Heat contracts: selling and buying heat – a market perspective

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Fortum

Fortum – Forerunner in clean energy

MEGATRENDS

Climate change
Urbanisation
Active customers
Digitalisation, new technologies

MISSION

We provide customers with energy solutions that improve present and future life, and we deliver excellent shareholder value.

STRATEGY

- Drive productivity and industry transformation
- Create solutions for sustainable cities
- Grow in solar and wind
- Build new energy ventures

MUST-WIN-BATTLES

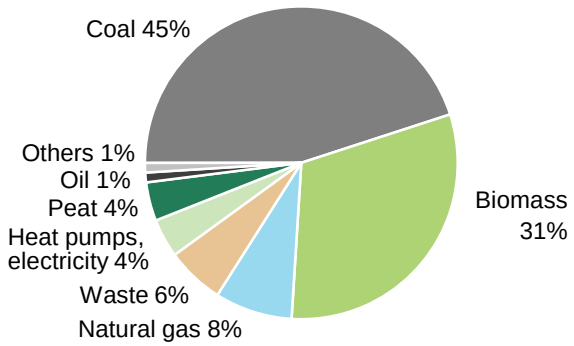
Put the customer in the centre | Establish a culture of speed and agility | Digitalise our business for maximum scalability | Create value from market volatility | Drive competitive markets and fair regulation

Experience of operating District Heating and CHP Assets

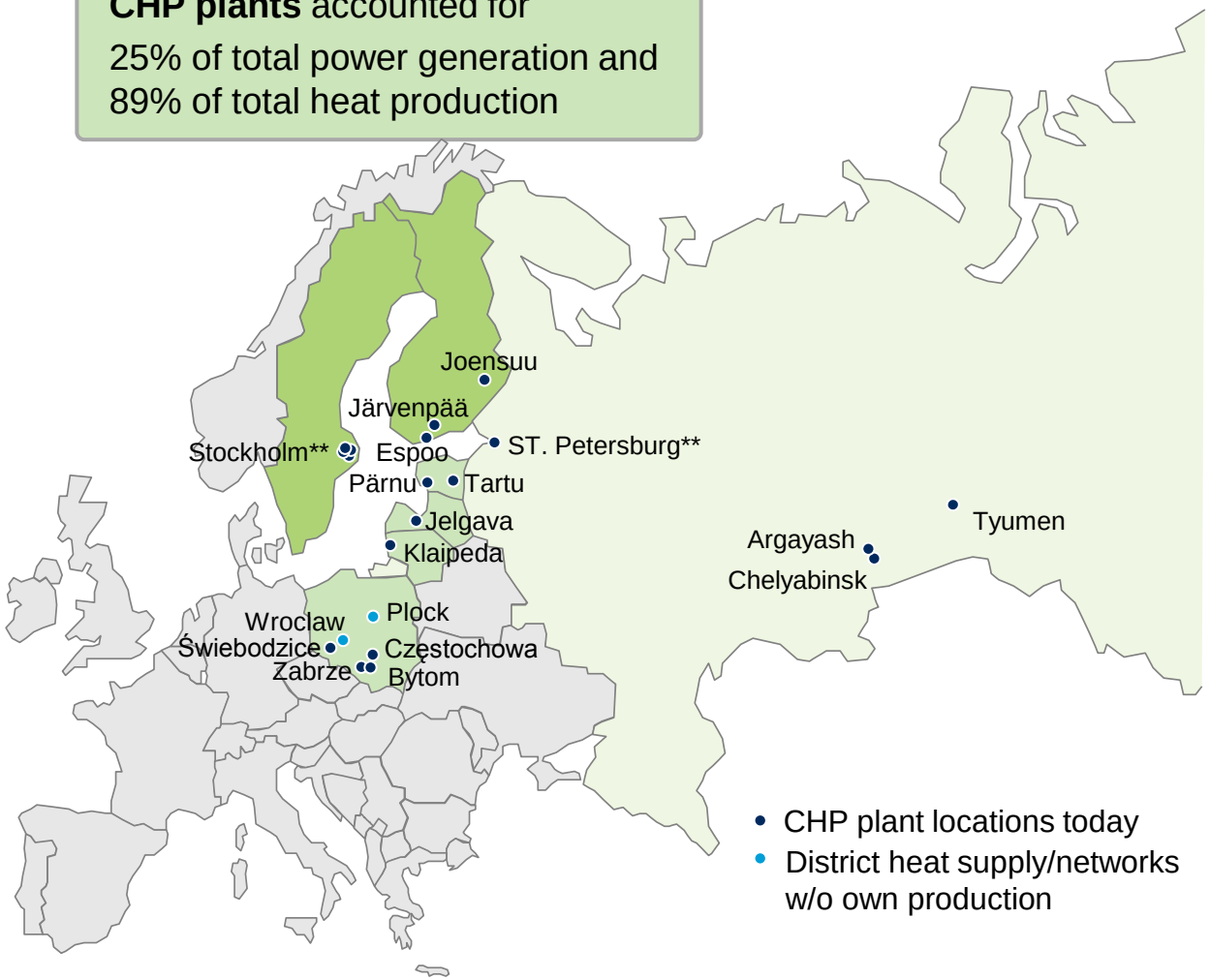
Total heat sales, TWh	33
Finland	3.1
Baltic countries	1.2
Poland	3.4
Russia	25.4

In jointly owned companies, heat sales, TWh**	
Fortum Värme in Sweden	7
TGC-1 in Russia	27

CHP plants accounted for
25% of total power generation and
89% of total heat production



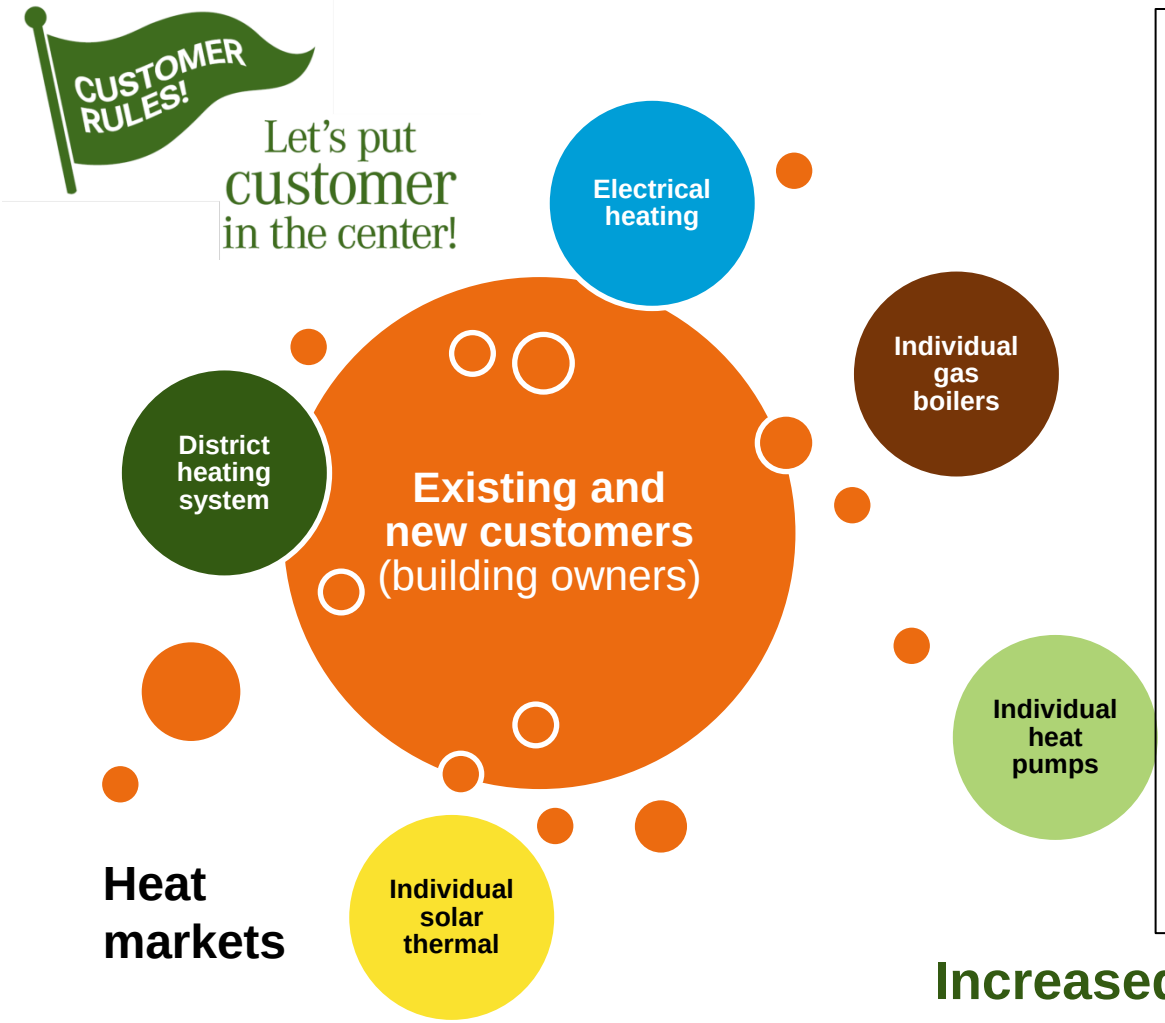
European heat production 6.4 TWh
(Heat production capacity 3,915 MW)



Note: Fortum's total power generation 76 TWh and total heat production 32 TWh in 2015

What is heat market?

Heat markets should be driven by customers and competition



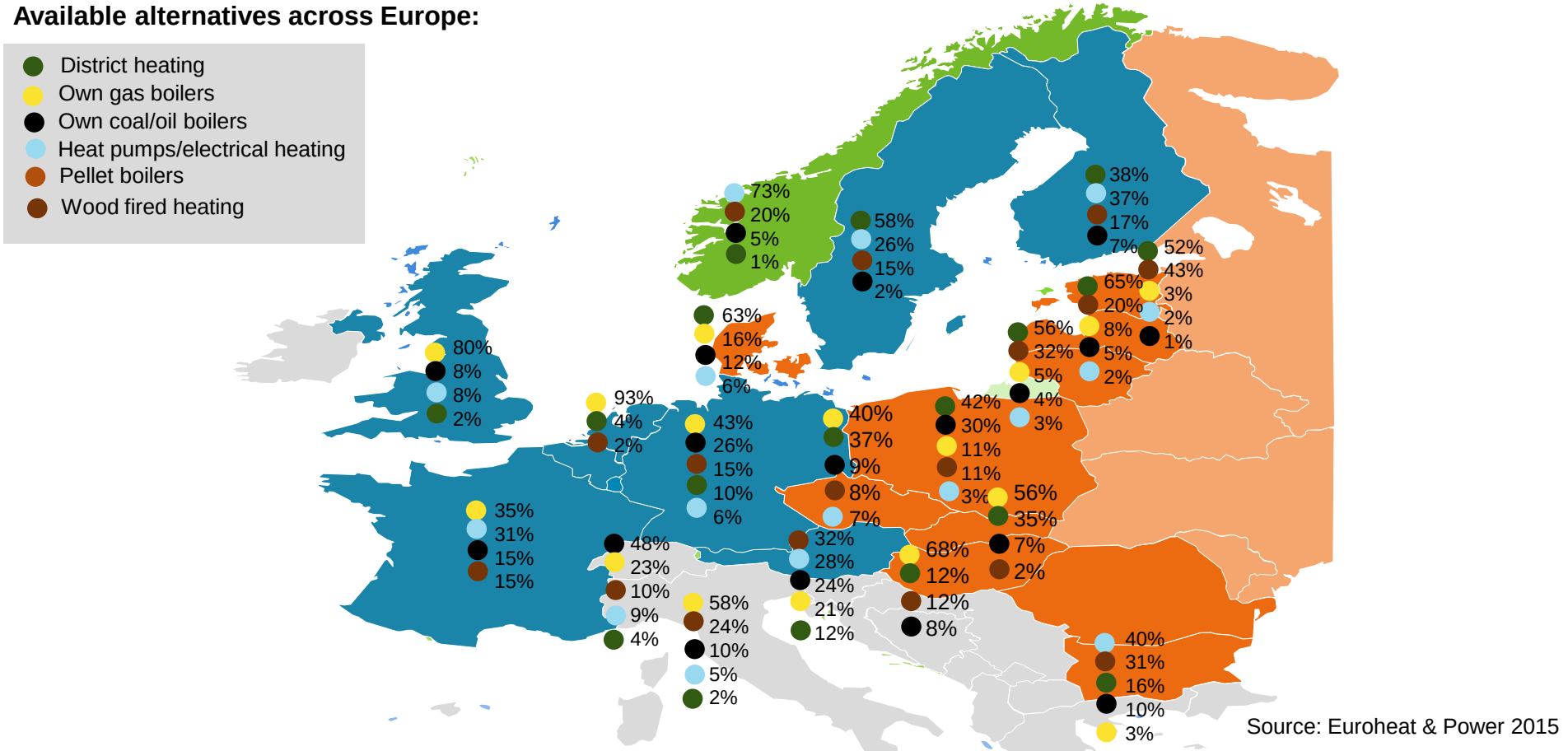
- Free choice by end-customers enhances engagement and trust on heat providers
- Fair competition between alter-natives calls for affordability
- Equal competition rules should replace unequal regulatory treatment of alternatives
- New technologies more likely to emerge and to be utilized
- Drives for best resource and system efficiency and for cost-optimality

Increased DH system flexibility required

What alternatives are in competition?

Main heating alternatives for residential customers

Available alternatives across Europe:



Source: Euroheat & Power 2015

NOTE! The market shares of heating solutions for new buildings may differ substantially compared to existing buildings. Data only available for few countries.

Regulatory oversight on DH pricing in some EU countries

Regulatory focus

DH competitiveness and long-run price levels (*DH promotion against alternatives*)

Cost recovery, return allowance and annual cost scrutiny (*customer protection against inflation and fundaments*; *separate regulation of heat distribution and production tariffs*)

Alternative-based heat pricing as main pricing principle to promote DH against other heating solutions

- Stipulated by Norwegian Energy Act

DH company sets competitive/cost-reflective prices while authorities monitor price changes and levels based on competition law

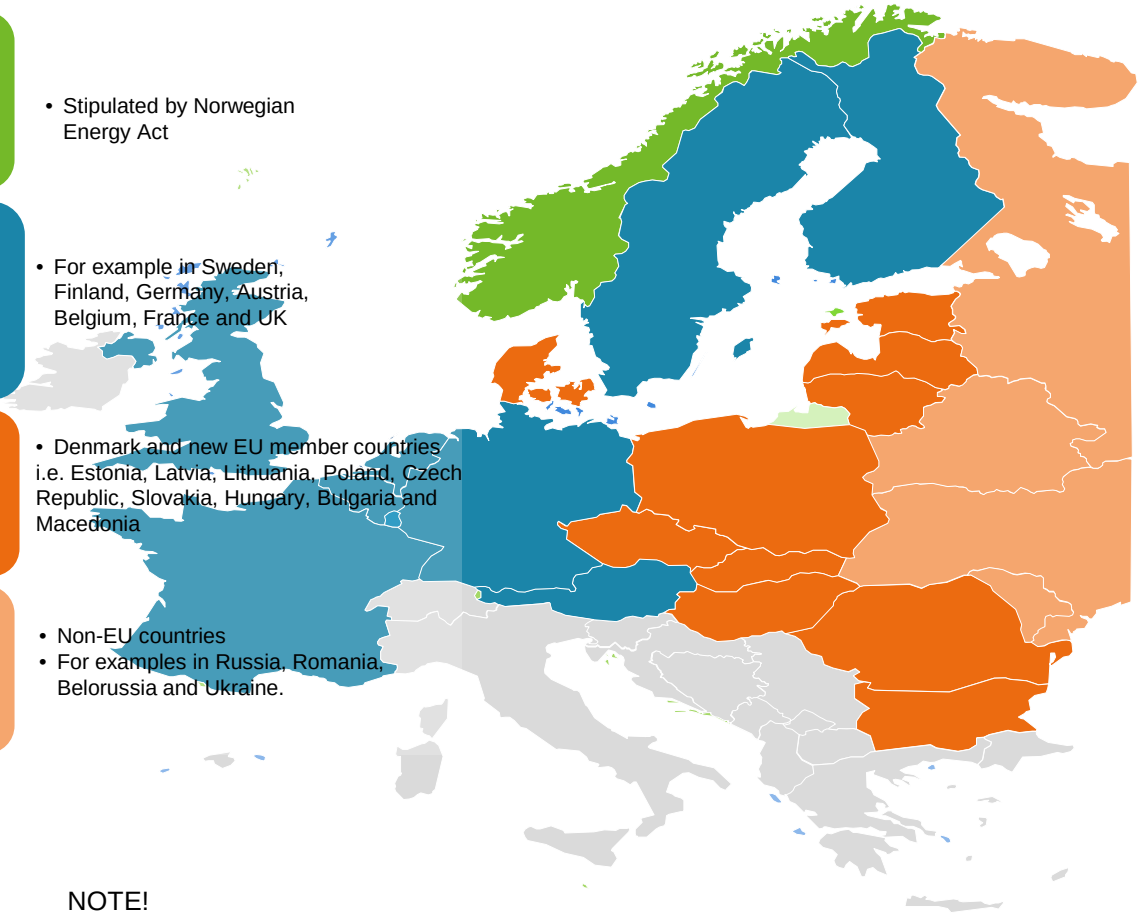
- For example in Sweden, Finland, Germany, Austria, Belgium, France and UK

Ex-ante price control based on established methodologies and/or regulator's heavy discretion

- Denmark and new EU member countries i.e. Estonia, Latvia, Lithuania, Poland, Czech Republic, Slovakia, Hungary, Bulgaria and Macedonia

Heavy-touch ex-ante price control based on multi-level approval from state, regional and local authorities

- Non-EU countries
- For examples in Russia, Romania, Belorussia and Ukraine.



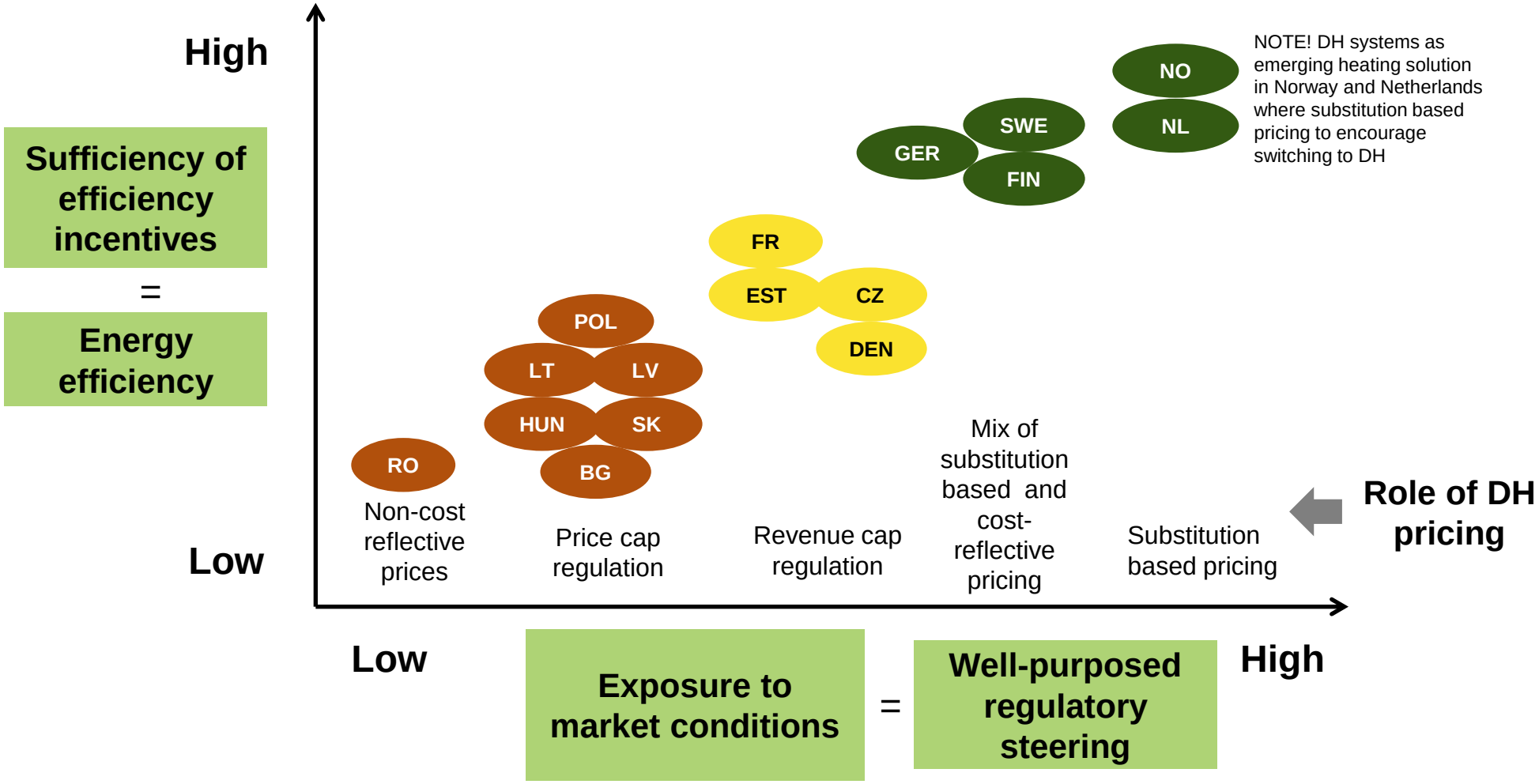
Sources: KPMG country-by-country DHC/CHP benchmark surveys, Euroheat & Power Year Book and Fortum analysis

NOTE!

- Alternative-based heat production price caps for CHP plants are used in several countries
- Heat market reform in Russia is considering alternative-based, end-customer DH price caps which would transform Russia to belong to blue/green categories

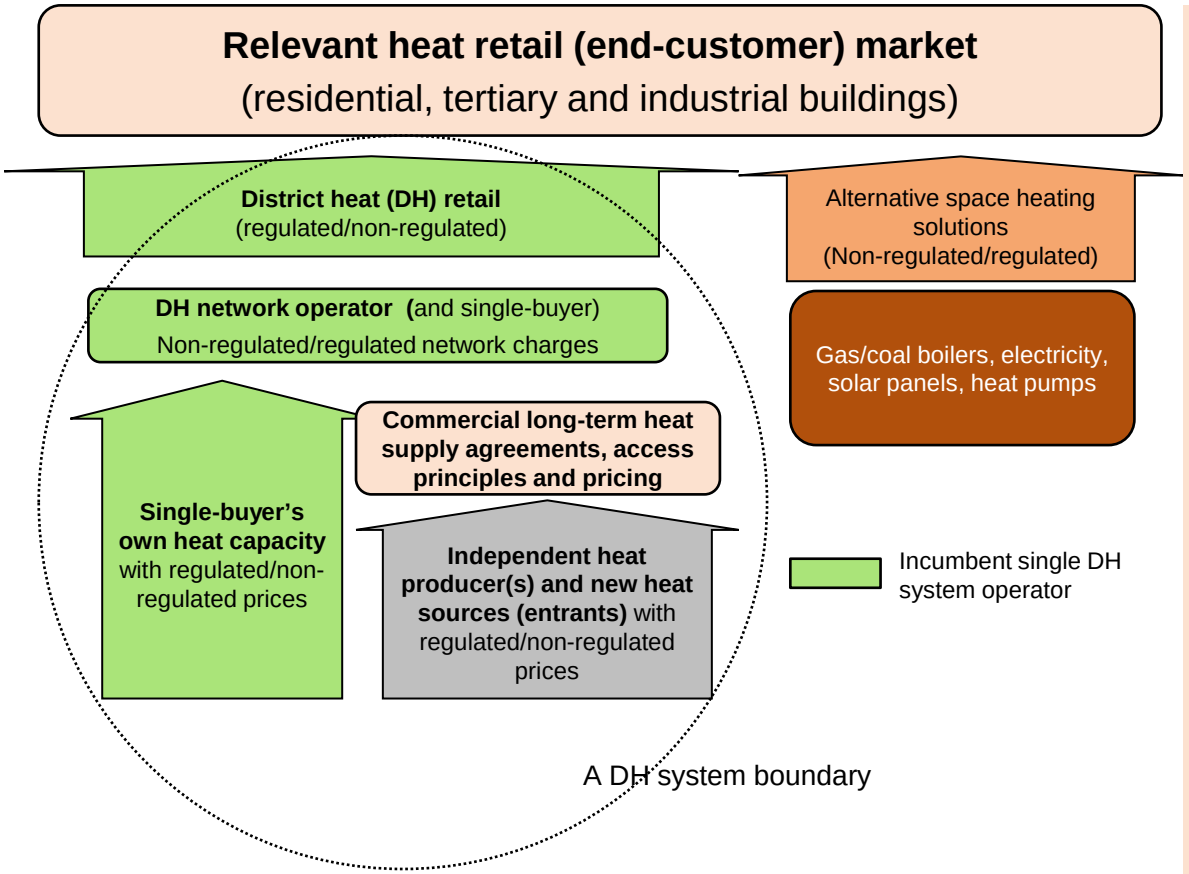
How can DH's regulatory regime boost for de-carbonization and energy efficiency?

Exposure to heat market competition incentivizes energy efficiency



How to determine the well-functionality of heat markets?

A definition for contestable and efficient heat markets



Effective heat markets

1. **Achievement of public interest objectives** *(de-carbonization and energy efficiency)*
2. **Ease of market entry** for new resource efficient technologies
3. **Transparency and access to information** for stakeholders
4. **Internationalization of costs for market externalities**
5. **Lack of discriminatory heat market dominance/ concentration**

What is heat market?

Heat policies should recognize competition and promote it

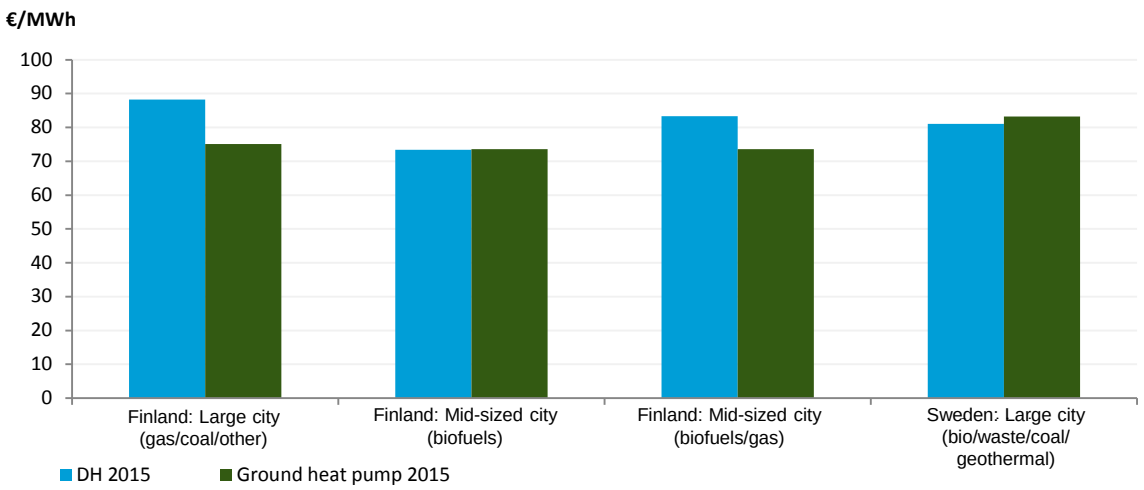
DH regulation	Heavy-handed ex-ante cost-plus regimes					Light-touch regimes		
Countries of Fortum operations	**Poland**	**Latvia**	**Estonia**	**Lithuania**	**Russia**	**Sweden**	**Finland**	**Norway**
Policy for heat retail competition	?	?	+/–	?	++	++	++	++
De-carbonization steering (heat)	+/–	+/–	+/–	+	?	++	++	+
DH price competitiveness	++	+/–	+/–	+/–	+/–	++	+	+
Access to gas networks	++	++	++	++	++	+/–	+/–	–
Availability of alternatives to DH	+	+	+	+	+	++	++	+
Absence of DH zoning policy	+	+	+/–	+/–	?	++	++	+/–
Ease of disconnection procedure	+	– –	+	– –	+	++	++	+/–
Market share of alternatives	+	+	–	+	+	+	+	++
Share of private DH ownership	+	–	++	+	++	+	+	+

Positive prospects for promoting effective heat retail competition exist but policy steering does not exist in many countries.

Sources: Oxera Consulting: Analysis of heat markets and Fortum analysis

End-customers should be provided with sufficient information

DH price competitiveness with a ground heat pump in Finland

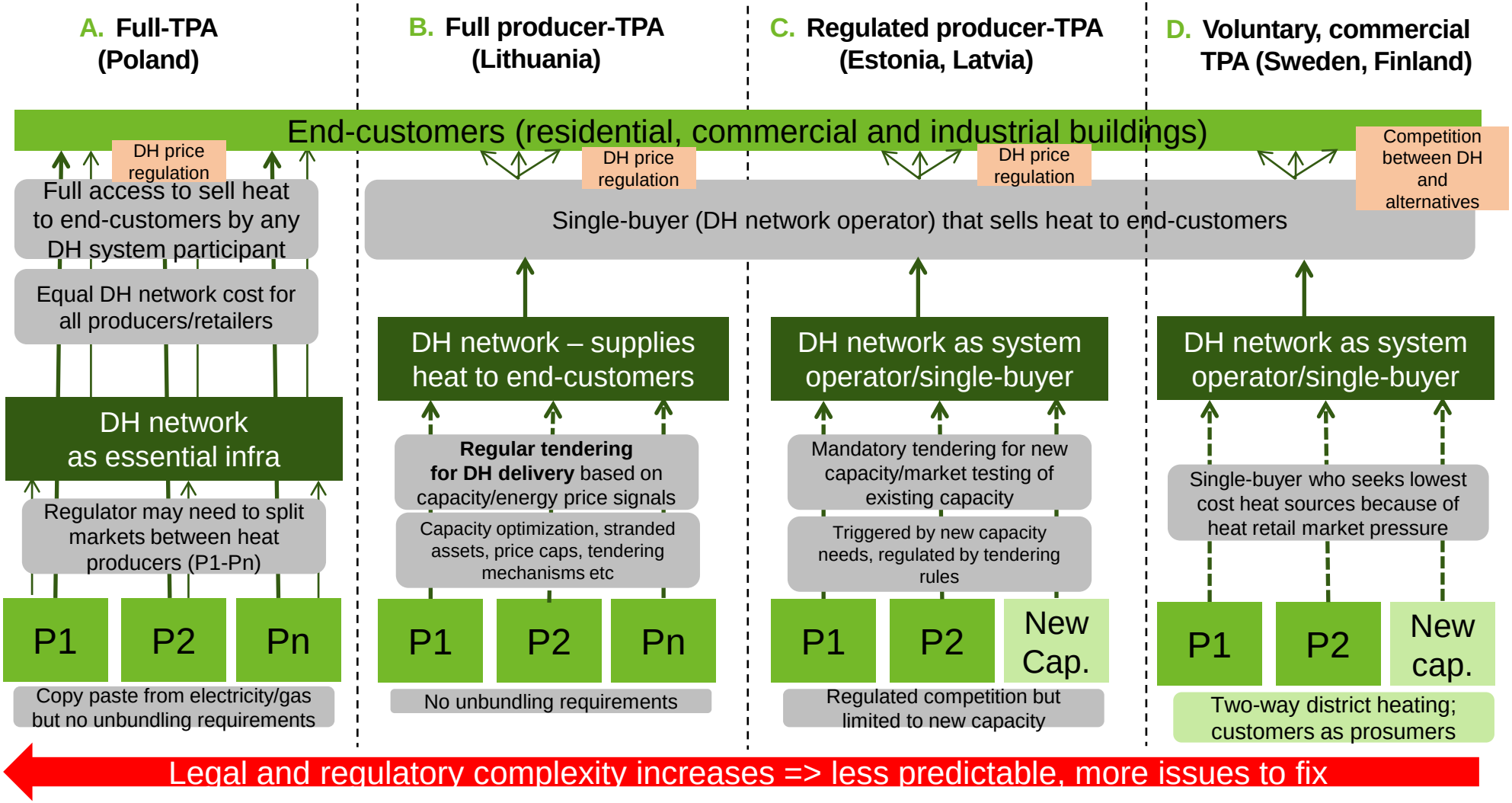


- Total heating cost (CAPEX, variable and fixed OPEX)
- High fossil fuel taxation of DH production in Finland and Sweden
- Challenging for gas based CHP but biomass CHP remains competitive

- **Low electricity prices and interest rates are driving ground heat pump competitiveness.**
- **Ground heat pumps are competitive with DH with current low power price in the Nordics.**
- **Gas boilers are serious competitors to DH i.e. in the Baltic countries.**
- **Air heat pumps have also become more efficient and less expensive and might reduce substantially the base load heat demand.**

A simplified illustration[1]

Concepts of third-party-access in DH networks



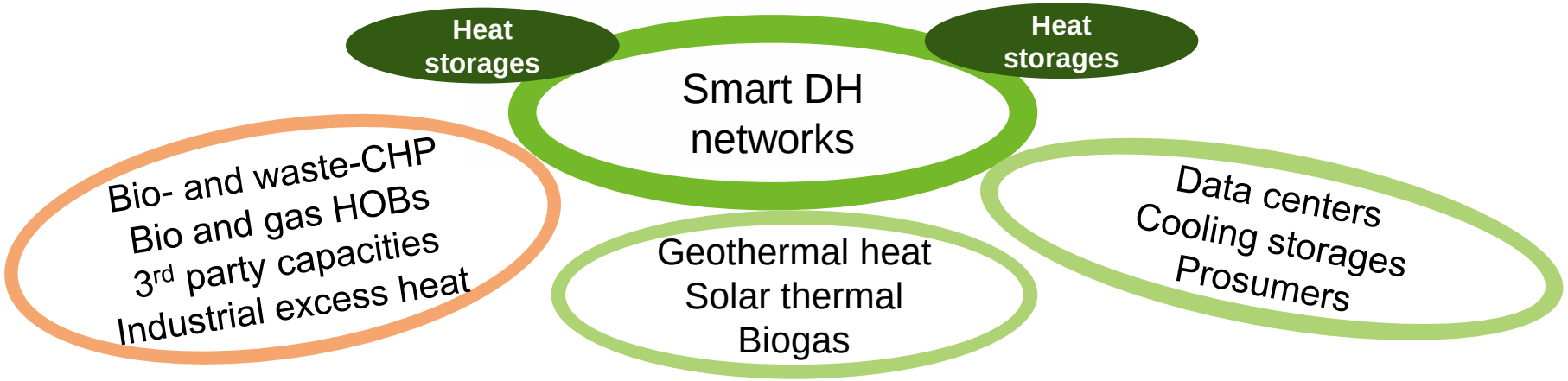
[1] This illustrative categorization is based on existing TPA literature and Fortum's experience

Fortum

Smart DH networks optimize heat demands and sources

- De-carbonization of heating and cooling
- Buildings energy performance
- System efficiency and flexibility
- Seasonal and daily variations
- Links with electricity and gas grids

- Demand response becoming as important as saving energy
- DH pricing products



The DH system operator (single-buyer) shall **voluntarily** seek for **lowest cost and sustainable heat sources** for the benefit of end-customers, system and society.

Third-party-access in DH networks

Issues to resolve when steering TPA with more regulation i.e.

1. The selection of the regulatory steering mechanism – what market failure needs fixing?
(full-TPA, full producer-TPA, regulated producer-TPA, other)

2. Unbundling requirements
(cost allocation / accounting / managerial / ownership unbundling)

3. Principles for equal treatment of producers
(i.e. to avoid distortions from RES priority or from operative/investment support)

4. What parts of heat capacity are open for TPA?
(annual/seasonal/monthly/hourly vs. peak/middle/peak capacities/energies)

5. Selection of competitive mechanism (auction for capacity/energy/back-up)?
(long-term, yearly, seasonal, monthly, weekly, hourly contracts; standard/mutual)

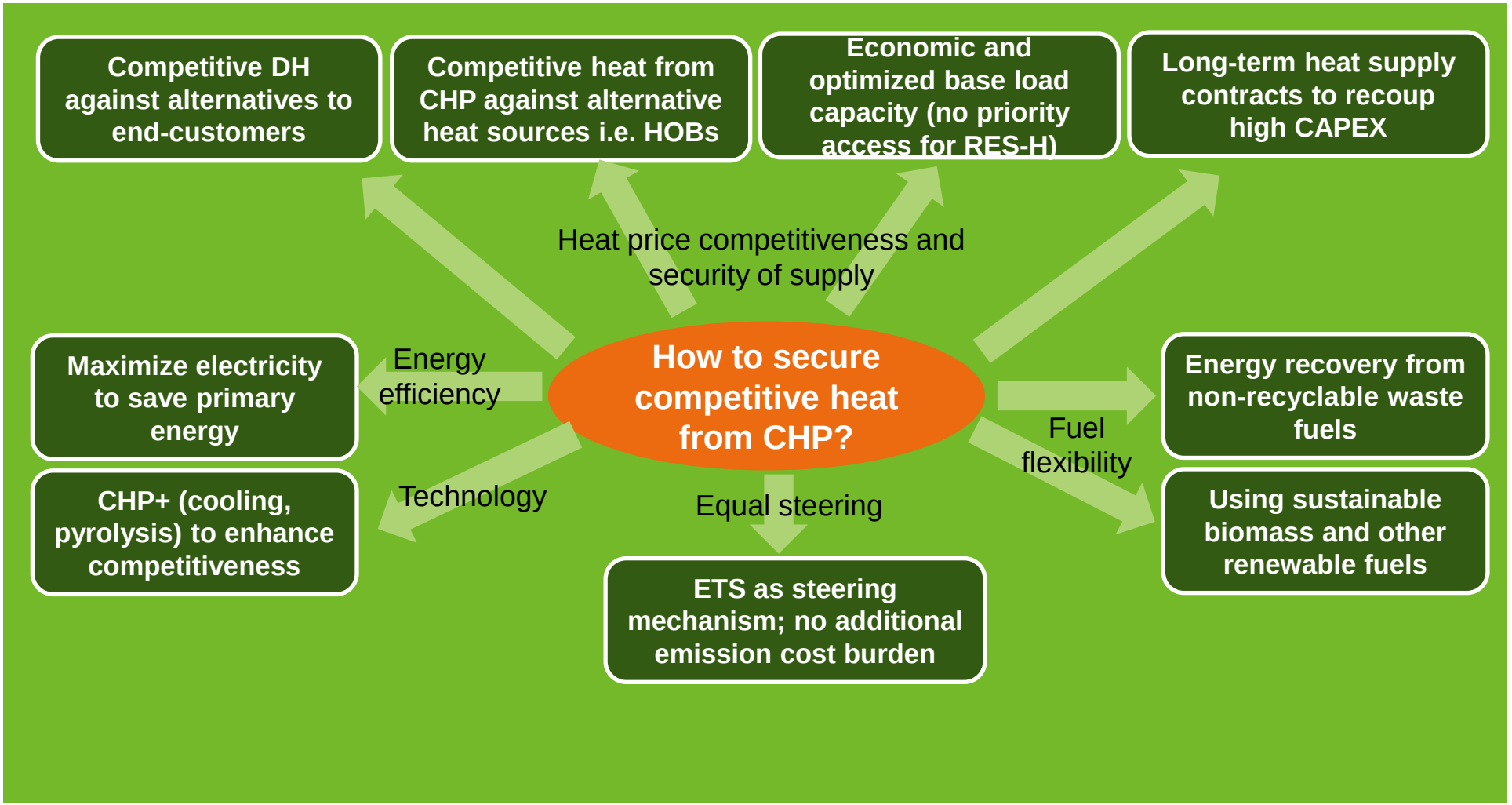
6. Criteria for selection of winning tenders?
(capacity and energy costs, other criteria, how equal tax and other treatment can be secured)

7. Treatment of stranded assets and costs? Who bears the stranded costs?
(incumbent heat production assets, increased network costs, how those costs impact customer prices)

8. How required back-up capacity is secured? Who is responsible?
(network operator, winning producer, other producers)

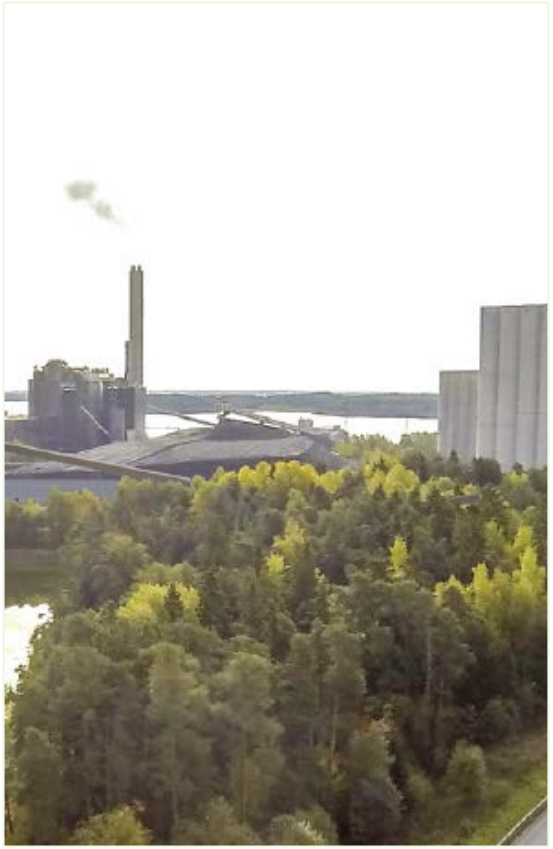
9. How producer competition shall impact the overall DH regulatory regime?
(needs for producer price-regulation, who plans for new capacity, refurbishment decisions etc)

Promoting high-efficient renewable CHP in heat markets



Wrap-up

- **Heat markets shall be driven by customers and competition**
- **EU/national heat policies should recognize the power of effective competition i.e. allowing the free choice of heating alternatives for end-customers**
- **TPA designs in DH networks can take several alternative forms but more regulation will bring more regulatory complexity and unpredictability – put DH network operator at the core**
- **EU should consider how to develop heat market's functionality to incentivize de-carbonization and energy efficiency –** more discussion for common elements of wanted heat market model?



Thank you!