



Barriers for flexibility between district heating and electricity

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Barriers for flexibility between district heating and electricity

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Flexible Nordic Energy Systems



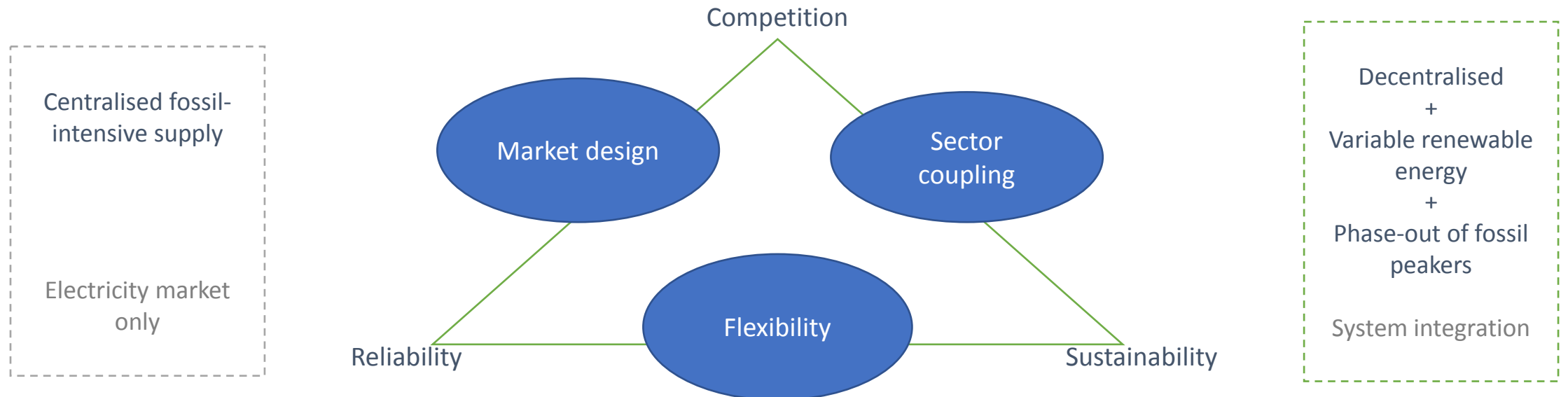
Nordic Energy Research
Nordic Council of Ministers

Wind of change

From centralised and fossil-intensive systems to decarbonised and integrated energy systems



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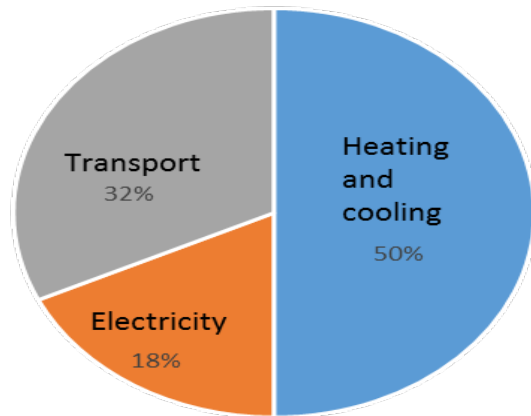


Sector coupling

Electrification as source of flexibility

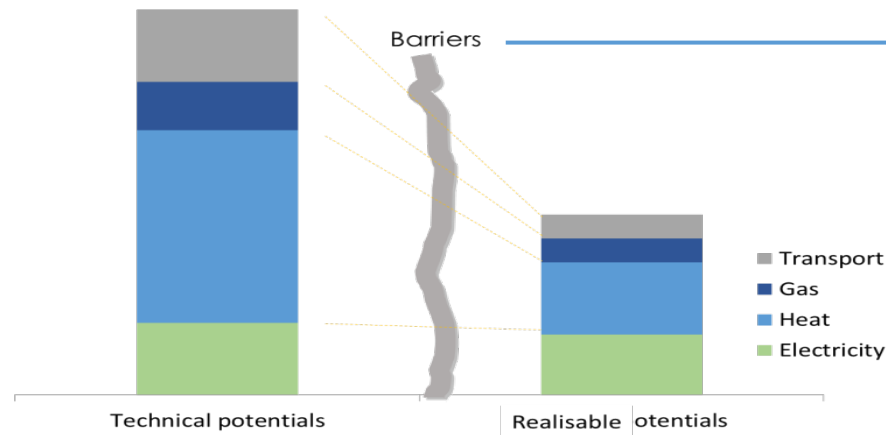


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Distribution of EU energy consumption
(Source: EU Heating and Cooling strategy)

From technical to realisable potentials



Framework conditions

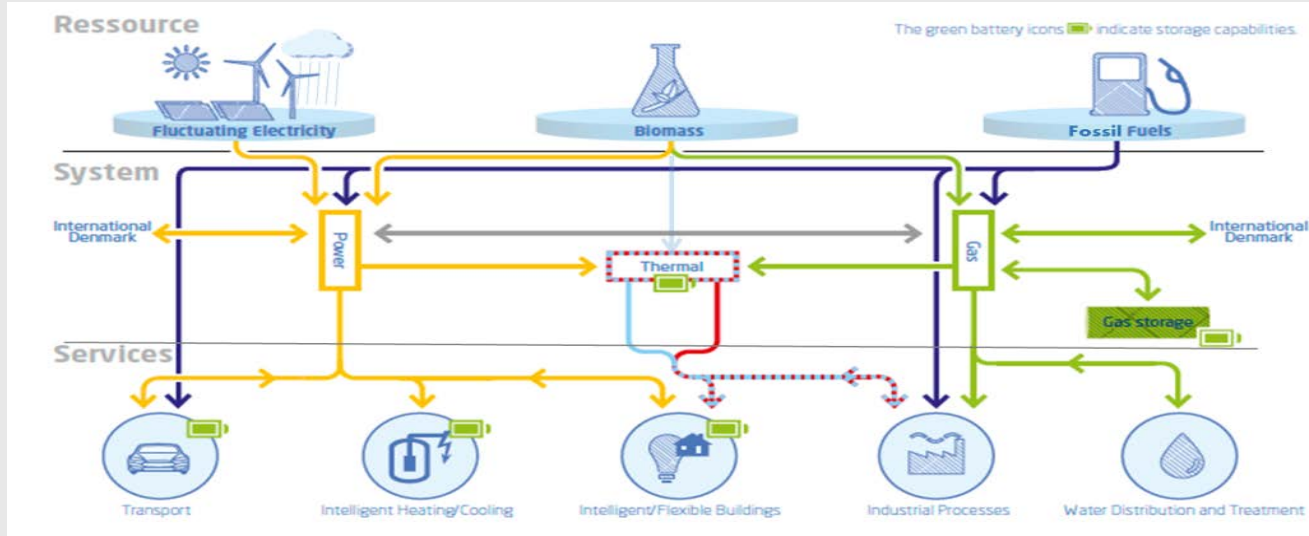
- Market design
- Direct regulation
- Fiscal policies
- Support schemes
- Grid regulation

Large flexibility potentials in electrification of the energy sectors

Hindered by regulatory barriers

Remove barriers

Challenges in a larger perspective



Energy system integration



Energy Efficiency



CCS

Infrastructure

Biomass Supply



Regulation & market design

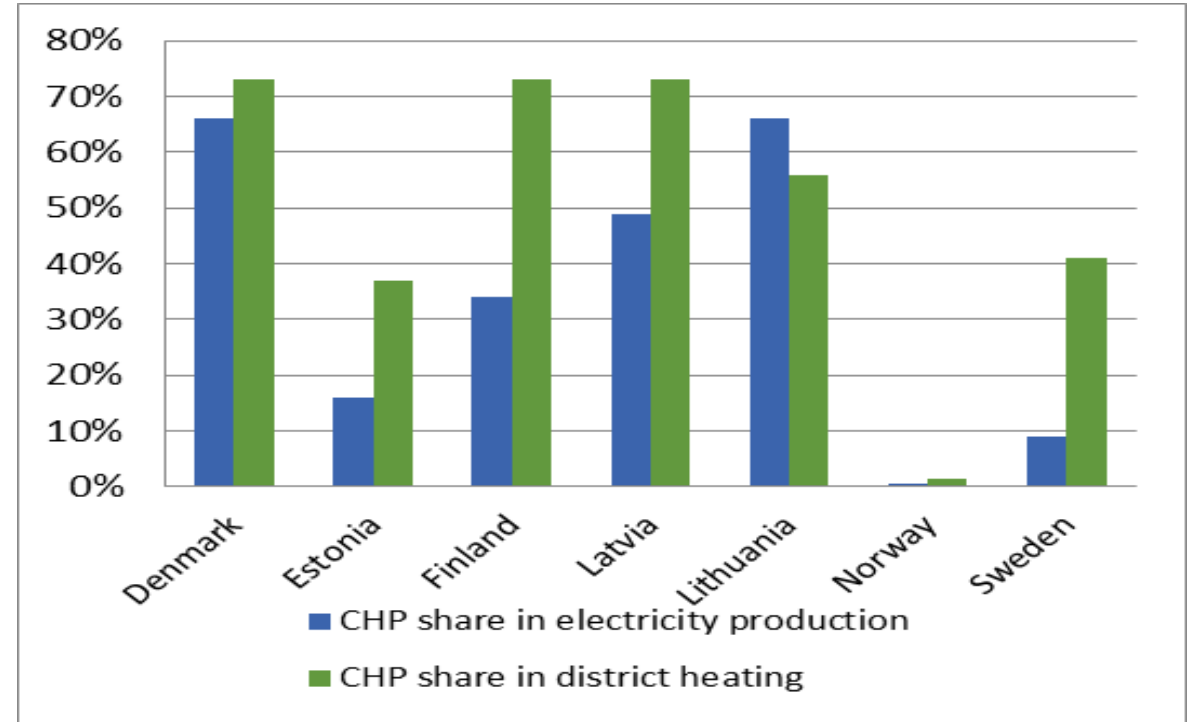
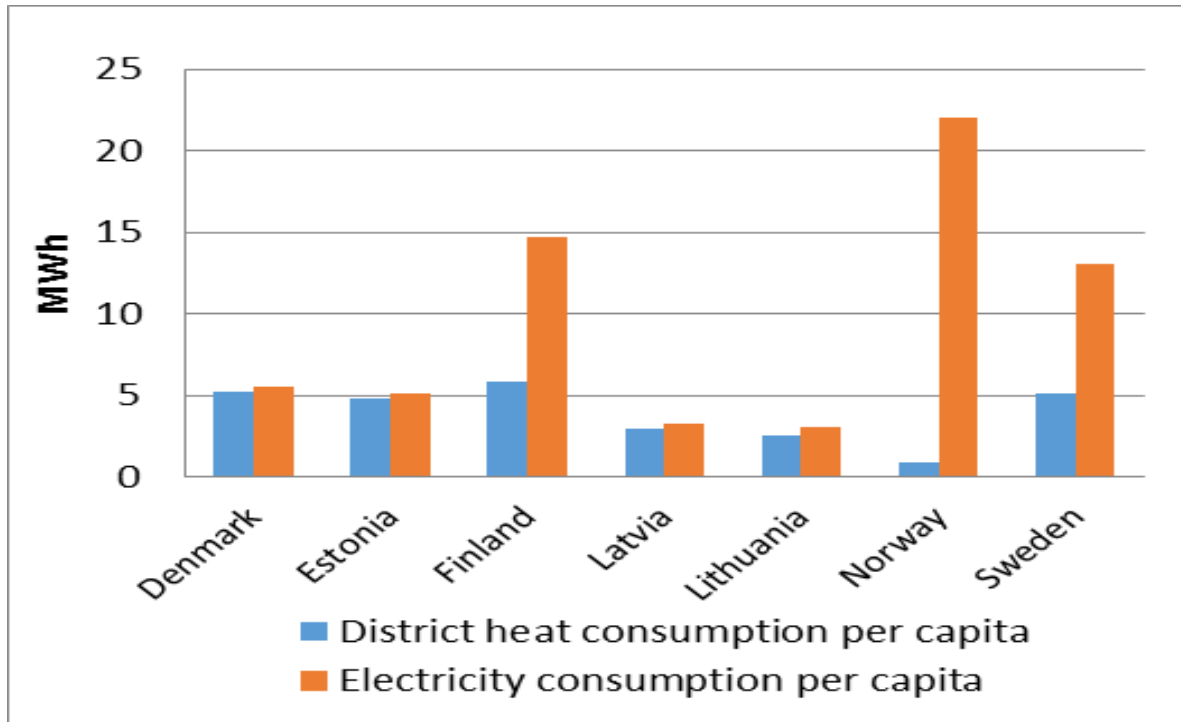


Outline of the talk today

- District heating-electricity interface
- Barriers for flexibility
- Discussion



District Heating in the Baltics/Nordics



Source: Euroheat, 2015

District heating is widely used in most Baltic/Nordic countries and thus represents a flexibility source of considerable magnitude which is only partly exploited today by the power market

Which technologies can provide flexibility?



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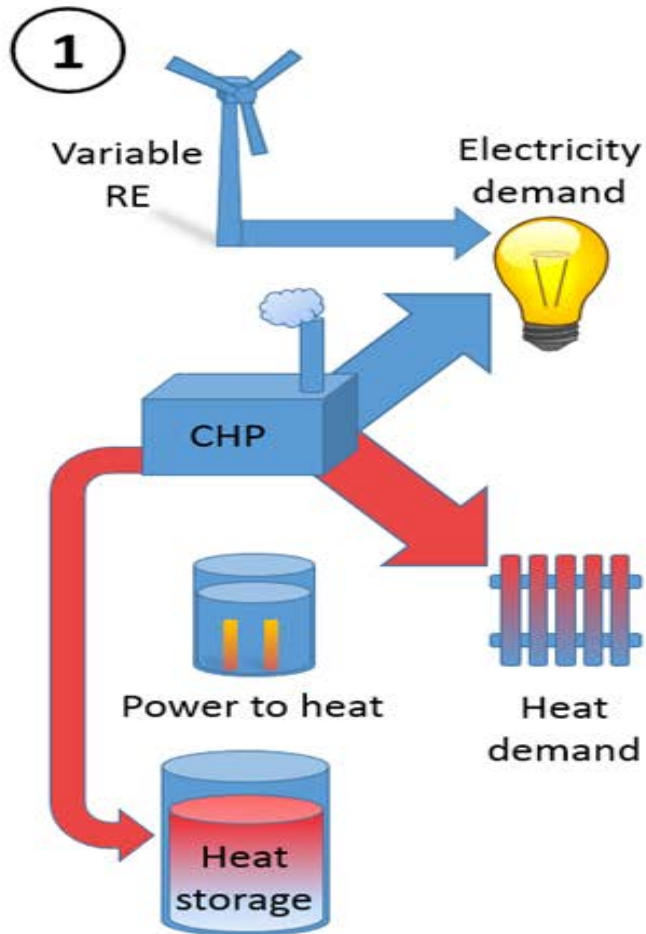
Today flexibility is mainly provided by CHP combined with heat storages (water tanks)

- Water tanks are widely installed and used in Denmark, Finland and Sweden

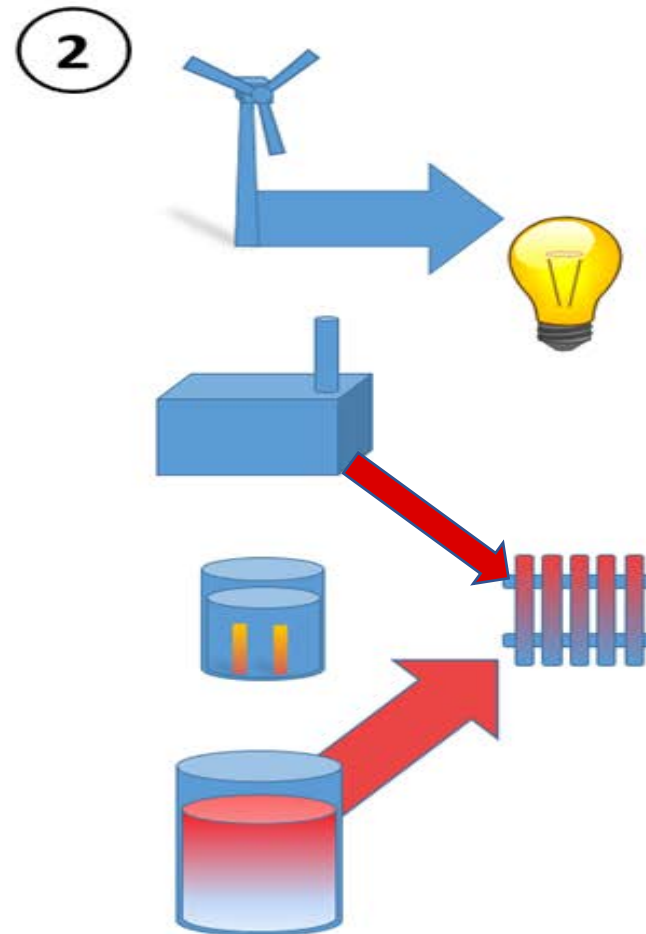
Electric boilers and large heat pumps

- Several barriers, e.g. existing taxation
- Consequently: very limited use in the Baltic/Nordic countries

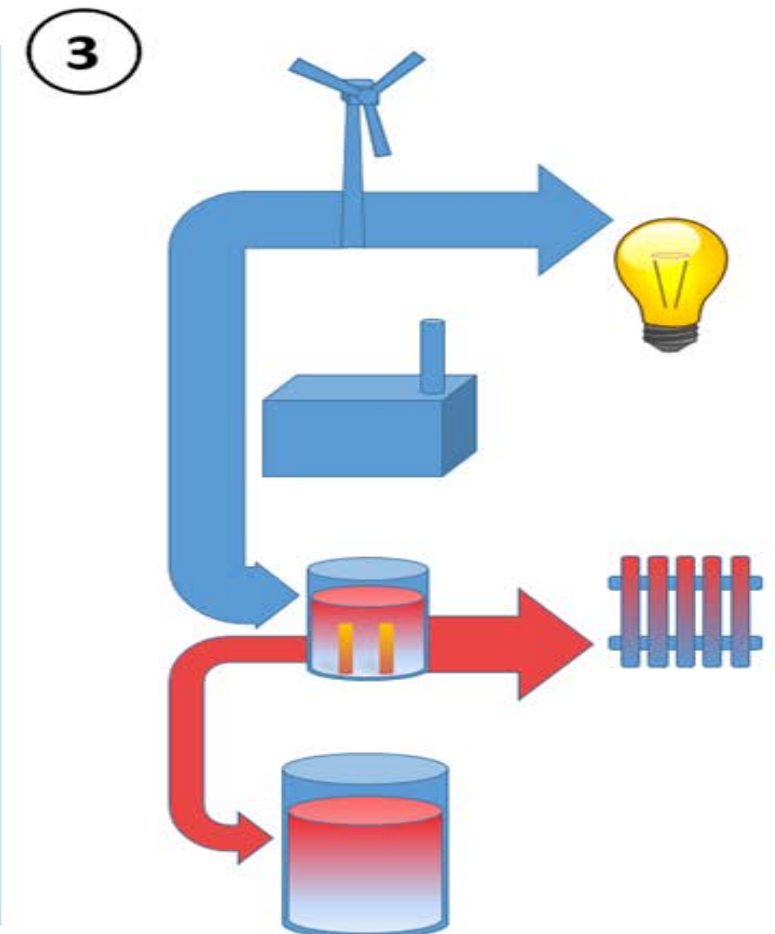
District heating-electricity interface



Power demand exceeds the VRE supply



VRE supply sufficient for demand
No need for additional flexibility



VRE power supply exceeds the demand



Different market frameworks

The Baltic/Nordic power market is an integrated competitive market

DH is supplied by local monopolies regulated by national rules and authorities

- Not originally designed to provide integration with the power market
- National rules sometimes work against DH providing flexibility services to the power market
- Local security-of-supply objectives may be preferred e.g. going from foreign natural gas to national biomass



Barriers to flexibility

Market development, e.g.

- Large central power plants run fewer and fewer hours due to low electricity prices
- No incentives to investment in flexible capacity

Regulatory set up, e.g.

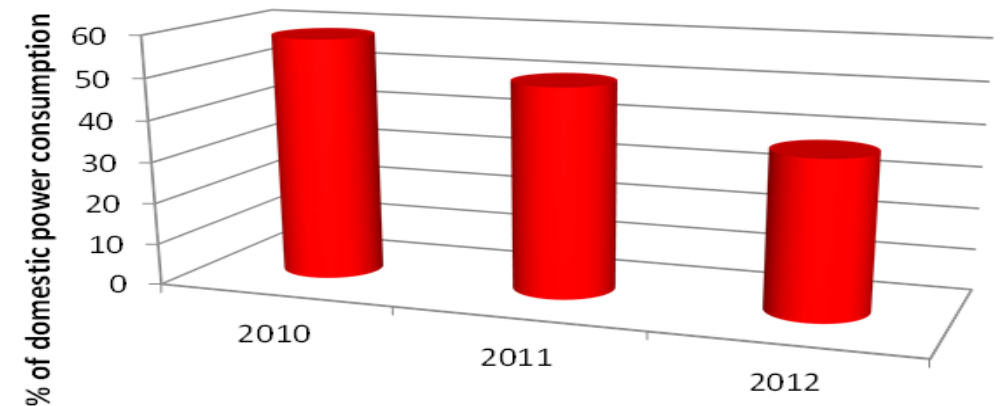
- grid tariffs and taxes on electricity use
- local DH utilities prefer to substitute gas-fired CHP by biomass heat-only boilers due to tax exemptions for biomass

Baltics:

Limited use of

- market prices for CHP
- thermal storages/water tanks

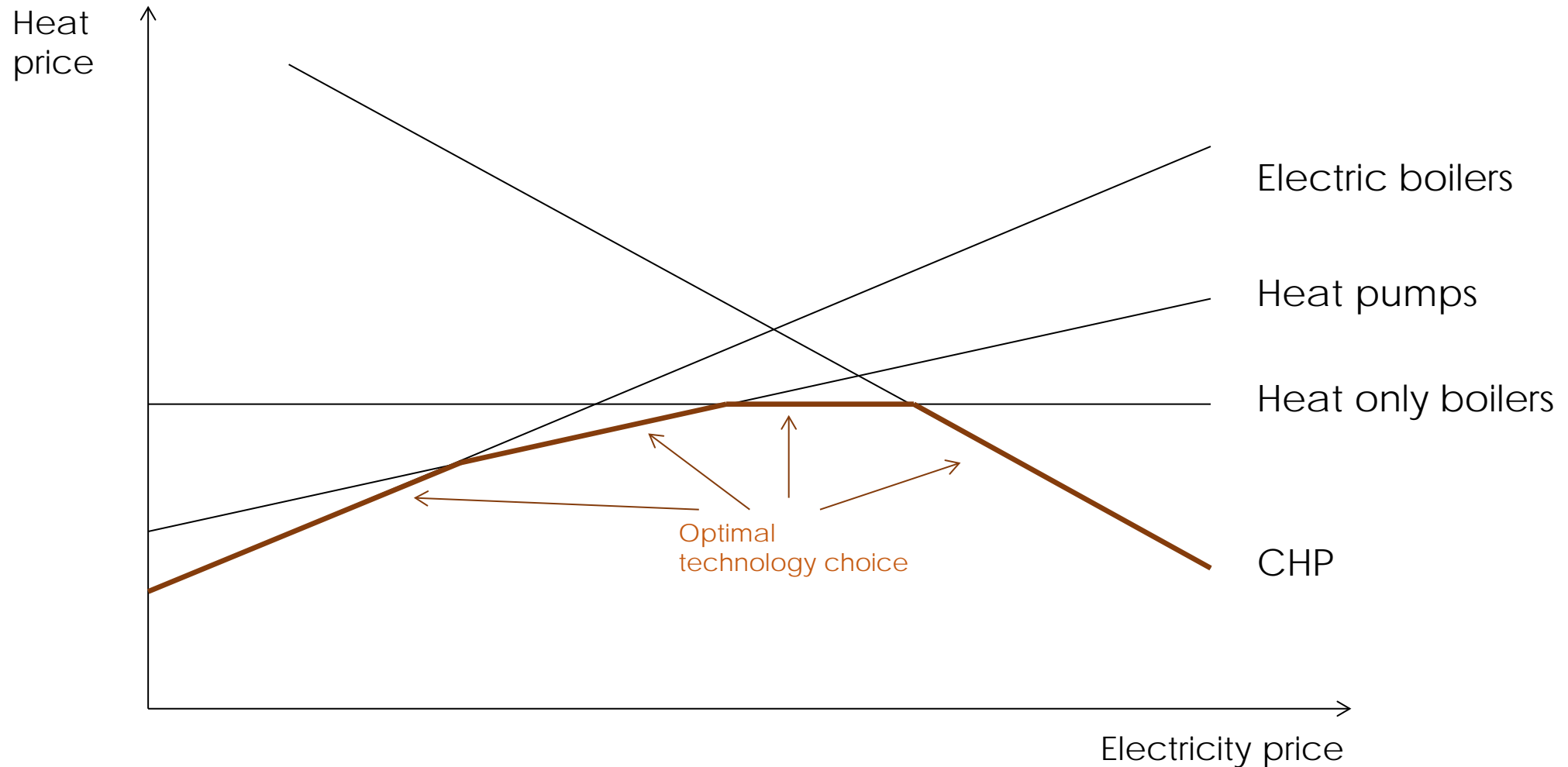
Central power plants' share of domestic power consumption



Choice of heat supply at different electricity prices net costs



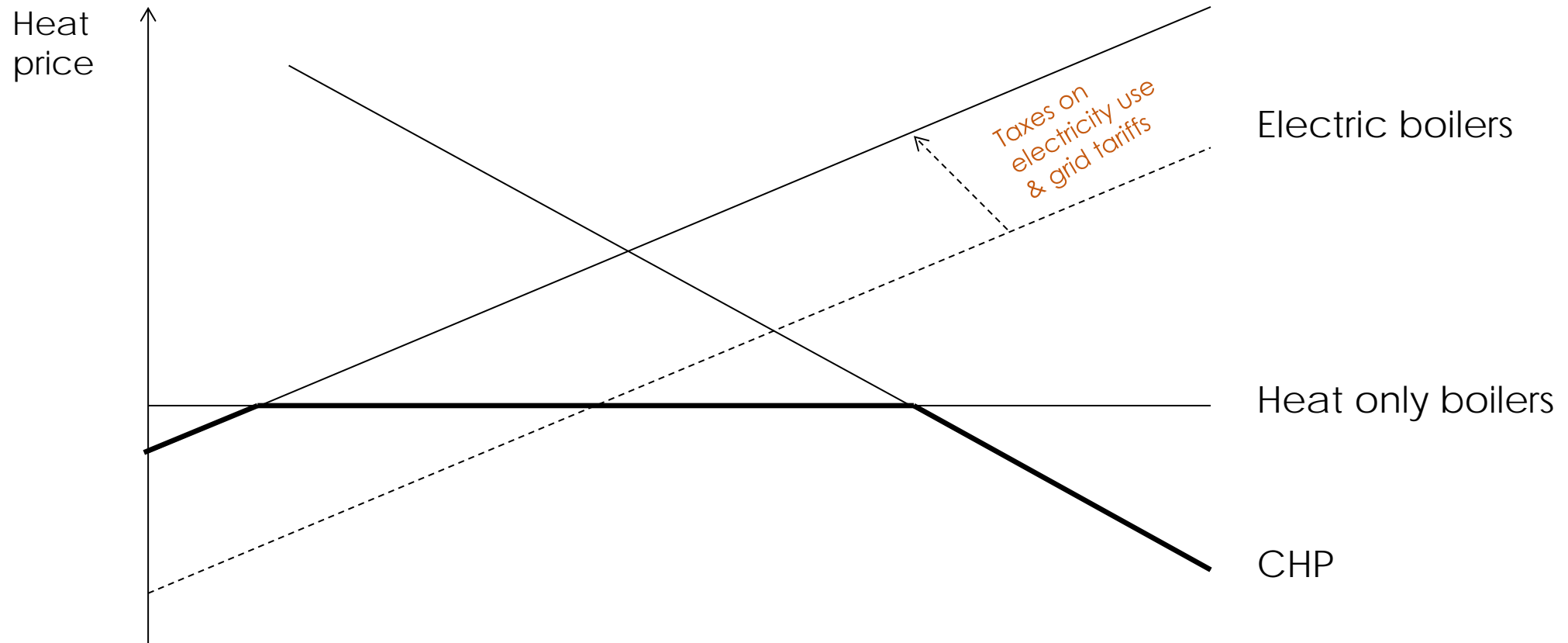
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Choice of heat supply - at different electricity prices



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Patchwork regulation between electricity and heat

- Taxes on electricity consumption
- Heat is taxed at the fuel input
- Biomass exempted for taxes



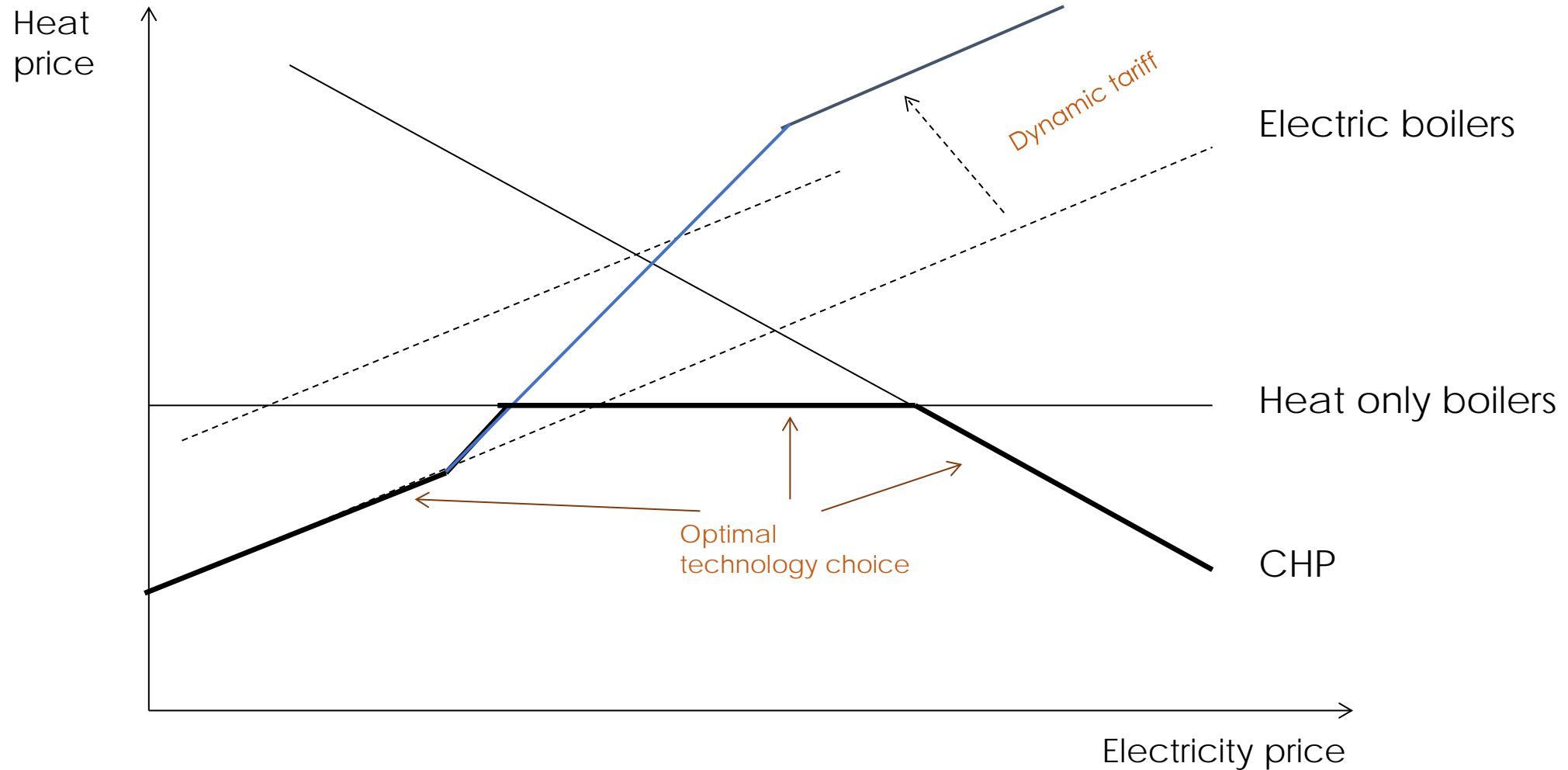
More heat only boilers.
Decoupling of electricity and heat
markets

Choice of heat supply

With dynamic tariffs



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Summing up

- Trend towards more *market integration* and need for more *flexibility*
- Large potentials in district heating
- Need for a holistic system approach in order to identify and assess *regulatory and technical pathways* towards coherent energy systems

REthink market designs and regulation

- Make RE market ready & Markets RE ready
- Coherent changes in market designs, regulatory framework condition, and coupling of markets
- Dynamic tariffs and taxes?

Thank you for your interest



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Questions?



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Share of energy consumption for heating in the Baltic countries



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