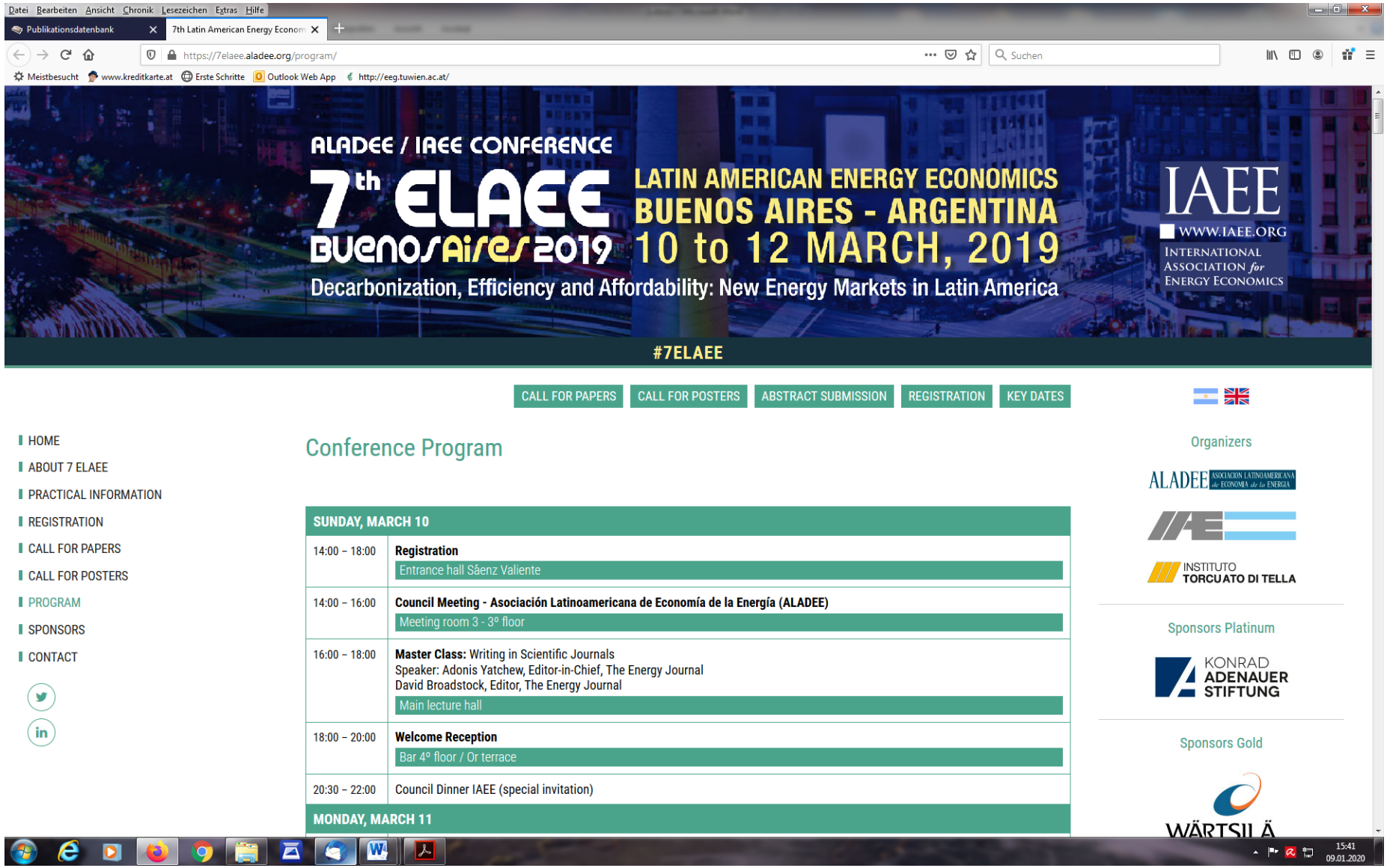
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Conference Program
SUNDAY, MARCH 10
14:00 – 18:00
Registration
Entrance hall Sáenz Valiente
14:00 – 16:00
Council Meeting - Asociación Latinoamericana de Economía de la Energía (ALADEE)
Meeting room 3 - 3º floor
16:00 – 18:00
Master Class: Writing in Scientific Journals
Speaker: Adonis Yatchew, Editor-in-Chief, The Energy Journal
David Broadstock, Editor, The Energy Journal
Main lecture hall
18:00 – 20:00
Welcome Reception
Bar 4º floor / Or terrace
20:30 – 22:00
Council Dinner IAEE (special invitation)
MONDAY, MARCH 11
Organizers
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POWER MARKET DESIGN: COEXISTENCE OF CONVENTIONAL AND RENEWABLE ENERGY – A EUROPEAN VIEW

Reinhard HAAS,

Energy Economics Group,

TU Wien

Buenos Aires, 11 March 2019

CONTENT

1. Introduction: Motivation
2. Method of approach
3. How variable renewables impact prices in electricity markets
4. The core problem of capacity payments
5. The role of flexibility
6. Subsidizing RES: How long?
7. Conclusions

1. INTRODUCTION

Motivation:

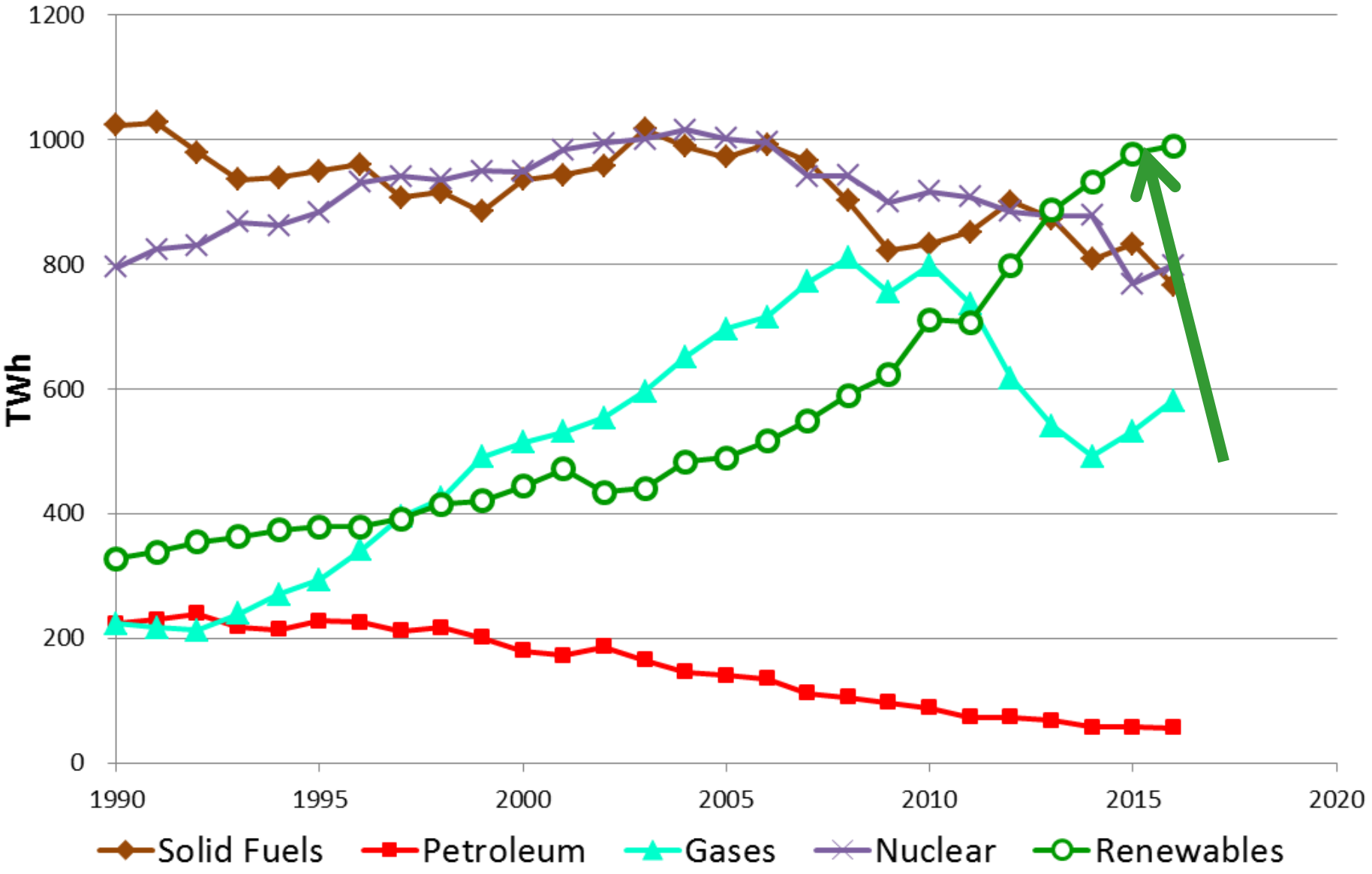
* Climate change → Paris agreements

* Targets for renewables

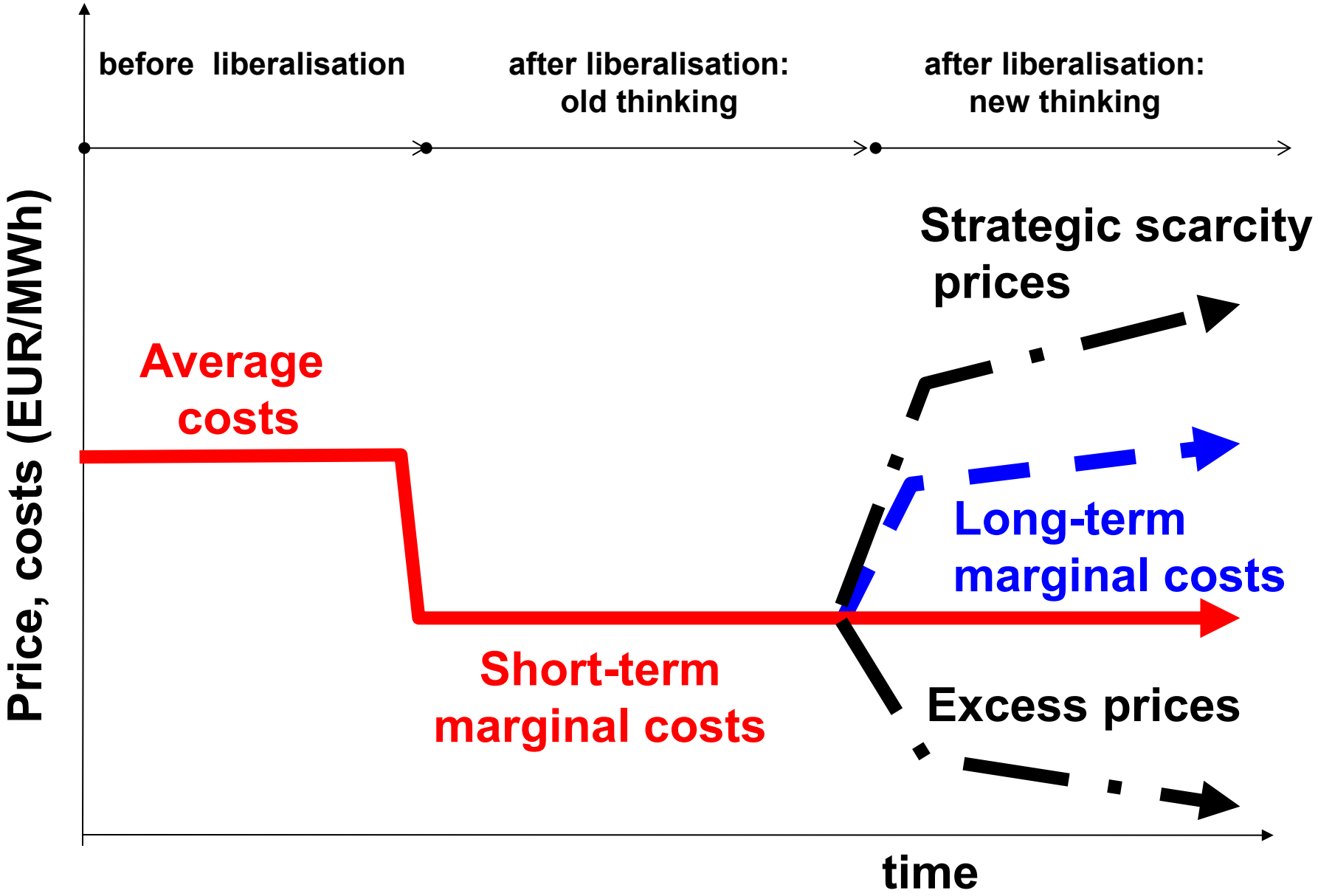
* The clean energy package

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

Introduction:
Electricity generation EU-28



How prices come about: Three periods of market design



Core objective

… to identify the major boundary conditions to integrate even larger amounts of variable renewables into the electricity system

Very important:

Our reflections apply in principle to every electricity system world-wide

…. are based on electricity economic point-of-view

2. METHOD OF APPROACH

- hourly resolution of residual load over a year in scenarios with large quantities of variable renewables;
- Applying a fundamental model to calculate (static) hourly electricity spot market prices;
- Integration of flexibility/elasticity in a dynamic framework for price calculation;

Day-ahead electricity markets

Expectation of

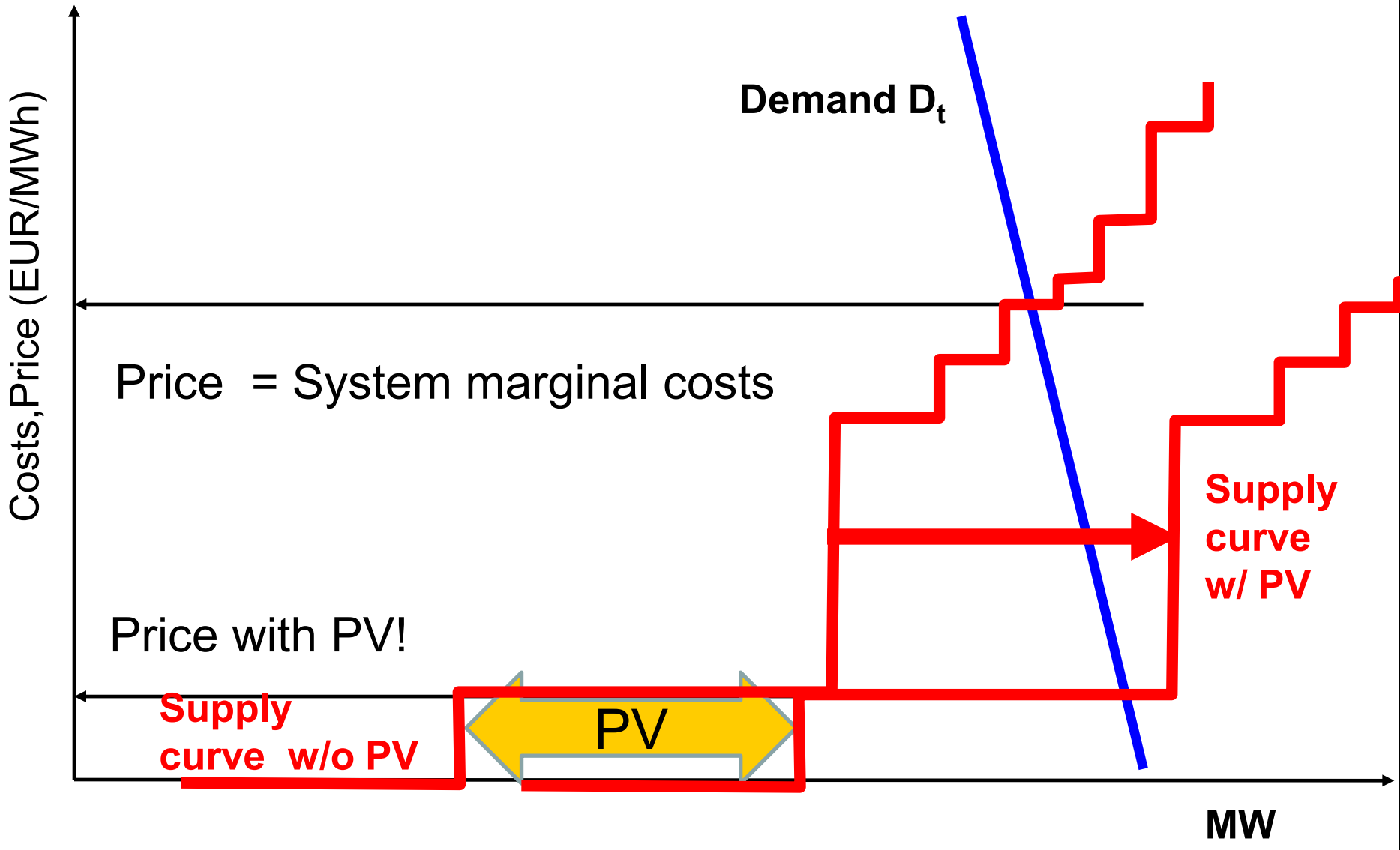
prices = Short-term marginal costs

(Short-term marginal costs = fuel costs)

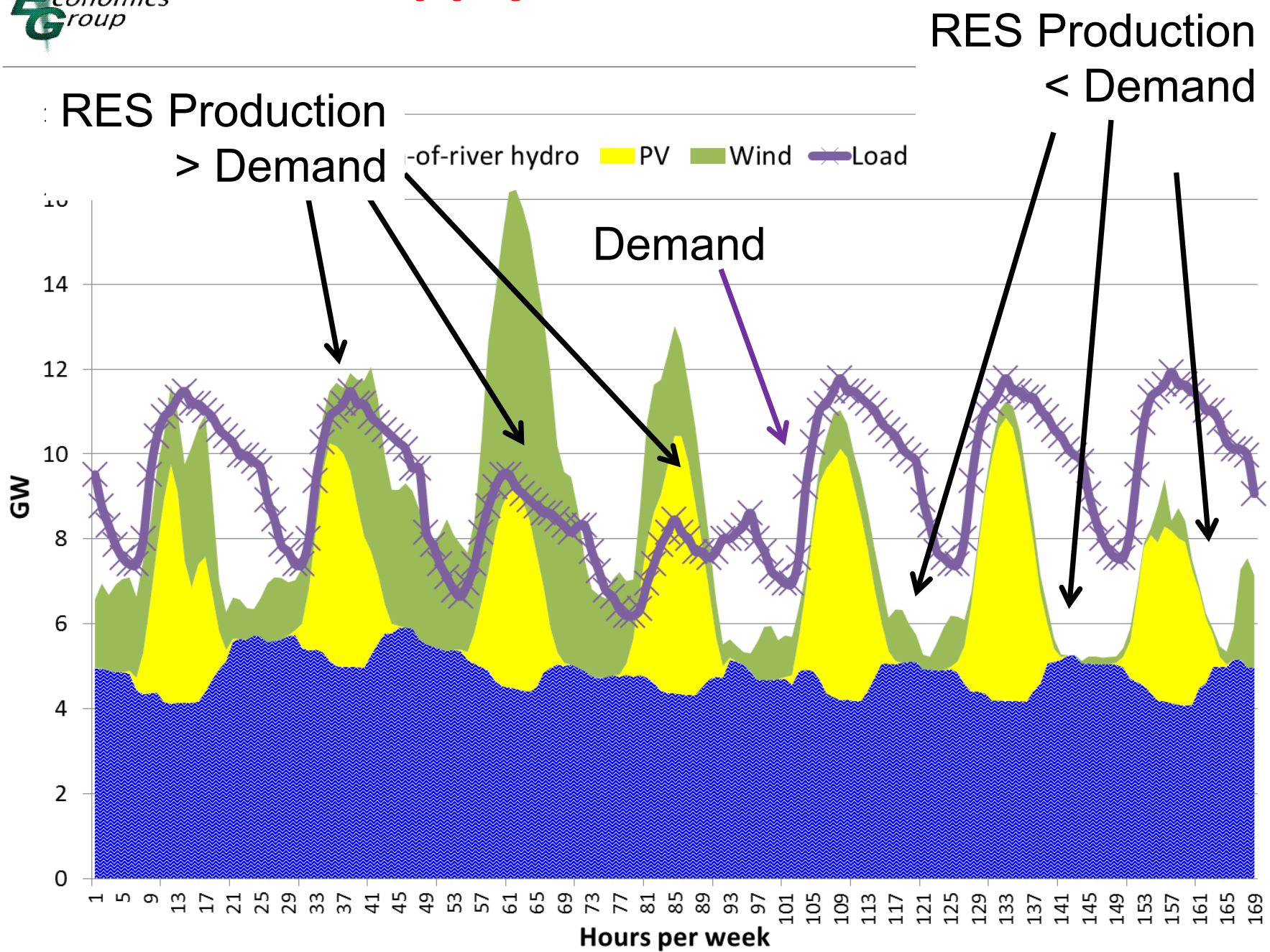
due to huge depreciated excess capacities at the beginning of liberalisation!

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

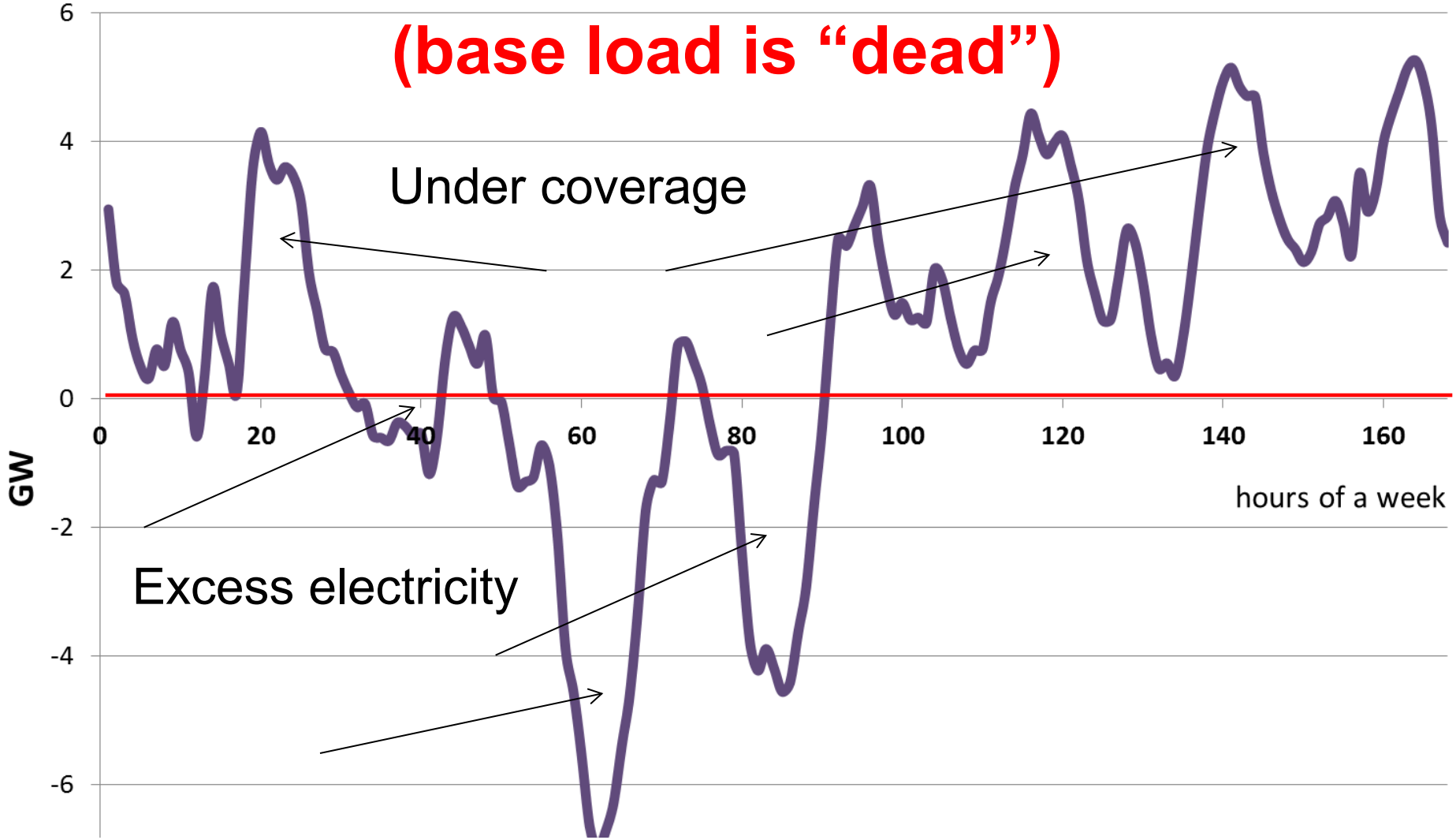
Example: prices without and with PV



Supply and Demand

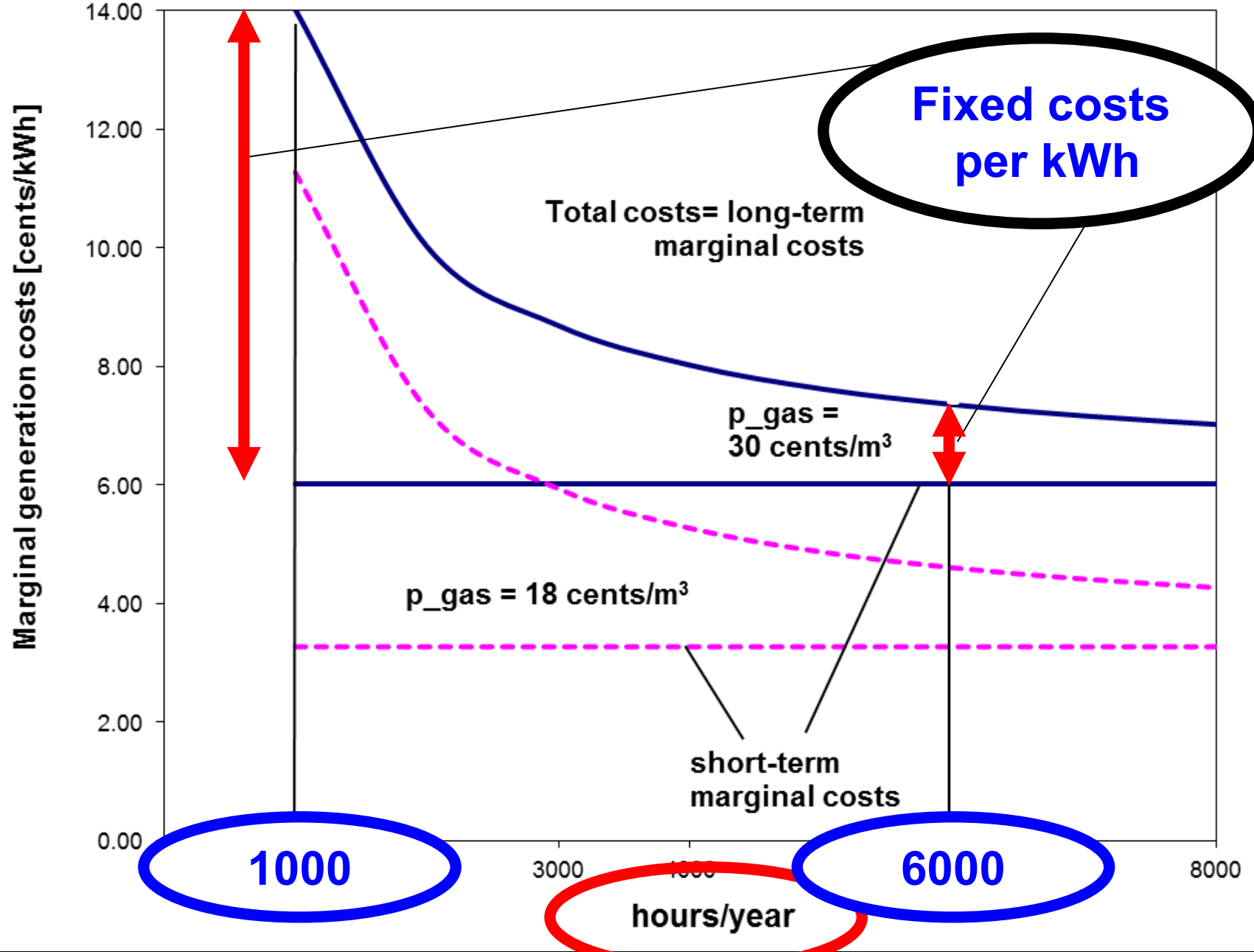


Key term of the future: Residual load (base load is “dead”)

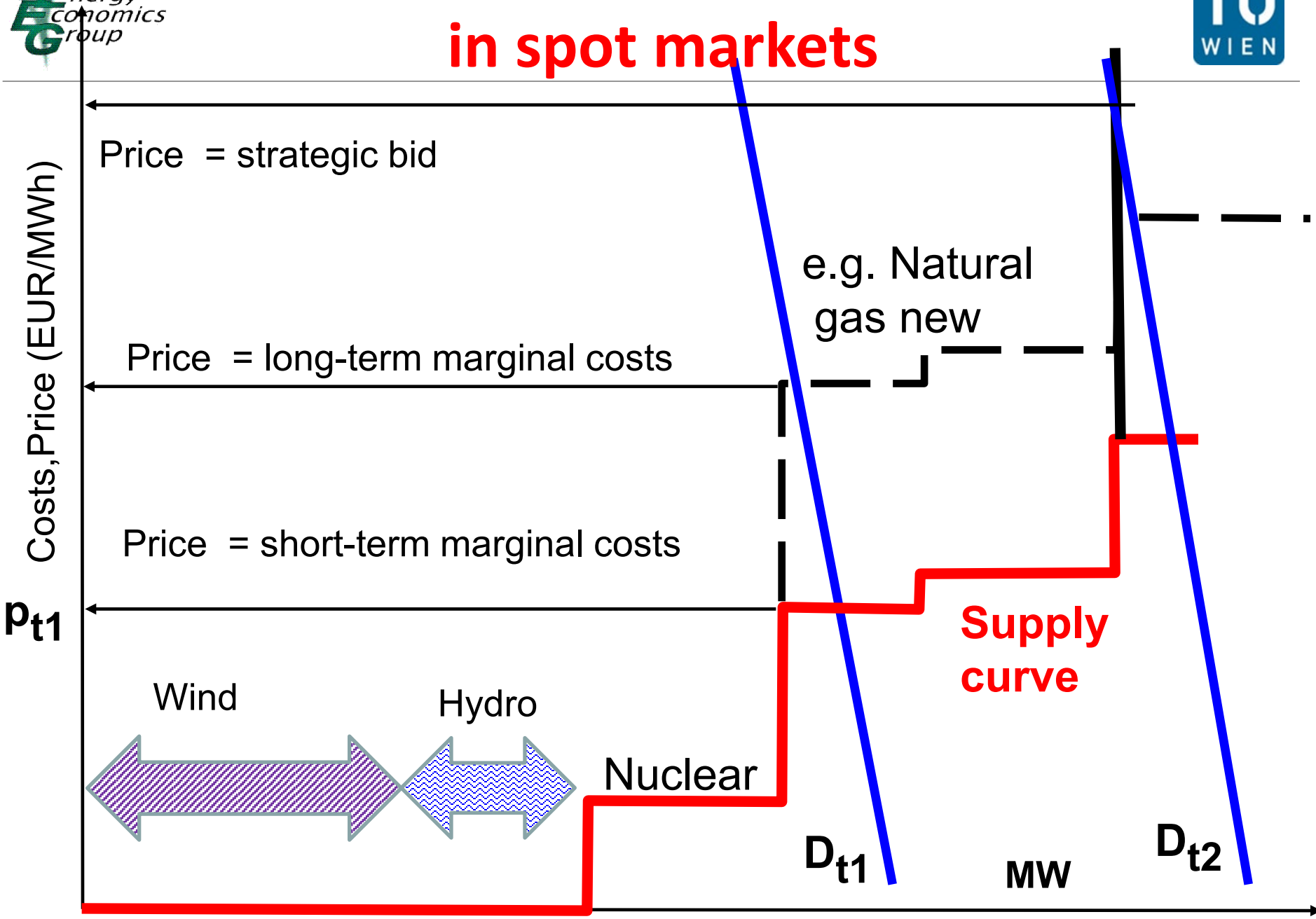


Residual load = Load – non-flexible generation

Effects on CCGT plants

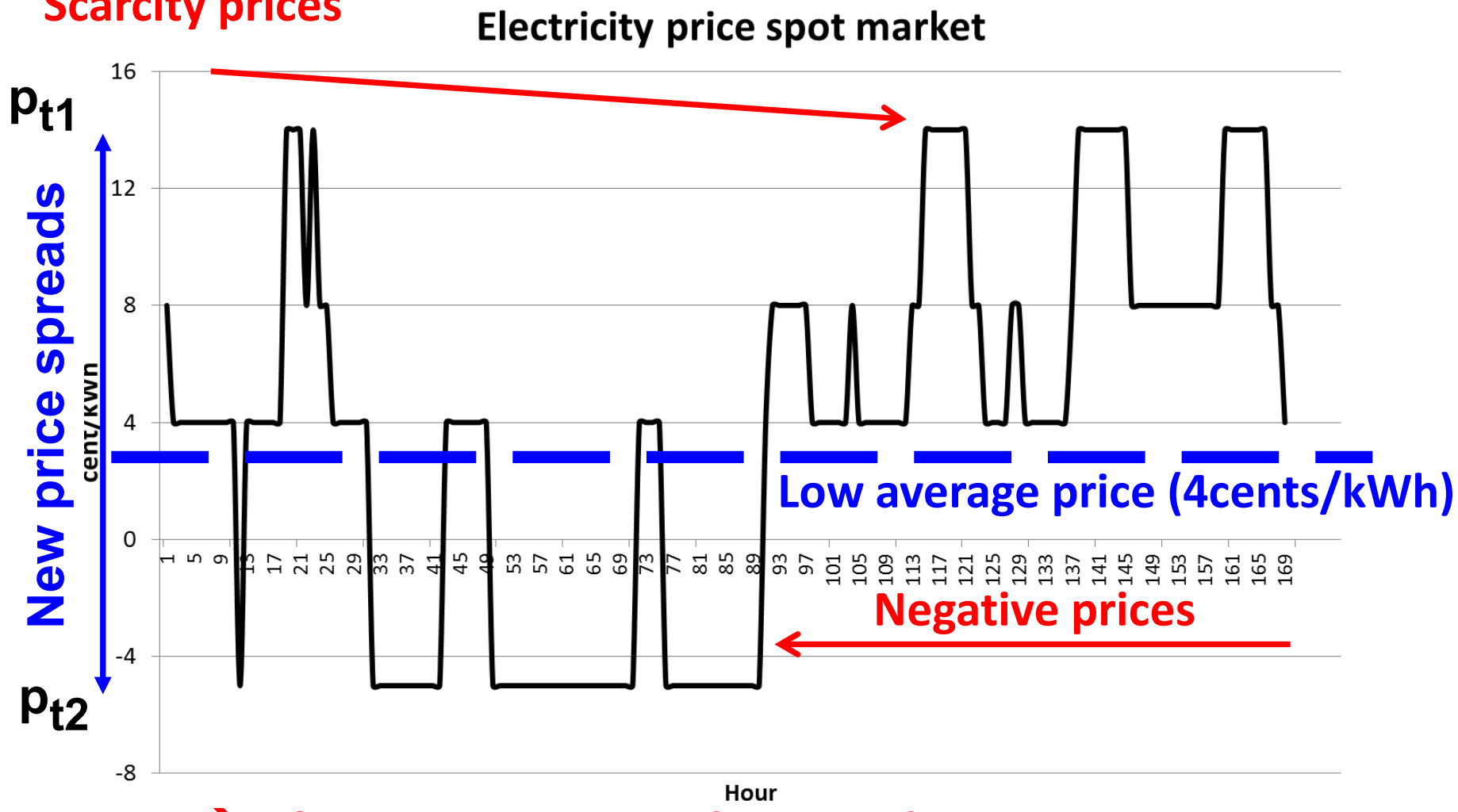


Deviation from STMC-pricing in spot markets



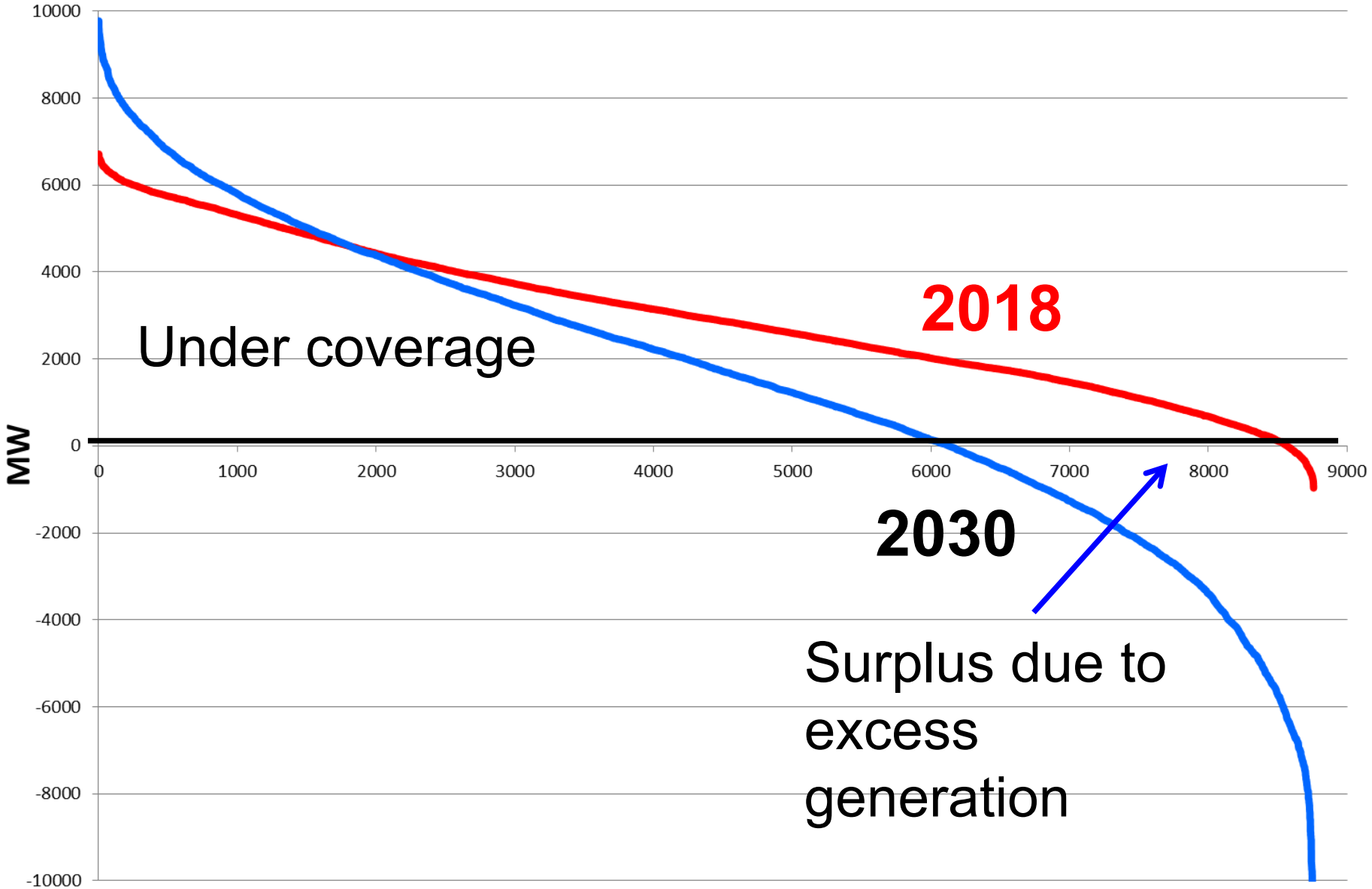
Deviation from STMC-pricing in spot markets

Scarcity prices

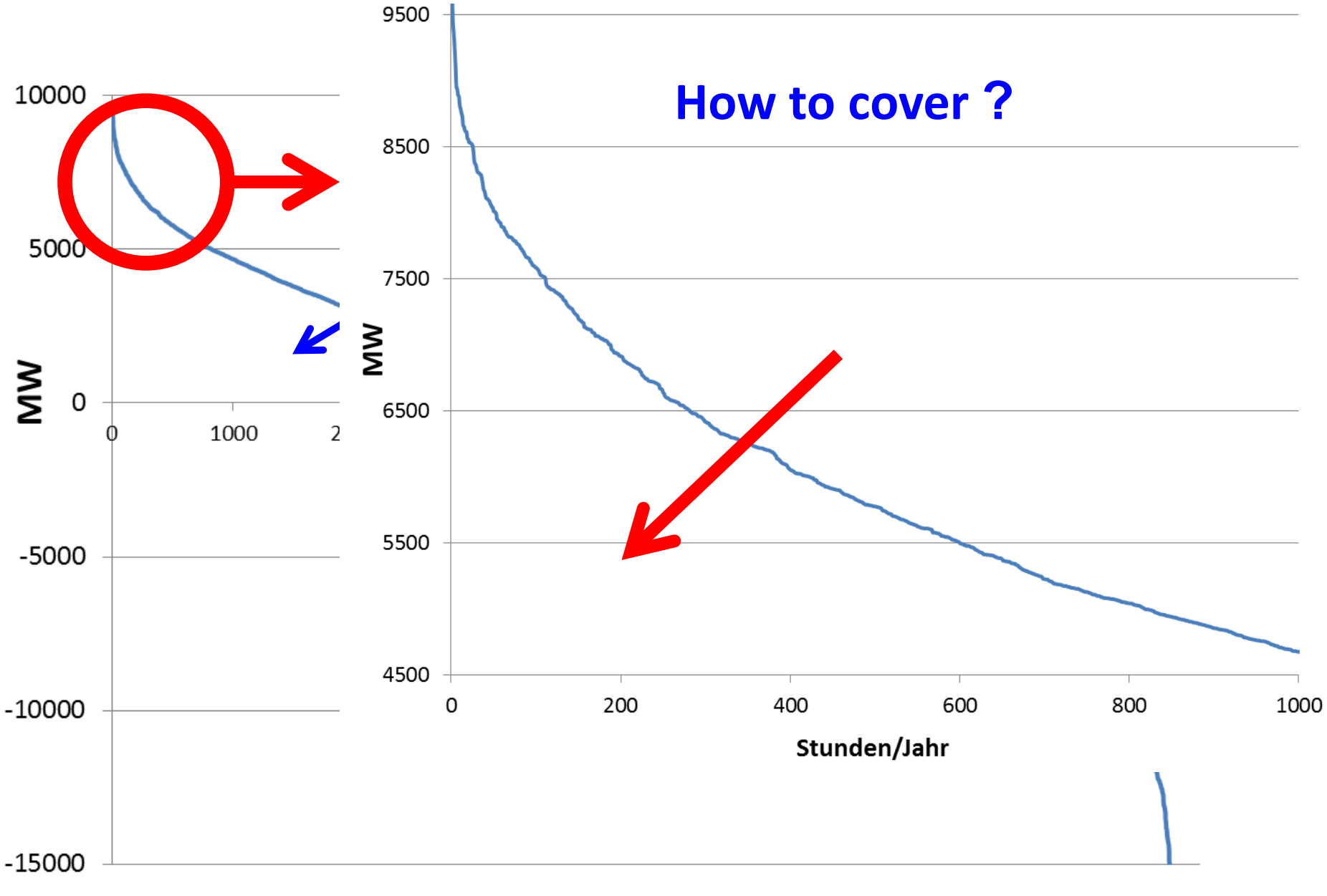


→ These price spreads provide incentives for new flexible solutions!!!!

Classified residual load



Classified residual load



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?

4 THE CORE PROBLEMS OF CAPACITY PAYMENTS

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

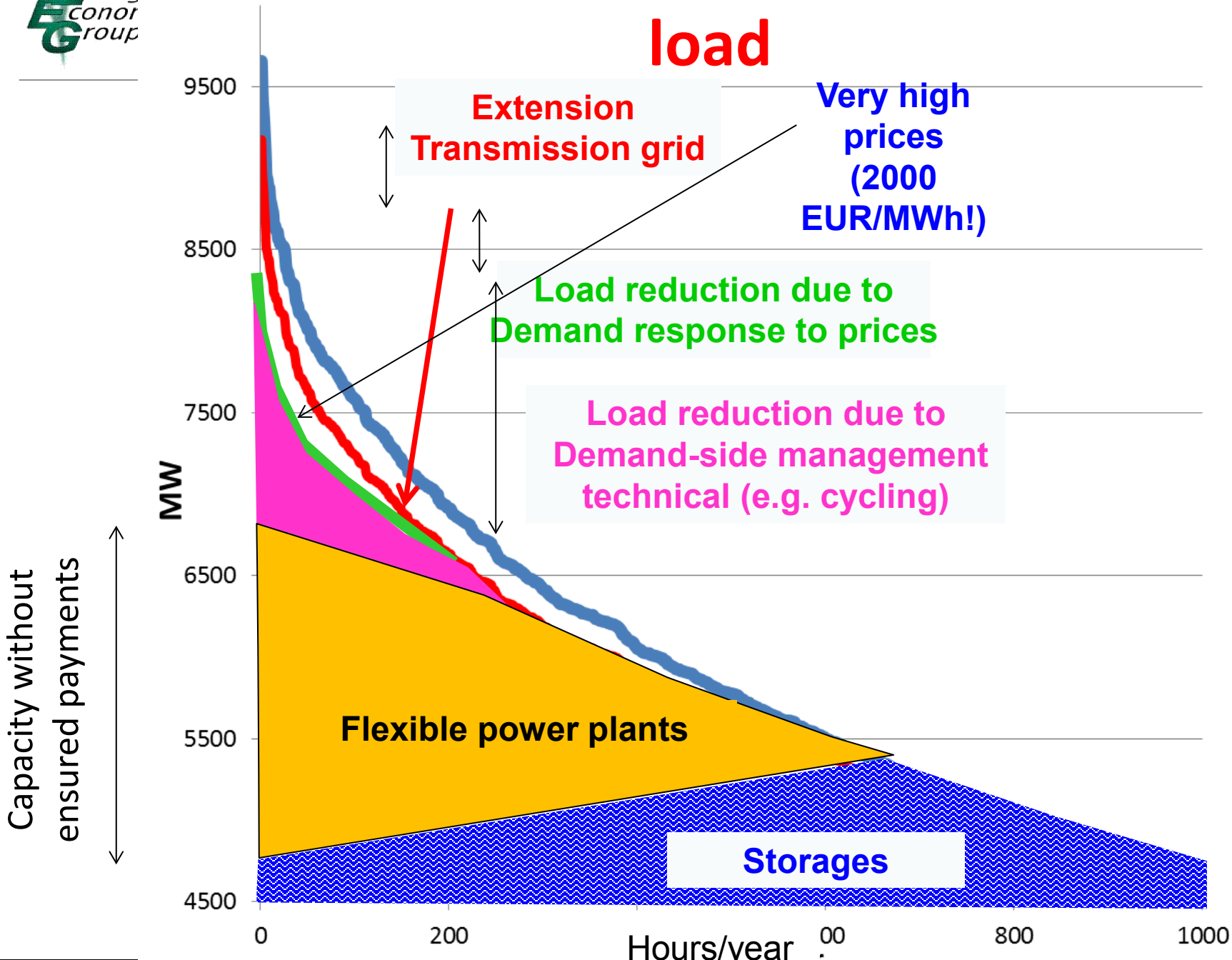
Price peaks at times of scarce resource should revive the markets and lead to effective competition

The higher the excess capacities, the lower is the share of RES

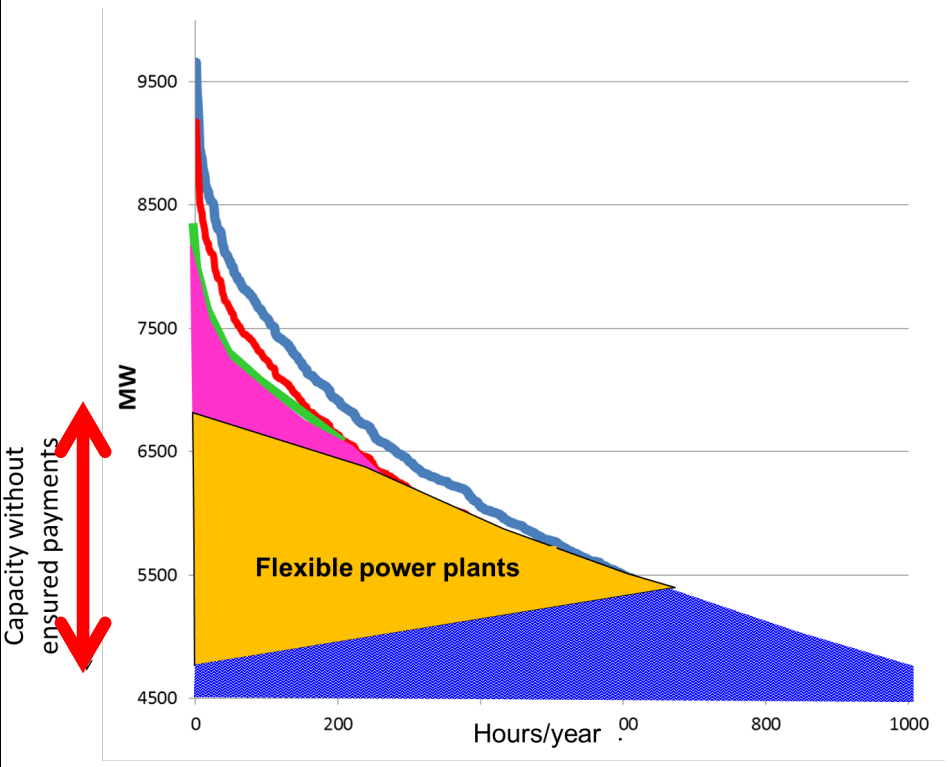
strive to retain system resource adequacy by correct price signals

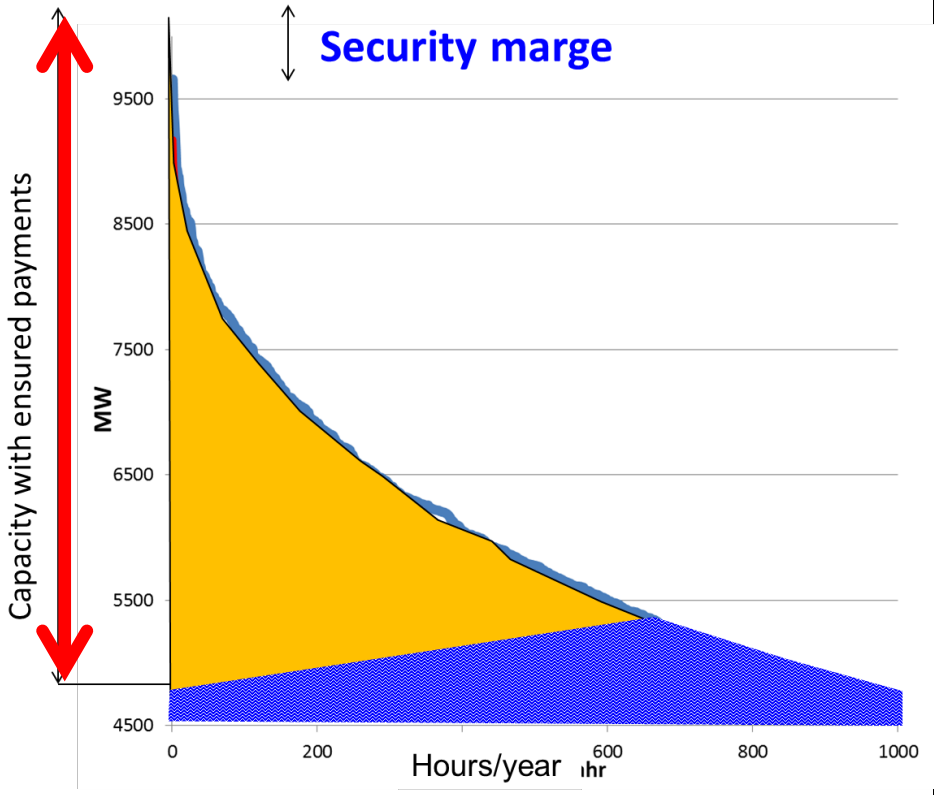
Given a price pattern, showing excess and scarcity prices it would be attractive for a sufficient number of flexible power plant operators to stay in the market!

5 Flexible coverage of residual load

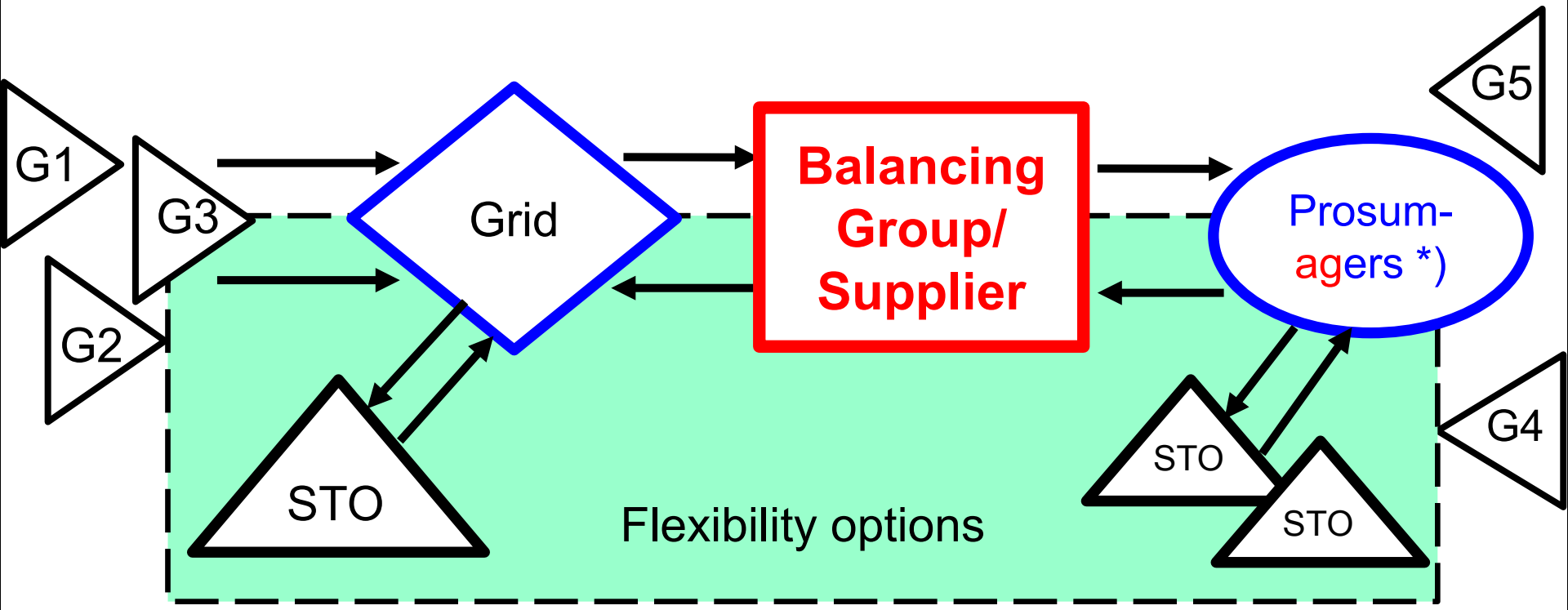


Comparison


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


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

New Thinking: Making the electricity system more democratic

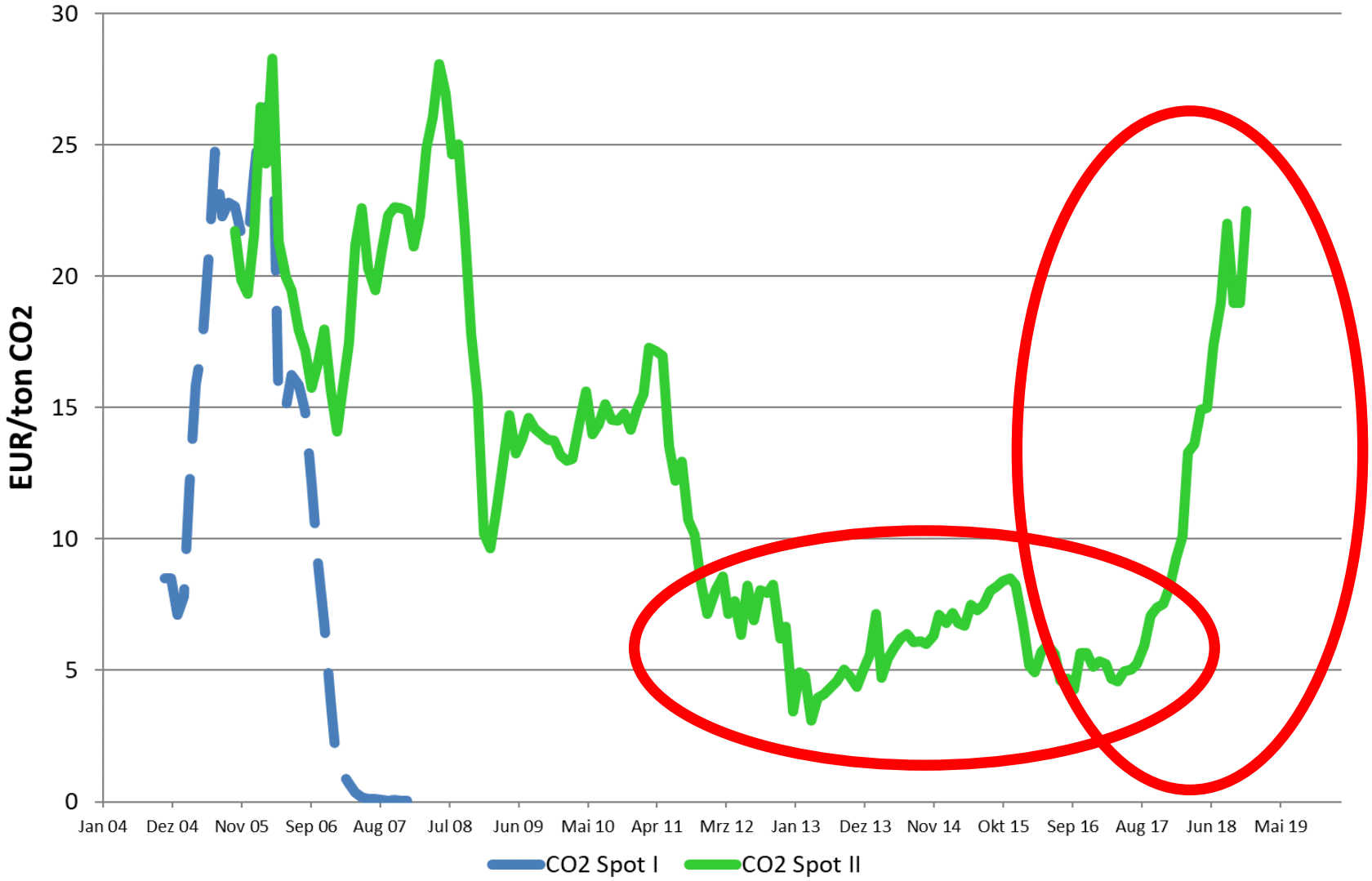


*) R. Green

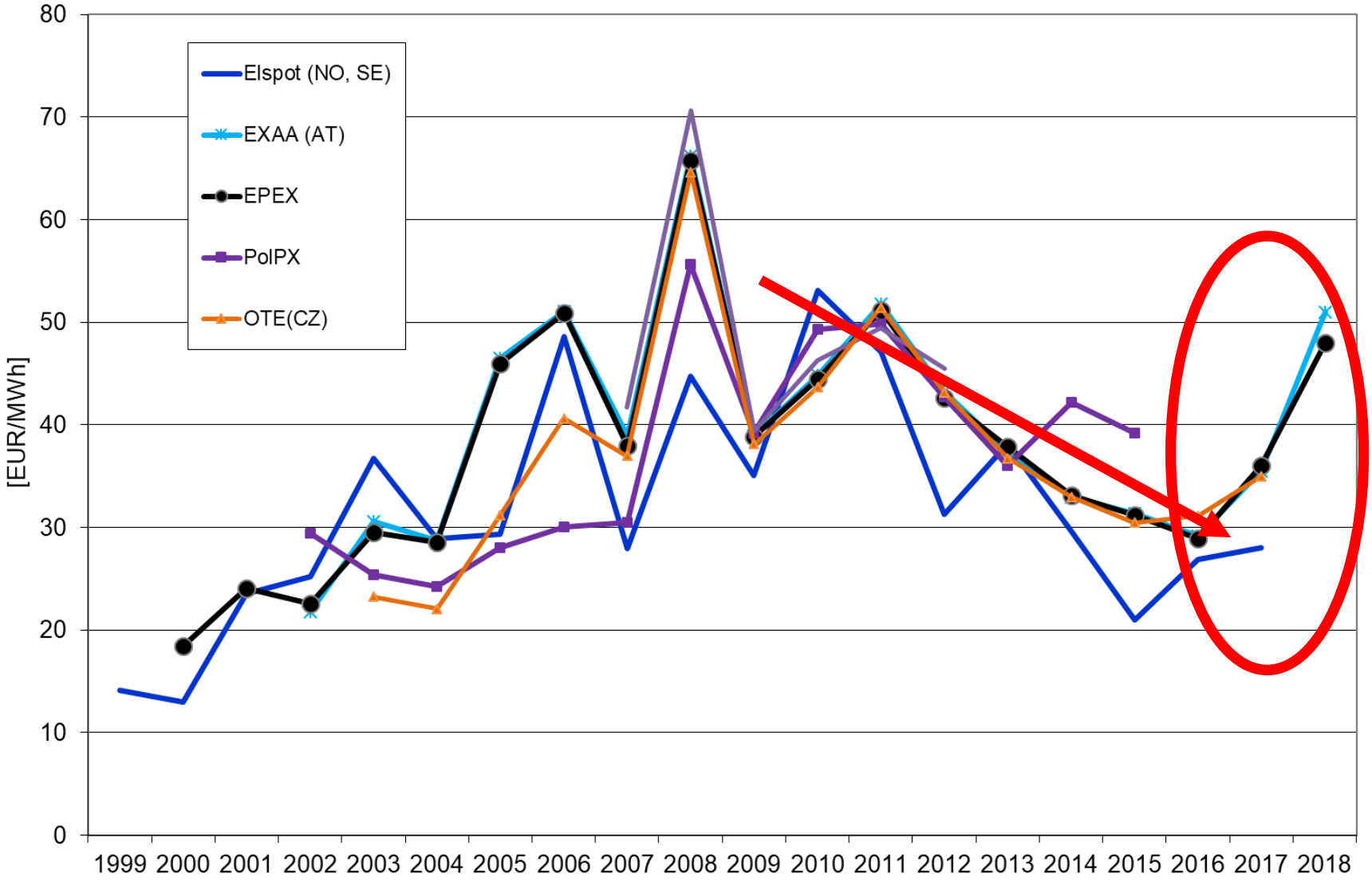
7. IS THE TIME FOR SUBSIDIZING RENEWABLES OVER ?

As long there is no price on CO2 …..

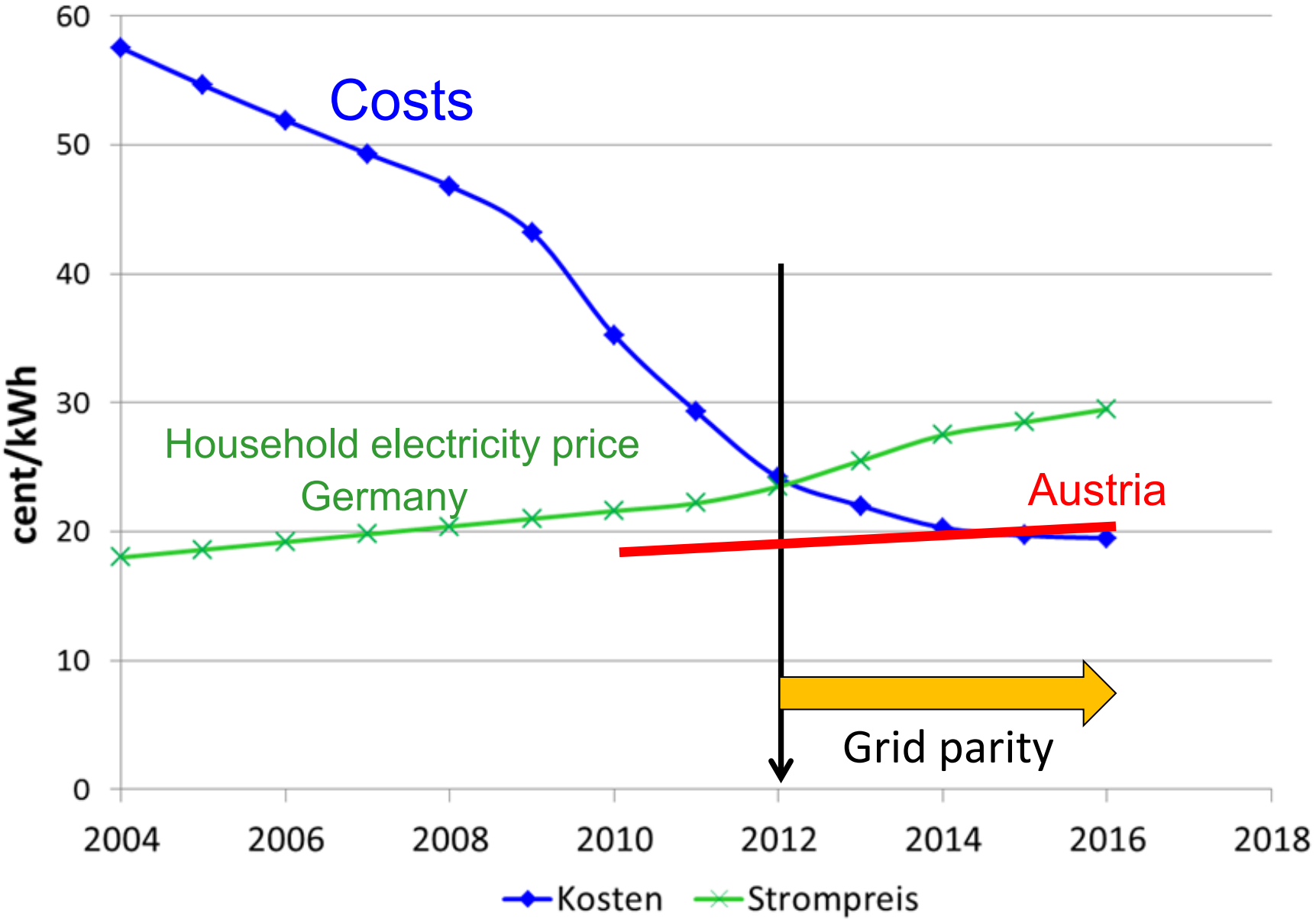
Der CO2-Preis



Development of electricity prices in Europe up to 2018



Grid parity: PV-costs and household electricity prices



8. CONCLUSIONS

- Sustainable electric. system → integration of a broad technology portfolio & demand-side options!
- Larger market areas favourable
- Very important: correct price signals (incl. CO2)
- Capacity payments: Any CP will distort the system towards more conv. and less RES capacity
- most urgent: exhaust full creativity for flexibility of all market participants incl. decentralised PV systems