



The future flexible, decarbonised, and coherent energy markets

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Publication date:
2017

Document Version
Publisher's PDF, also known as Version of record

[Link back to DTU Orbit](#)

Citation (APA):
Skytte, K. (Author). (2017). The future flexible, decarbonised, and coherent energy markets. Sound/Visual production (digital)

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Flex4RES
Flexible Nordic Energy Systems



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The future flexible, decarbonised, and coherent energy markets

Workshop
KTH, Stockholm 28 November 2017

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Nordic Energy Research
Nordic Council of Ministers

The Future Energy System

Goals and RE-thinking of the Nordic Energy Co-Operation

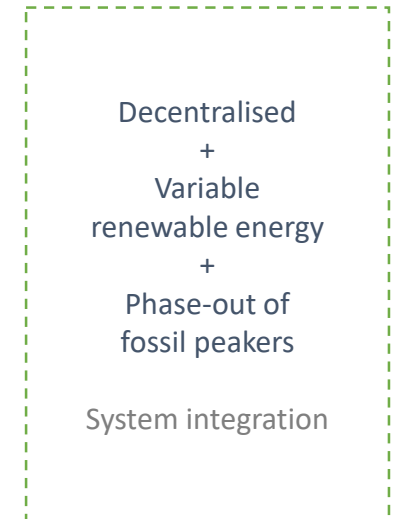
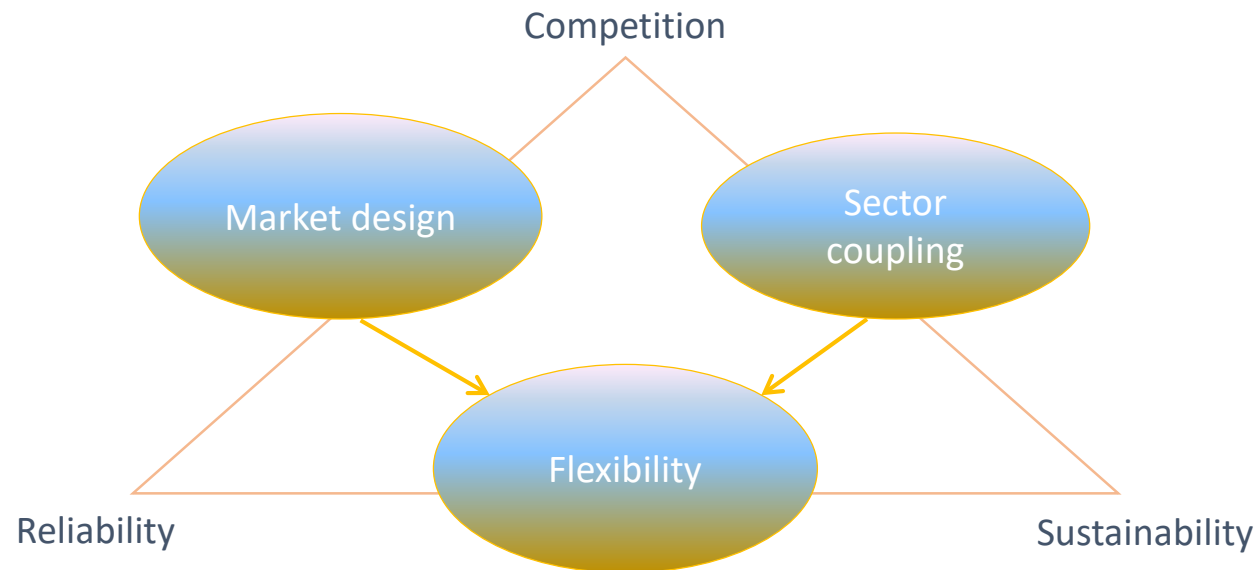


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Current
electricity system

The trichotomy
of energy policy

Decarbonised
energy systems

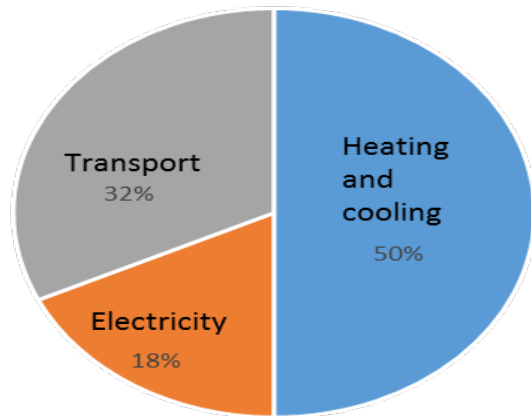


Sector coupling

Electrification as source of flexibility

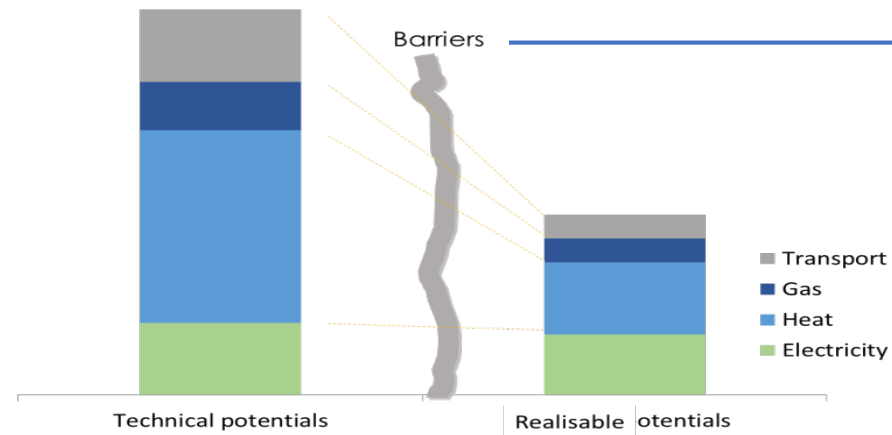


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Distribution of EU energy consumption
(Source: EU Heating and Cooling strategy)

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

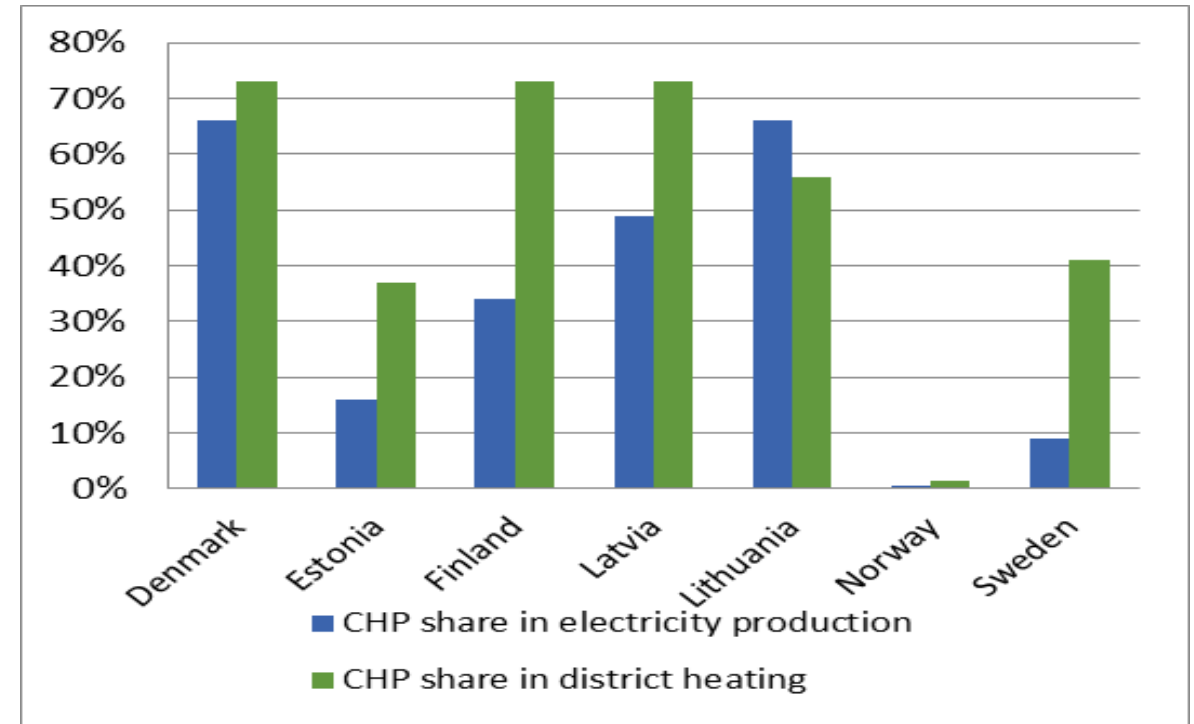
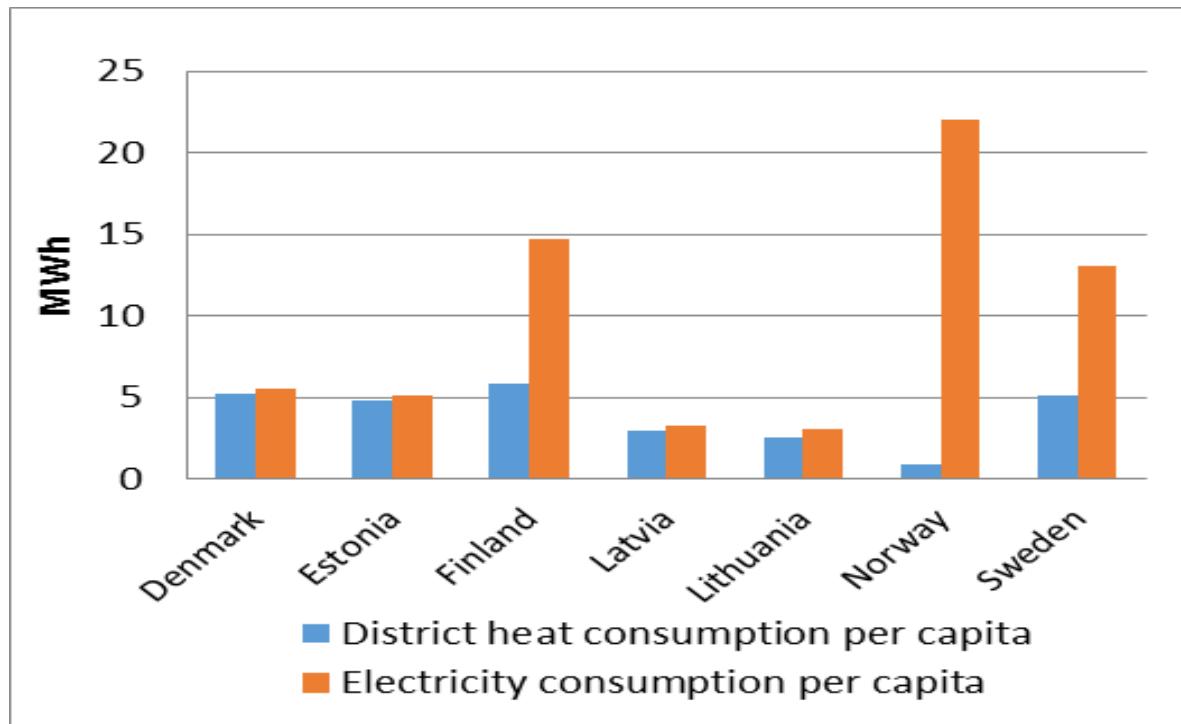


Remove barriers

District Heating in the Baltics/Nordics



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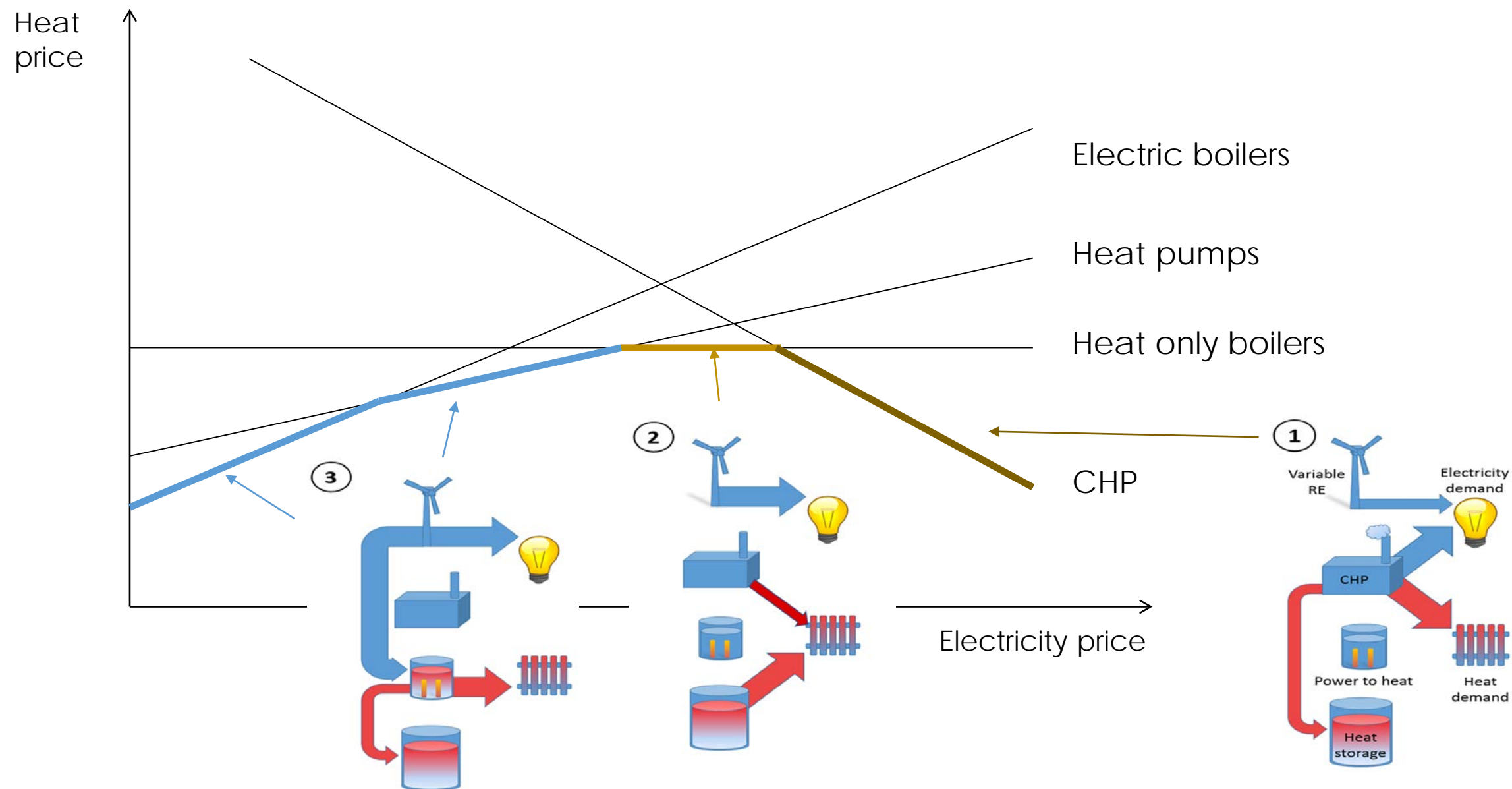
Source: Euroheat, 2015

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

District heating-electricity interface



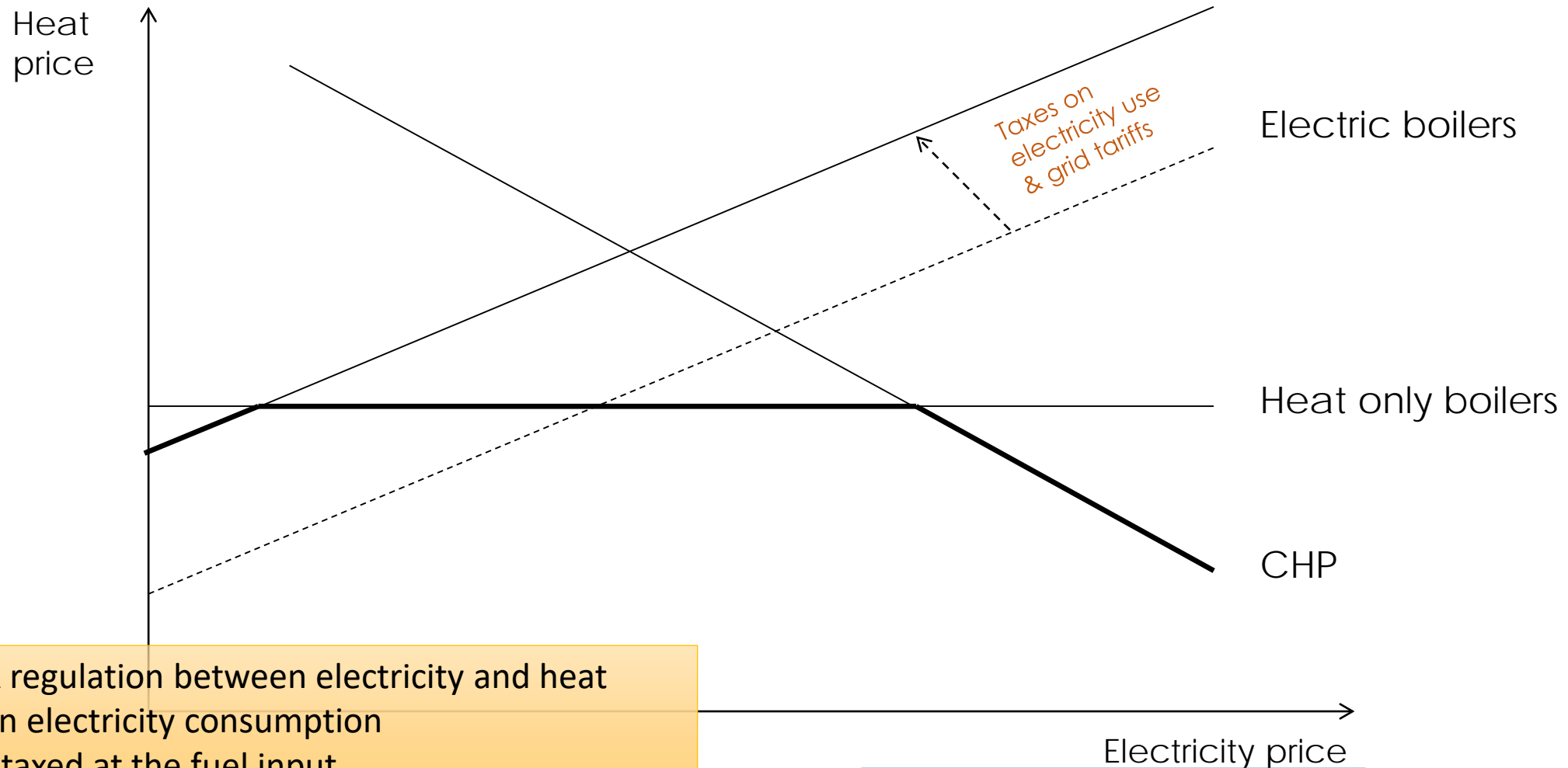
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Choice of heat supply - at different electricity prices



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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



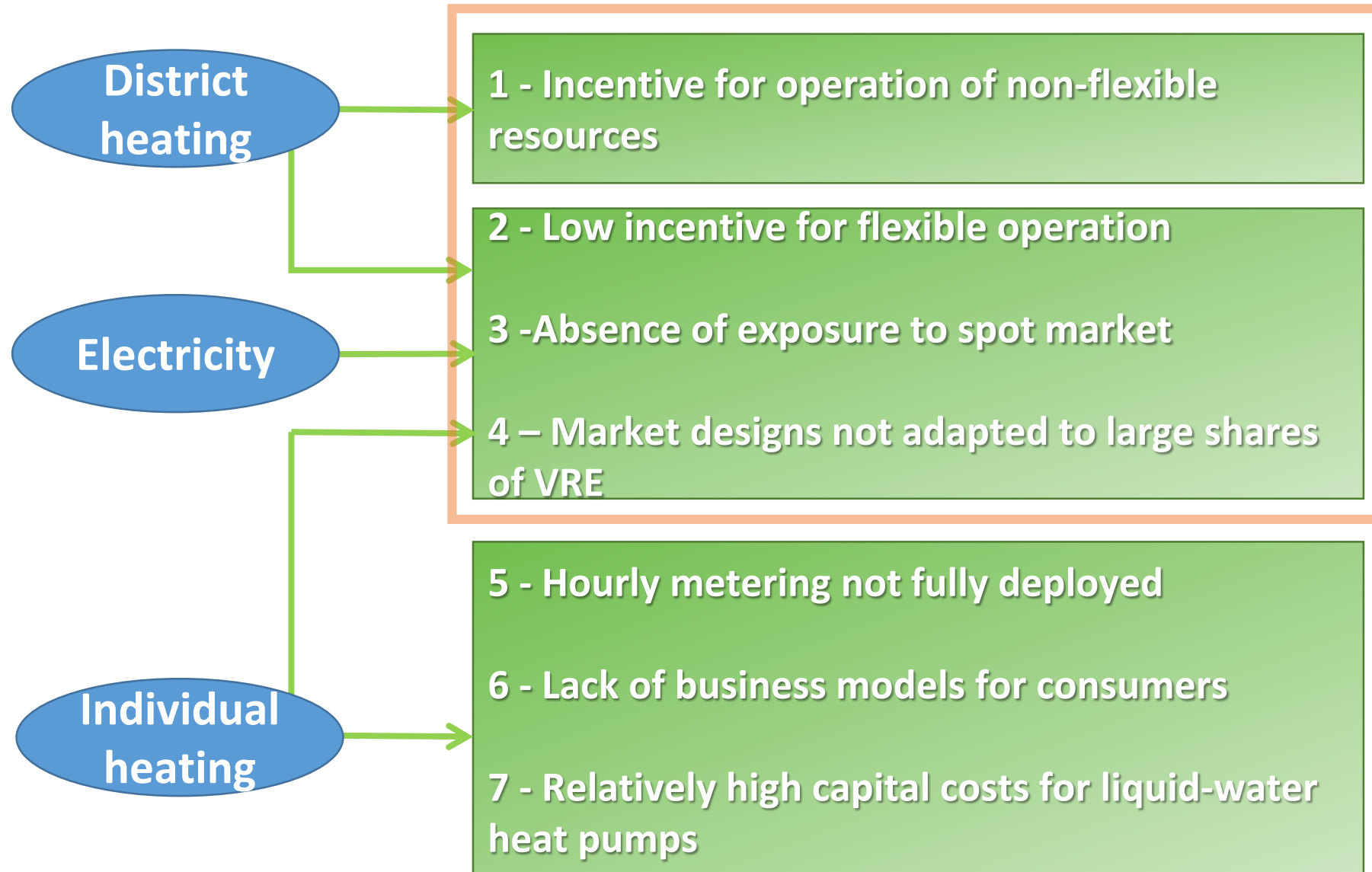
More heat only boilers.
Decoupling of electricity and heat
markets

Common and sector-specific barriers

- examples



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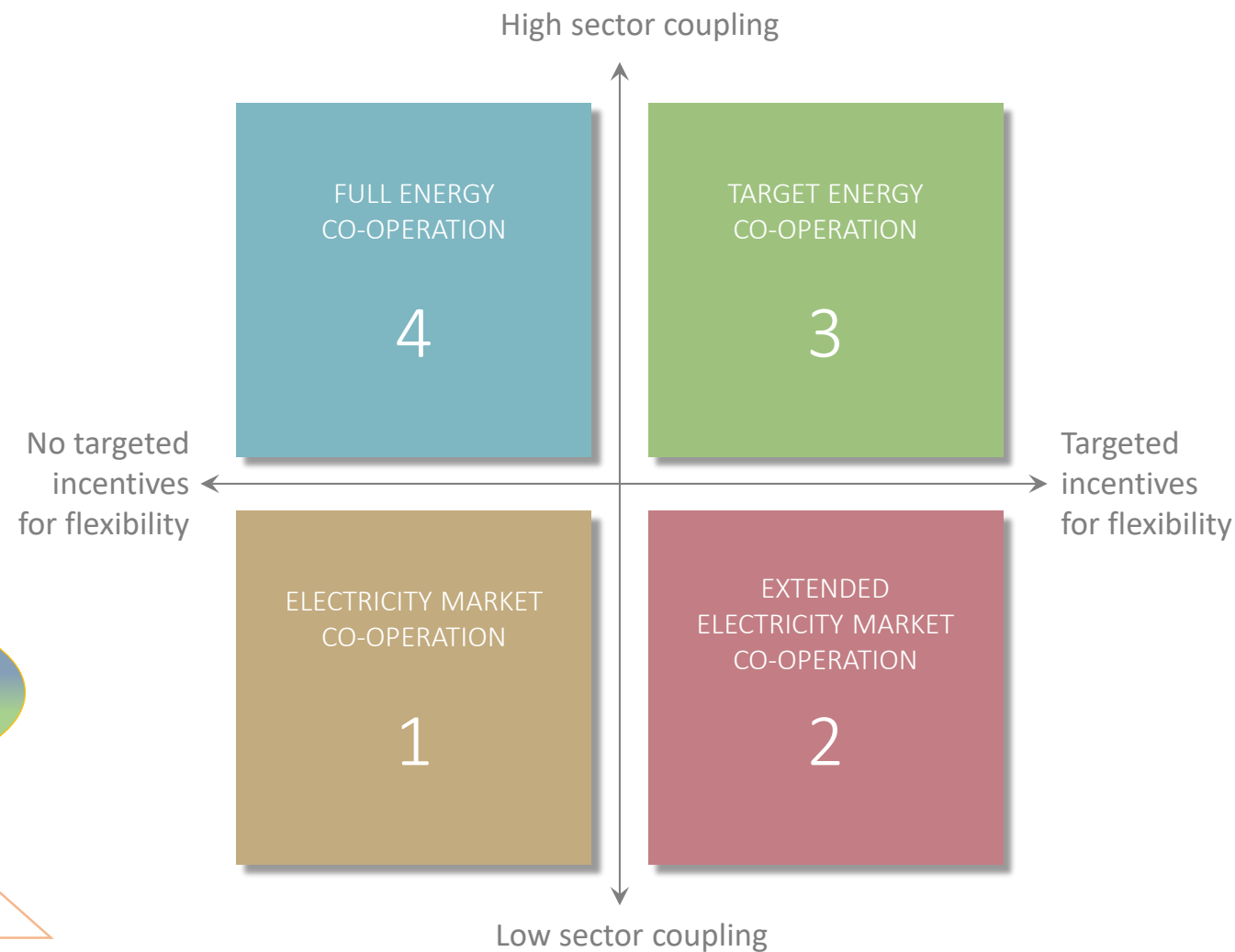
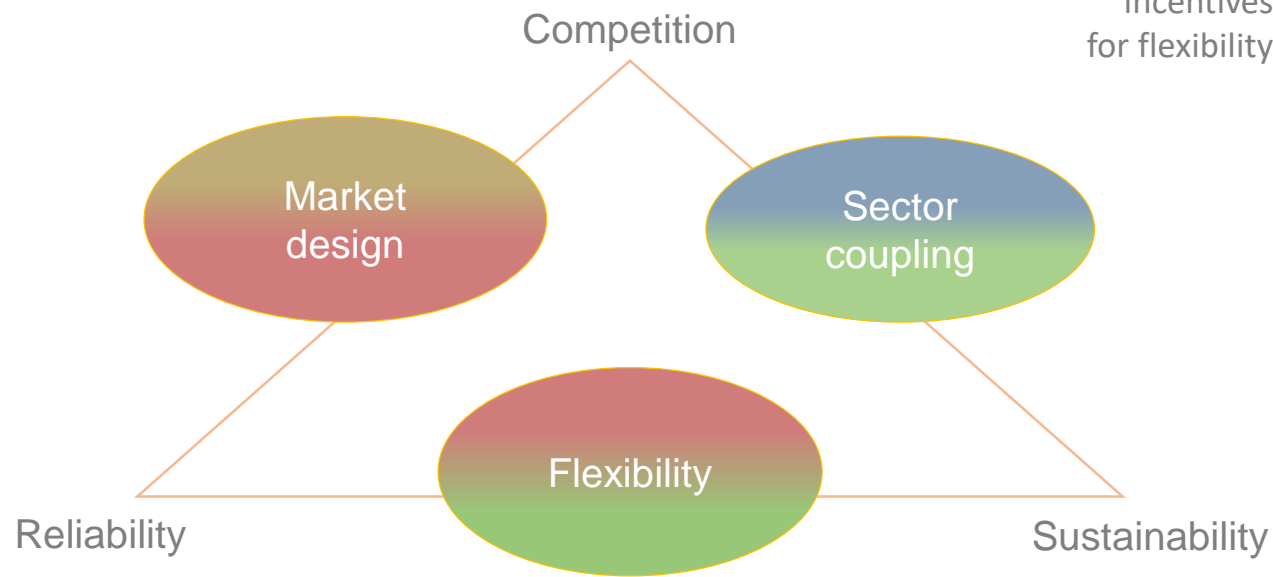
Nordic Energy Co-Operation

Policy Scenarios towards 2050



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Strong today - Stronger tomorrow
How?

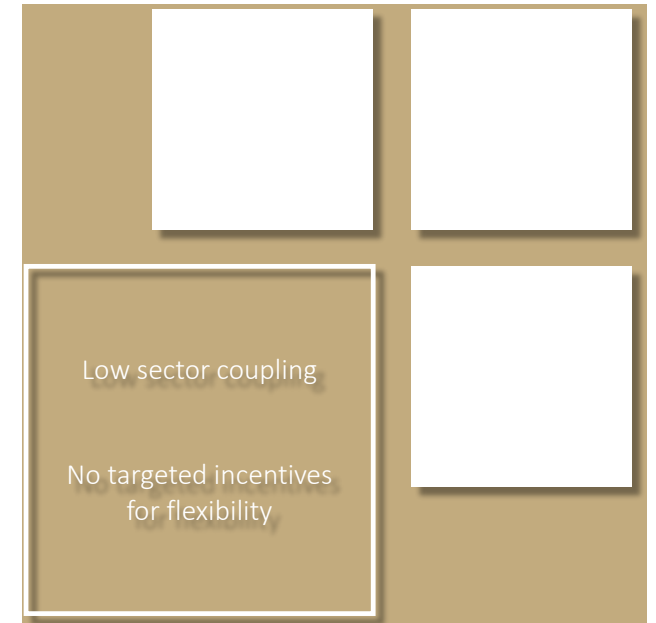
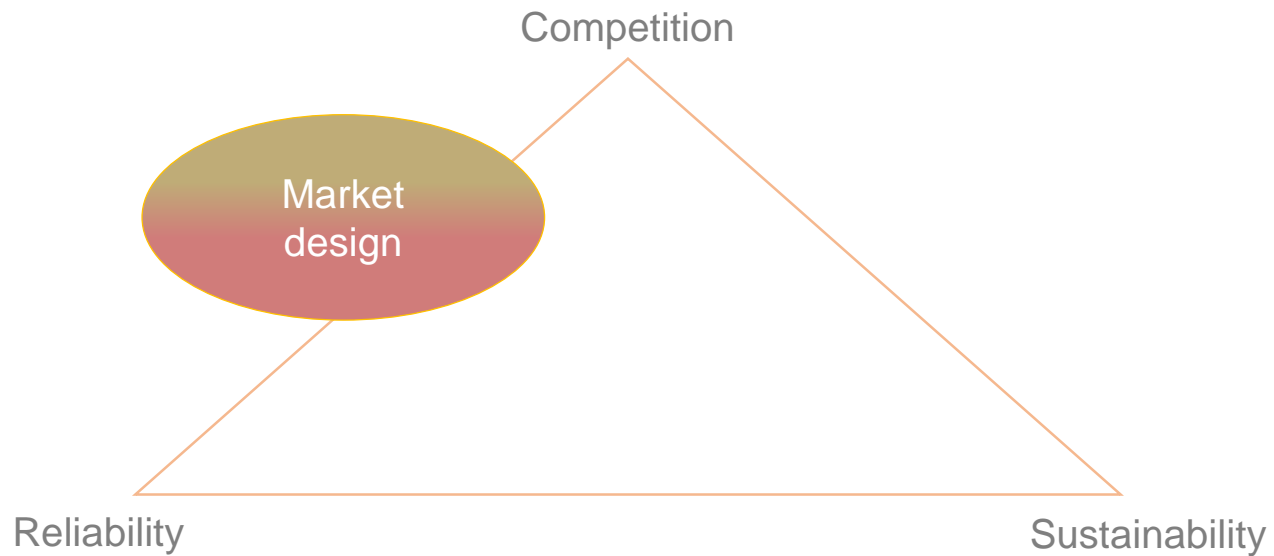


ELECTRICITY MARKET CO-OPERATION

Scenario 1



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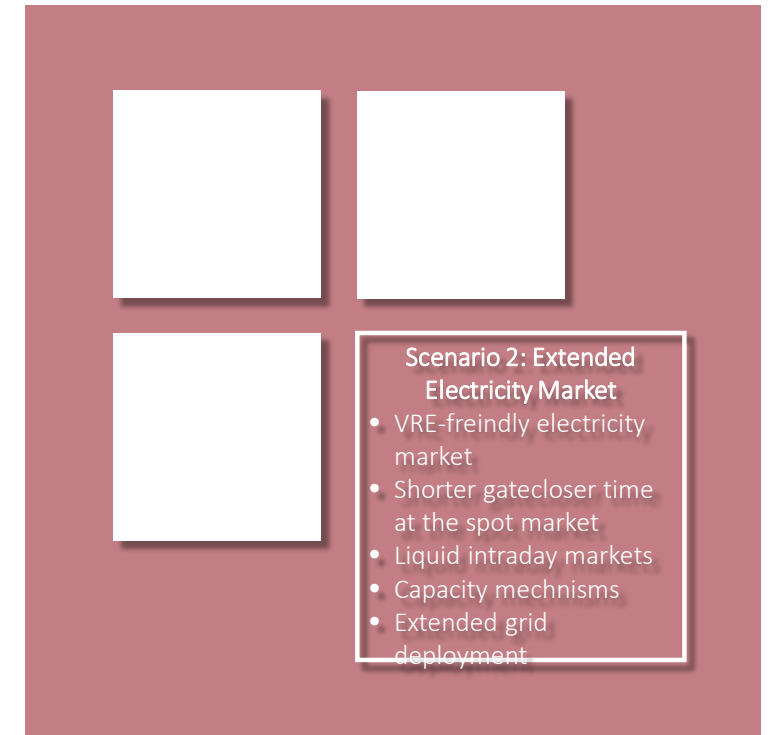
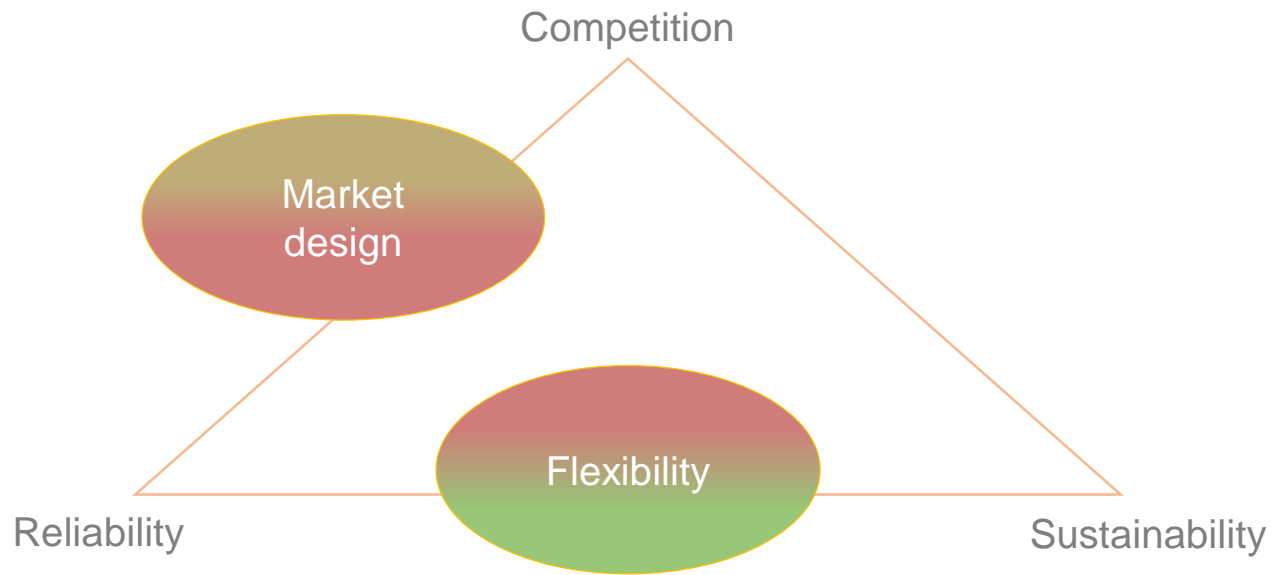


EXTENDED ELECTRICITY MARKET CO-OPERATION

Scenario 2



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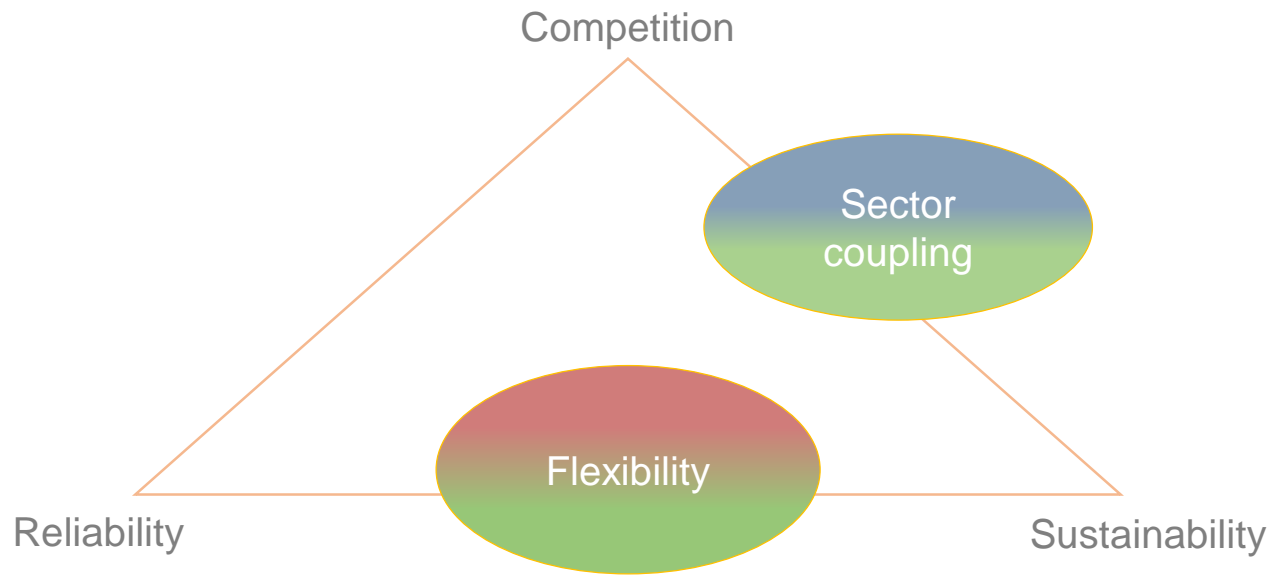


TARGETED ENERGY CO-OPERATION

Scenario 3



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Scenario 3: Targeted flexibility

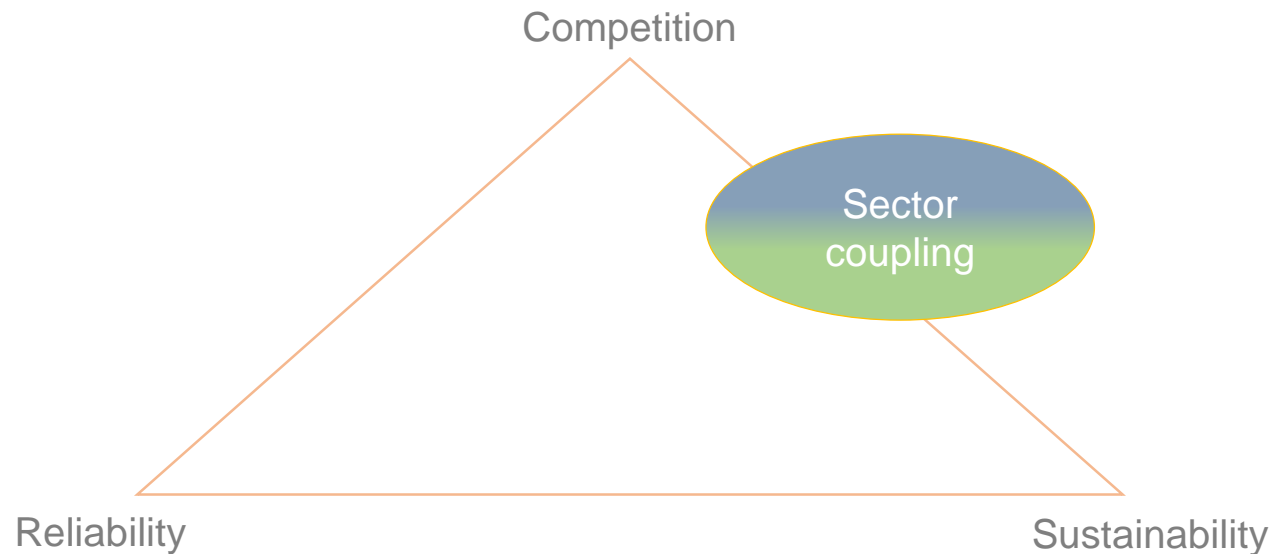
- Electrification of district heating
- Removal of regulatory barriers for flexible operation of P2H and for large consumers
- ??? EV?

FULL ENERGY CO-OPERATION

Scenario 4



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Scenario 4: Coherent policies

- High sector coupling
- Level playing fields for all fuels at the different energy markets and sectors
- No targeted incentives for flexibility

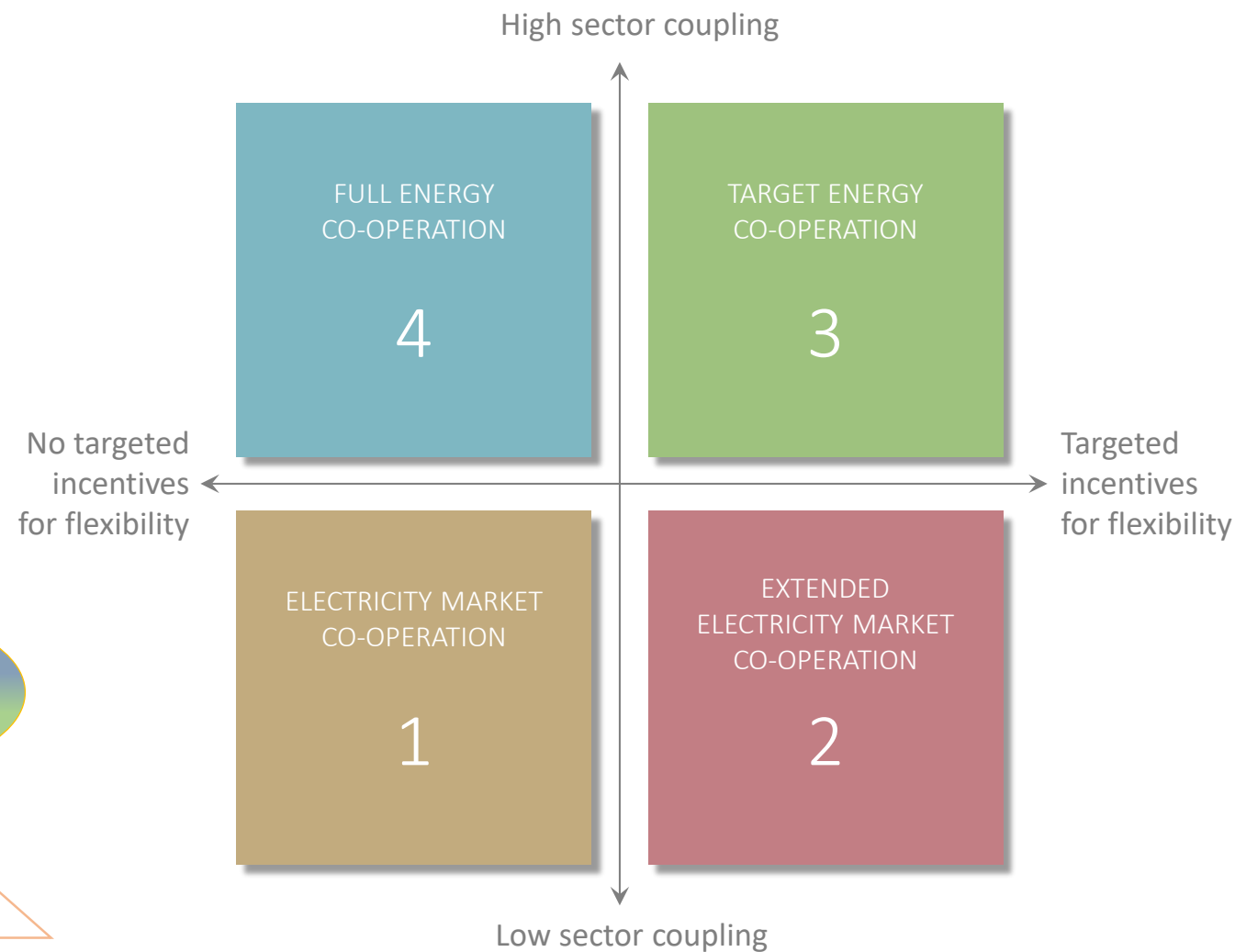
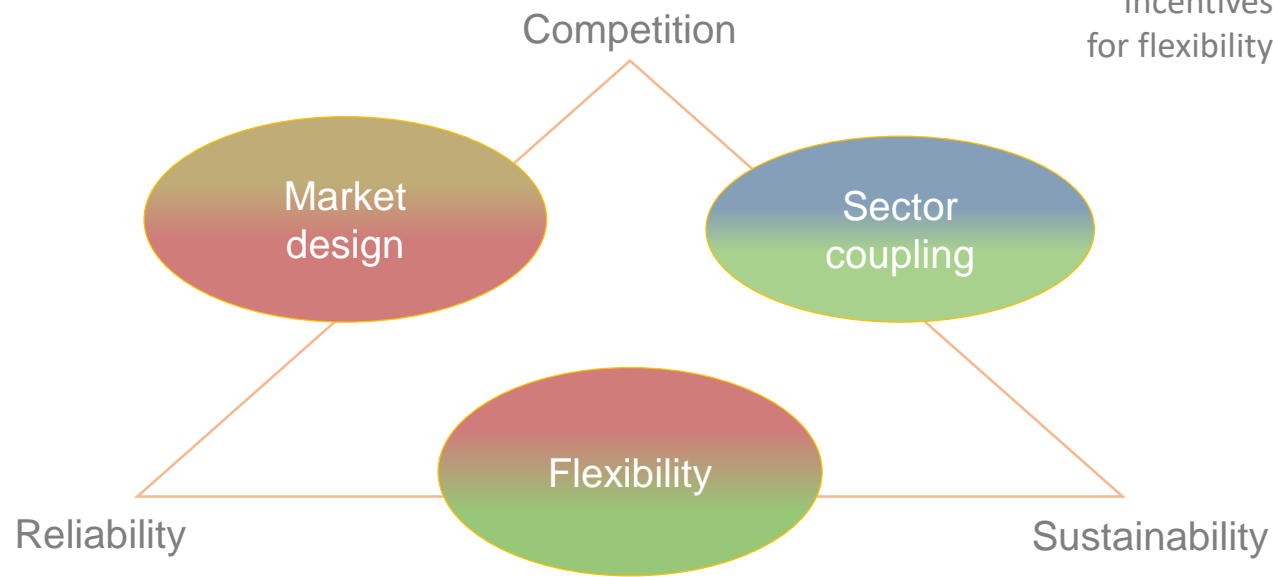
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Strong today - Stronger tomorrow
How?





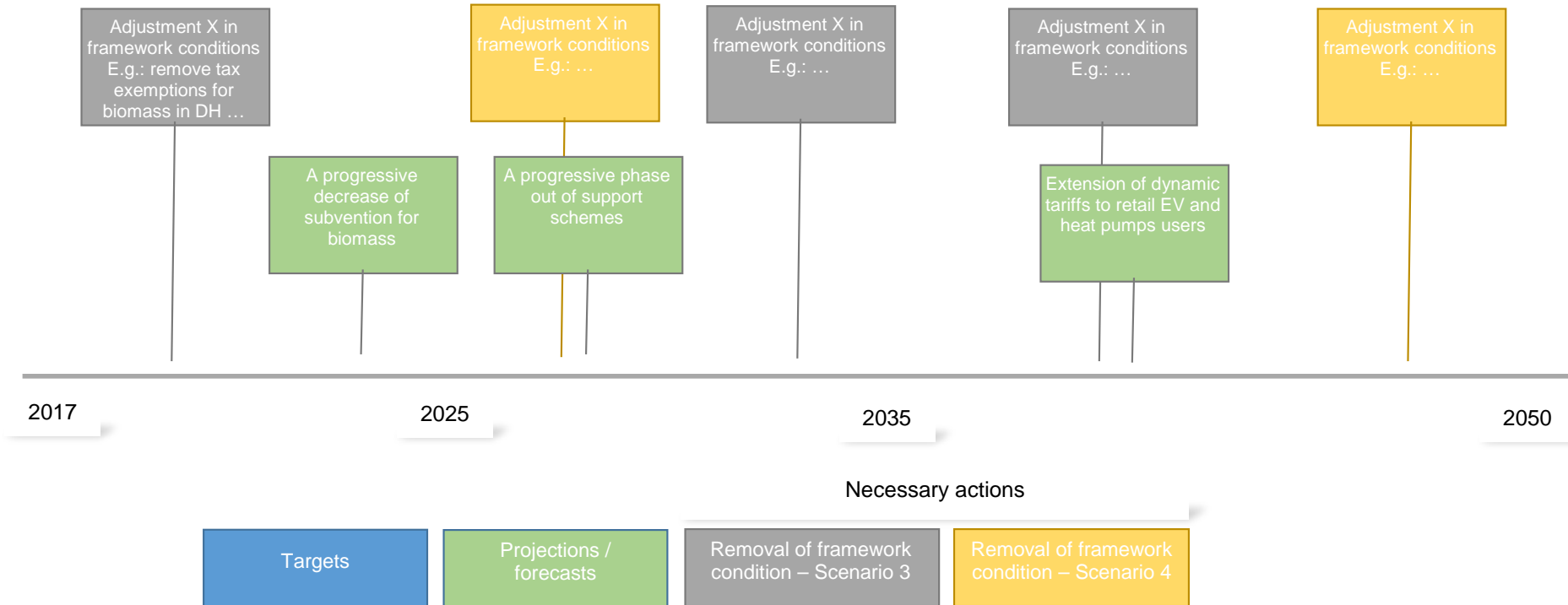
www.Flex4RES.org

Pathways

towards Nordic Energy Co-Operation



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Potential Game Changers

Coherent pathway, model and market analyses,
as well as policy recommendations.
How do we ensure consistent analyses
and recommendations