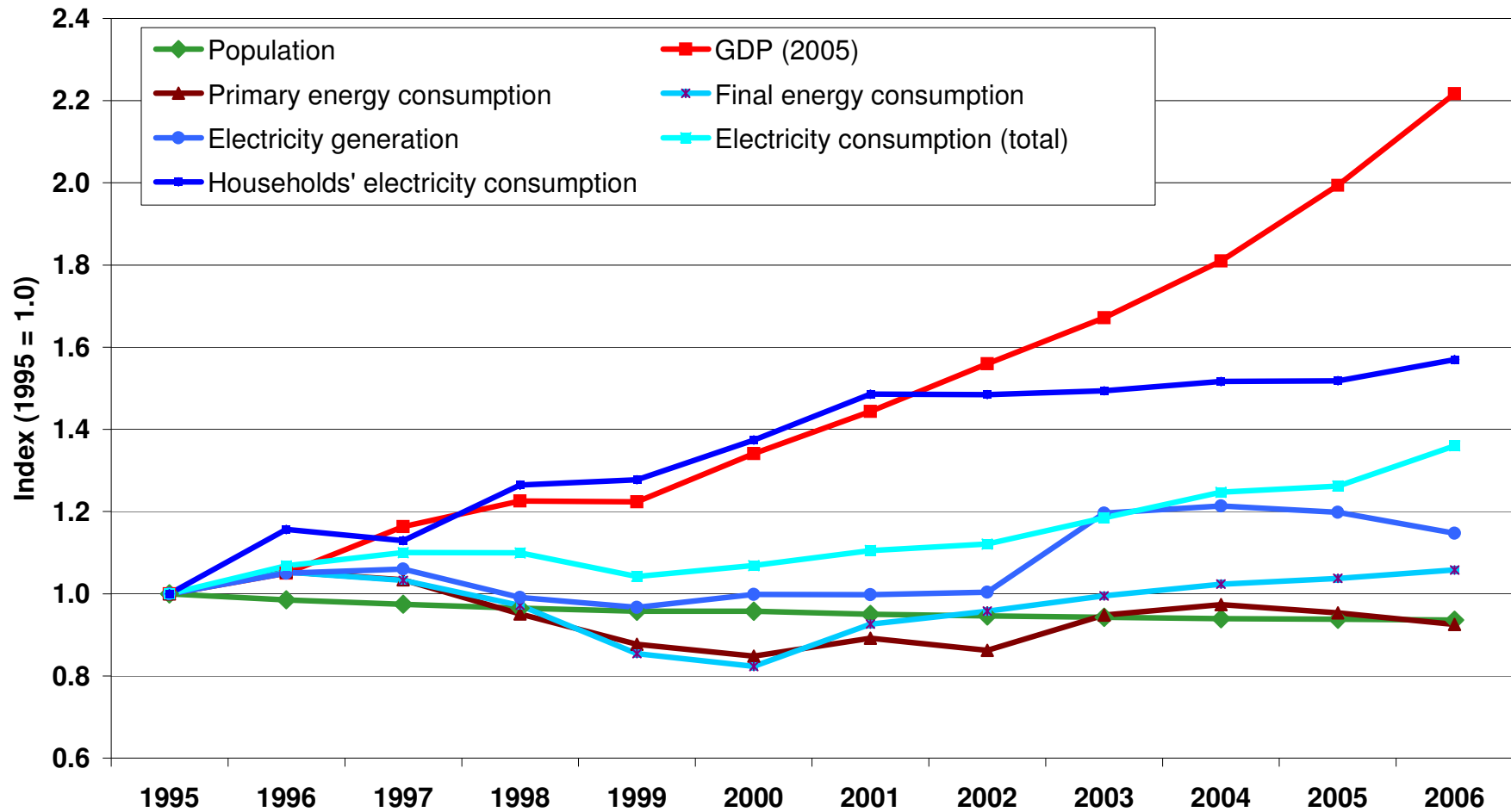


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Estonia – general development indicators (1995 – 2006)



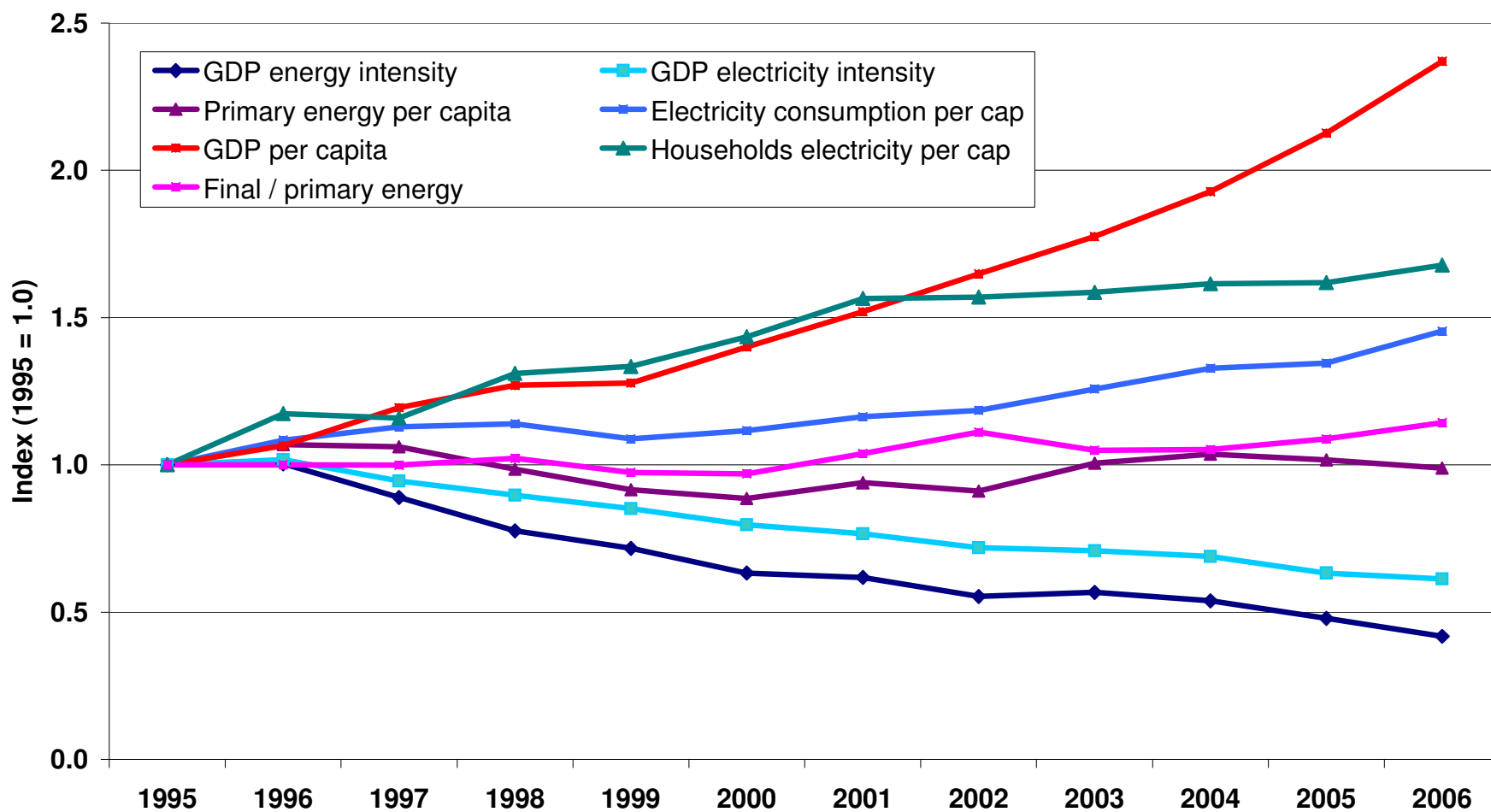
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Estonia – economic and energy indicators (1995 – 2005)

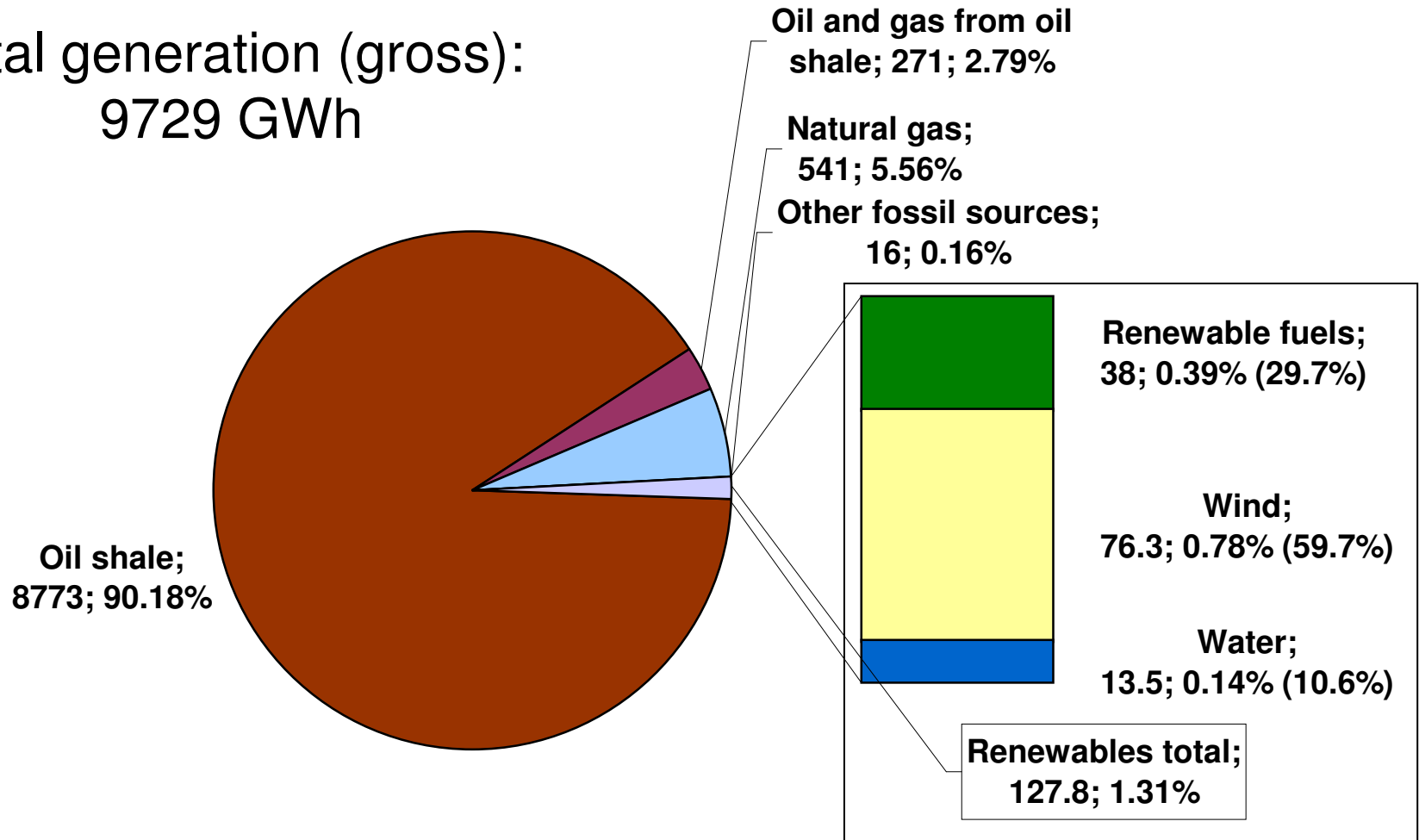


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Electricity generation by source of energy (2006)

Total generation (gross):
9729 GWh



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Electricity in Estonia

1 kWh less energy in consumption means:

- 4 kWh less fuel (oil shale)
for electricity generation
- and 6-8 kWh less mined fuel

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Investments

Electricity conservation –

1-40 thousand EEK

to reduce the load by 1 kW.

Electricity production chain –

50-70 thousand EEK

to supply 1 kW to customers.

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Running costs

Electricity conservation –
very small

Electricity production –
fuel, maintenance, etc.

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Energy policy trends

Emphasis on production

or

Emphasis on conservation?

To reduce the annual increase in demand from 2-3% to 1% means:

less capacity in 10 years (300-400 MW)

and less investments (>15 billion EEK)

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Heat pumps in Estonia (2008)

Total number:

over 10000, incl. 4000 GSHP

Capacity:

total $>100 \text{ MW}_{\text{th}}$

electrical $30\text{-}40 \text{ MW}_{\text{el}}$

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Heat pumps – *pro et contra*

Advantages –

many

Problems –

high investment

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GCHP efficiency

COP – 4-5

SPF – 2-4

Only electricity consumption is metered.

Payback – can be below 10 years.

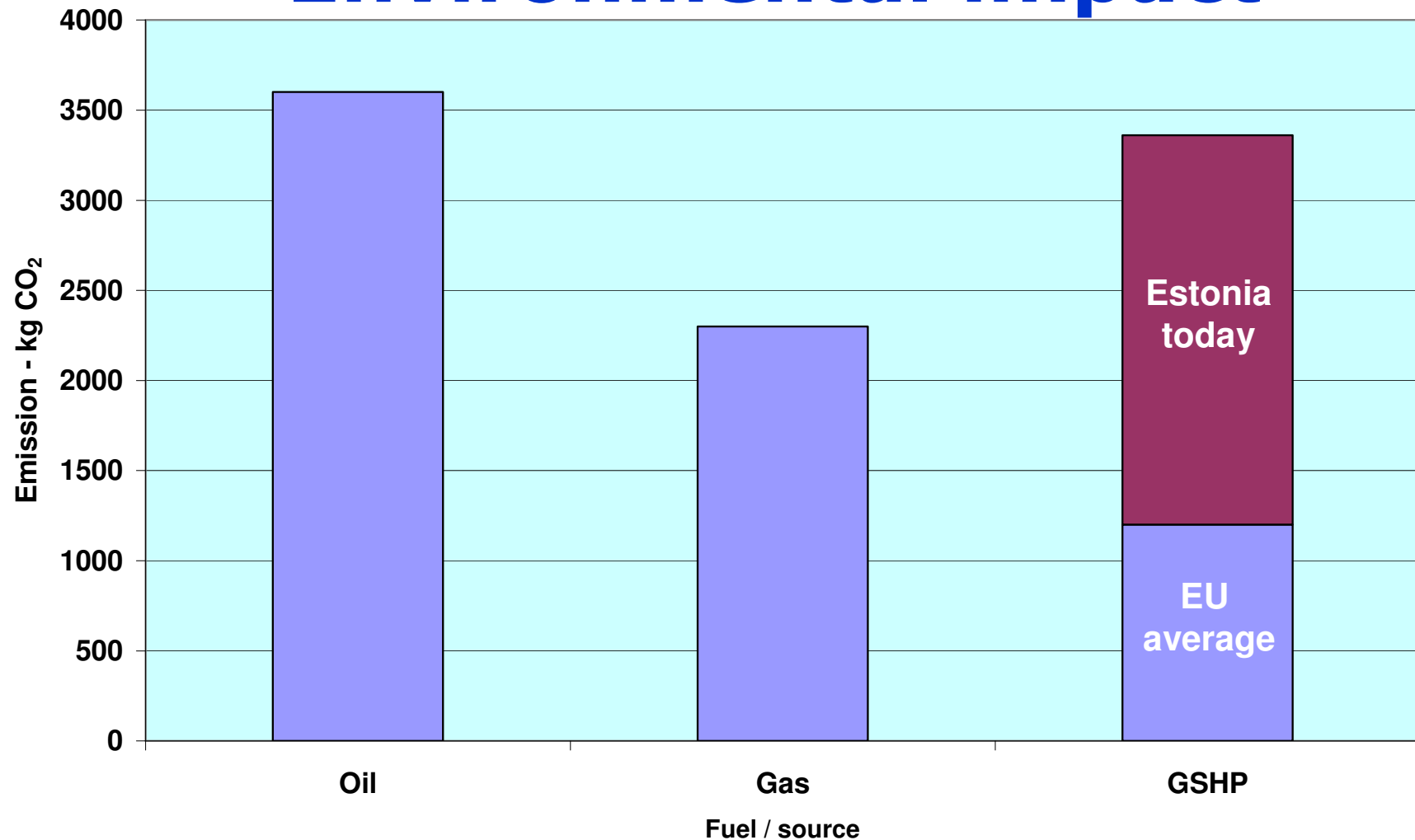
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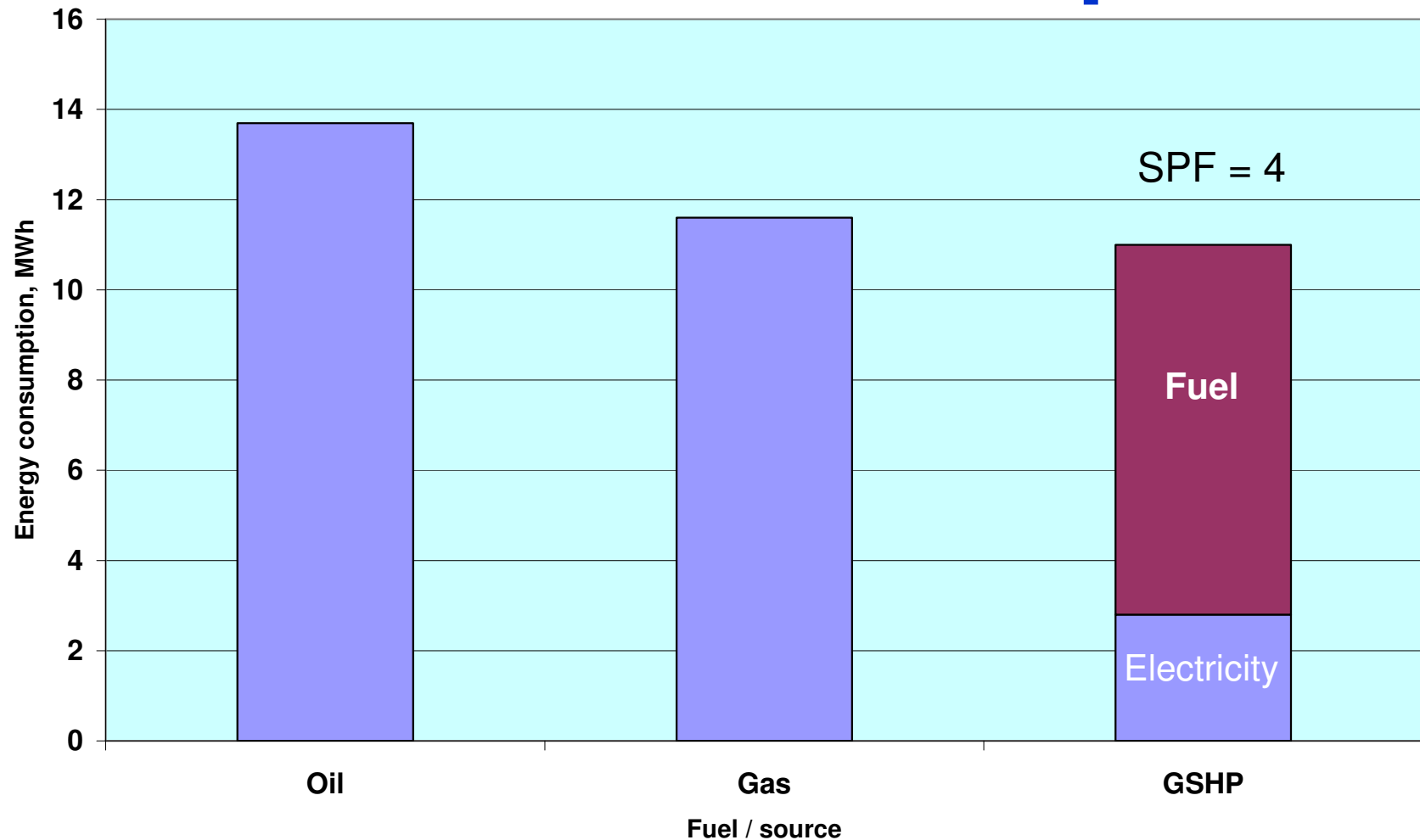
Environmental impact



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Environmental impact



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Summary

Heat pumps - increasingly popular.

Advantages improving.

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Thank you !



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