NEW CHALLENGES IN ELECTRICITY MARKETS

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CZ-AT summer school, May 2024

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2. How prices in ele markets come about
3. The key term of the future: Residual load
4. Capacity payments vs Flexibility
5. Electricity prices
6. Retail markets: Towards prosumagers and energy communities
7. Conclusions

1. INTRODUCTION

Motivation:

* Europe: The clean energy package → RE-Power → FIT for 55%

* 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

A revised **EU electricity market design** to:

Boost renewable energy investments

Better protect and empower EU consumers

Enhance the competitiveness of EU industry

European Commission

14. Dezember 2023

Commission welcomes deal on

https://ec.europa.eu/commission/presscorner/detail/en/ip_23_6602

European Commission

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Available languages: English

PRESS RELEASE | 14 December 2023 | Brussels

Commission welcomes deal on electricity market reform

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The Commission welcomes the provisional agreement reached today by the European Parliament and Council on the **reform of the EU's electricity market design.** This deal will help the EU build a **renewables-based energy system**, **lower energy bills** and **better protect consumers** from price spikes and empower them to benefit from the transition. It will ensure a **sustainable and independent energy supply** to the EU, in line with the European Green Deal and the REPowerEU Plan. This reform, which was proposed by the Commission as part of the Green Deal Industrial Plan, will also make the **European industry cleaner and more competitive** thanks to better access to affordable renewable, non-fossil energy.

The reform provisionally agreed today by the EU co-legislators features revisions to several pieces of EU legislation– notably the Electricity Regulation, the Electricity Directive, and the REMIT Regulation. Building on the lessons of the energy crisis spurred by Russia's invasion of Ukraine, the agreed reform will bring **more price stability** to both consumers and suppliers thanks to a broader use of **long-term contracts for clean power production** and will bring more **non-fossil flexible solutions** into the system such as demand response and storage.

Better protected and empowered consumers

Suchen

Adresse

Desktop

Links

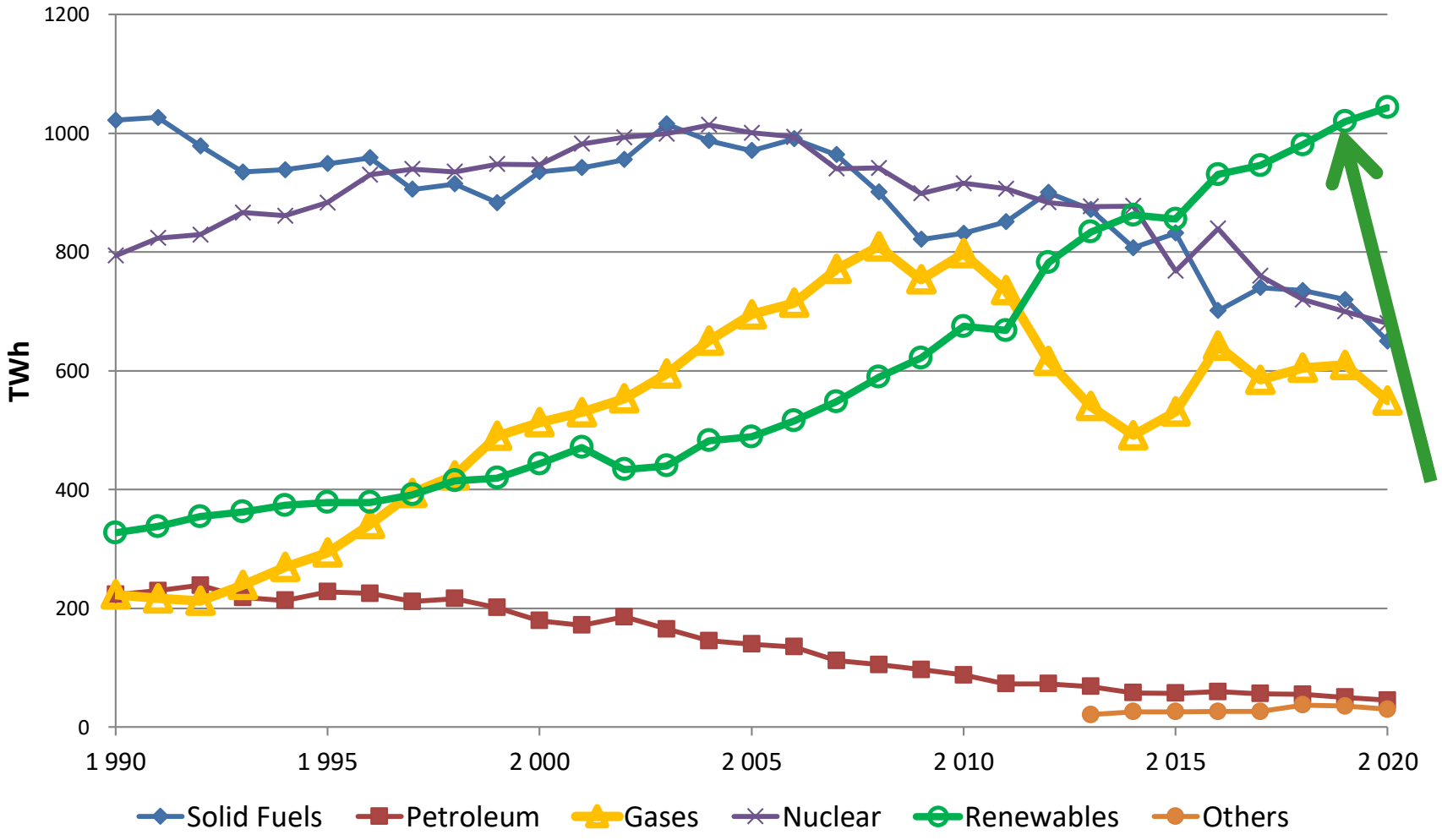
Son...

17:14
14.02.2024

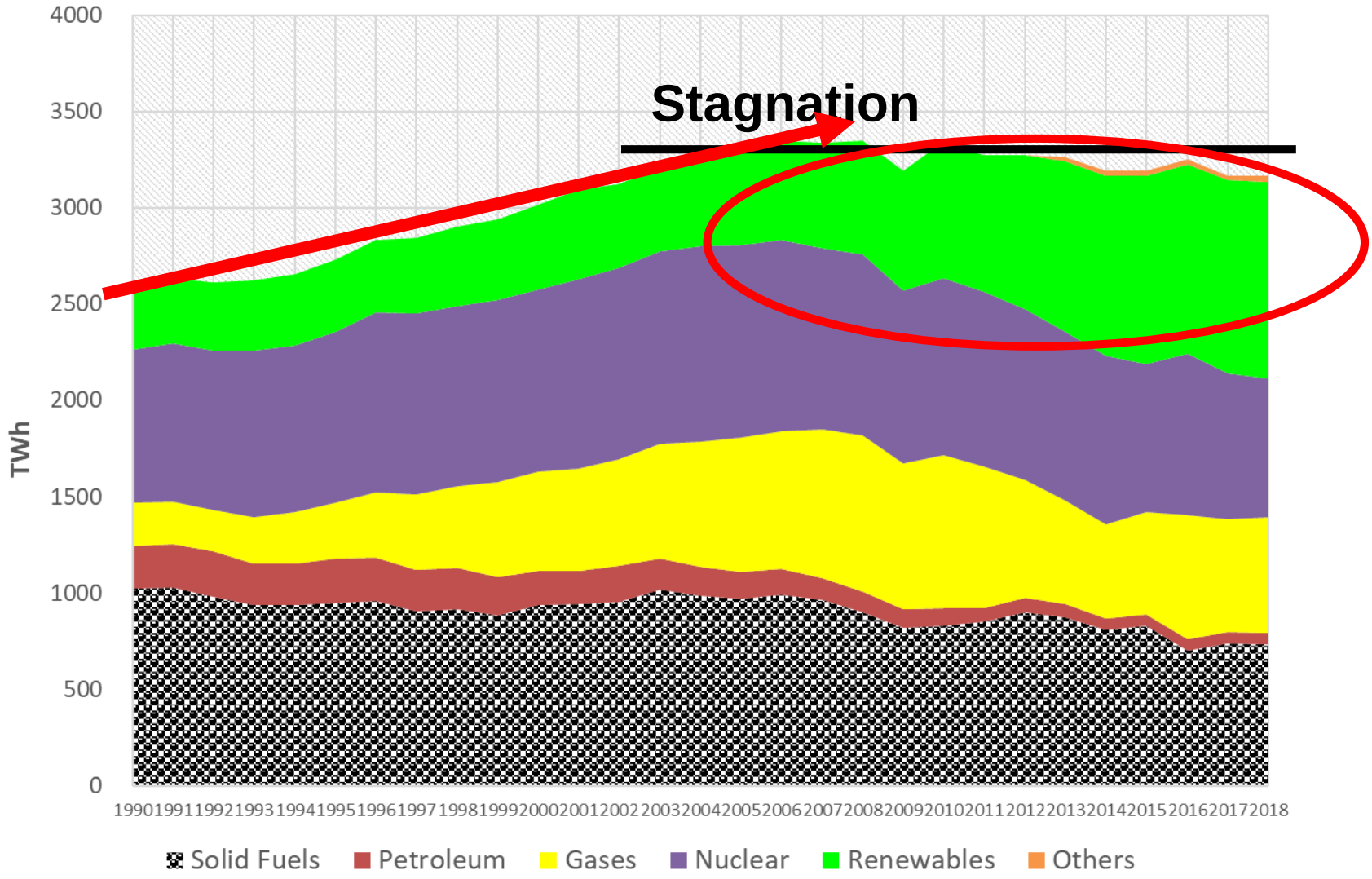
MAJOR ISSUES:

* Better protected and empowered consumers;
* energy market integrity and transparency (ACER) ;
* A competitive European industry with predictable energy costs
* Long-term contracts: PPAs and CfD
* integration of renewables

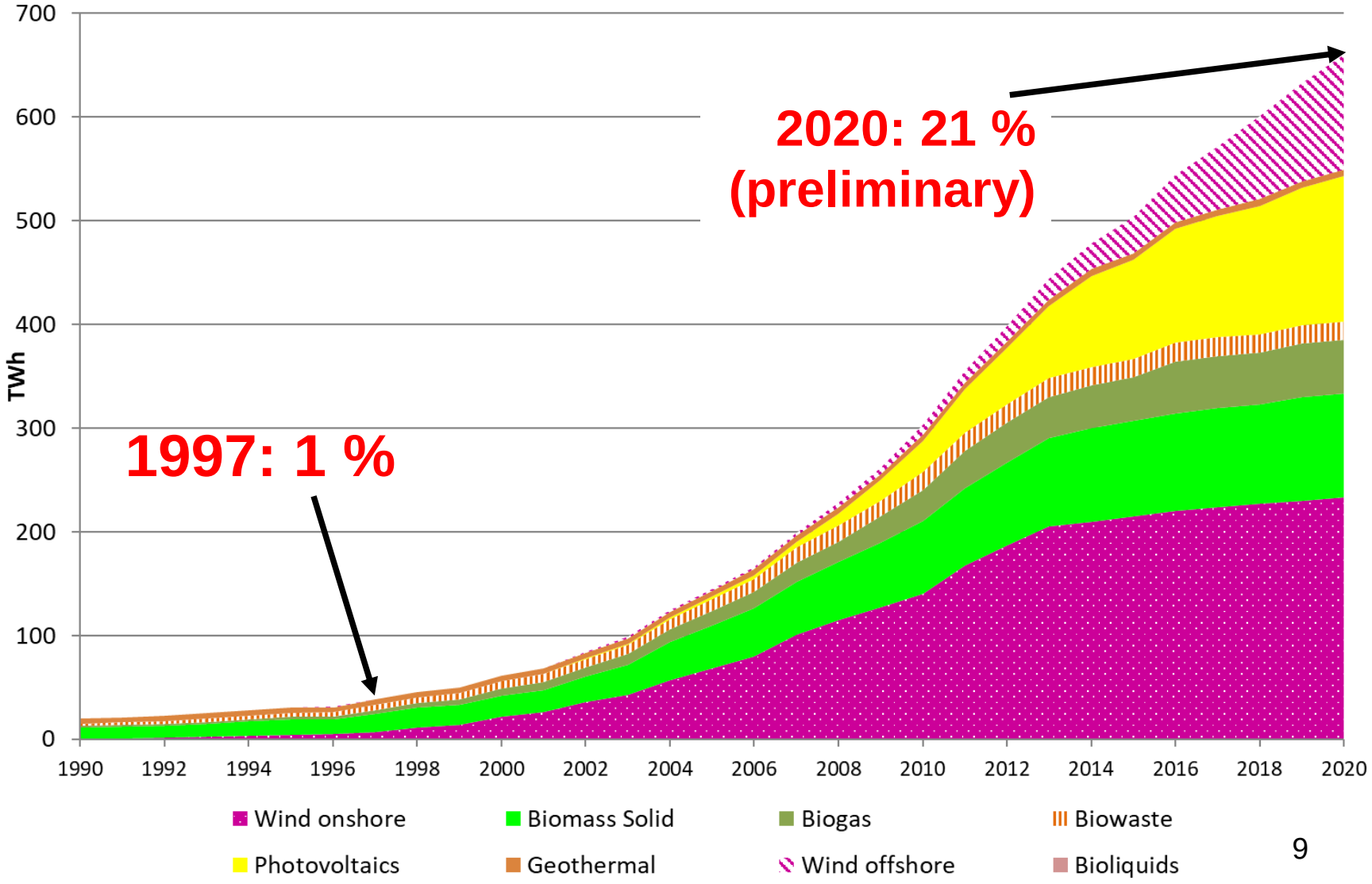
Electricity generation EU-28



Electricity generation EU-28



EU-28: Electricity generation from „new“ RES

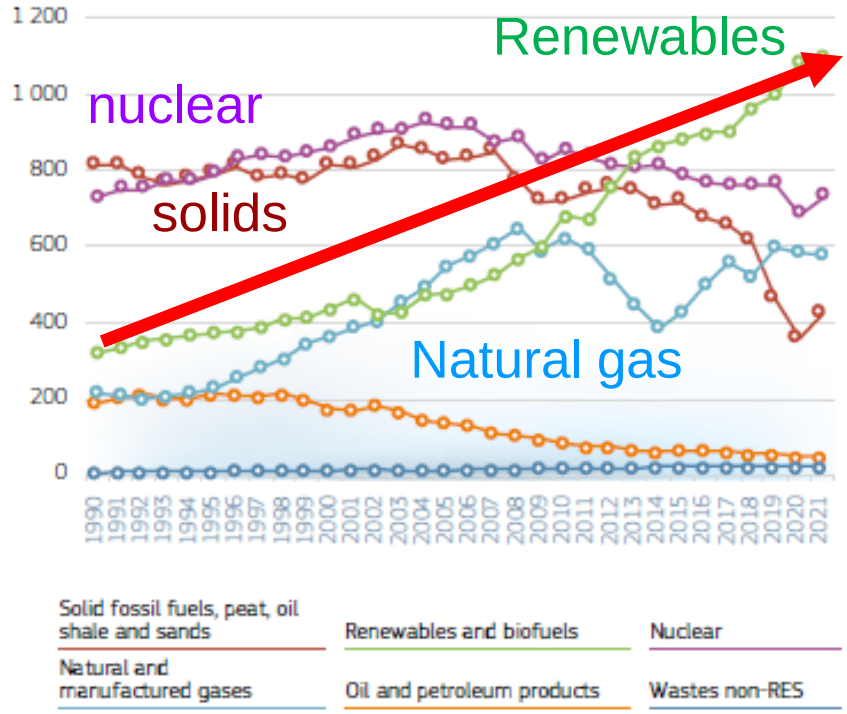


Source: EUROSTAT, own estimations

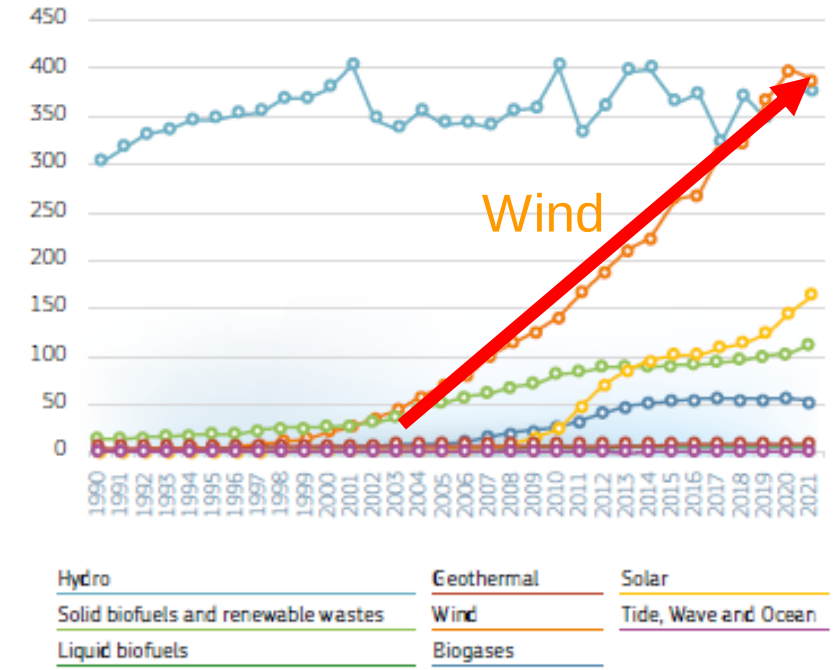
Electricity generation EU-27

2.6.2 Gross Electricity Generation

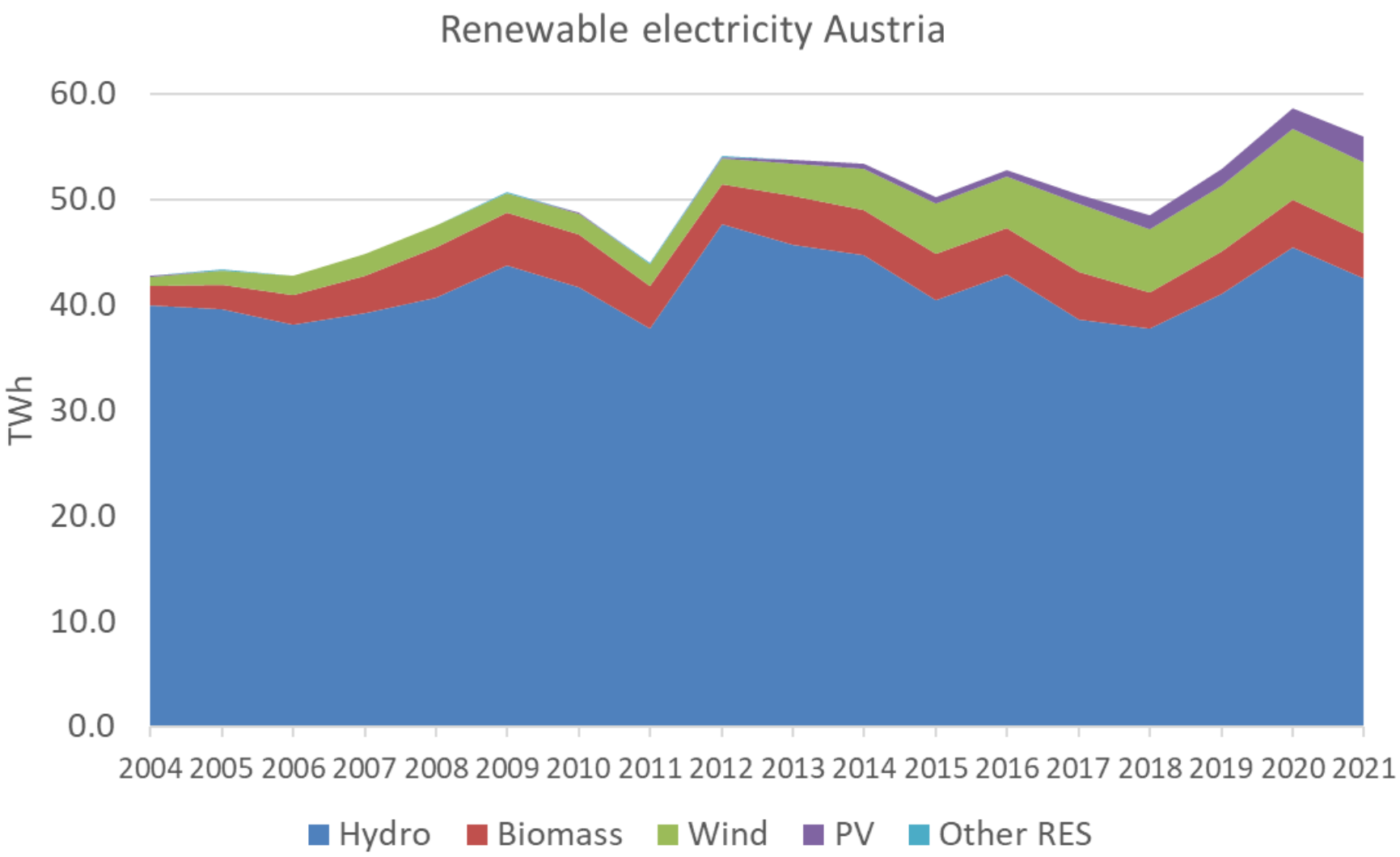
EU27_2020 – BY FUEL – ALL FUELS – **1990-2021 (TWh)**



EU27_2020 – BY FUEL – GROSS ELECTRICITY GENERATION, BY FUEL: RENEWABLES – **1990-2021 (TWh)**

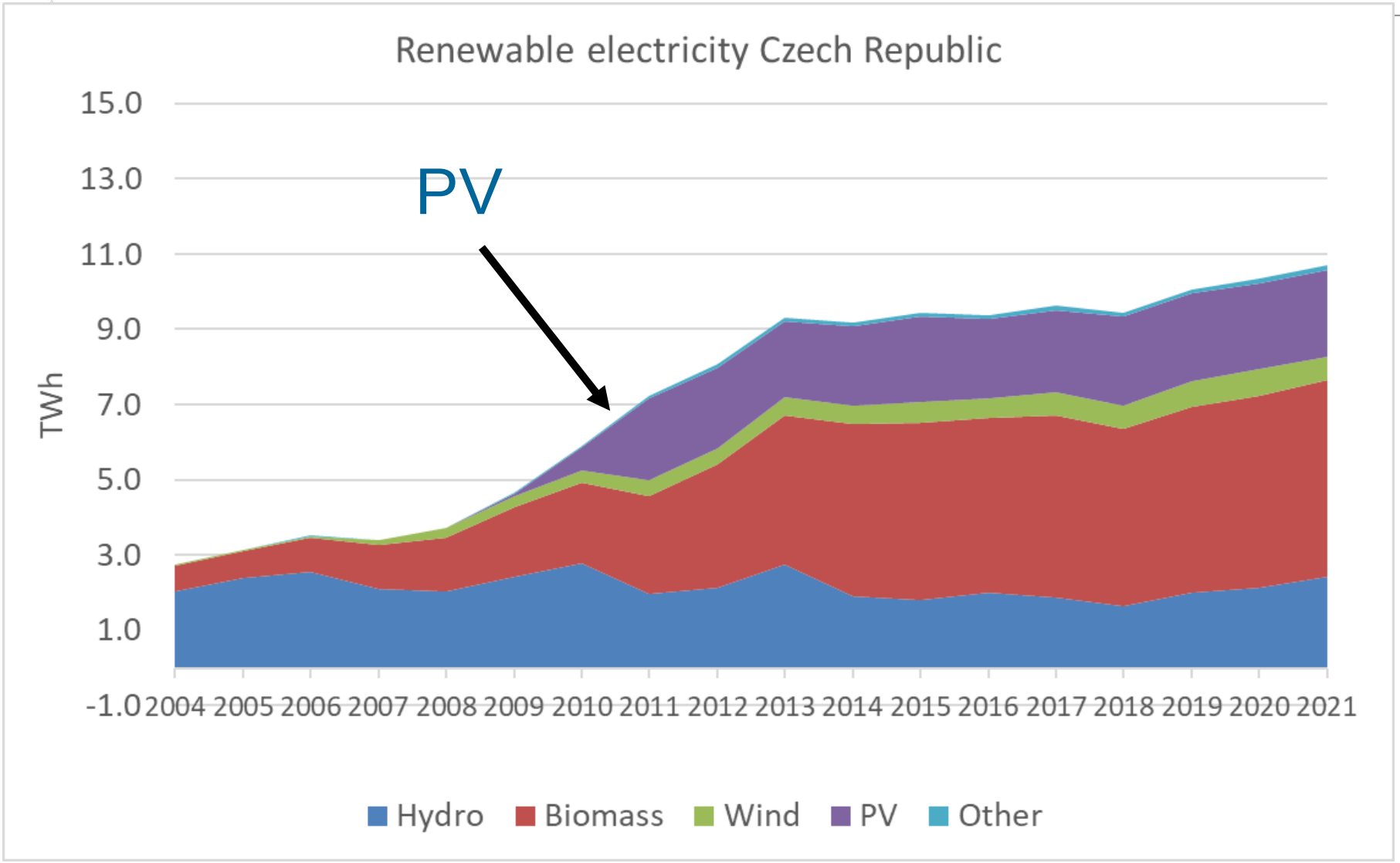


Austria



Increase 2004-2021: 13 TWh

Czech Republic



Increase 2004-2021: 8 TWh

Czech Republic vs Austria

Austria:

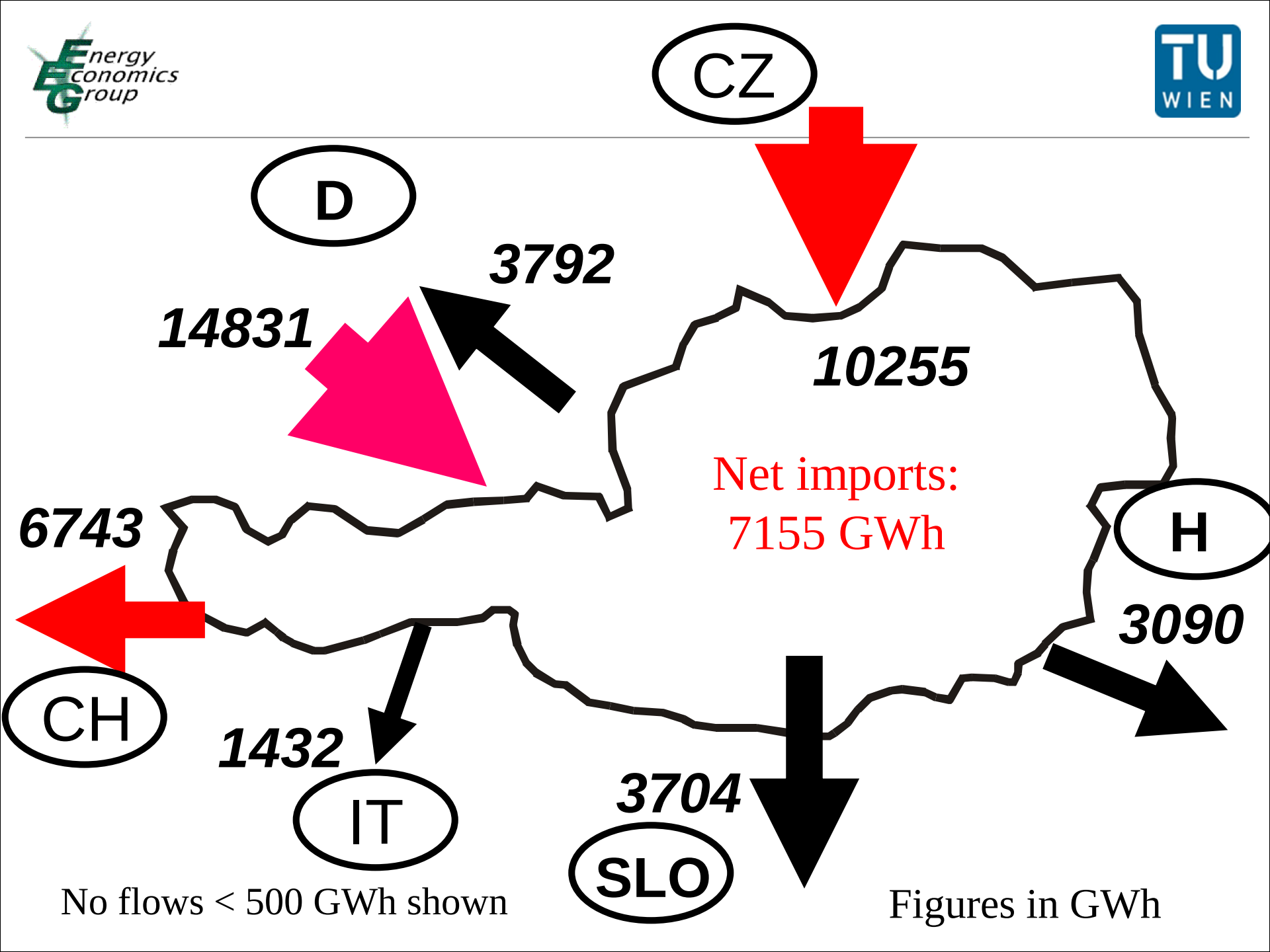
Increase renewables 2004-2021: 13 TWh

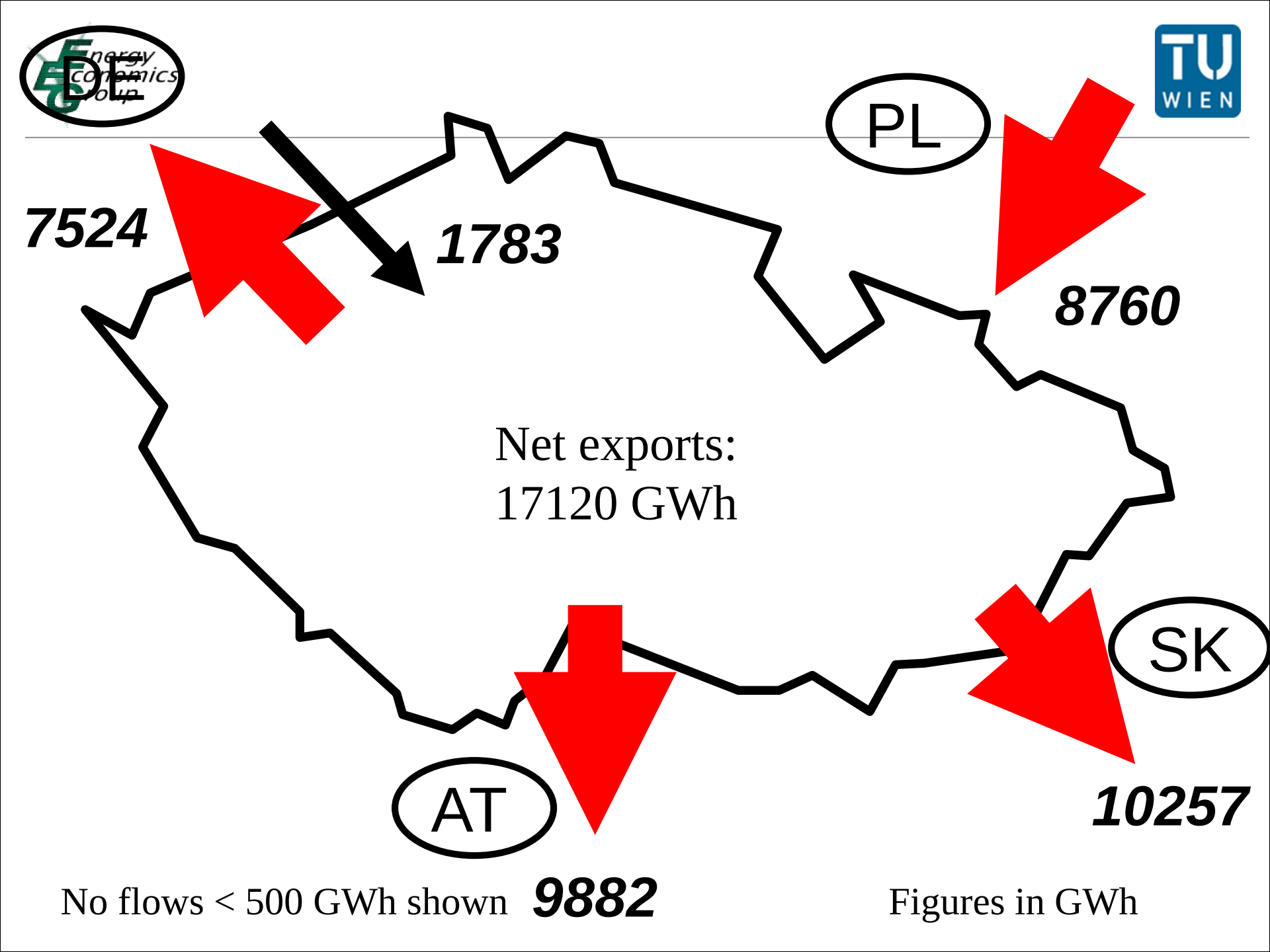
= Increase of 30 %

Czech Republic

Increase renewables 2004-2021: 8 TWh

= Increase of 290 % (!)


CZ
D
3792
14831
10255
Net imports:
7155 GWh
6743
H
3090
CH
1432
IT
3704
SLO
No flows < 500 GWh shown
Figures in GWh

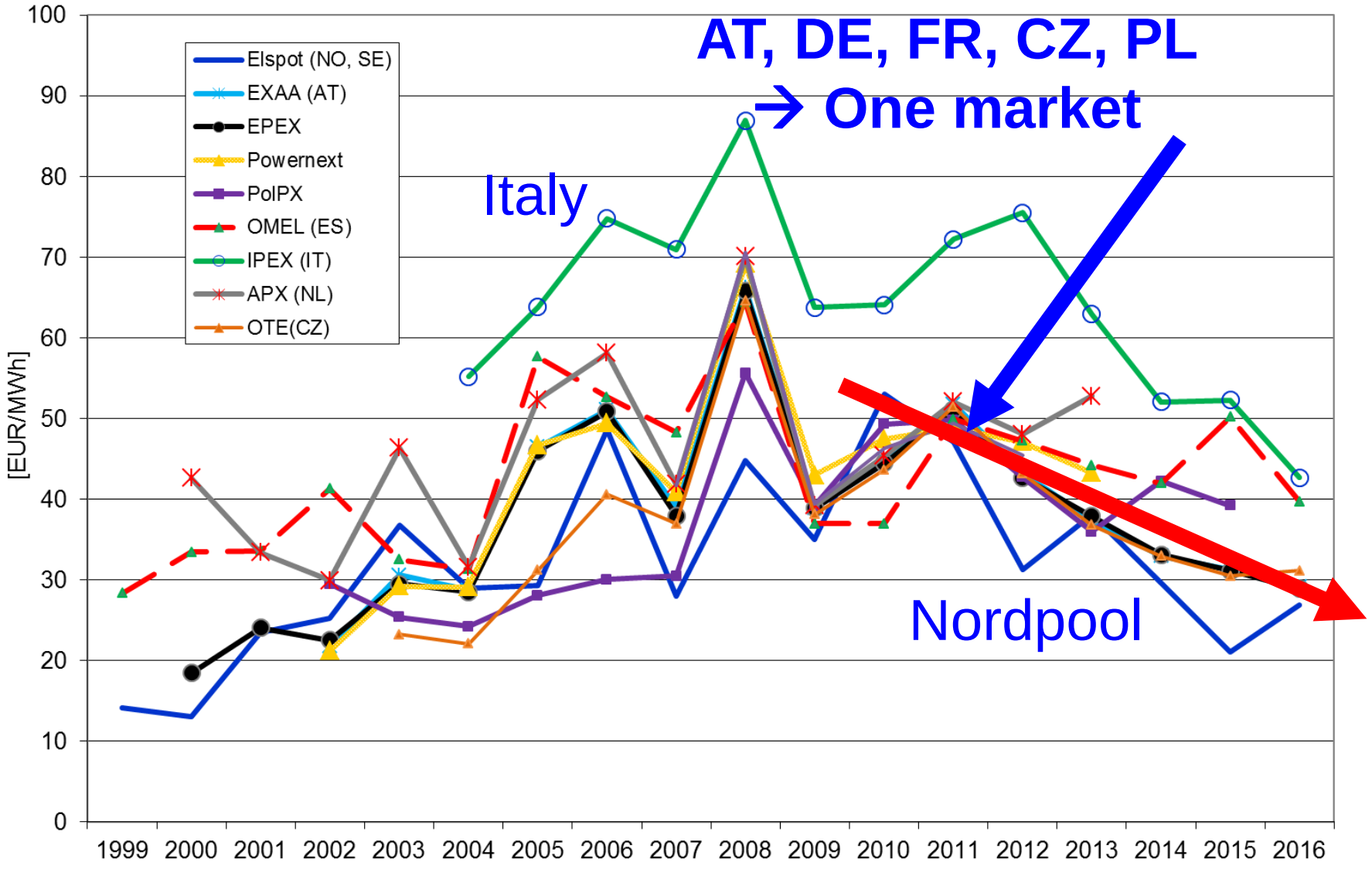


No flows < 500 GWh shown

Figures in GWh

2 HOW PRICES IN ELECTRICITY MARKETS COME ABOUT

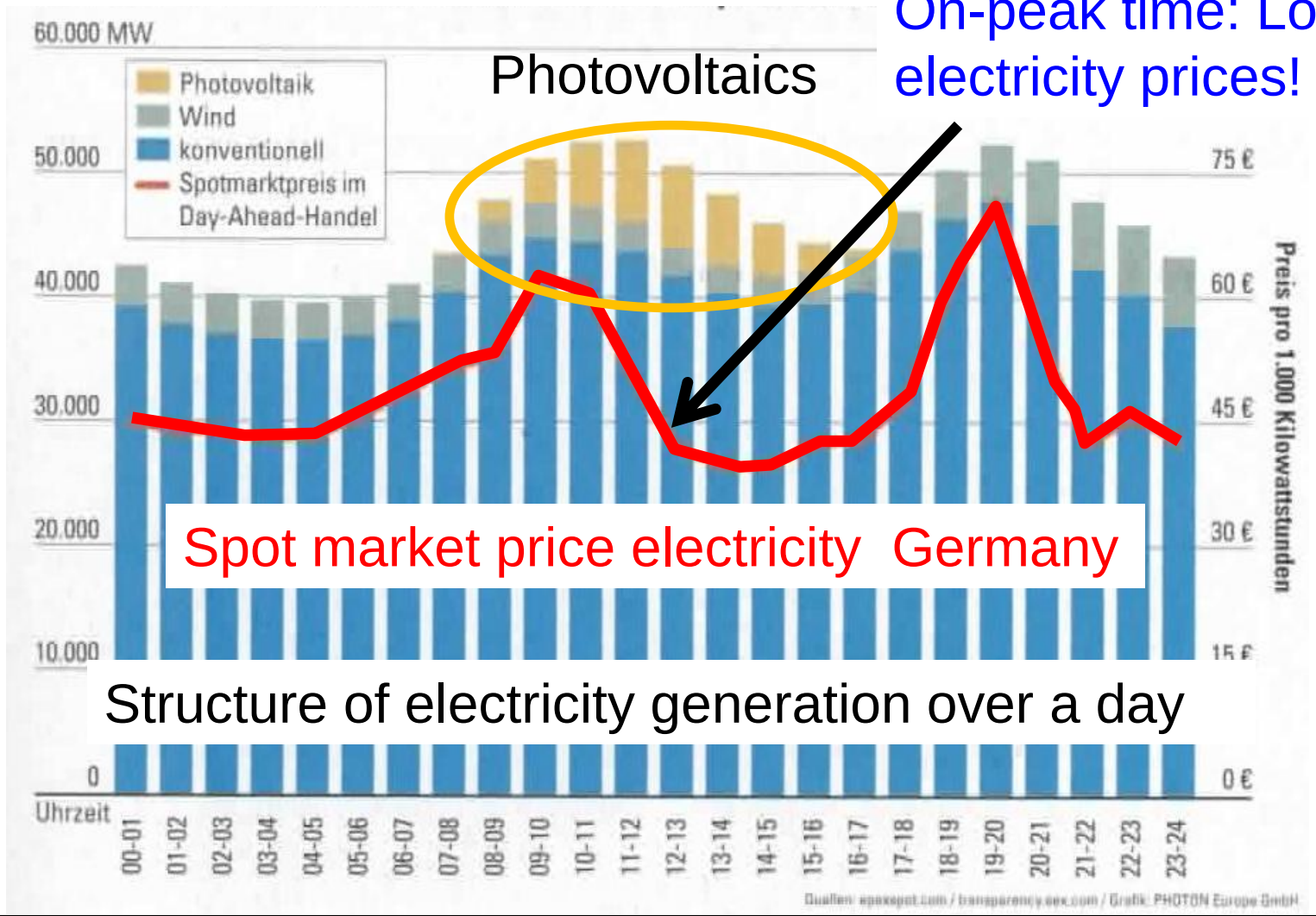
Development of electricity prices in Europe up to 2016 (1)



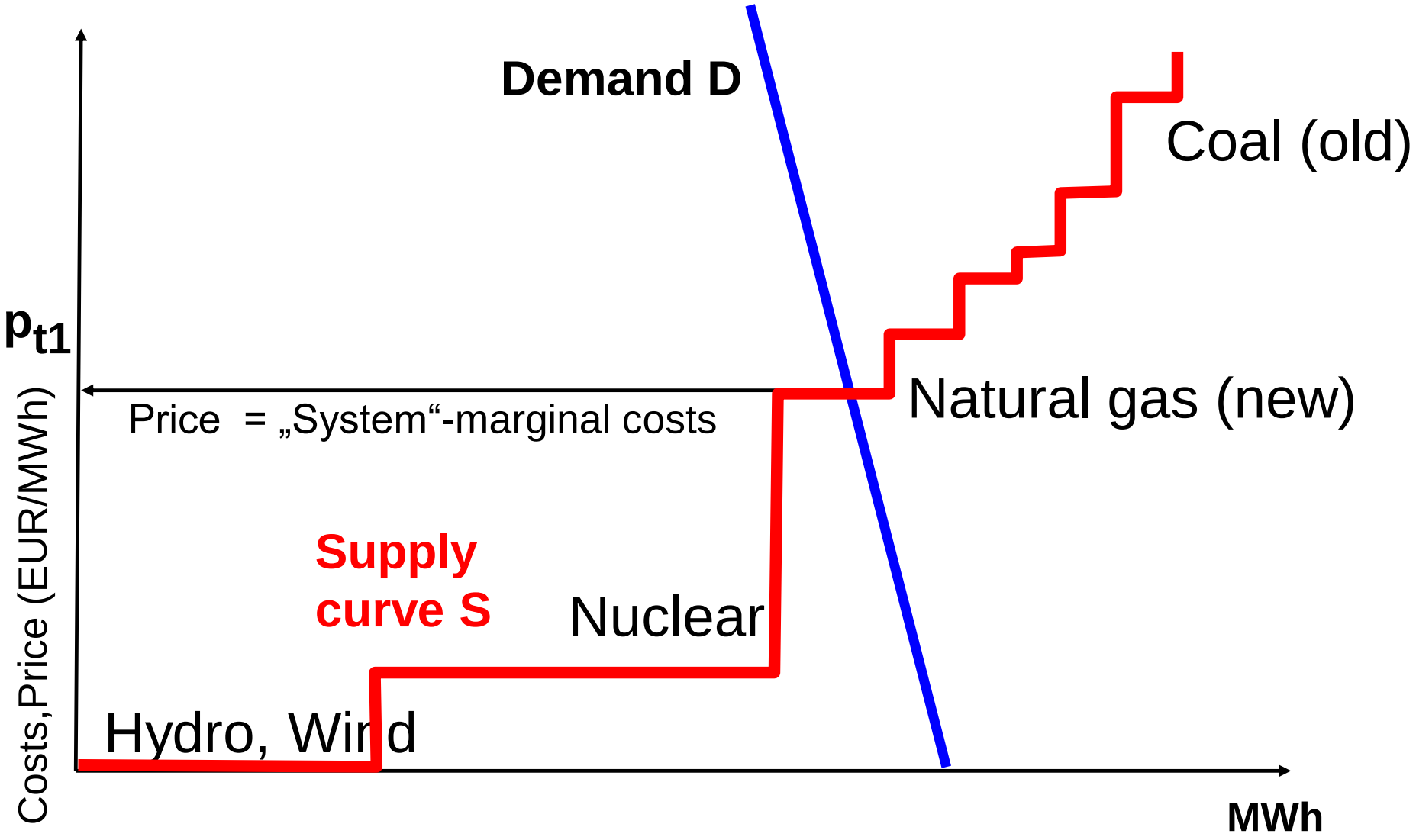
WHY?

STMC = 0!

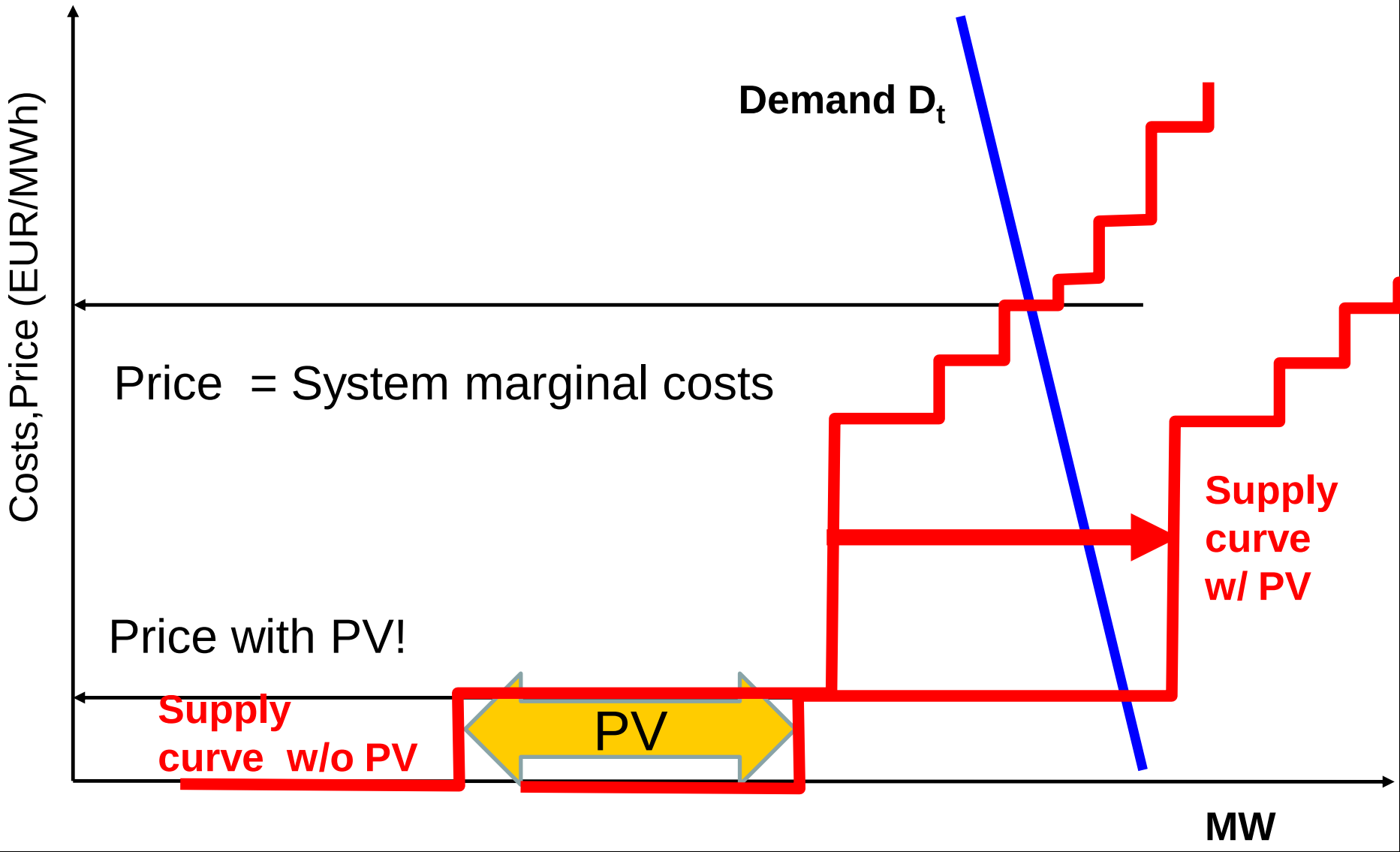
PV AFFECTS THE ELECTRICITY MARKET PRICE IN GERMANY



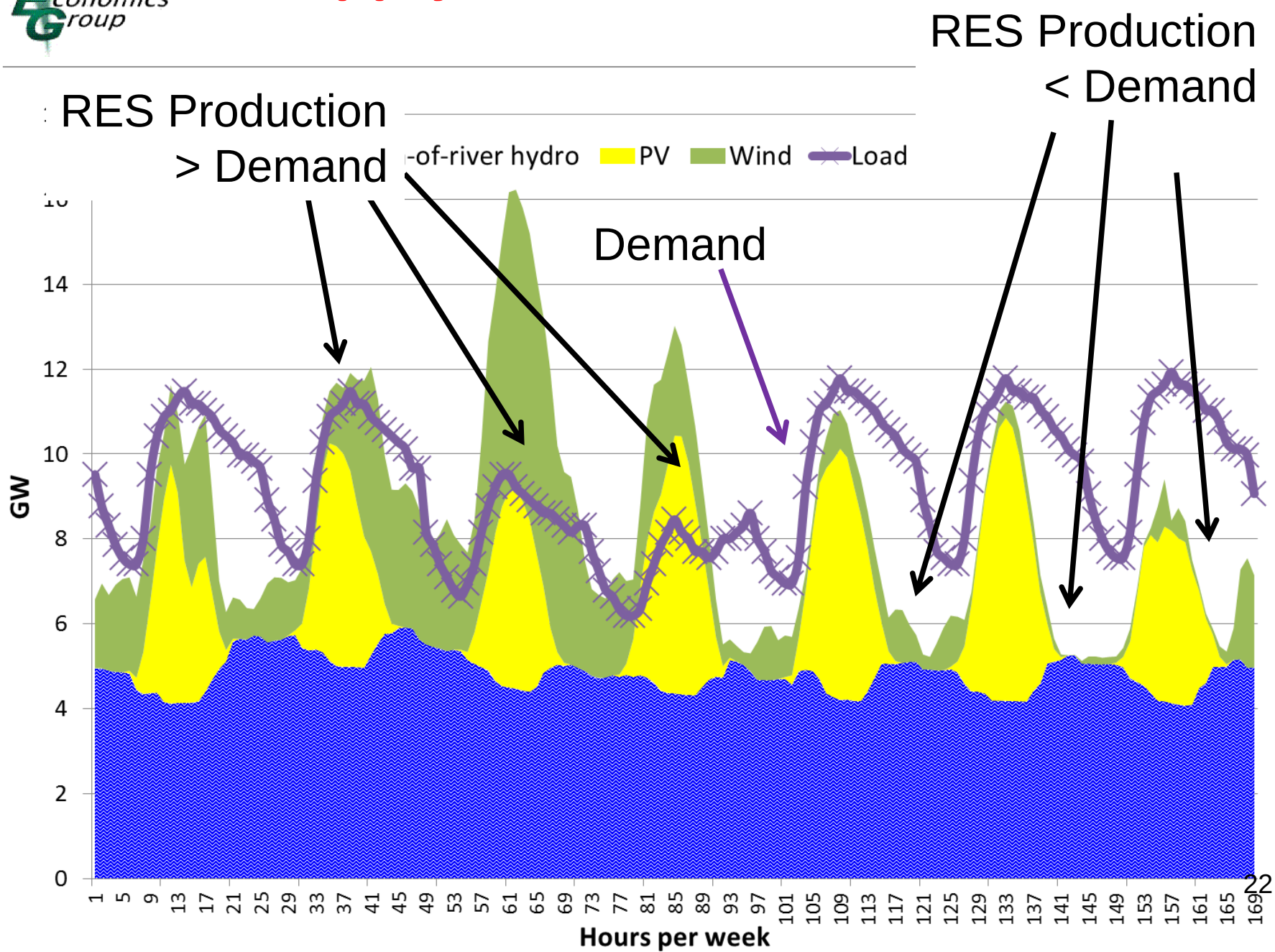
BASIC PRINCIPLE OF COMPETITION: PRICE = MARGINAL COSTS



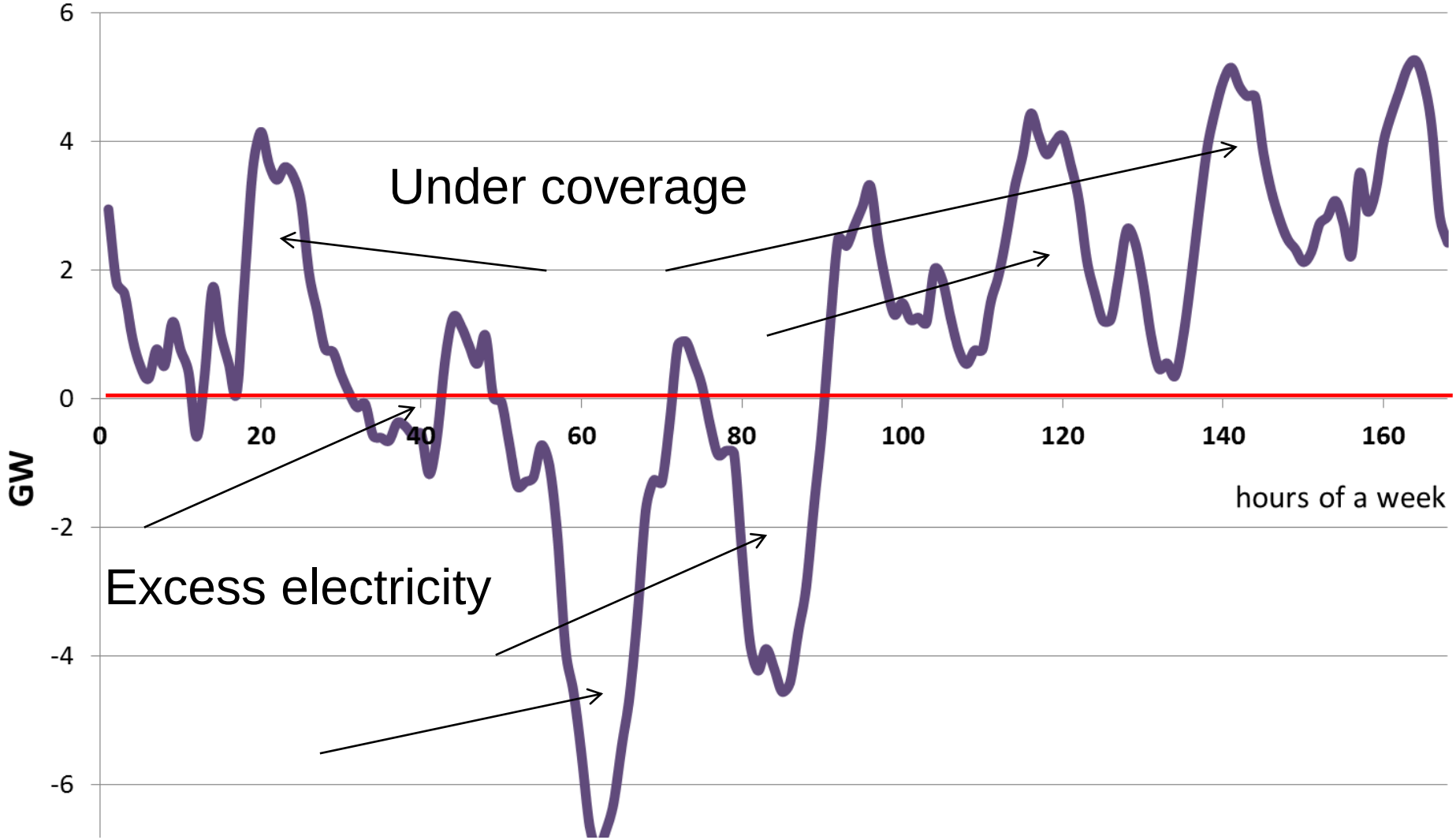
PRICES WITHOUT AND WITH PV



Supply and Demand 2030



3. Key term of the future: Residual load



Residual load = Load – non-flexible generation

What do you think about renewables in the energy system?

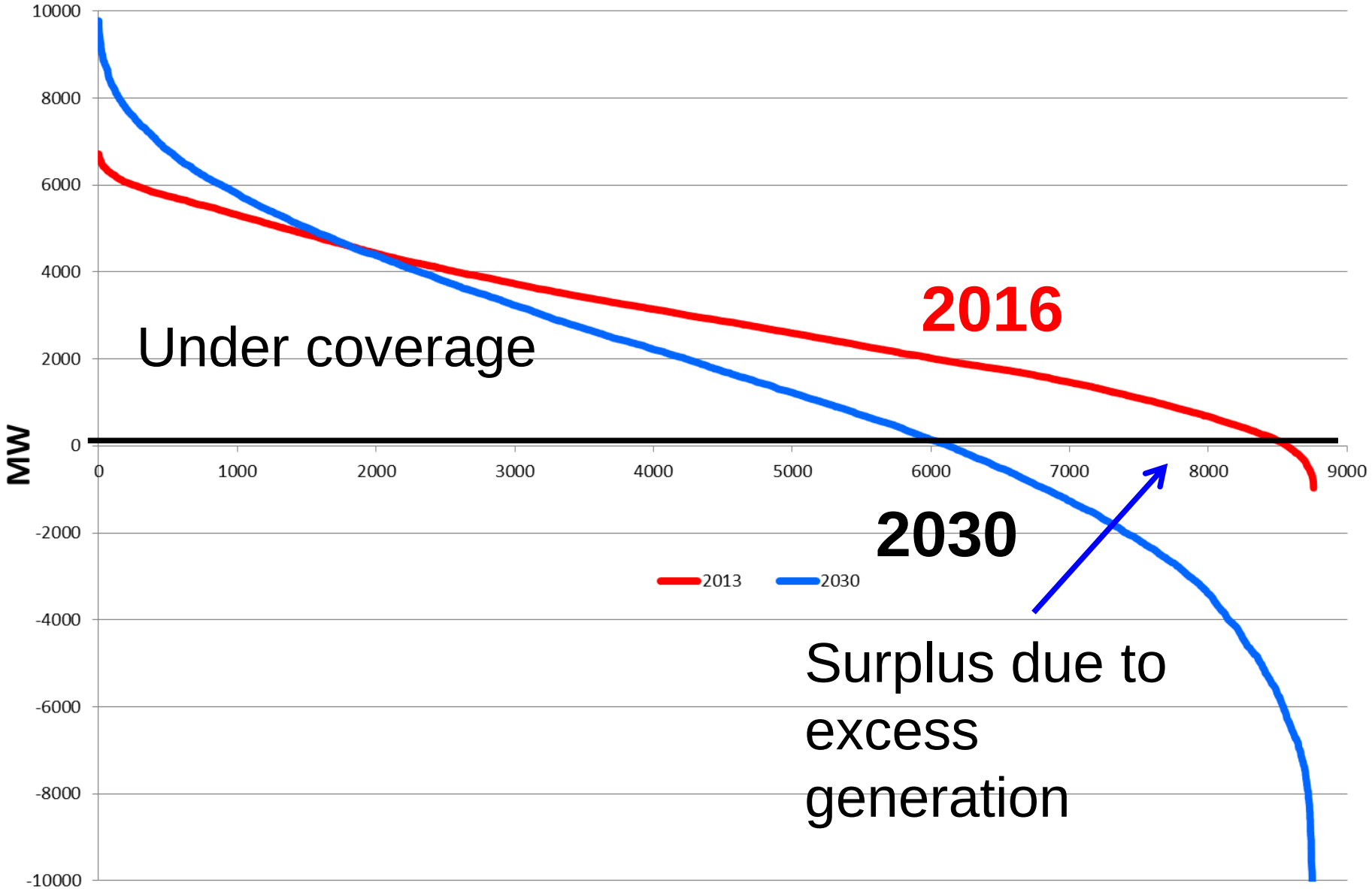
CATEGORIES OF „PROBLEMS“:

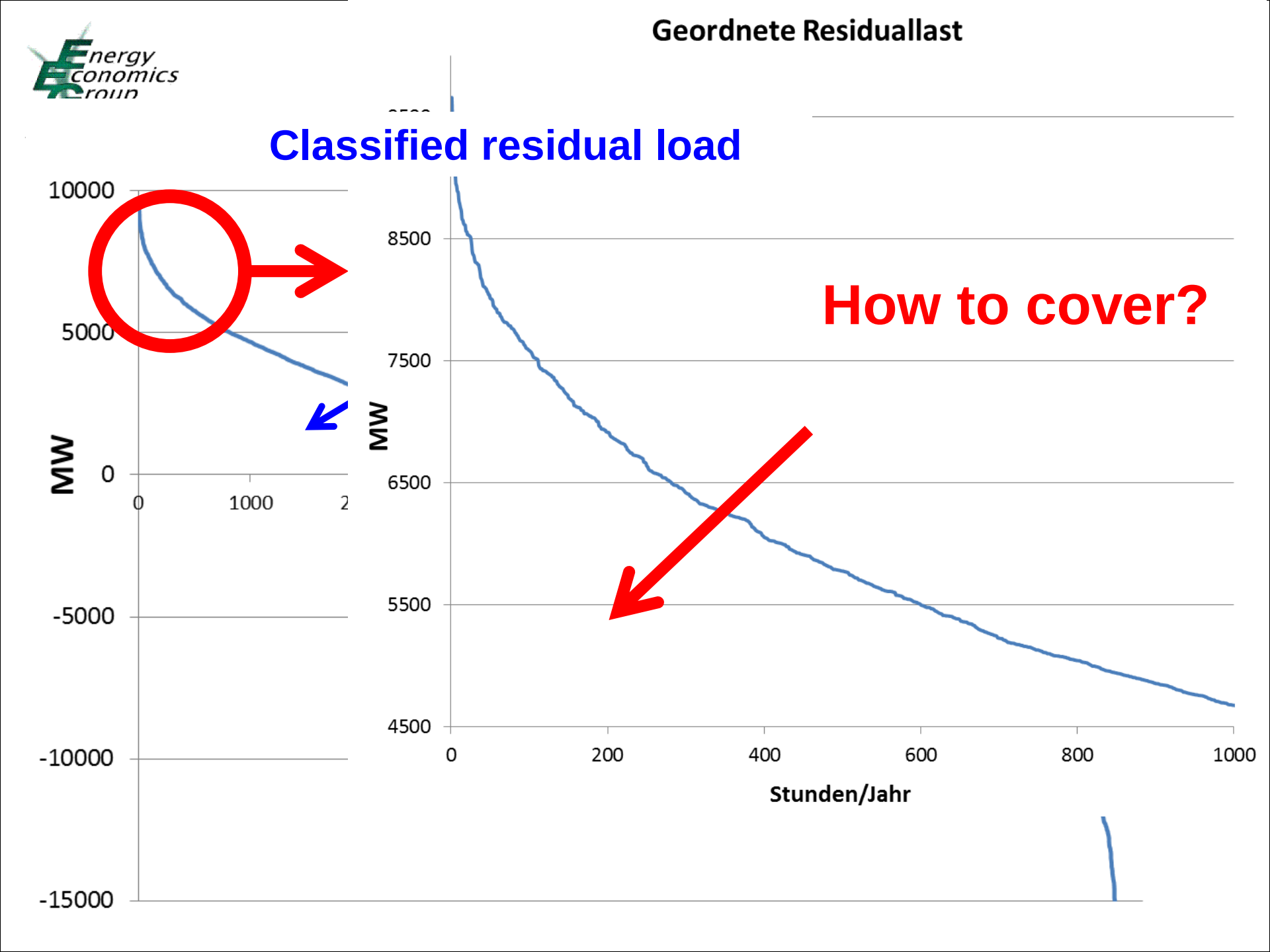
1. Prices decrease to Zero (or below) at a number of days;

2. Lacking contribution margin to fixed costs

3. On how many days will we face high and on how many dayslow prices?

Classified residual load




Geordnete Residuallast
Classified residual load
How to cover?
MW
10000
5000
0
-5000
-10000
-15000
0
1000
8500
7500
6500
5500
4500
200
400
600
800
Stunden/Jahr

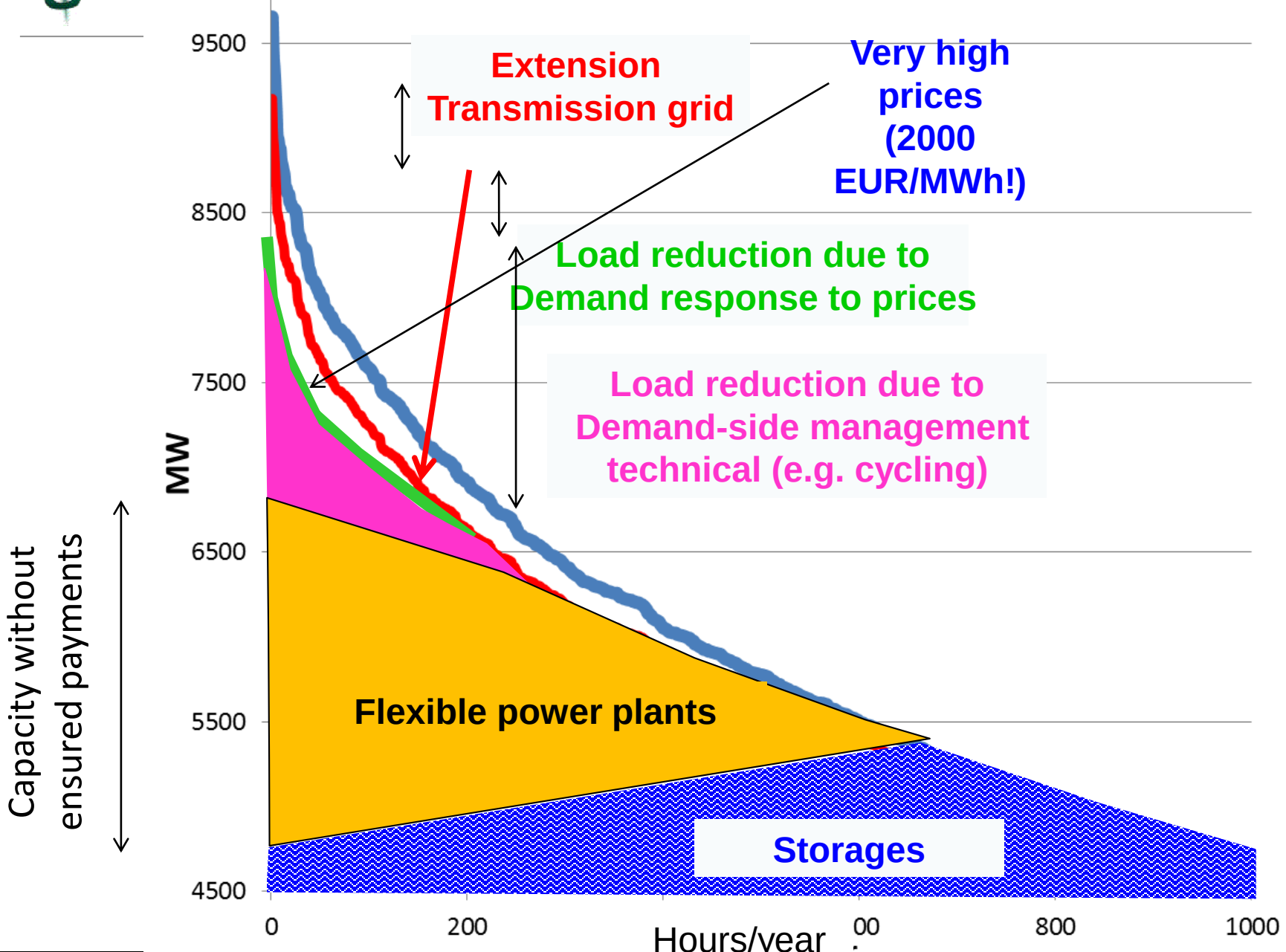
4. Capacity payments vs Flexibility

By a regulated capacity „market“ ?

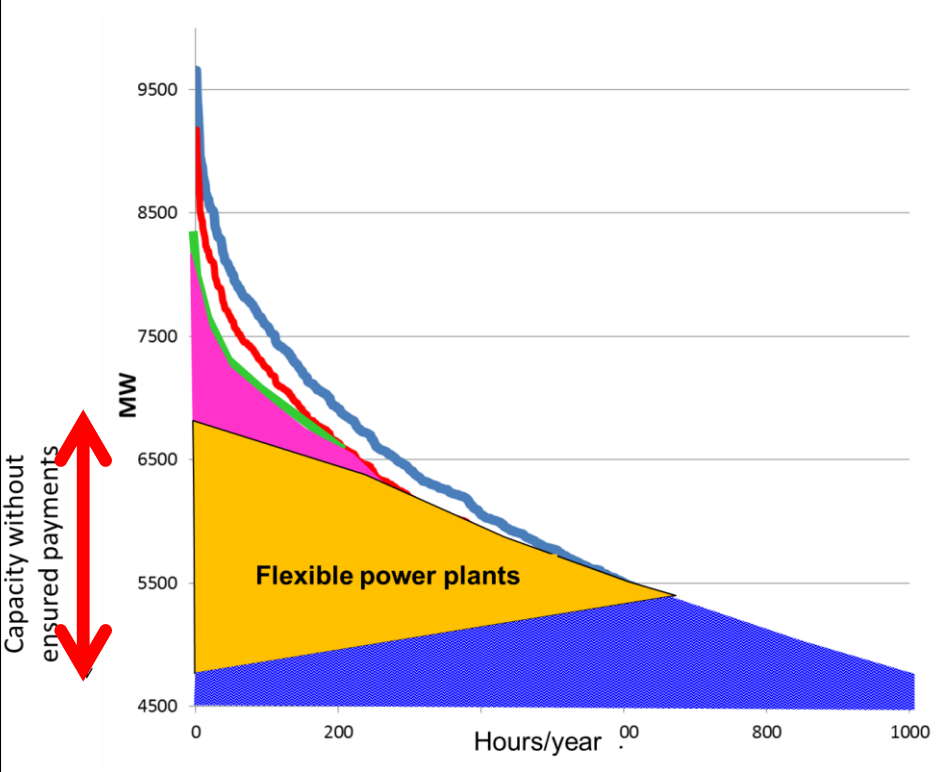
or

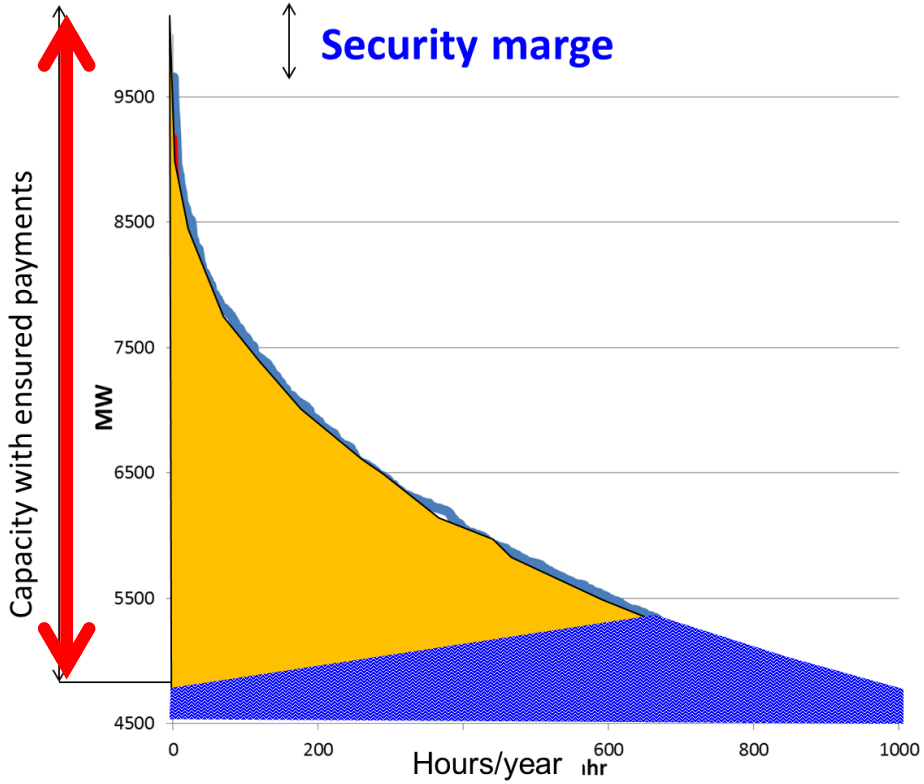
By competition between supply-side and demand-side technologies (incl. storages and grid)?

Flexible coverage of residual load



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

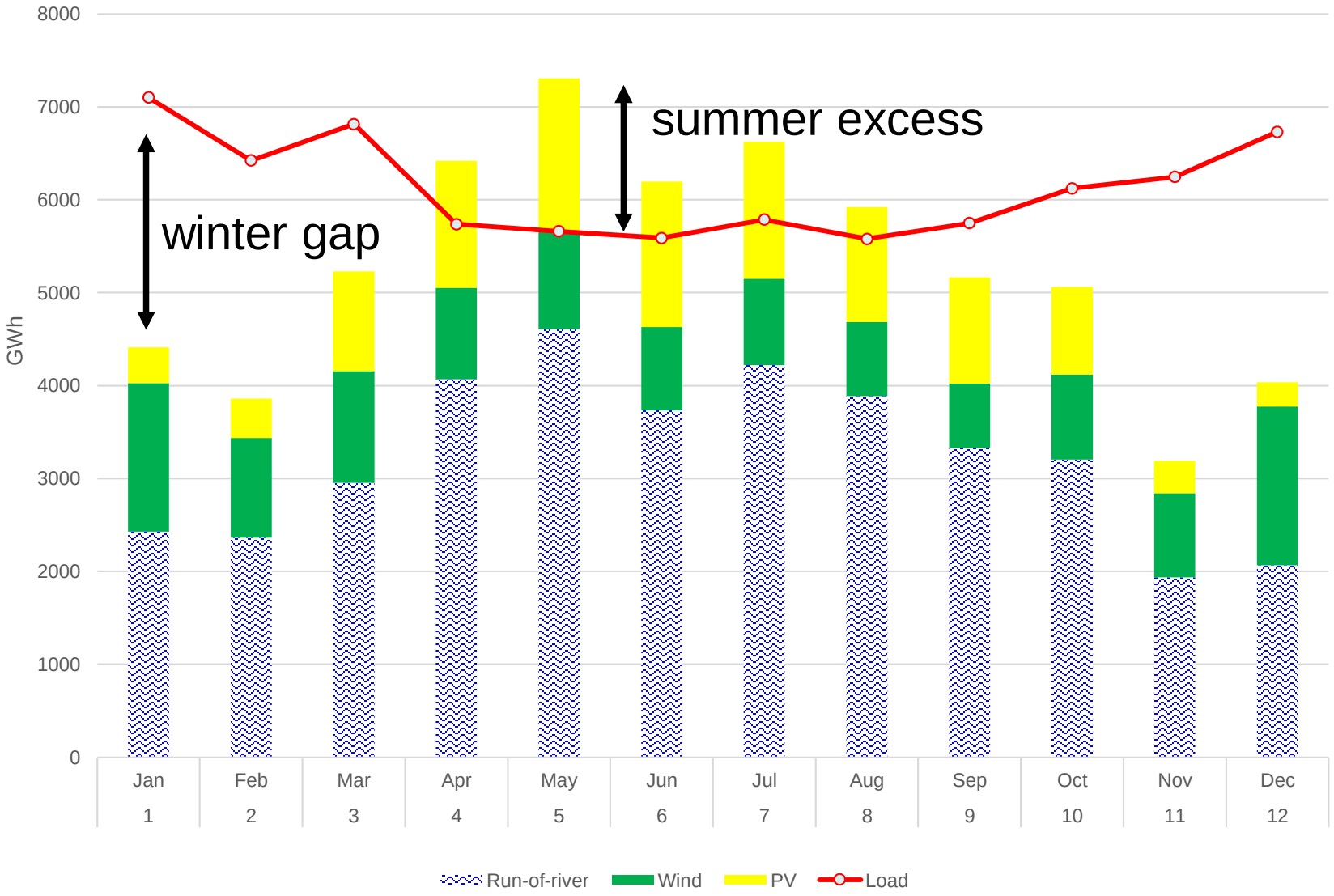
THE CORE PROBLEMS OF CAPACITY PAYMENTS

All regulatory capacity payments for power plants distort the EOM and lead to wrong price signals for all other options

Price peaks at times of scarce resource should revive the markets and lead to effective competition

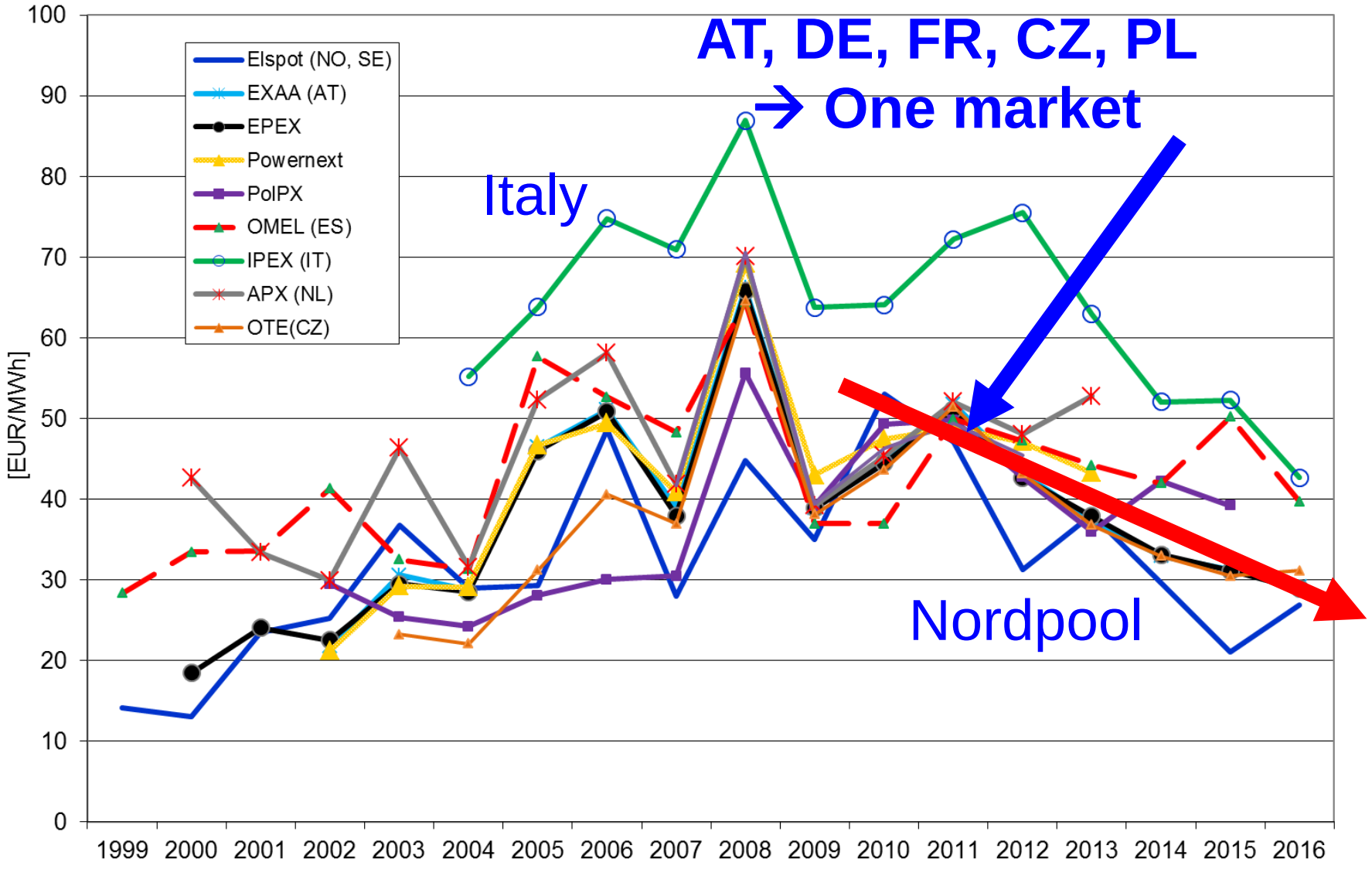
strive to retain system resource adequacy by correct price signals

Sommer vs Winter: Wie ?

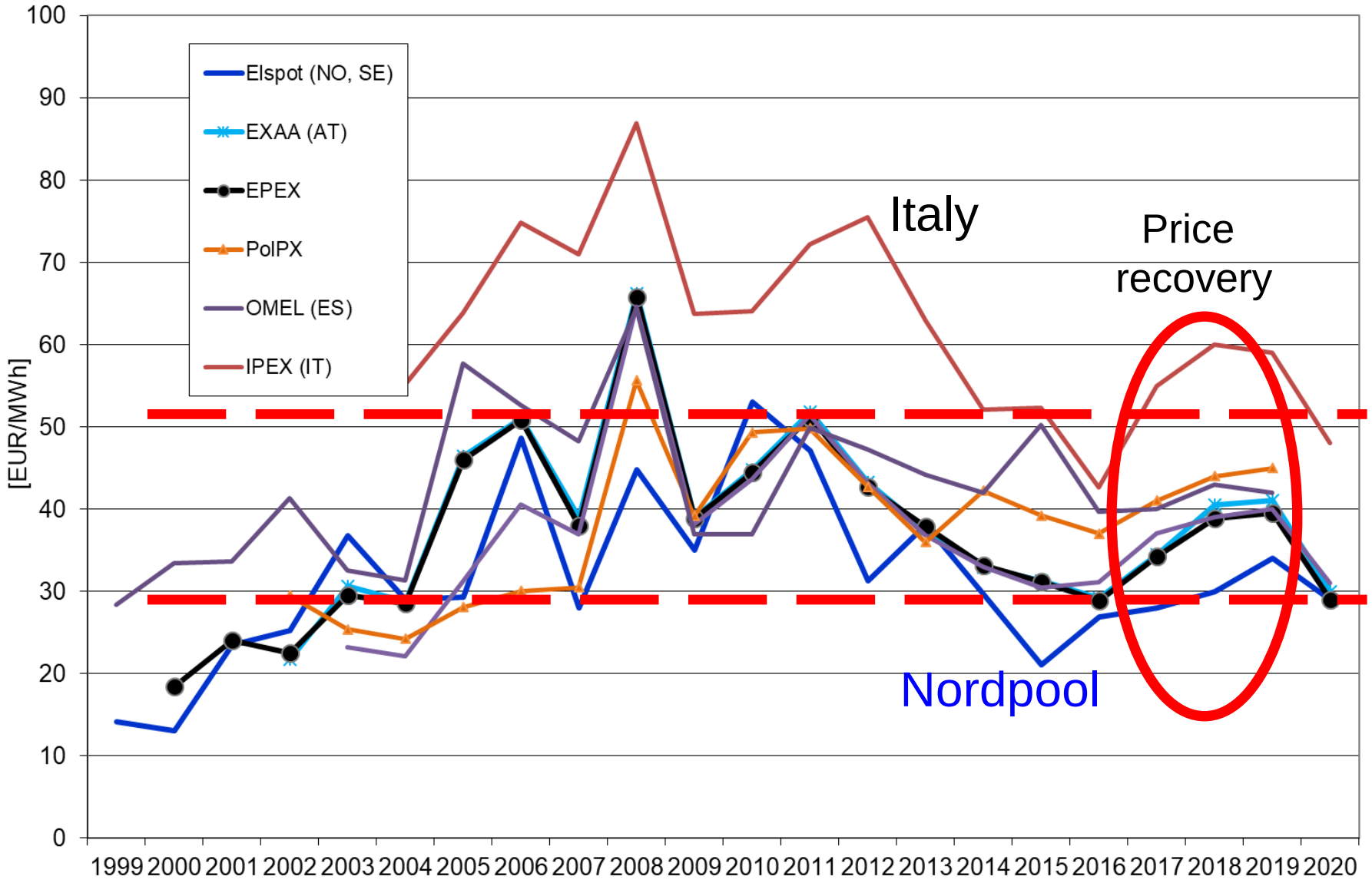


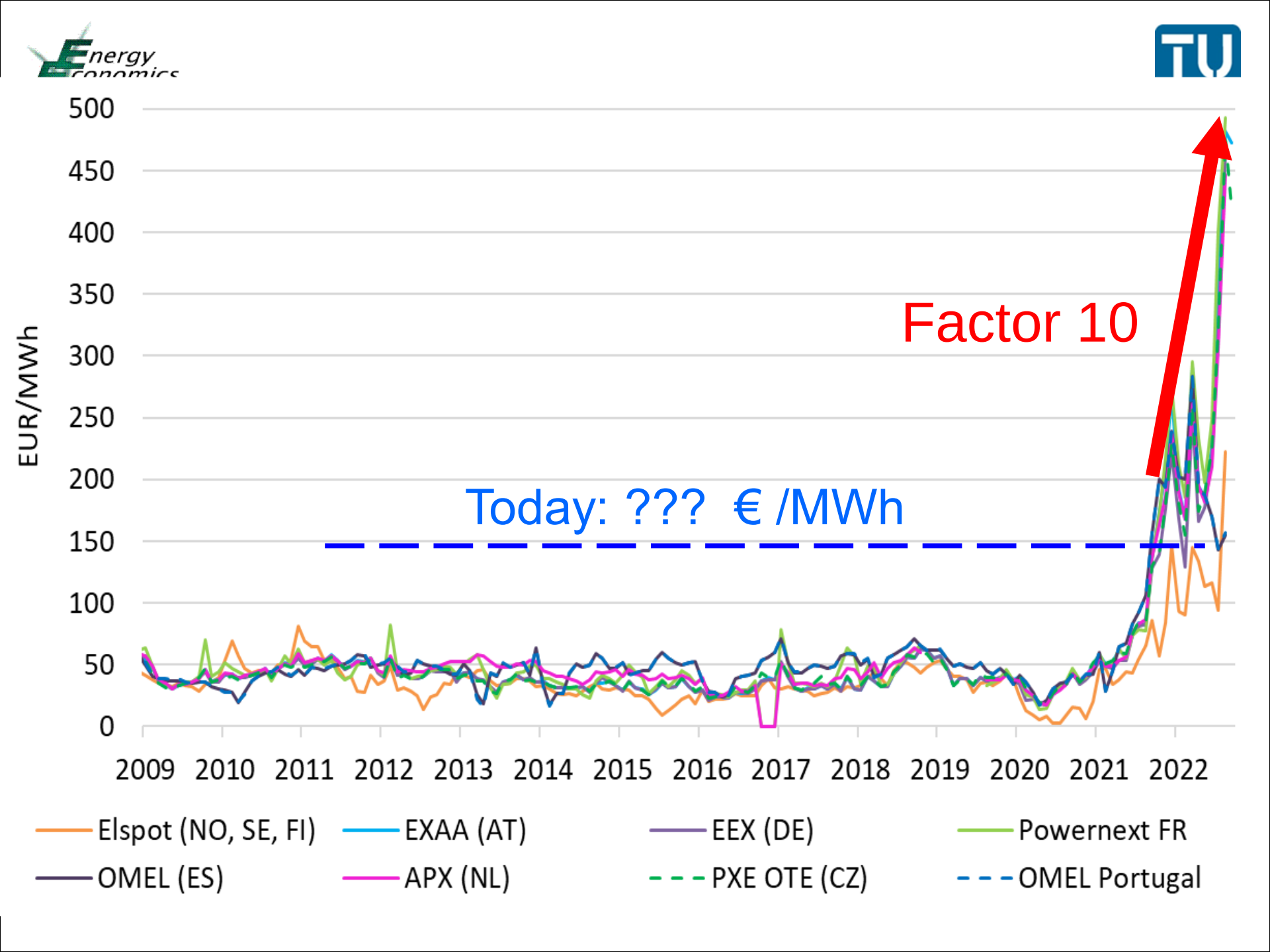
5 DEVELOPMENT OF ELECTRICITY PRICES

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



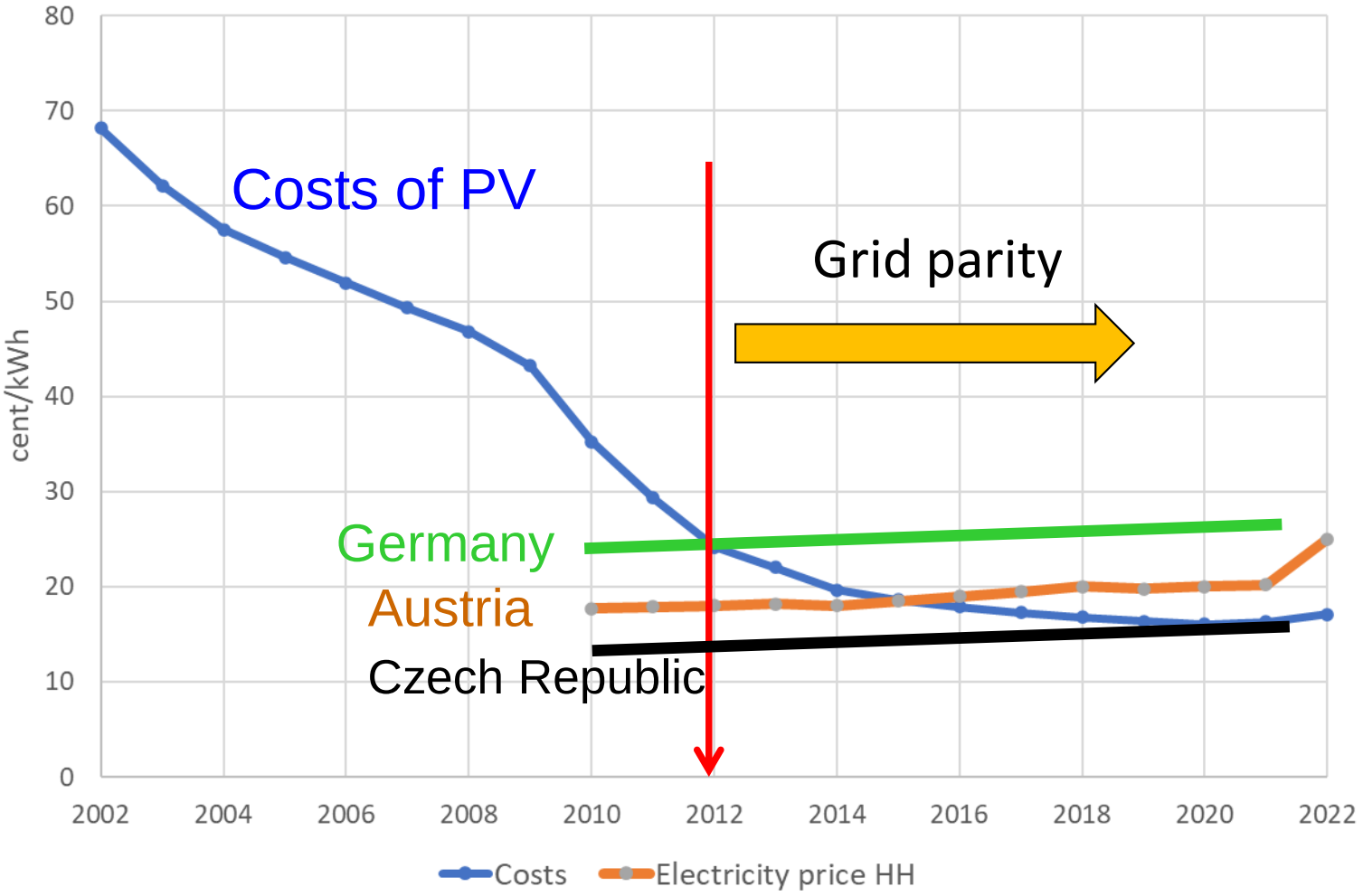
Development of day-ahead electricity prices in Europe per year (2)



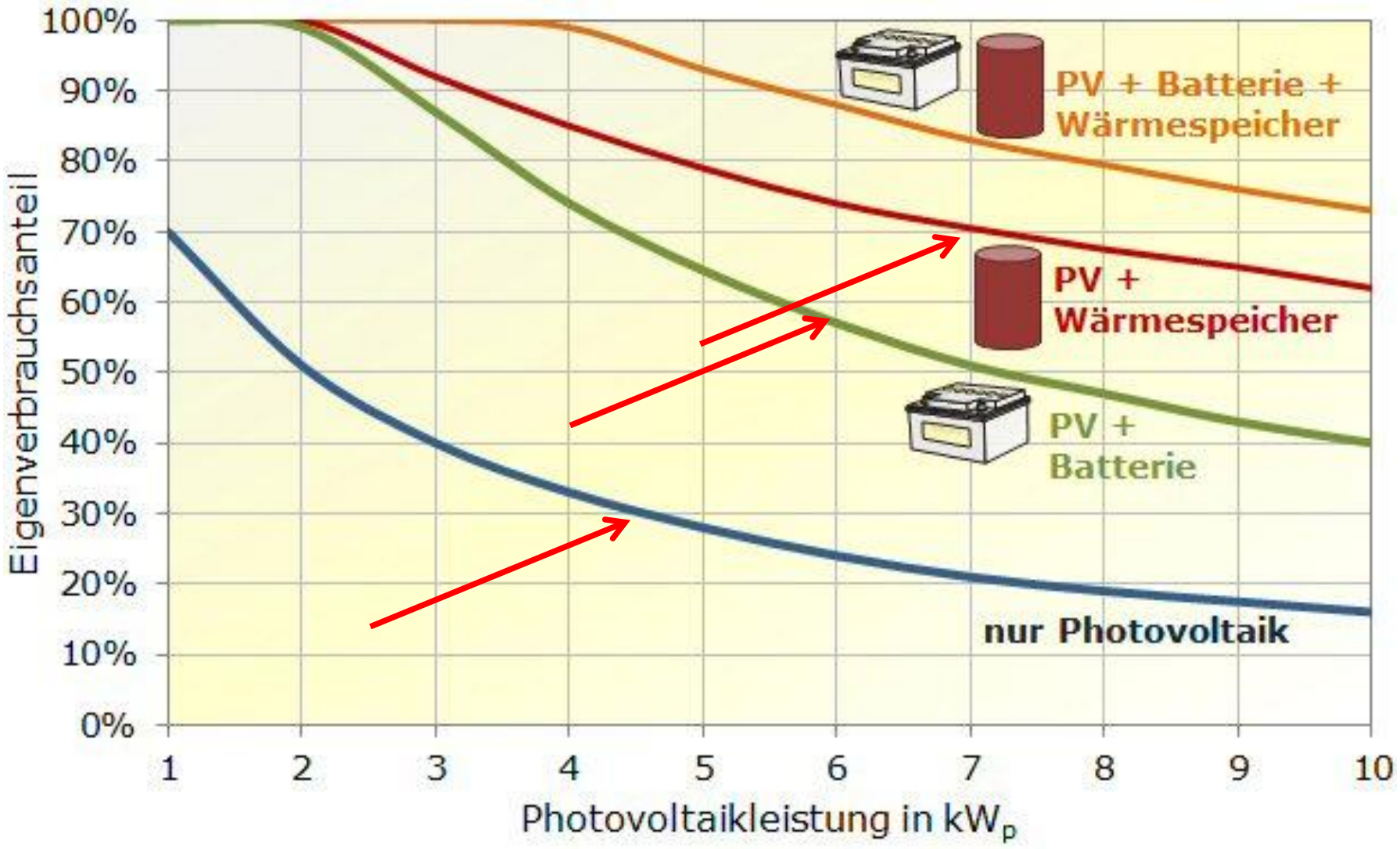

Energy Economics
500
450
400
350
300
250
200
150
100
50
0
EUR/MWh
Factor 10
Today: ??? € /MWh
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
Elspot (NO, SE, FI)
EXAA (AT)
EEX (DE)
Powernext FR
OMEL (ES)
APX (NL)
PXE OTE (CZ)
OMEL Portugal

6. RETAIL MARKETS: TOWARDS PROSUMAGERS AND ENERGY COMMUNITIES

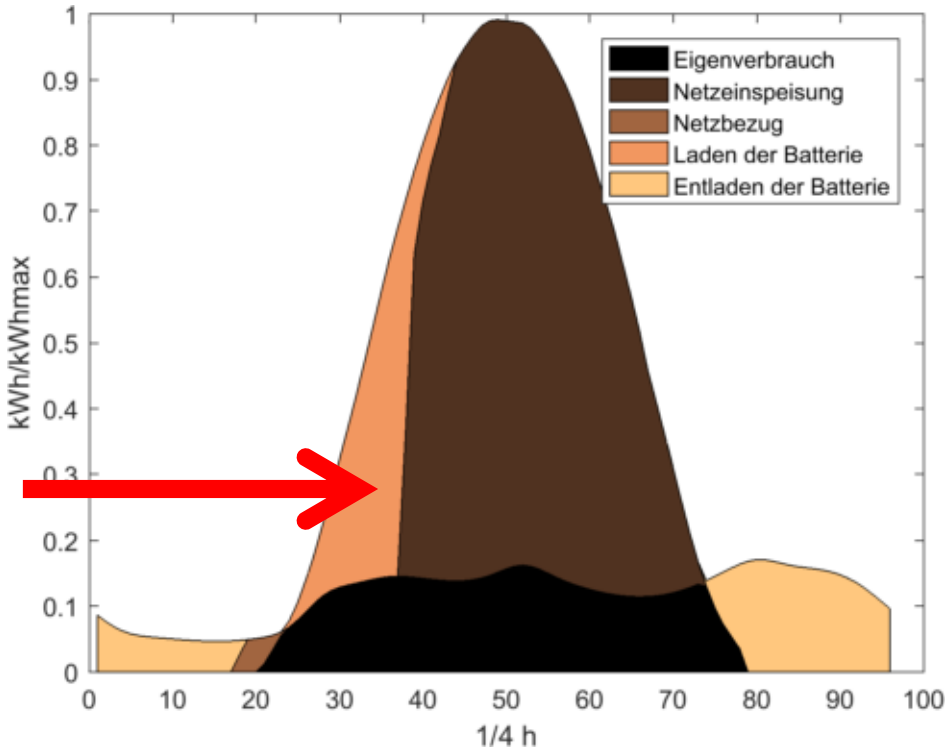
Grid parity: PV-costs and household electricity prices

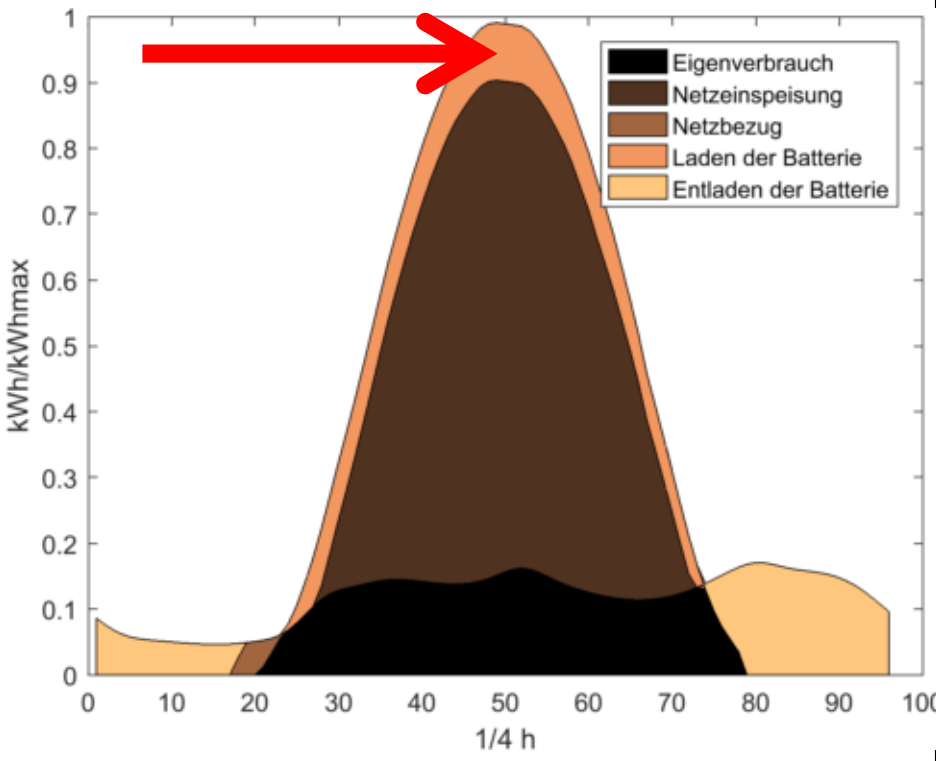


Eigenverbrauchsanteil:

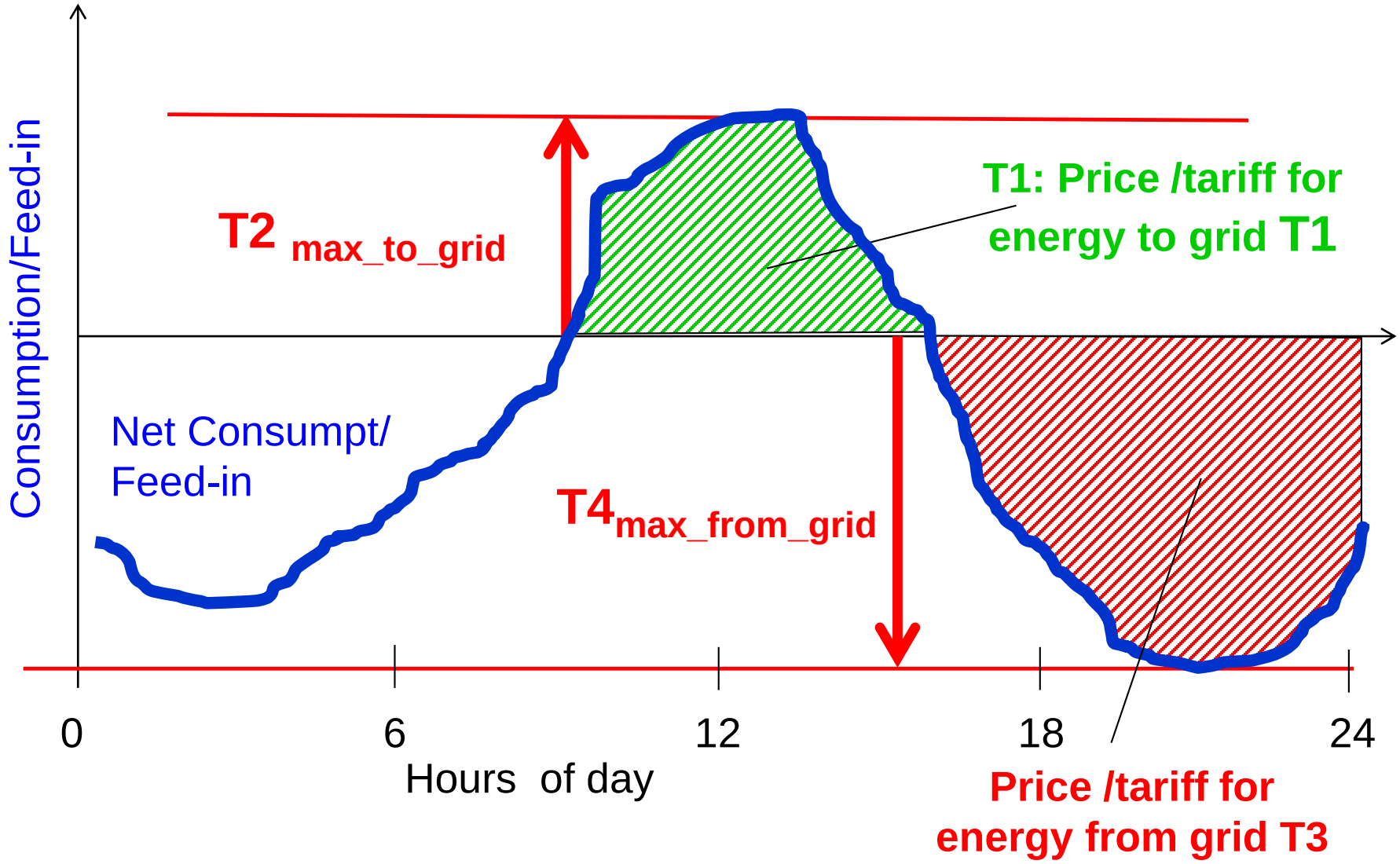


Koordinierte und nicht koordinierte Speichernutzung

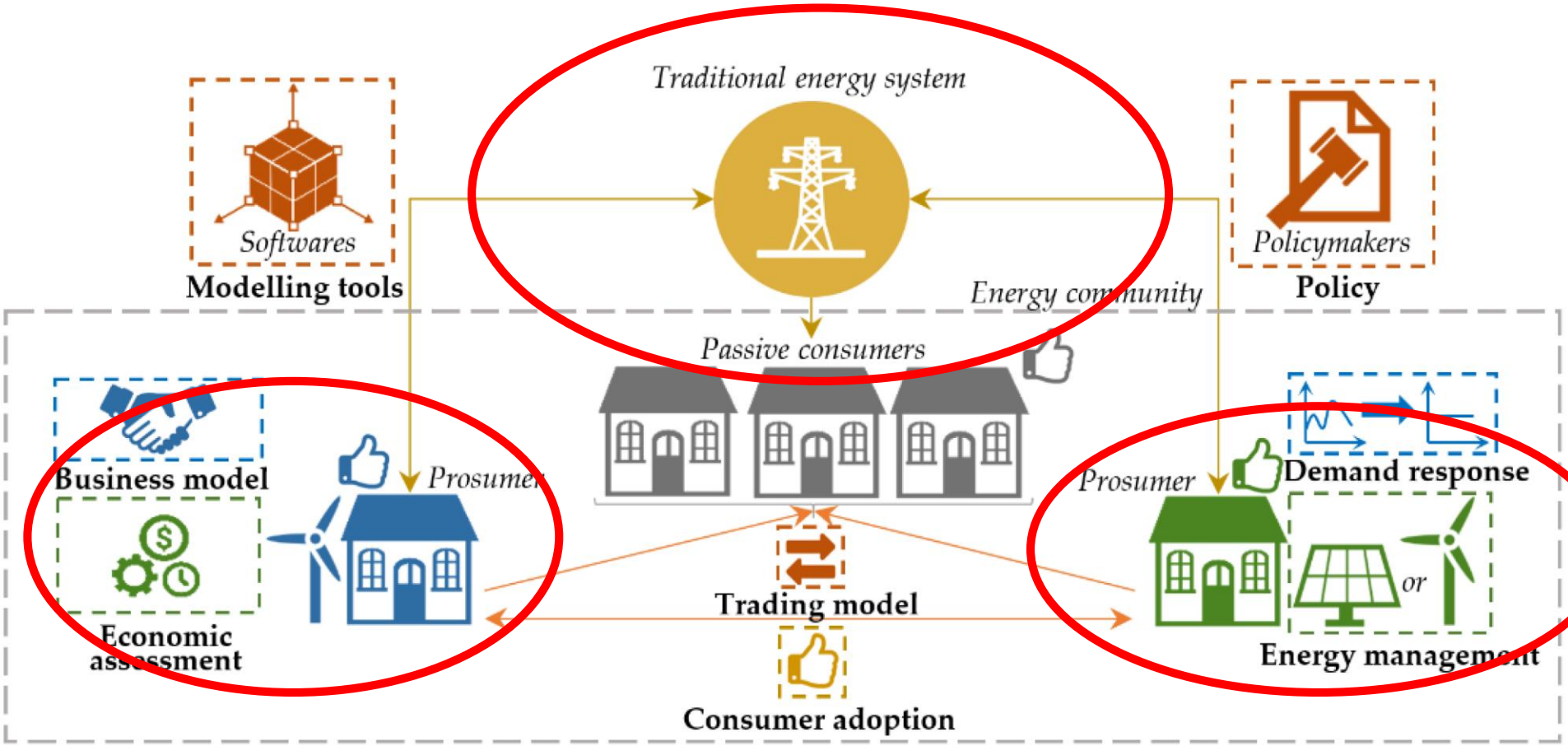




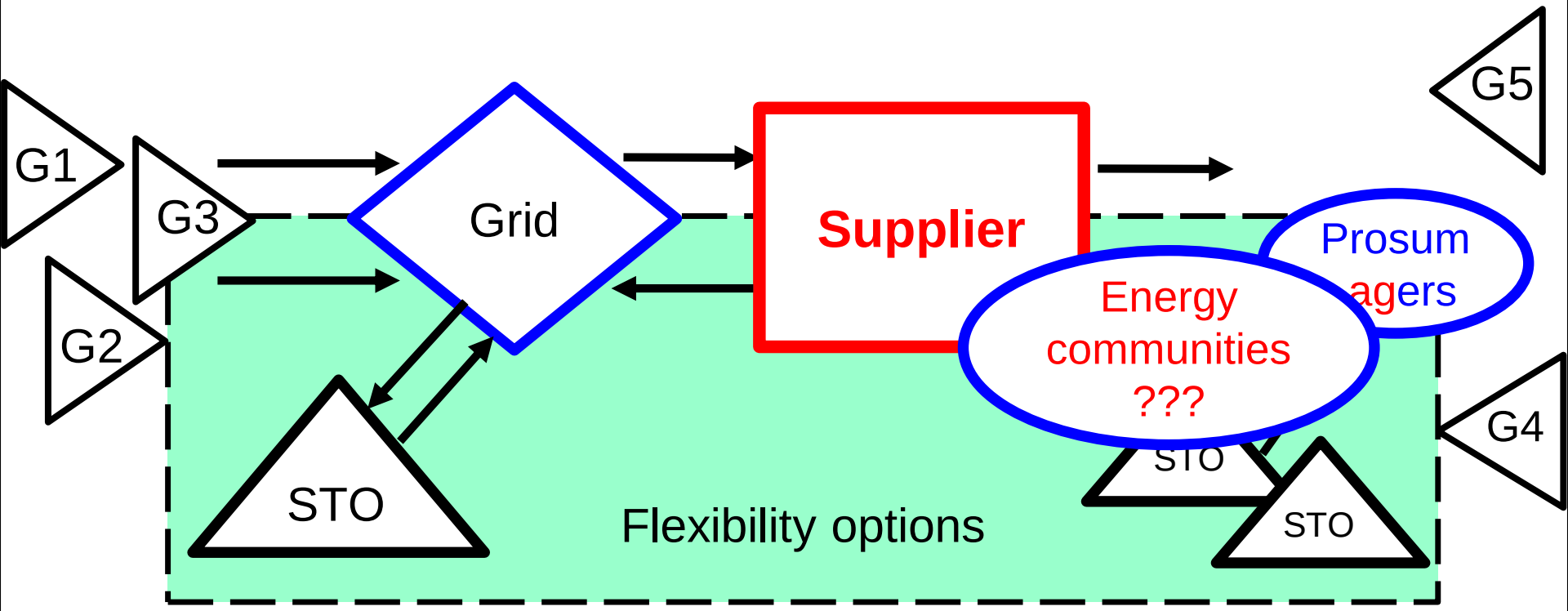
Bidirectional tariffs (and prices) for Power and energy

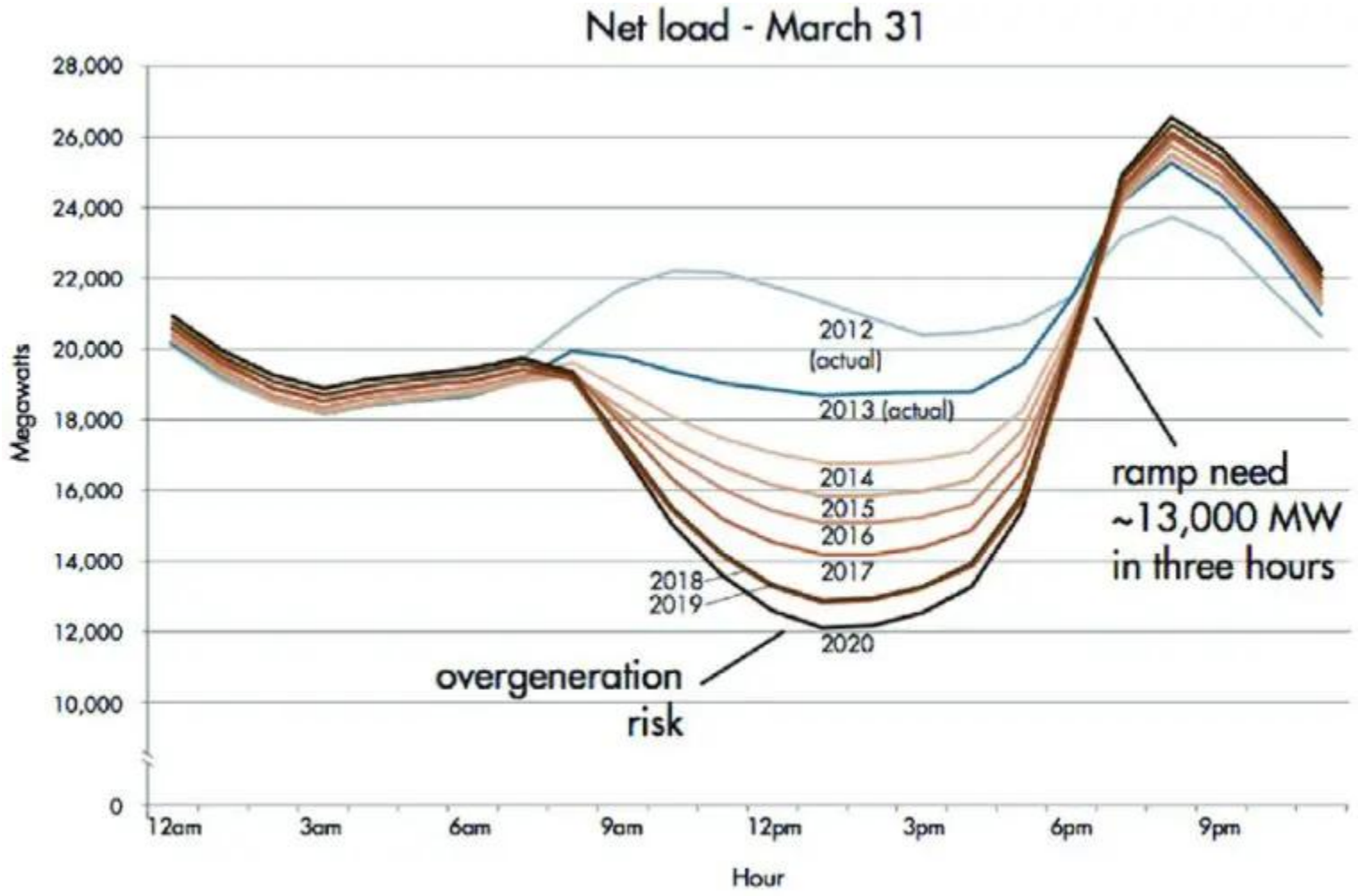


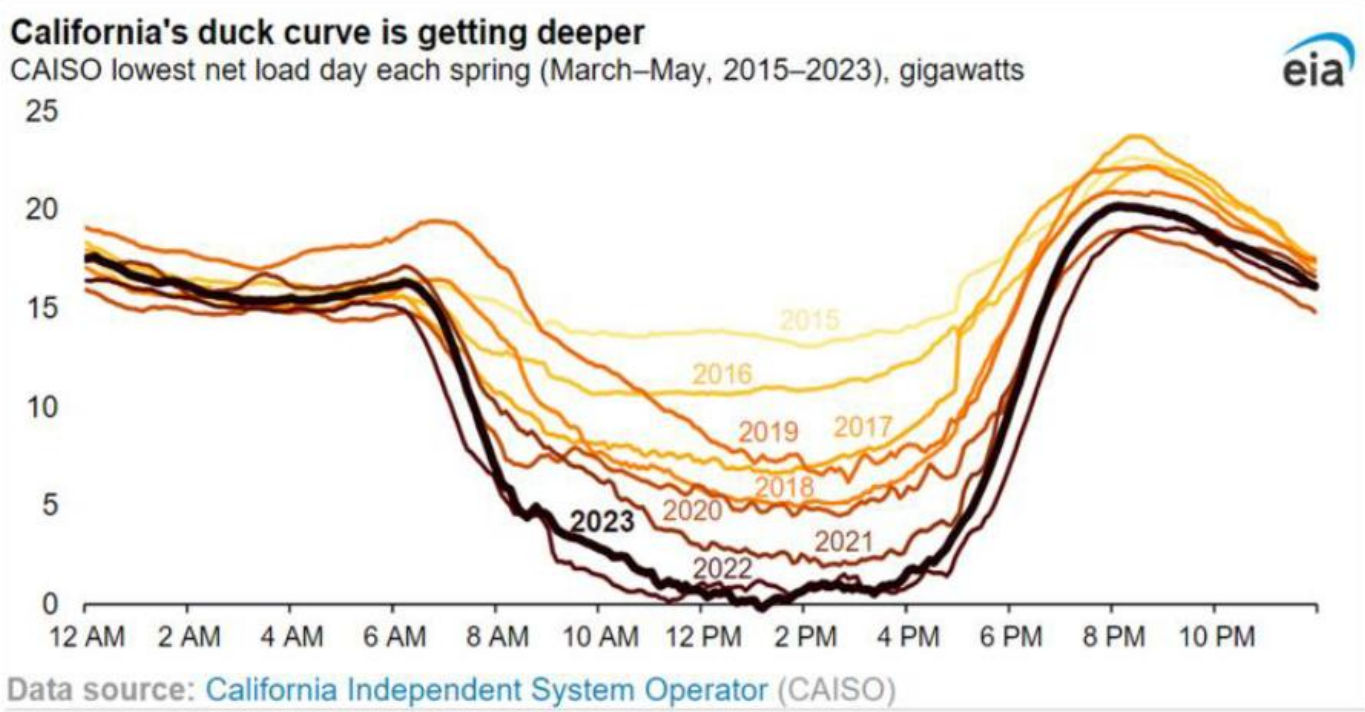
Energy Communities



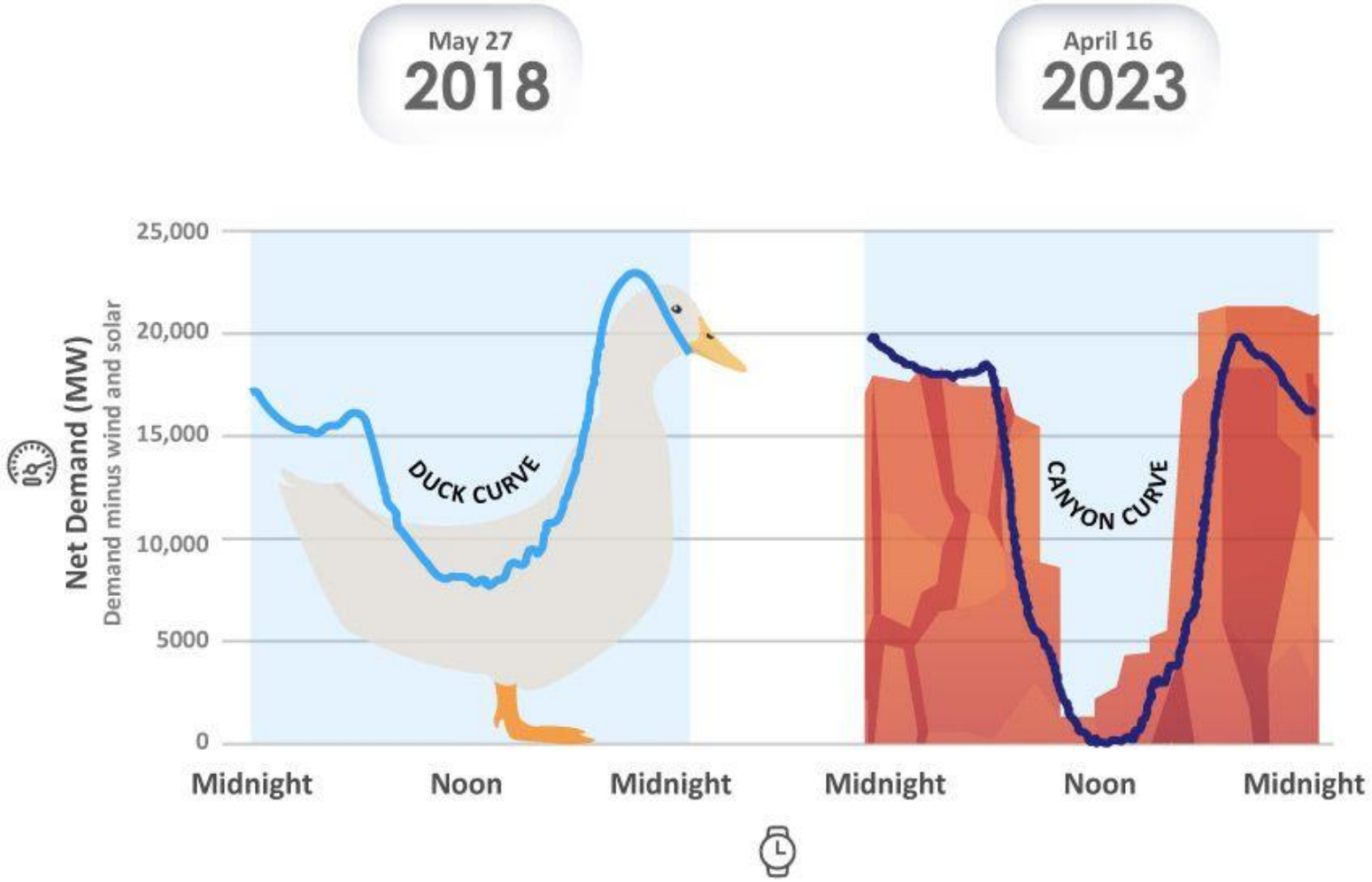
New Thinking: Making the electricity system more democratic




Net load - March 31
28,000
26,000
24,000
22,000
20,000
18,000
16,000
14,000
12,000
10,000
0
Megawatts
12am
3am
6am
9am
12pm
3pm
6pm
9pm
Hour
2012
(actual)
2013 (actual)
2014
2015
2016
2017
2018
2019
2020
ramp need
~13,000 MW
in three hours
overgeneration
risk



Source: CAISO


May 27
2018
April 16
2023
25,000
20,000
15,000
10,000
5000
0
Net Demand (MW)
Demand minus wind and solar
DUCK CURVE
CANYON CURVE
Midnight
Noon
Midnight
Midnight
Noon
Midnight

7. CONCLUSIONS

- A more democratic system allows customers to participate in supply, storage and DSM
- most urgent: exhaust full creativity for flexibility of all market participants
- Diversification of back-up systems for supply security ?
- How to recover the investment costs of variable renewables if P=0?
- New market design (s) ?