CONDITIONS FOR COMPETITIVE, SUSTAINABLE AND DEMOCRATIC ELECTRICITY MARKETS

Reinhard HAAS,
Energy Economics Group,
TU Wien

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2. How variable renewables impact prices in electricity markets
3. Capacity payments vs Flexibility
4. Towards prosumagers and energy communities
5. A new market design?
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1. INTRODUCTION

Motivation:

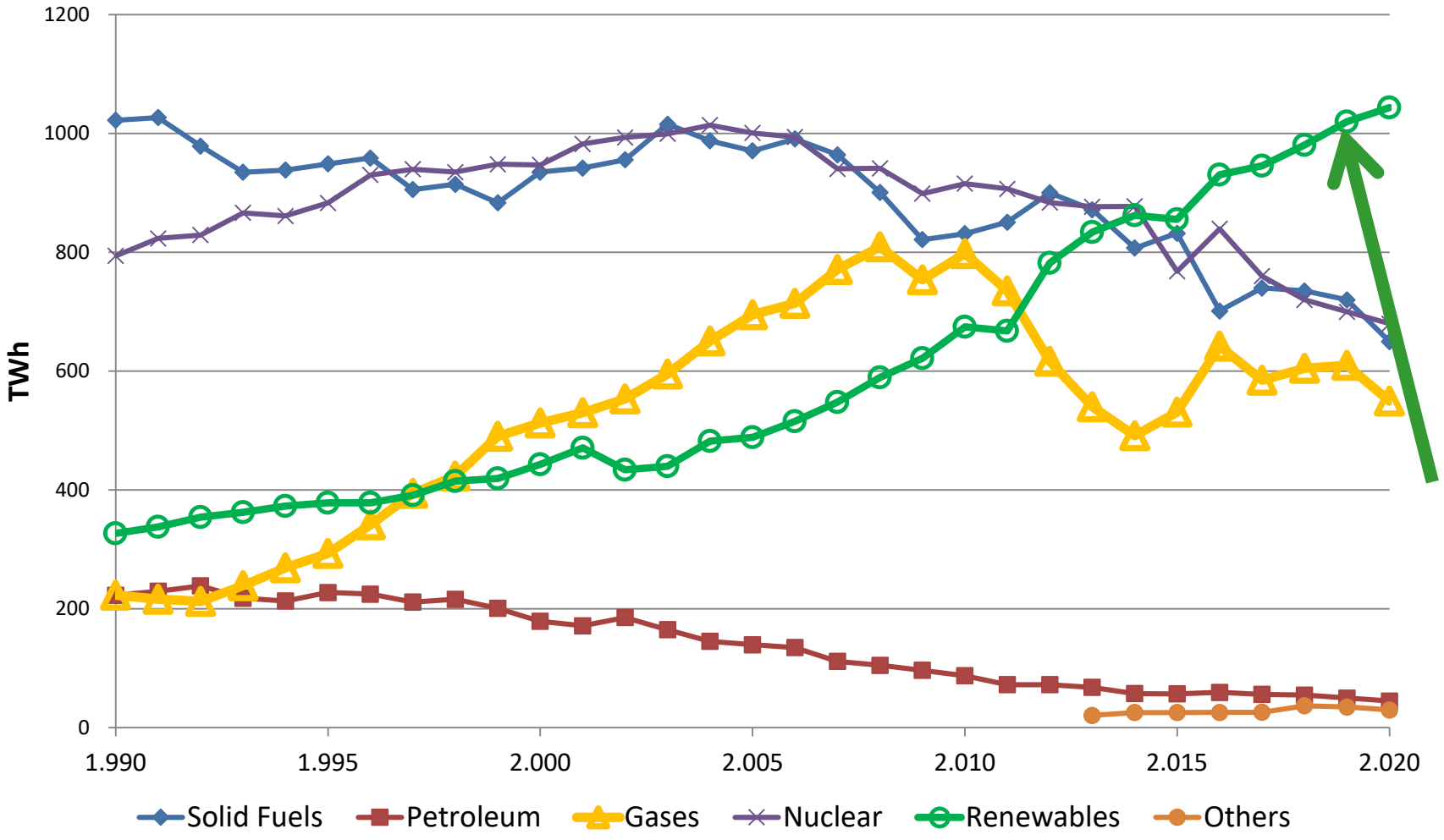
* Europe: The clean energy package → RE-Power → energy communities

* It is not possible to force variable renewables into the system

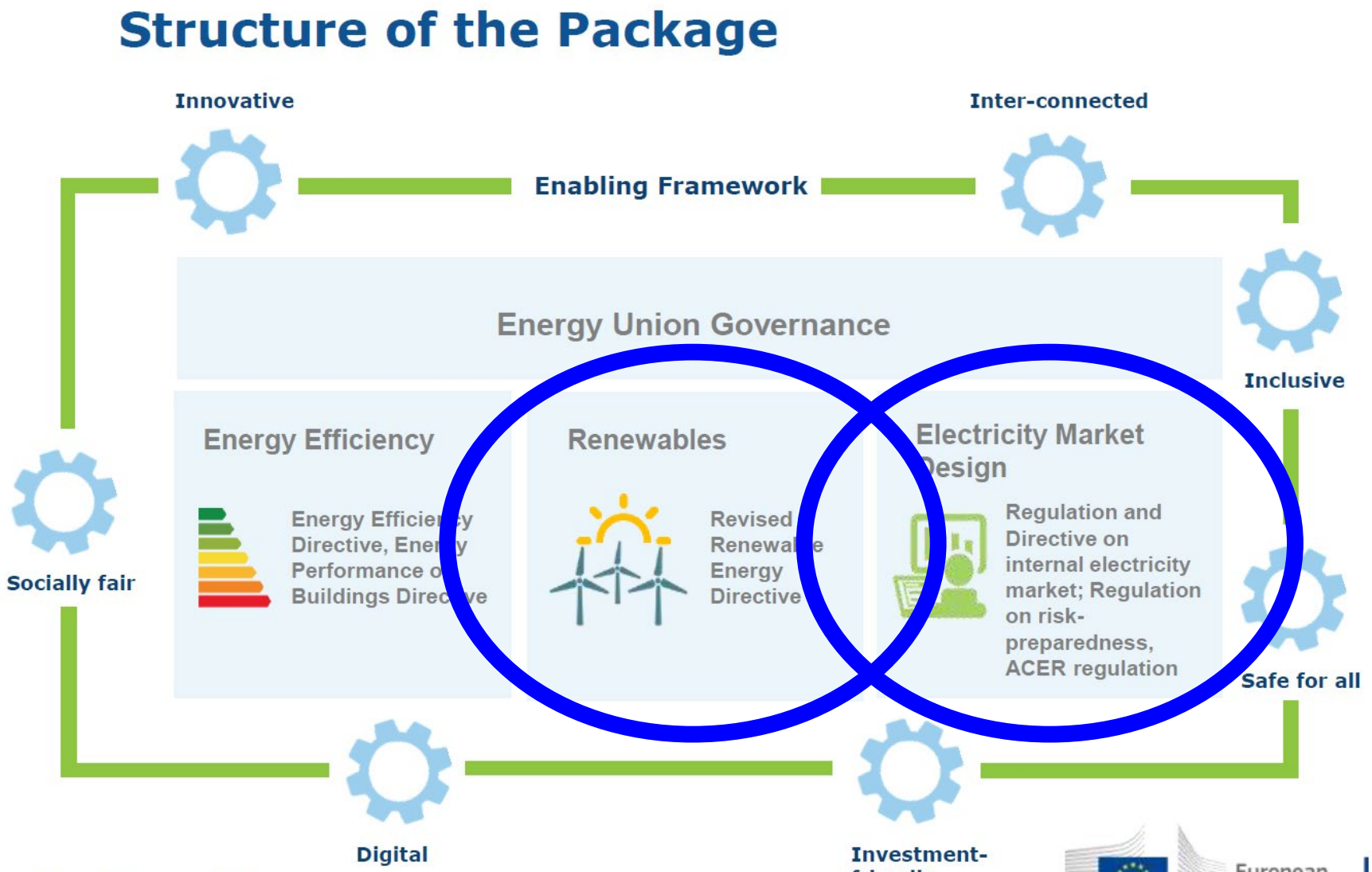
* Strong desire of more and more customers to participate in electricity supply

* Highly volatile electricity prices

Electricity generation EU-28

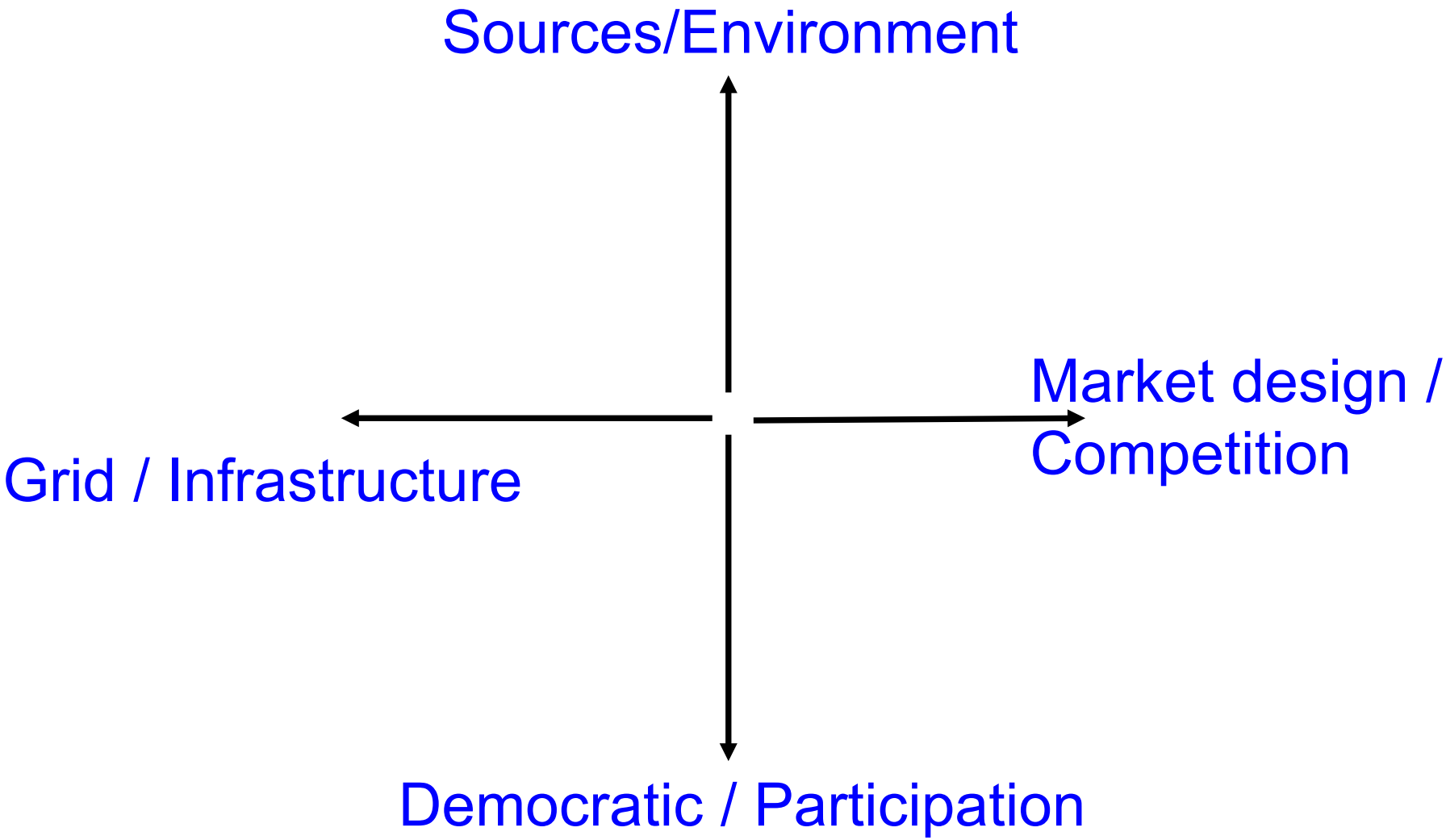


THE CLEAN ENERGY PACKAGE

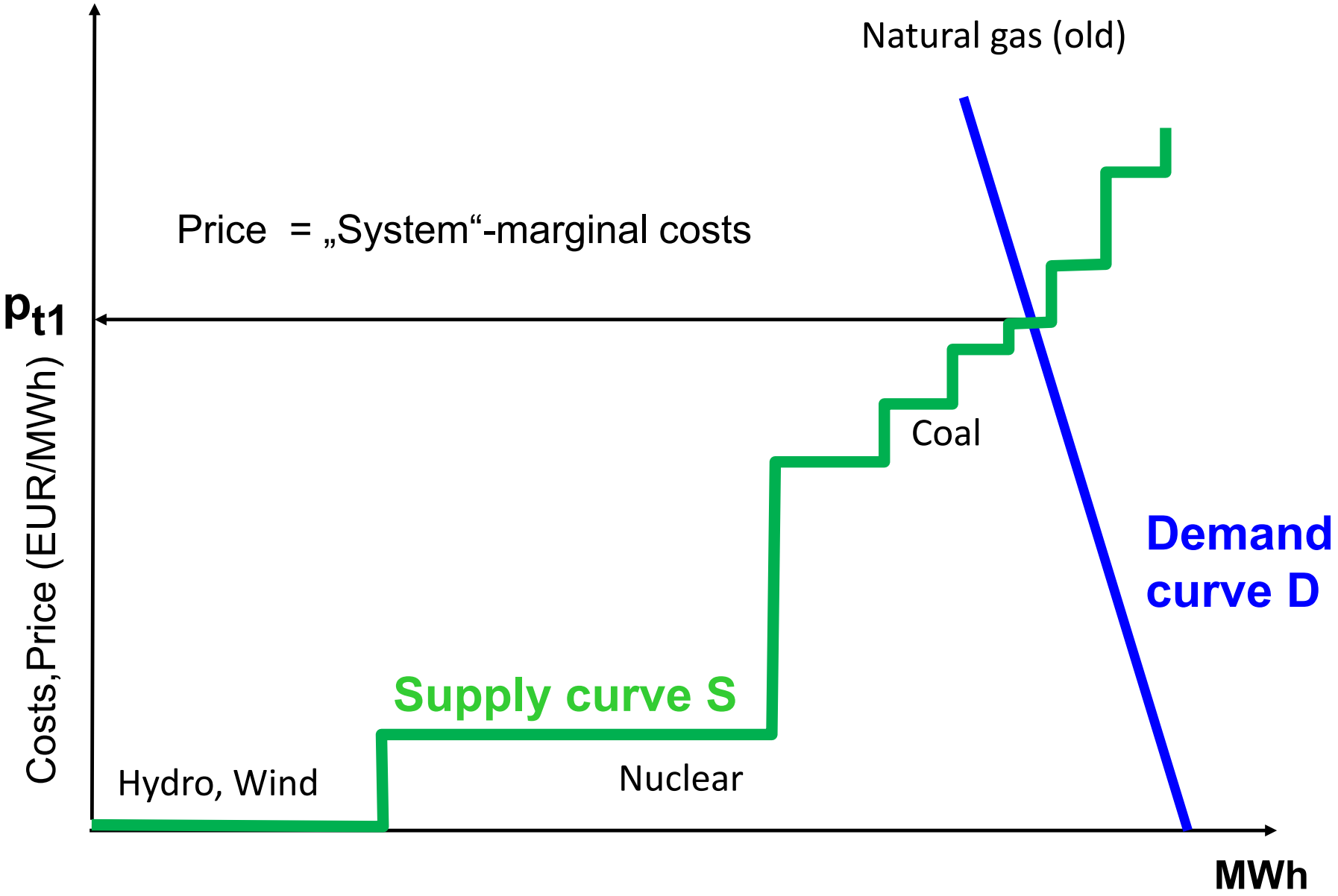


→ Energy communities

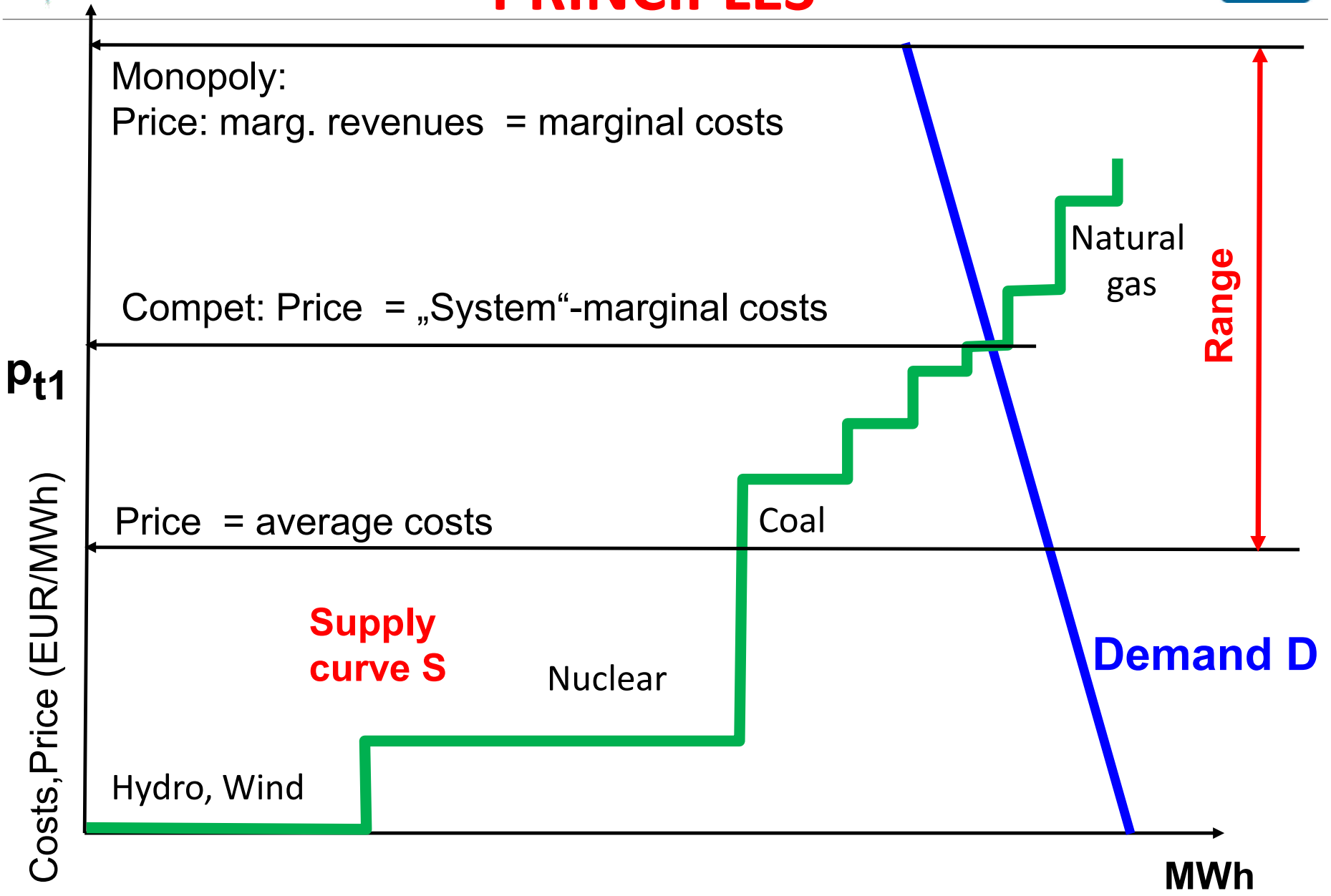
Sustainability – The big picture



BASIC PRINCIPLE OF COMPETITION: PRICE = MARGINAL COSTS

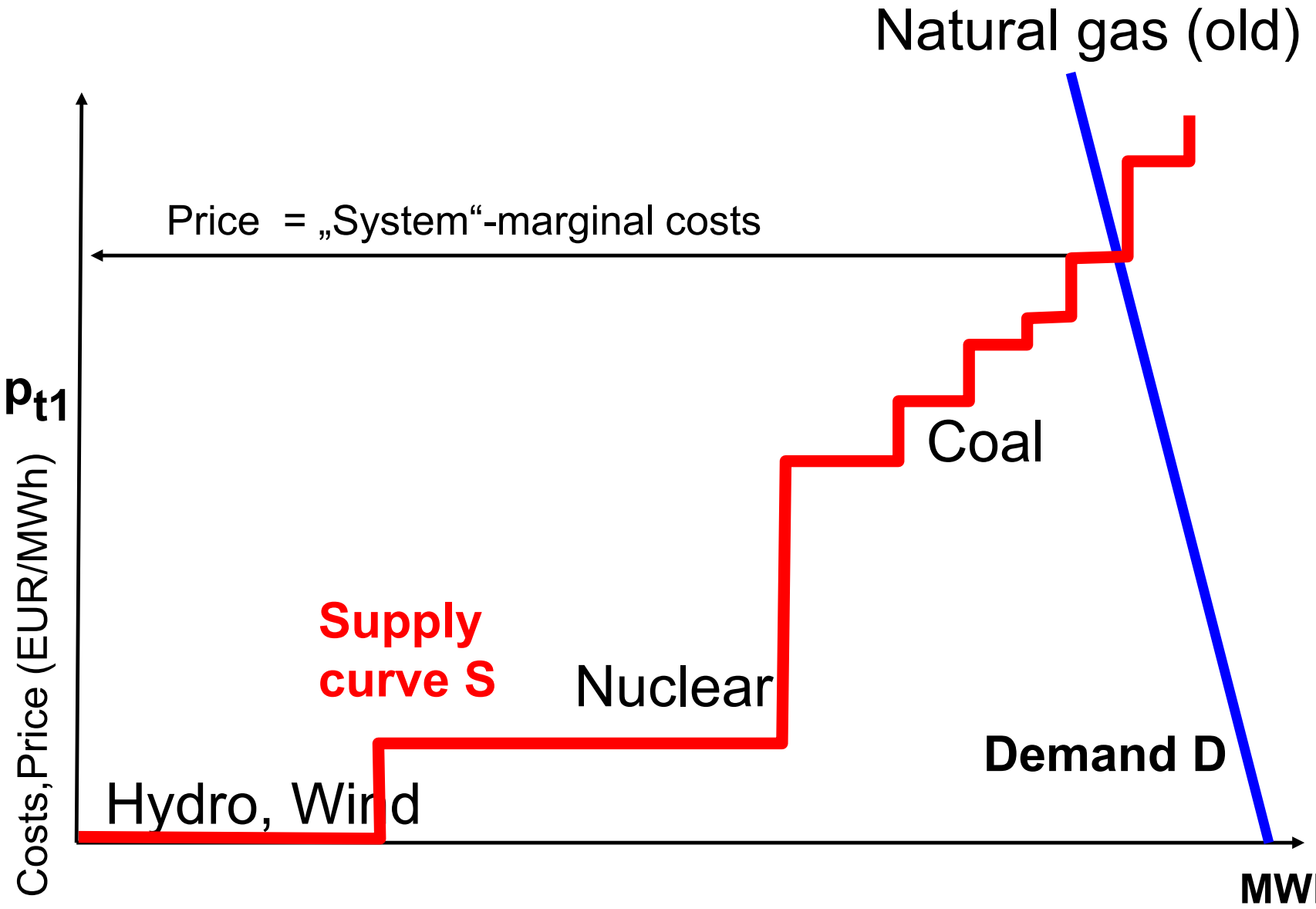


SURVEY: POSSIBLE PRICING PRINCIPLES

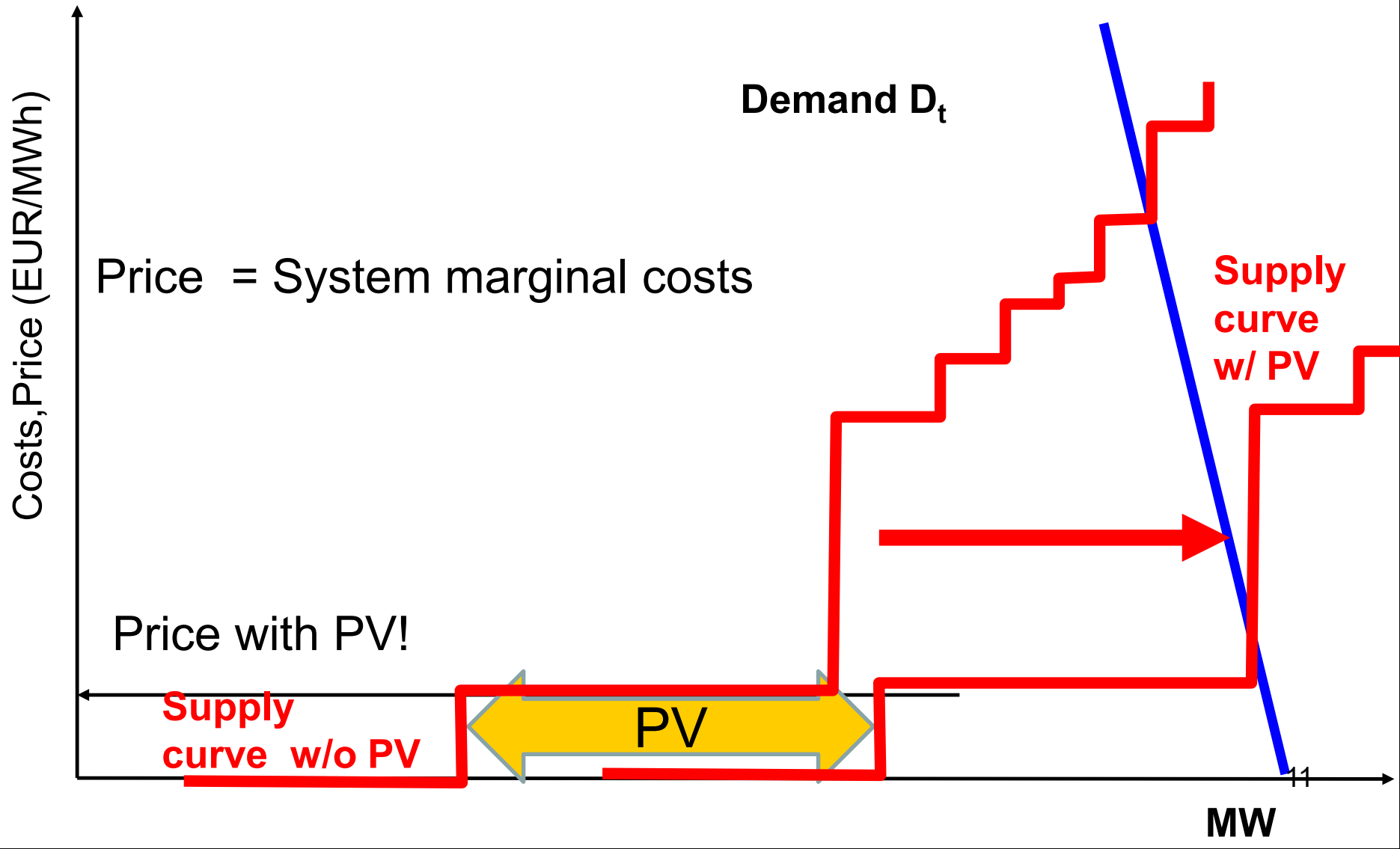


2 HOW VARIABLE RENEWABLES IMPACT THE ELECTRICITY SYSTEM AND PRICES IN ELECTRICITY MARKETS

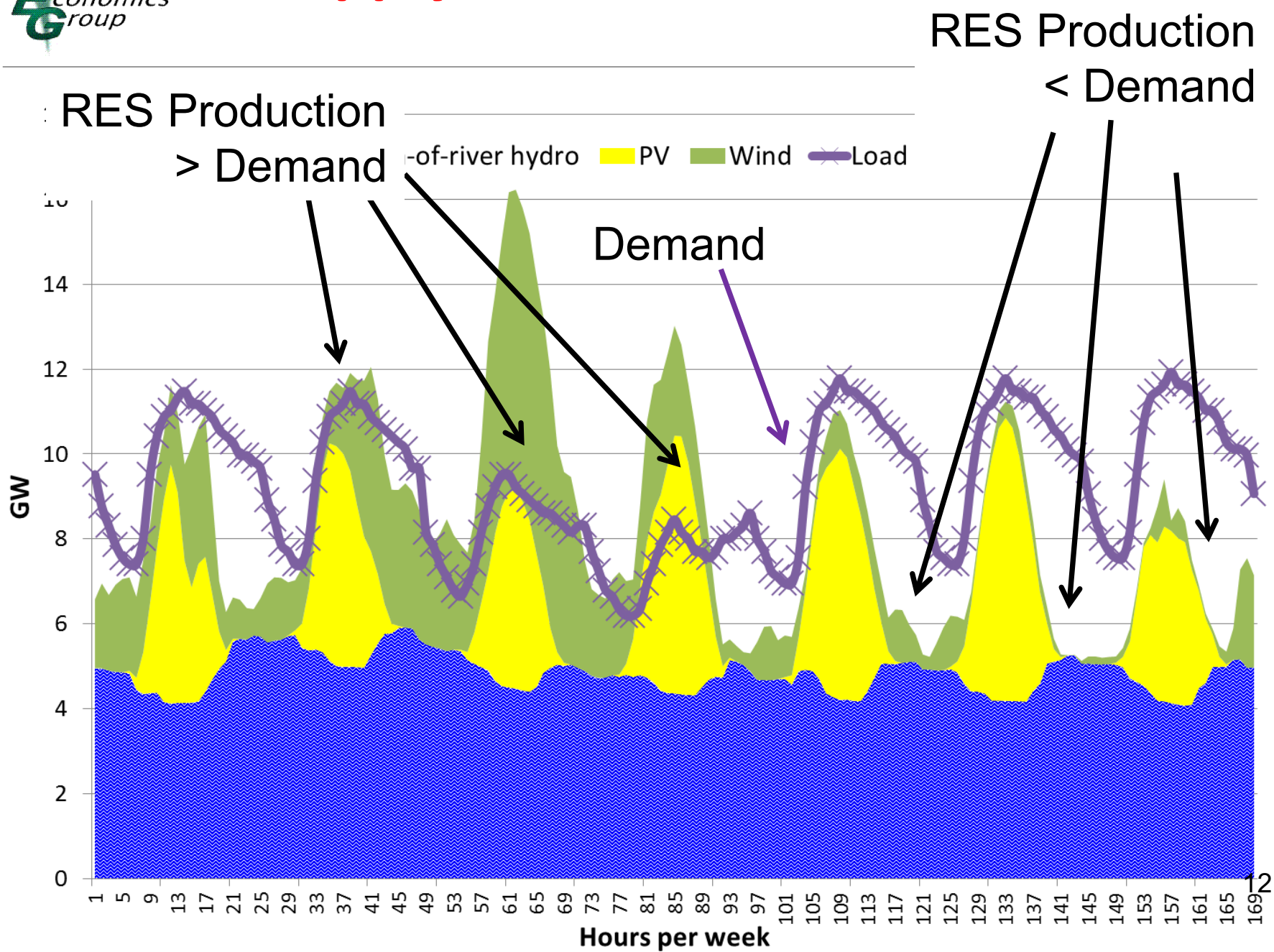
BASIC PRINCIPLE OF COMPETITION: PRICE = MARGINAL COSTS



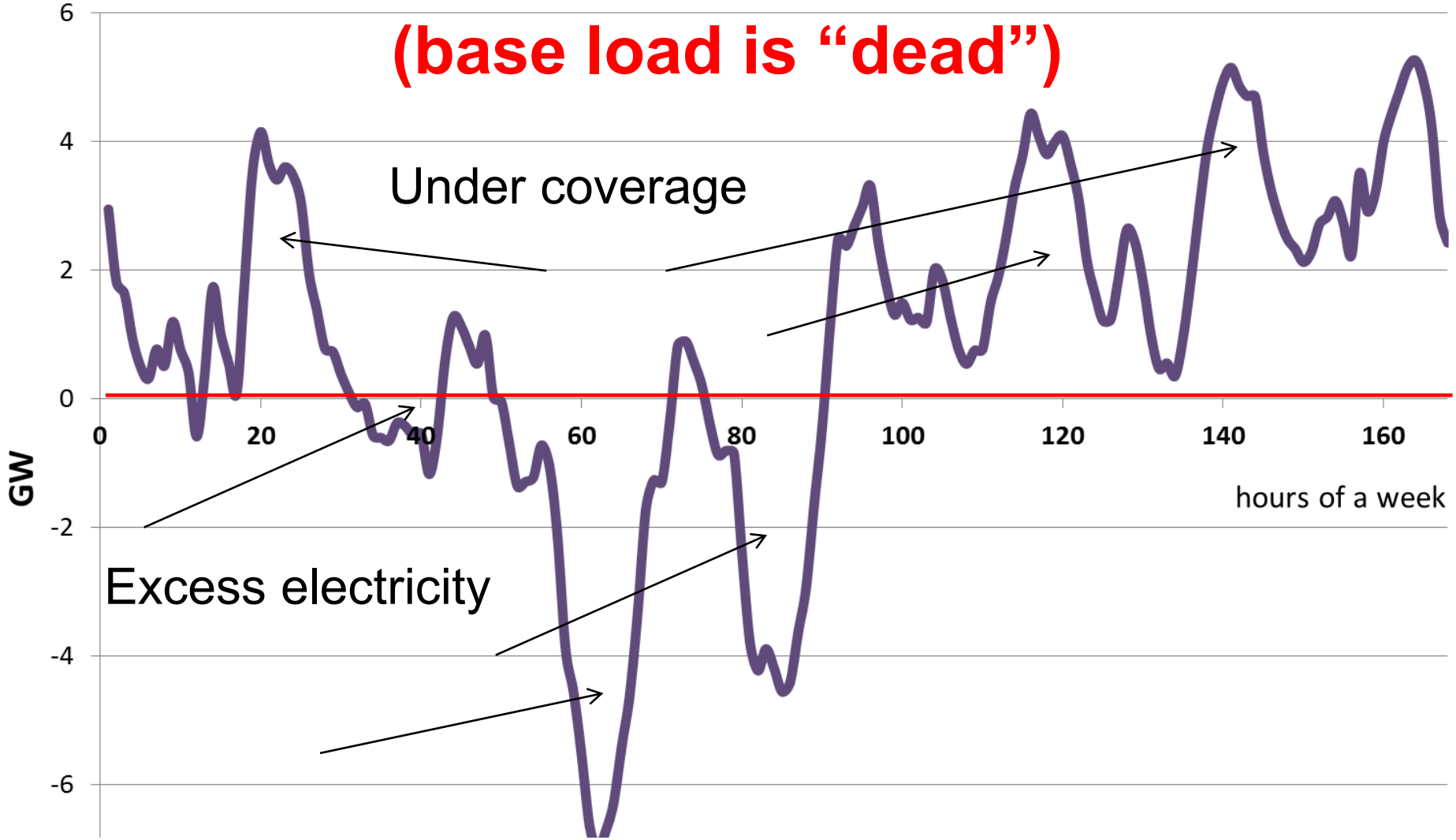
Example: prices without and with PV



Supply and Demand 2030

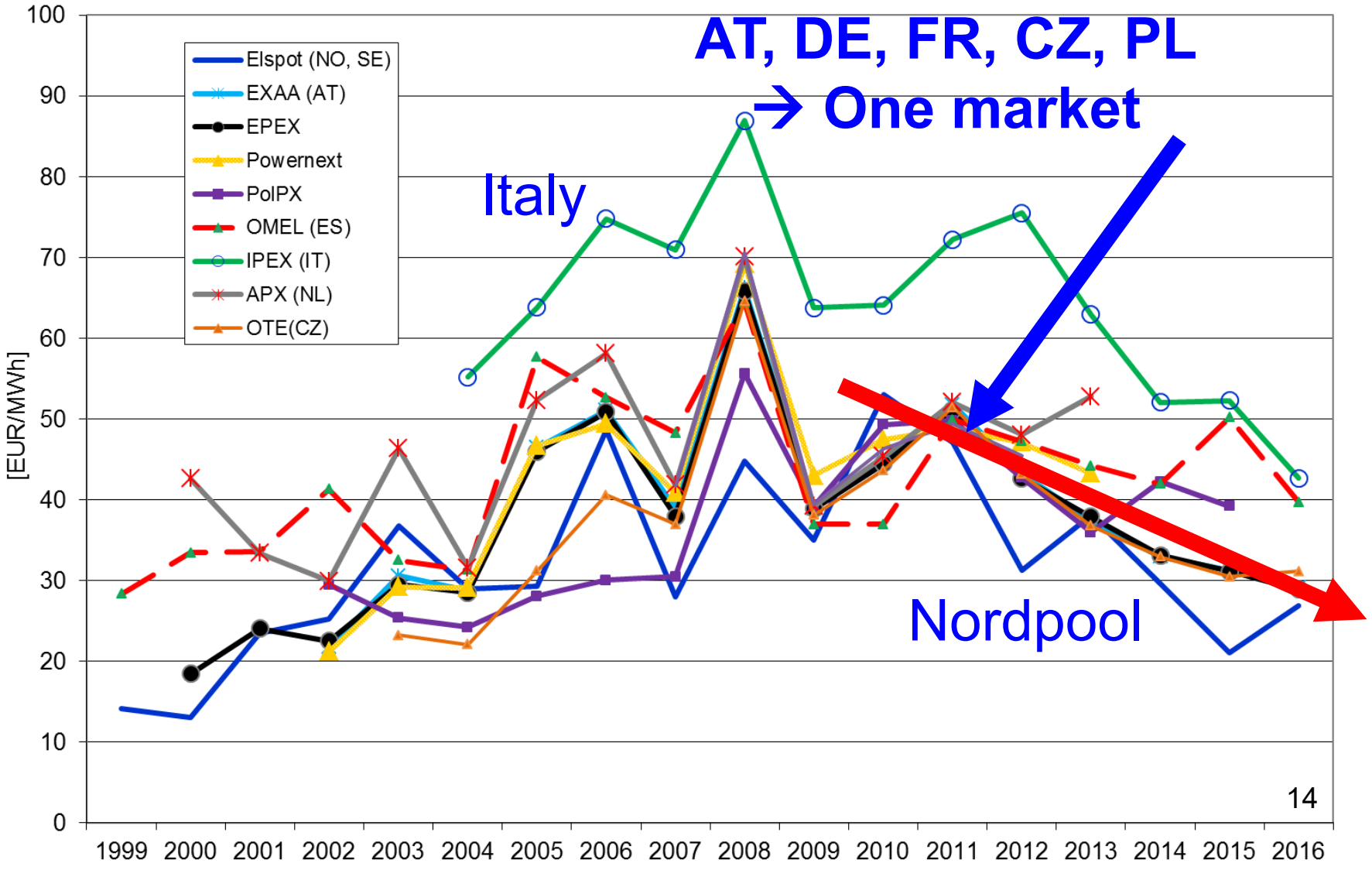


Key term of the future: Residual load (base load is “dead”)

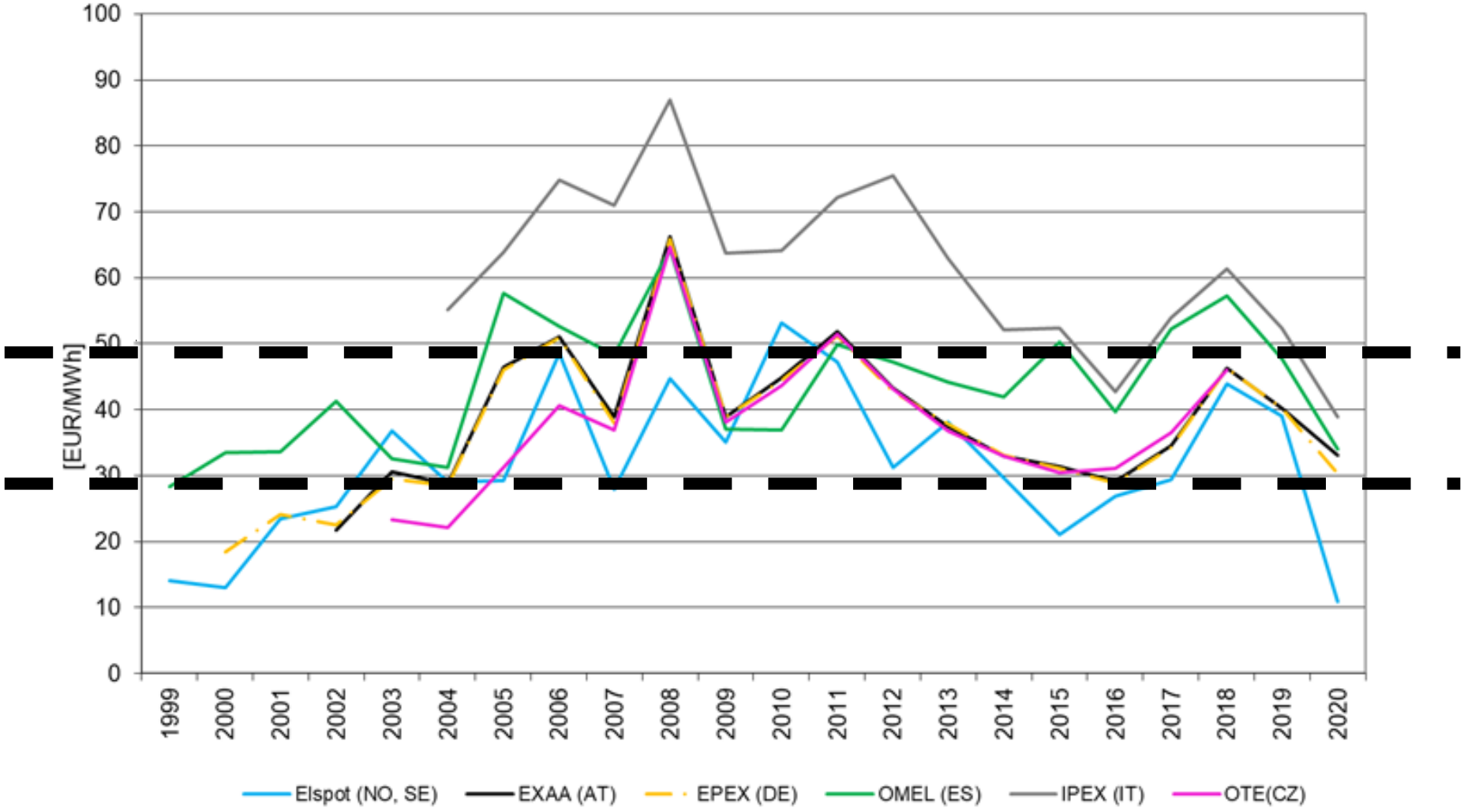


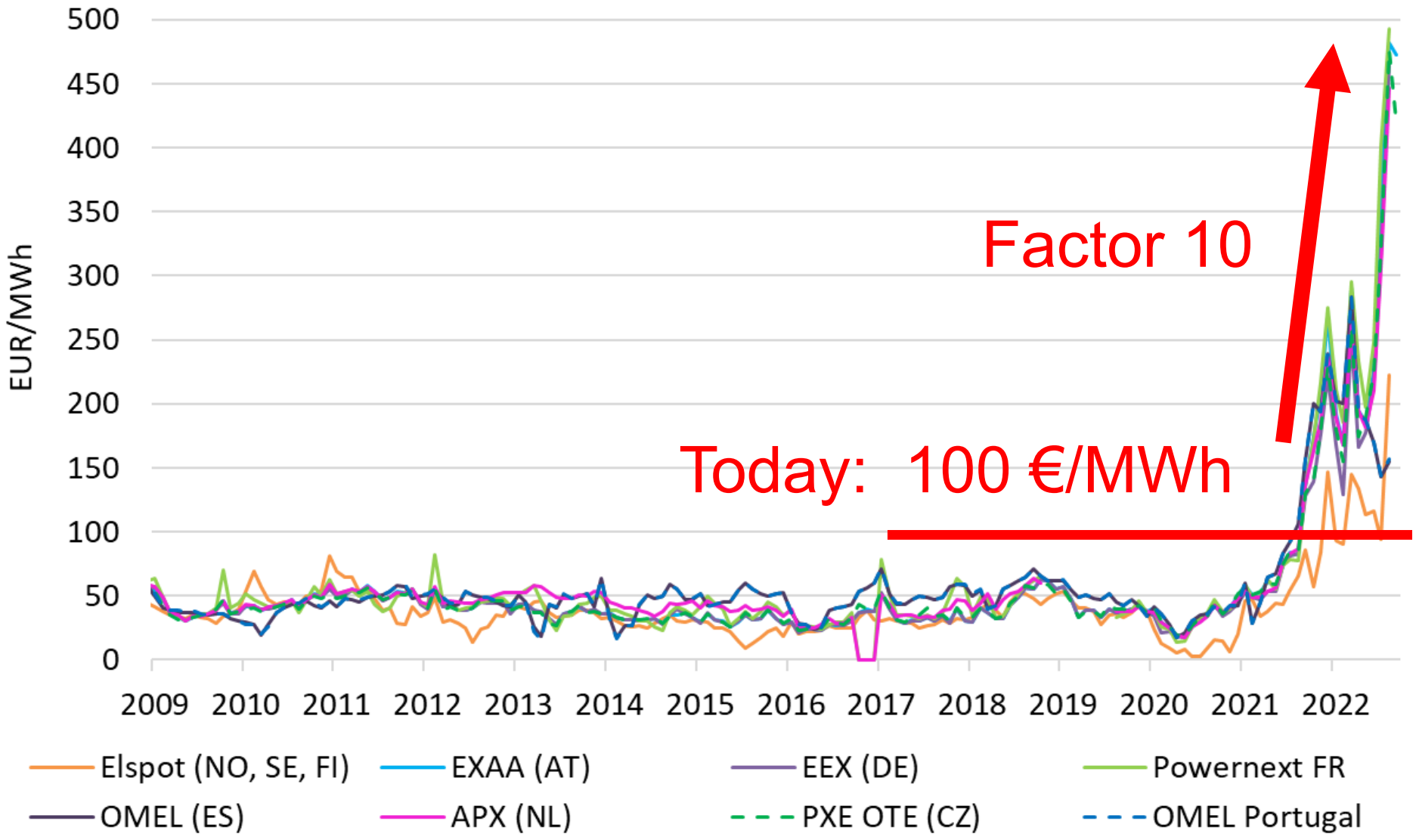
Residual load = Load – non-flexible generation

Development of electricity prices in Europe up to 2016 (1)

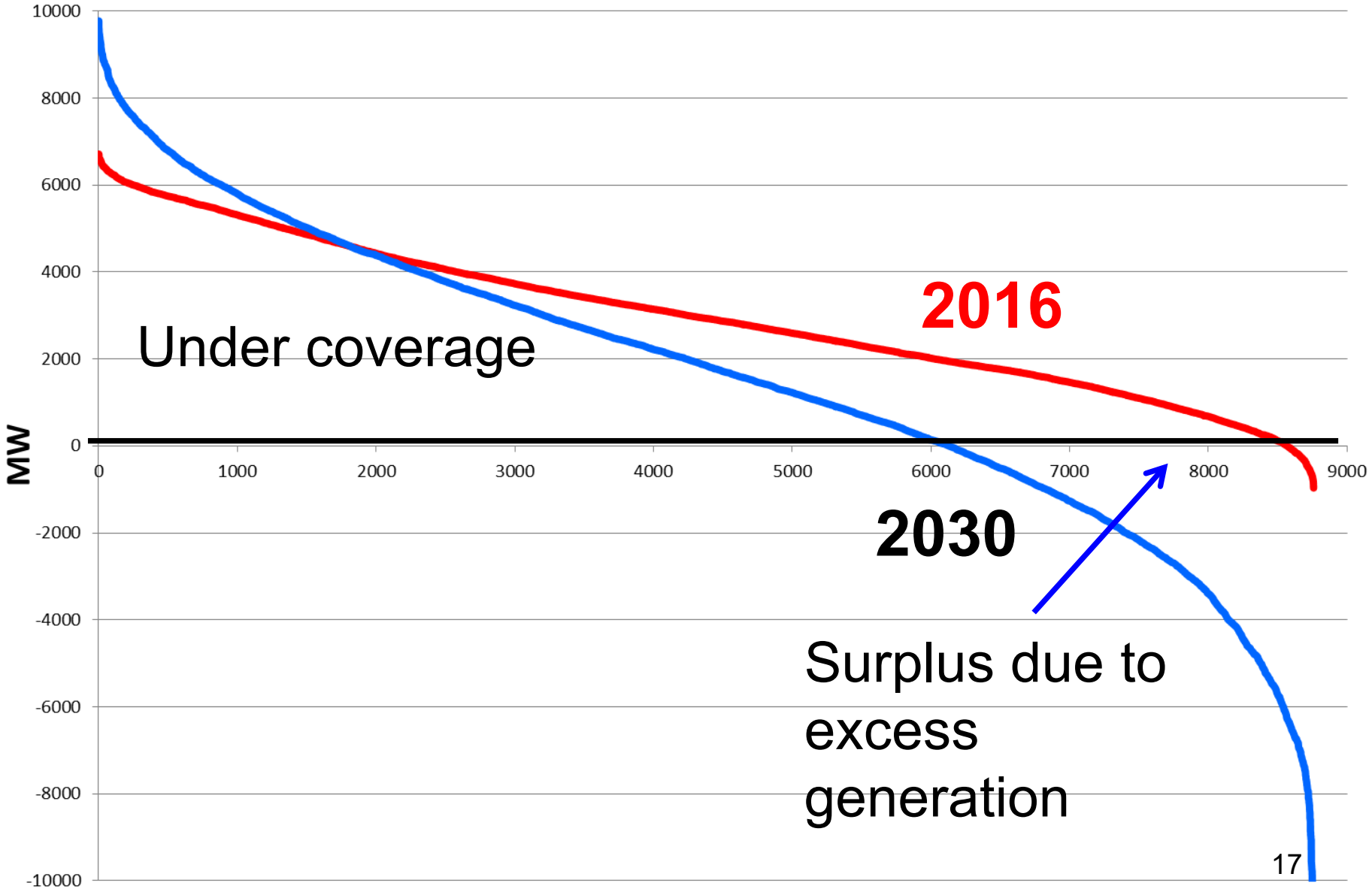


Development of electricity prices in Europe up to 2020

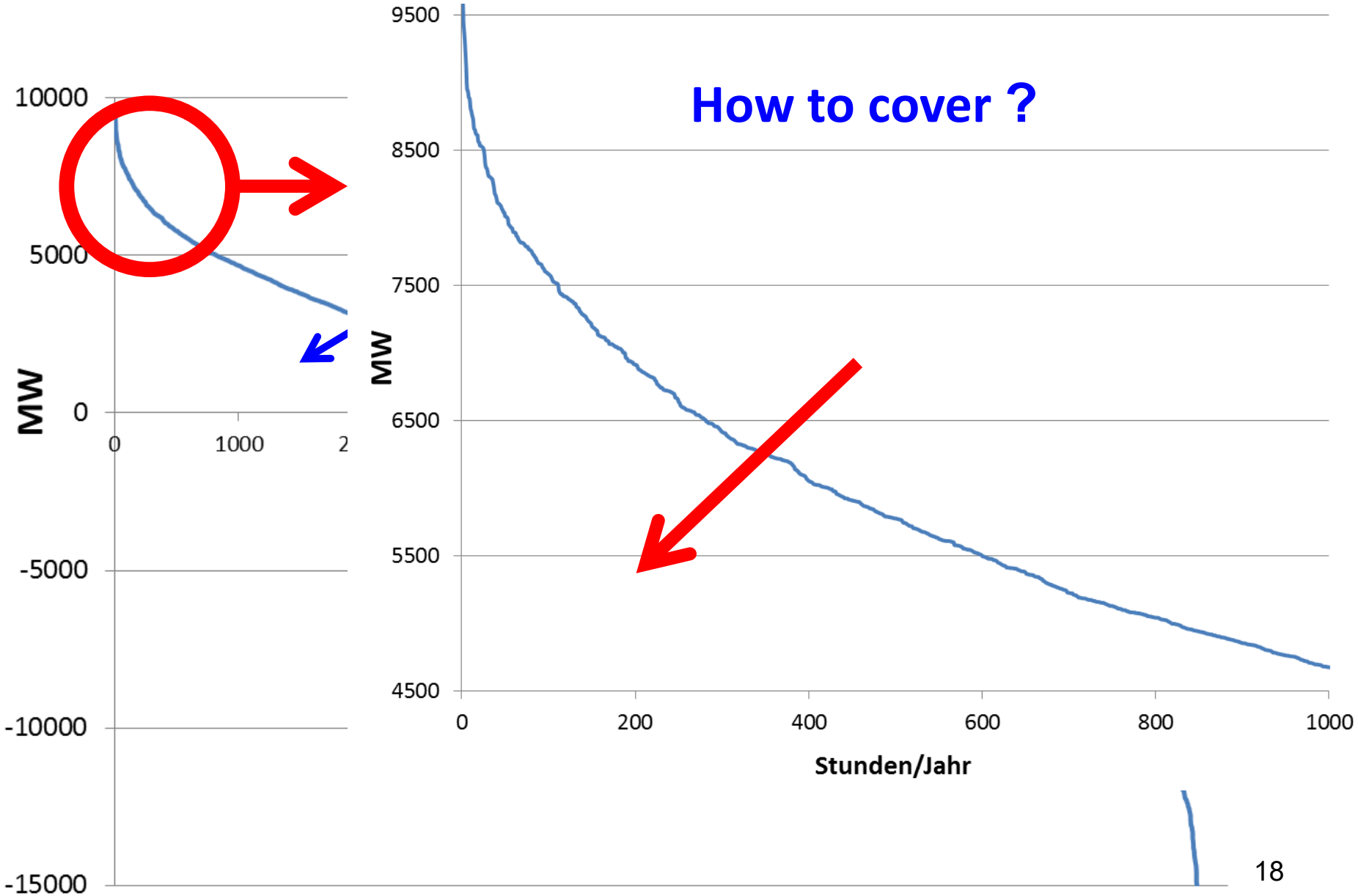



500
450
400
350
300
250
200
150
100
50
0
EUR/MWh
Factor 10
Today: 100 €/MWh
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
Elspot (NO, SE, FI)
EXAA (AT)
EEX (DE)
Powernext FR
OMEL (ES)
APX (NL)
PXE OTE (CZ)
OMEL Portugal

Classified residual load over a year



Classified residual load



3 Capacity payments vs Flexibility

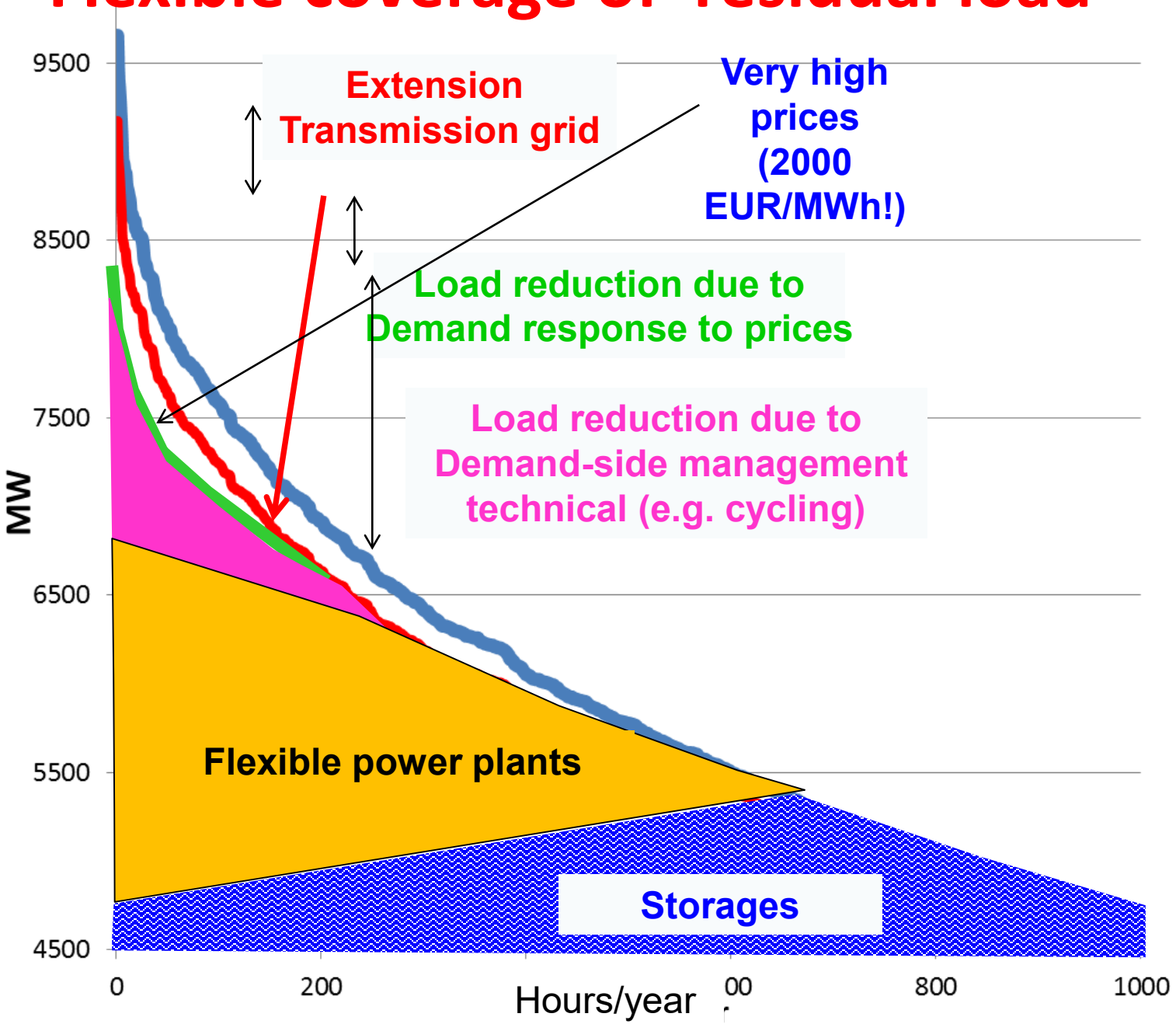
There are two extreme positions:

By a regulated capacity payment with STMC pricing?

or

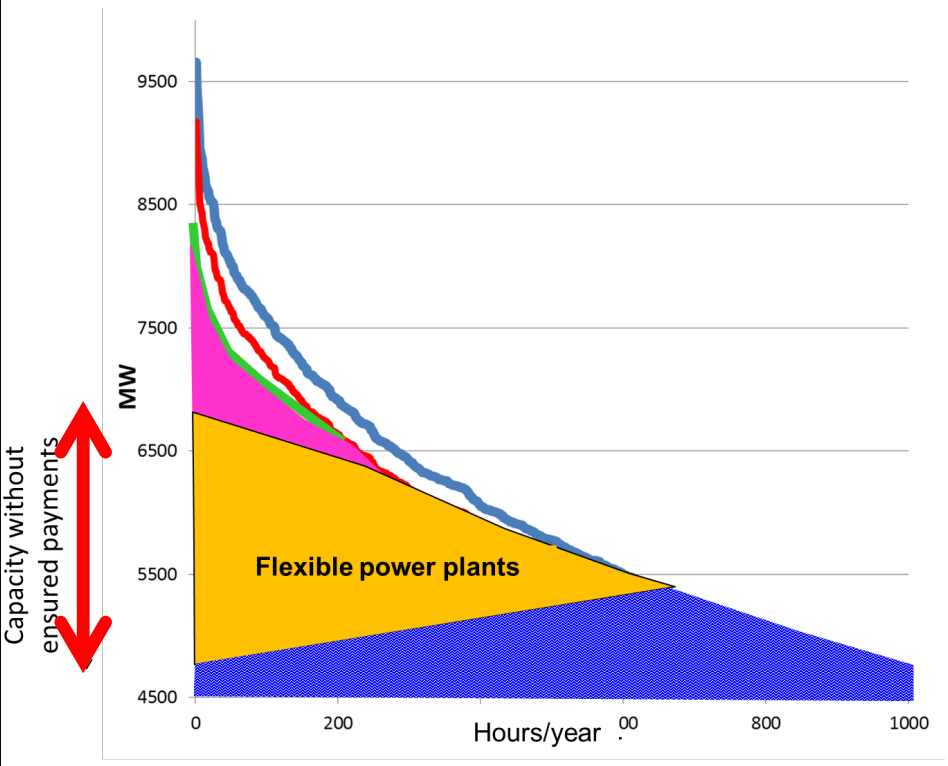
By competition between supply-side and demand-side technologies and behaviour (incl. Storages, grid and other flexibility options) with correct scarcity pricing signals?

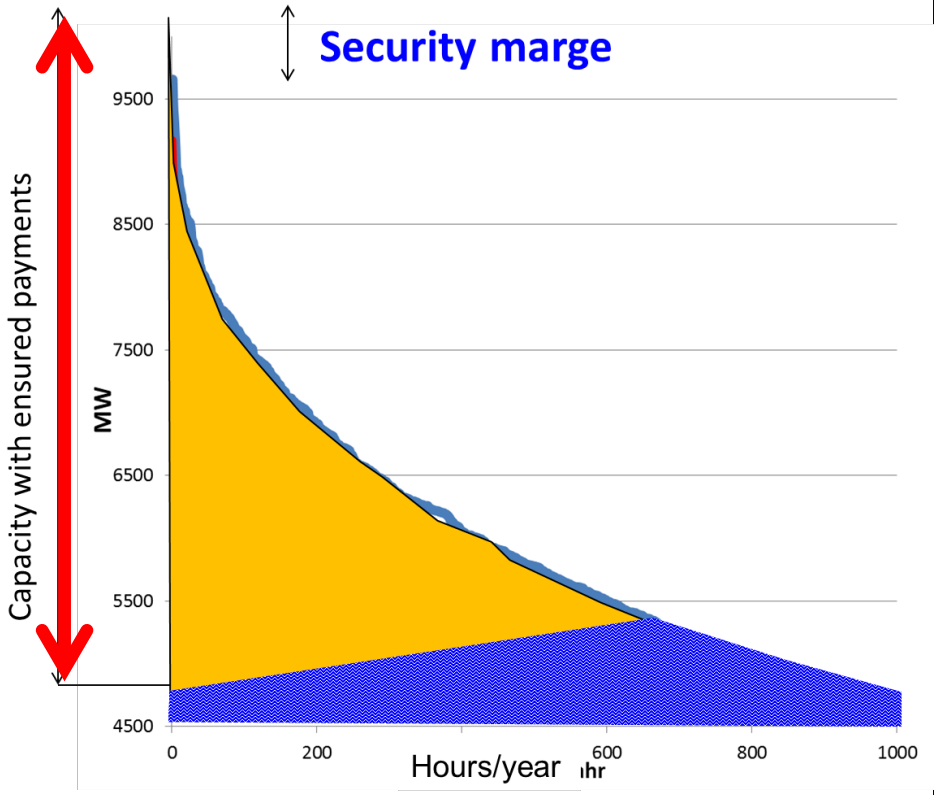
Flexible coverage of residual load



Capacity without ensured payments

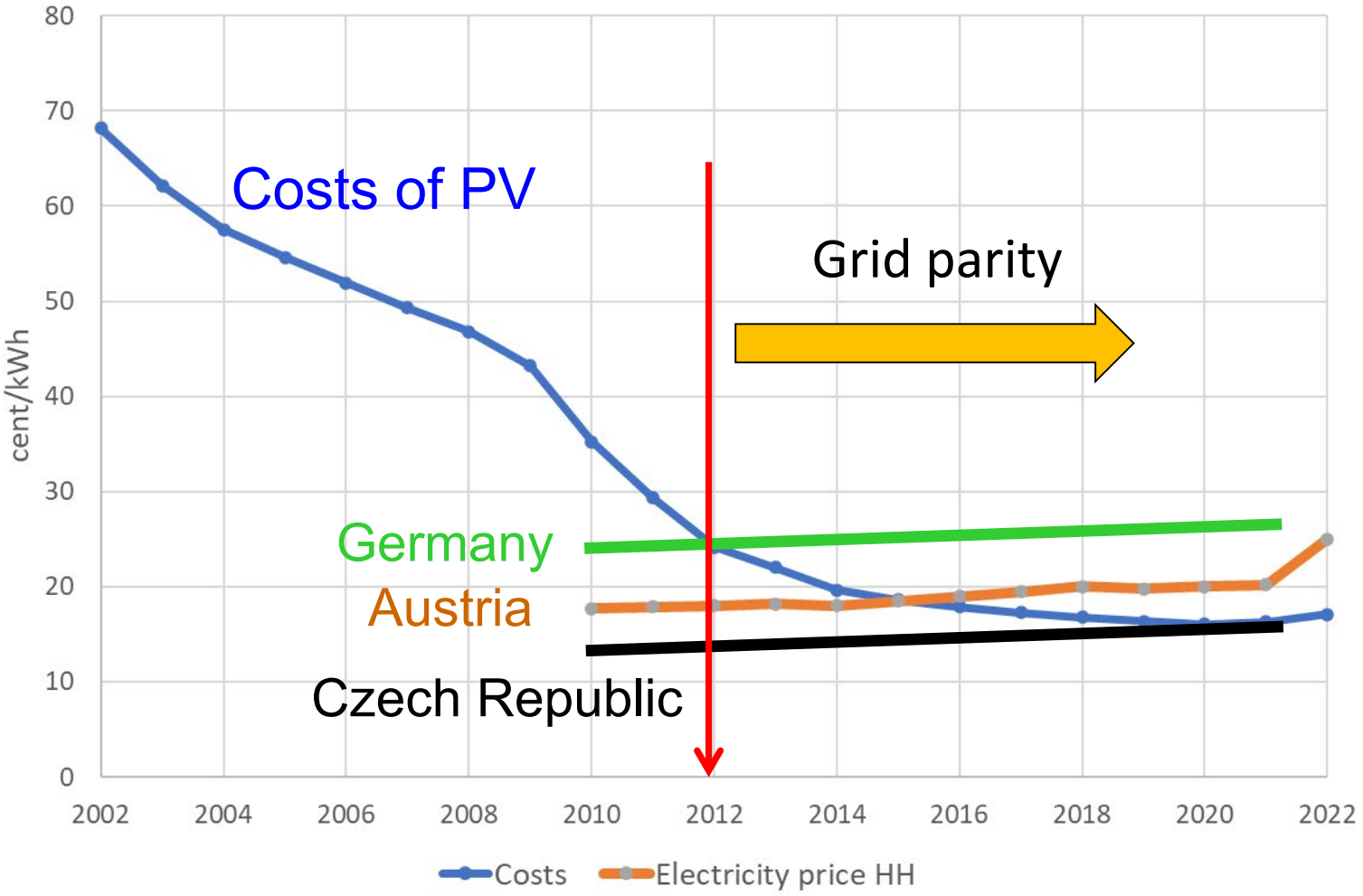
Comparison


Capacity without ensured payments
MW
9500
8500
7500
6500
5500
4500
Flexible power plants
0
200
800
1000
Hours/year

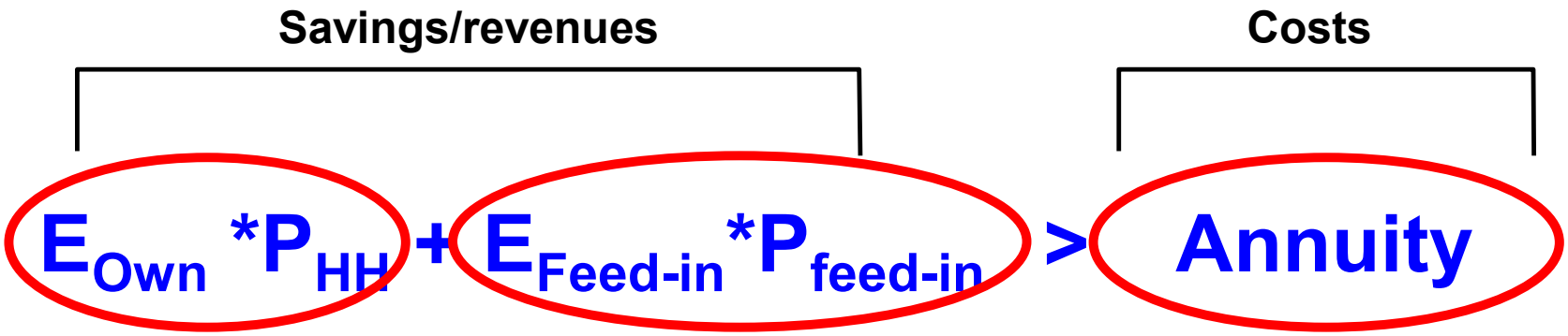

Security marge
Capacity with ensured payments
MW
9500
8500
7500
6500
5500
4500
0
200
600
800
1000
Hours/year

4. TOWARDS PROSUMAGERS AND ENERGY COMMUNITIES

Grid parity: PV-costs and household electricity prices



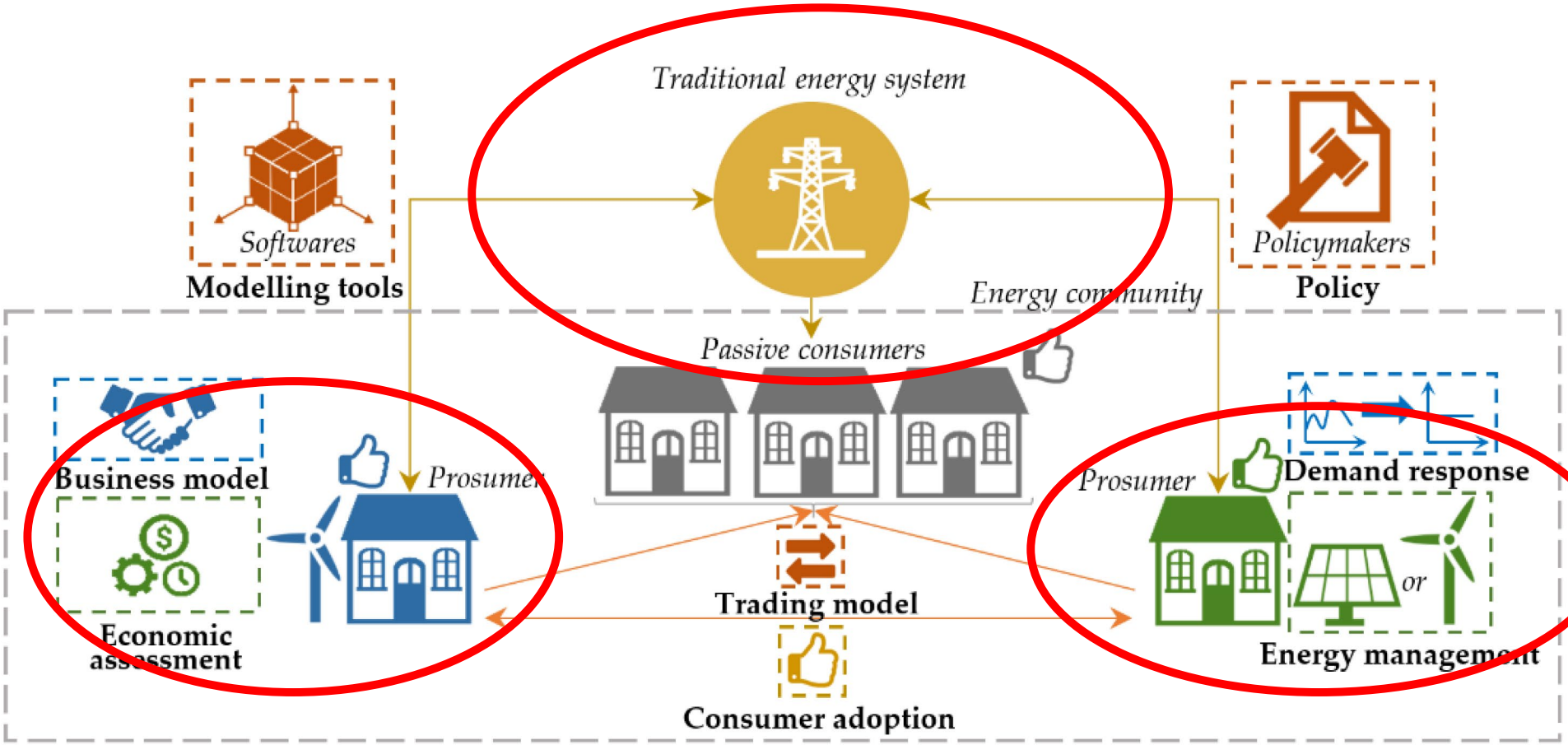
Assessment of Grid Parity



Grid parity term

Subsidy still necessary?

Energy Communities



5. A NEW MARKET DESIGN?

* How to recover the investment costs of variable renewables if P=0?

* Capacity payments anyway?

* What is a long-term market? How strongly to interfere by a regulatory authority?

* C f D and PPA

* However, „If it ain‘t broke, don‘t fix it“

6. CONCLUSIONS

- Sustainable electric. system → integration of a broad technology portfolio & demand-side options!
- A more democratic system allows customers to participate in supply, storage and DSM
- most urgent: exhaust full creativity for flexibility of all market participants
- New market design? New models of long-term contracts … but, however … „If it ain‘t broke, don‘t fix it“