

Wind power and Conventional power plants Optimization and Trading

Vattenfall at a glance

Vattenfall

- Generates, distributes and sells electricity and heat
- Provides energy services and solutions
- 32,400 employees*
- Electricity sales: 193.8 TWh per year
- Electricity generation: 167.6 TWh per year.
- Heat production: 36.2 TWh per year

Key figures for the fiscal year 2007:

- Net sales: 143 billion SEK (15.1 bn EUR)
- Investments: 18.9 billion SEK (2 bn EUR)
- Return on net assets, excluding items affecting comparability: 16.6 %

* All figures as of December 2007



Trading 2007

Trading Volume [External]	2007
Electricity in TWh	672
Coal in mt	13
CO2 in mt	72
Gas in TWh	10
Counterparts	350



Logistics Department

- Responsible for the Power and Gas transportation
- Intraday Optimisation of Power and Gas
- Rebalancing the day after
- Reserve management for the Vattenfall Germany production
- Portfolio responsible for external Reserve contracts

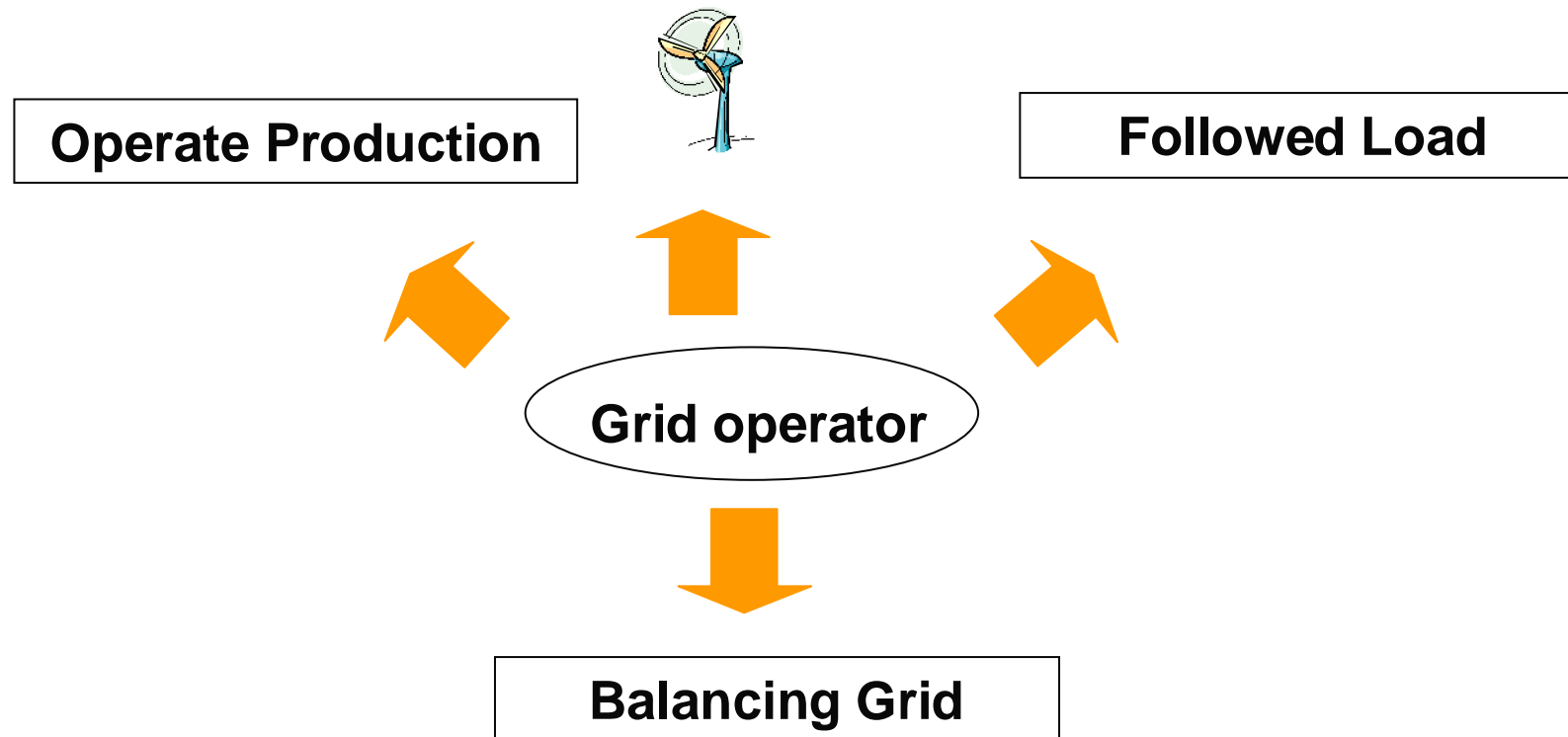
Wind and other renewable Production

Renewable Production is for the future an important part of our power supply. Fossil fuel becomes more and more scarce resources. Prices will even more increase and the supply will not be possible with only fossil fuels.

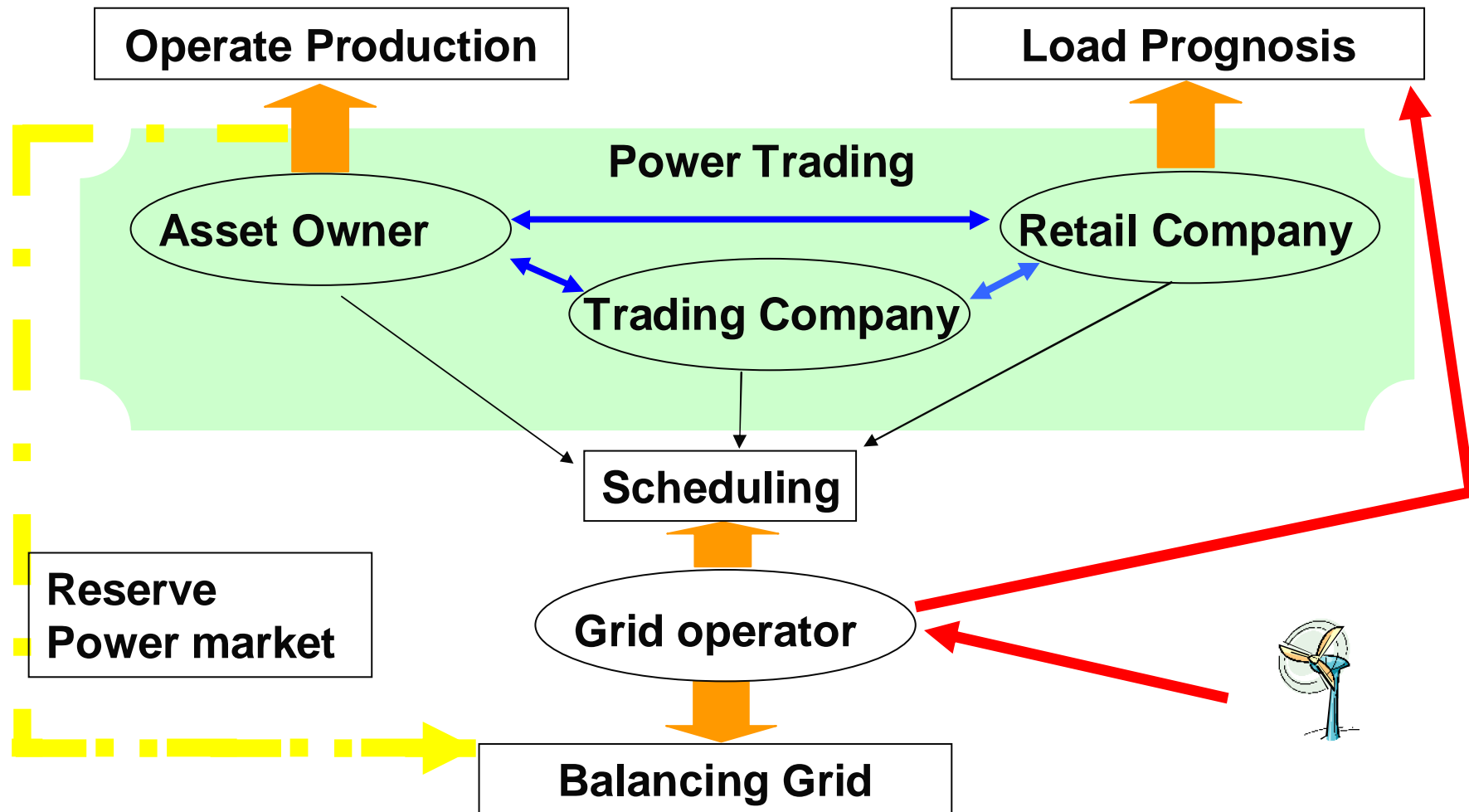
Another advantage is that with renewable production countries are more independent from the resource owner of fossil resources.

We all have to master the challenge to integrate the new production in our environment. Only if we integrate the renewable production fully in our economy, we will have a secure and cost efficient supply

Before liberalisation

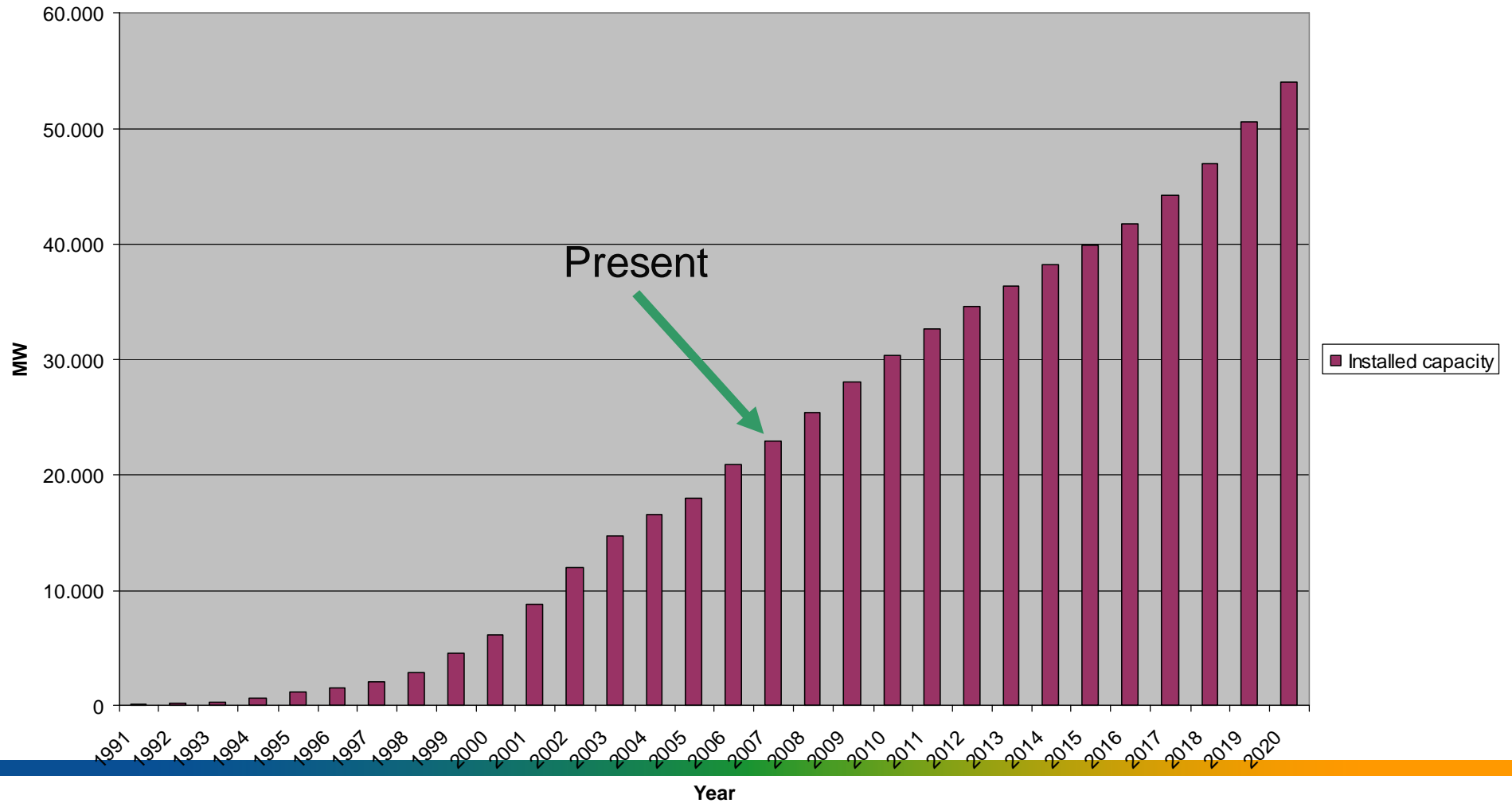


After liberalisation



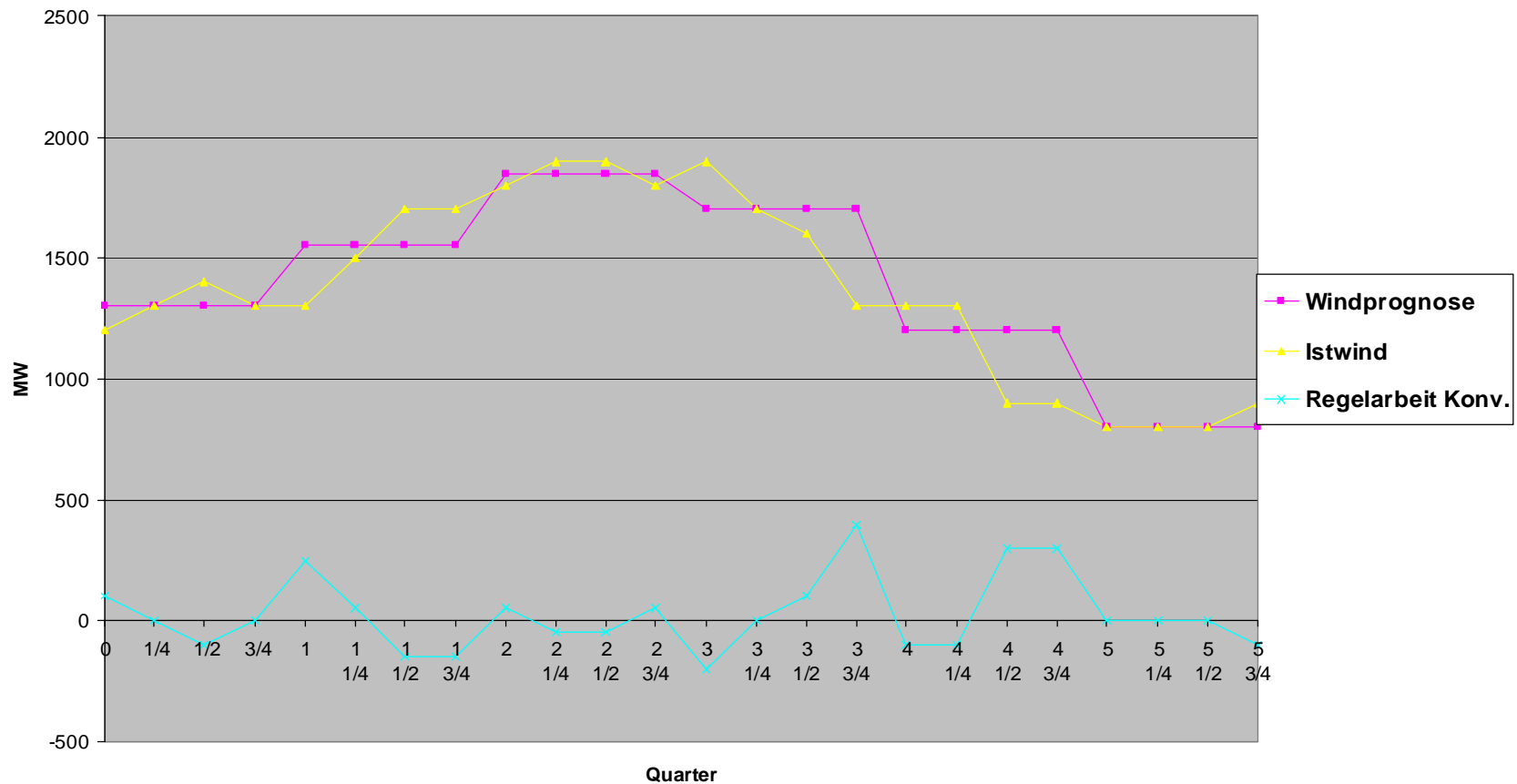
Development of wind power in Germany

Windpower



Balancing efforts for Wind power today

Reservepower for Wind balance



German Market

Consumption

Min. 33.000 MW

Max 88.000 MW

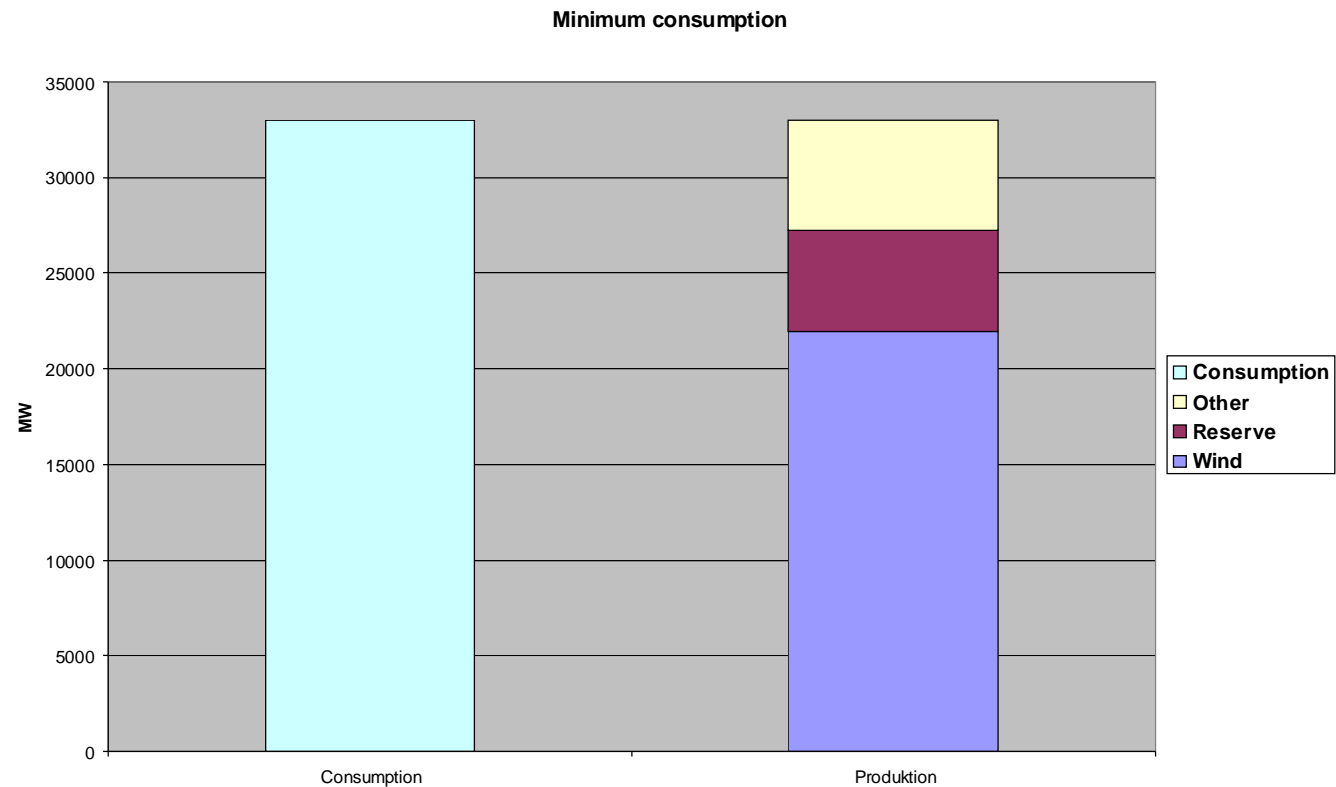
Reserve power

Pos 7.114 MW

Neg 5.264 MW

Wind power

Max 22.000 MW

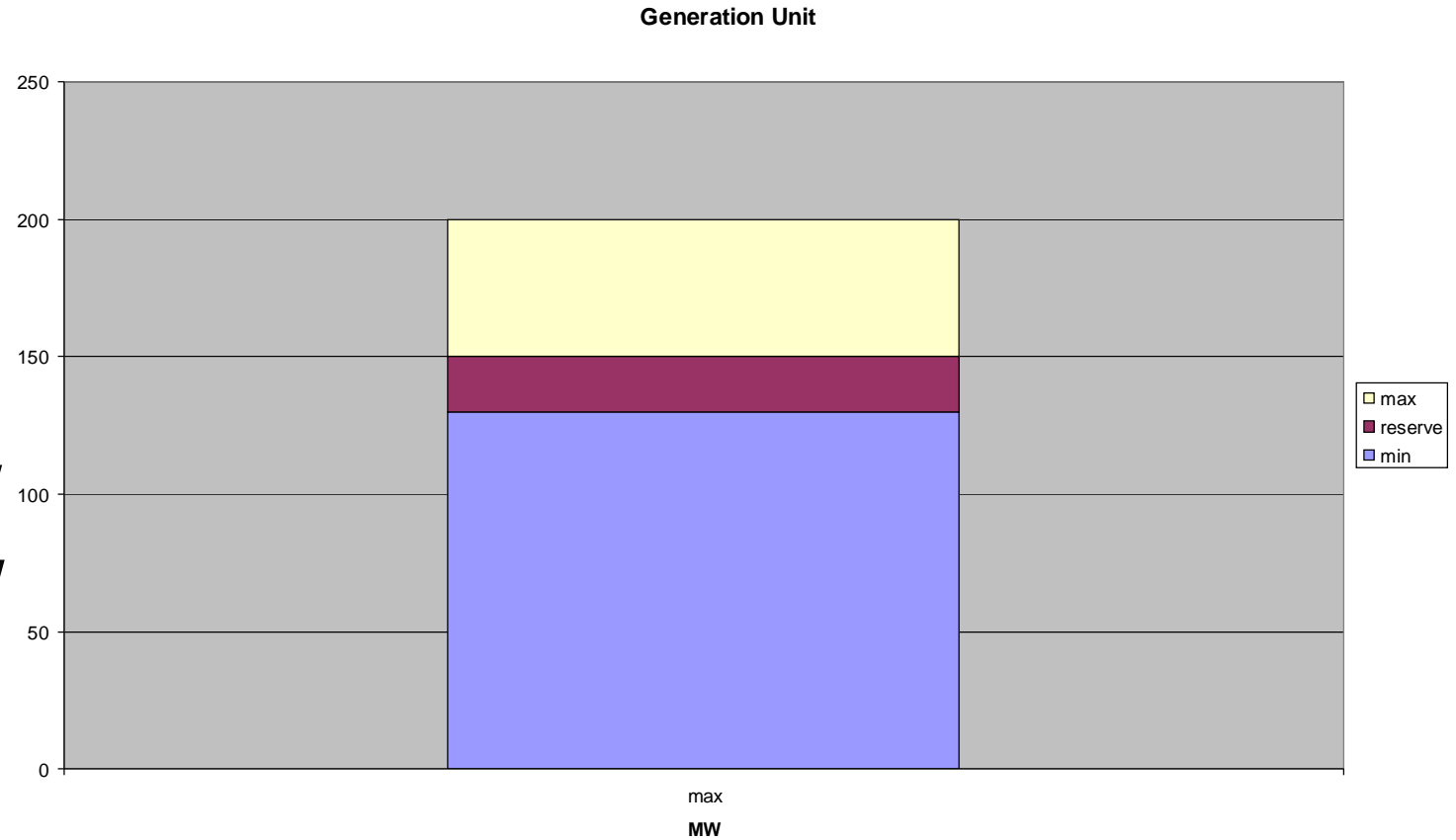


Conventional Power Unit

An example for the operating points from a conventional Power Unit

Minimal 130MW

Maximum 200MW



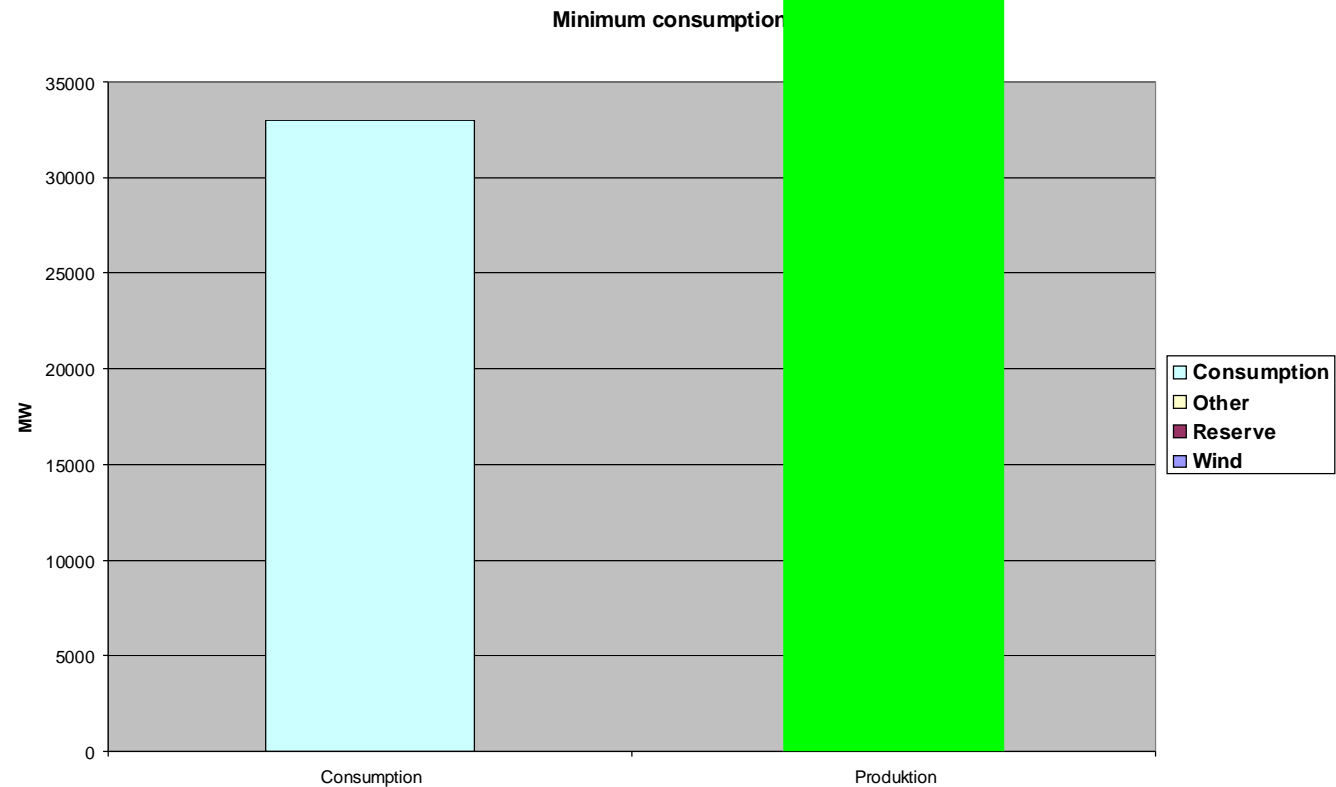
German Market

Consumption
Min. 33.000 MW
Max 88.000 MW

Reserve power
Pos 7.114 MW
Neg. 5.264 MW

Wind power
Max 22.000 MW

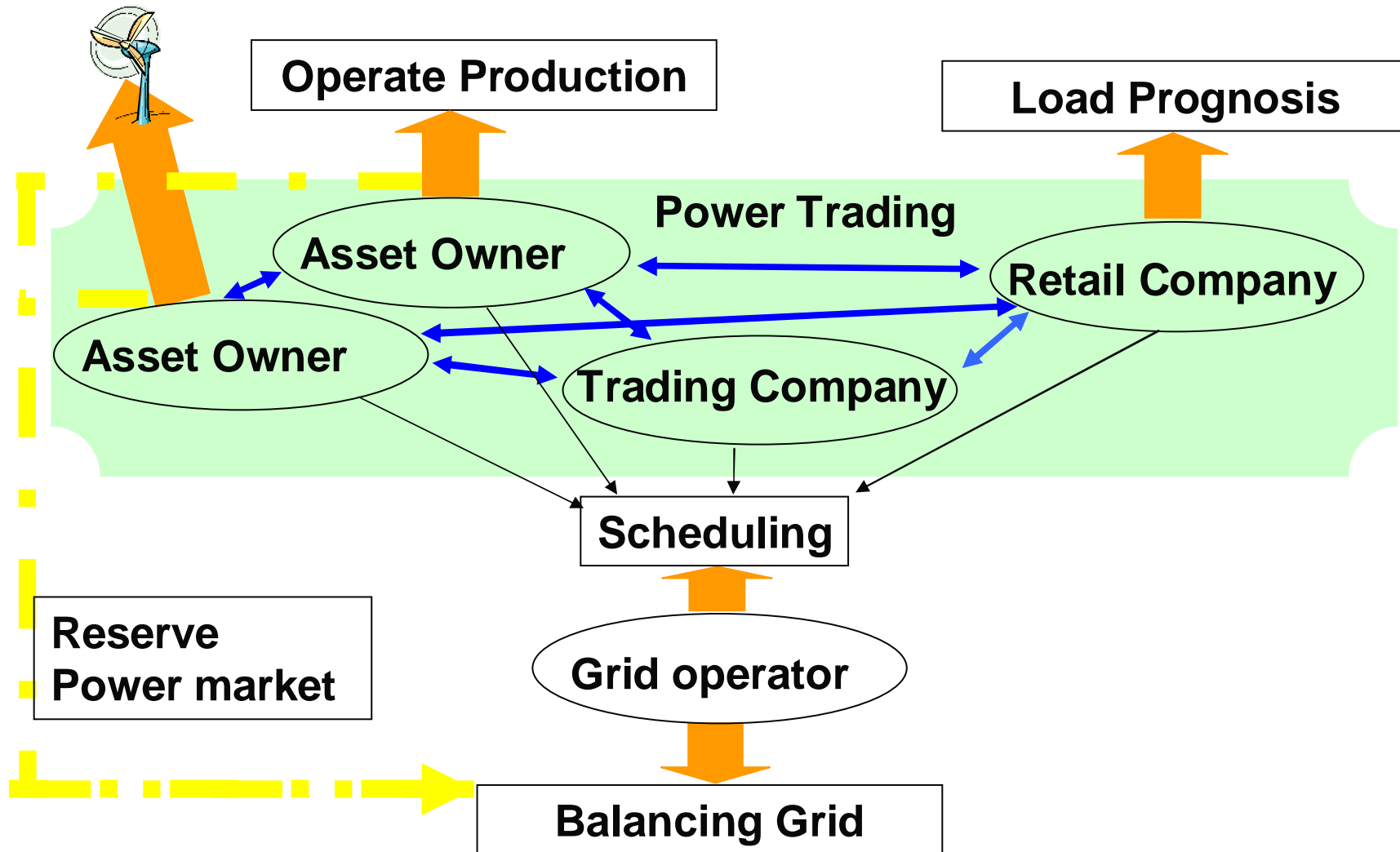
55.000
MW
Year
2020



Wind power integration

- Lower balancing cost
 - More liquidity in the trading market
 - Better Climate result
 - More reserve power
 - Lower energy cost
- ➔ A better over all optimum

Wind power integrated in the market



Markets/Profit sources

Markets

- Power market
- Heat market
- Reserve market

Subsidize schema

- Certificate
- Bonus schema
- Feed in tariff

Cost for the production today

Fix cost

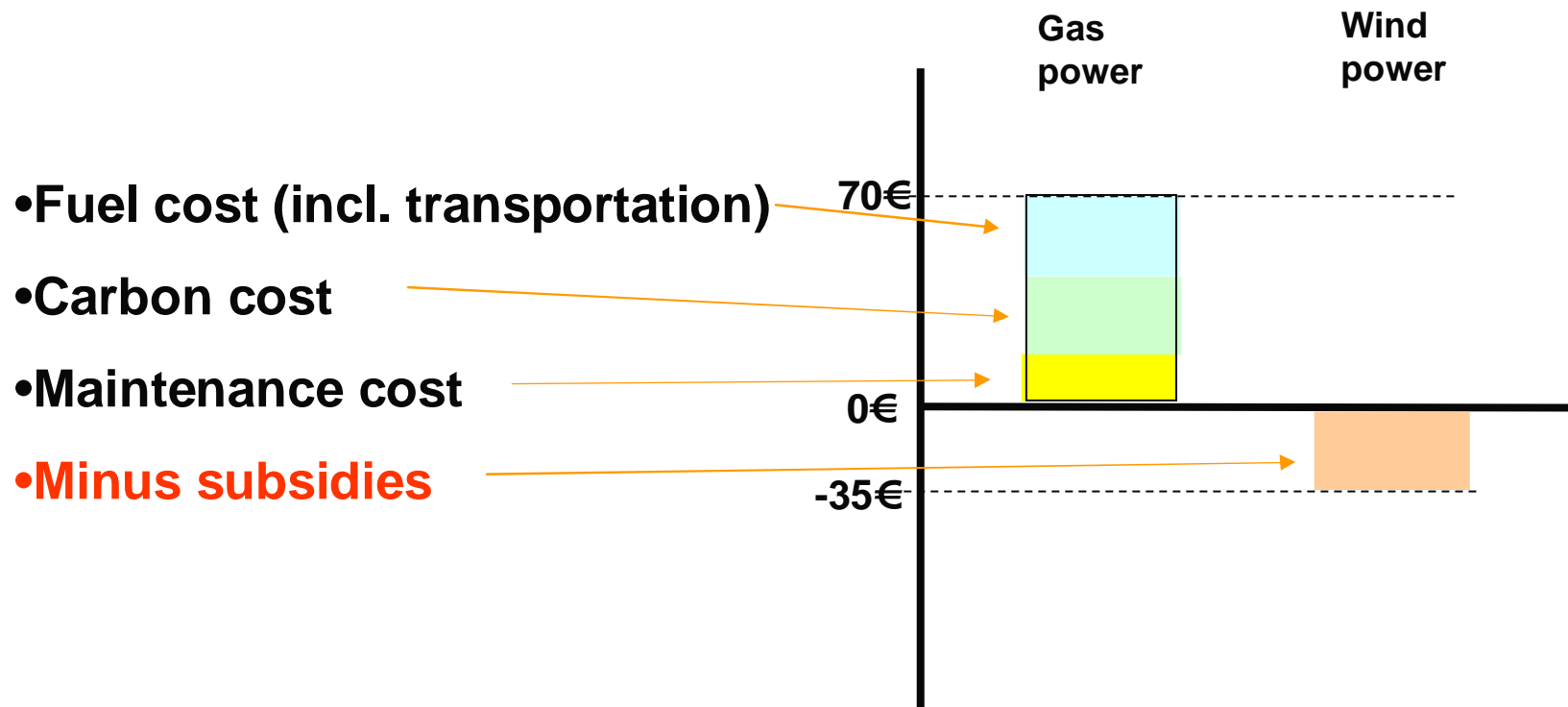
- labour cost
- Investment cost

Margining cost

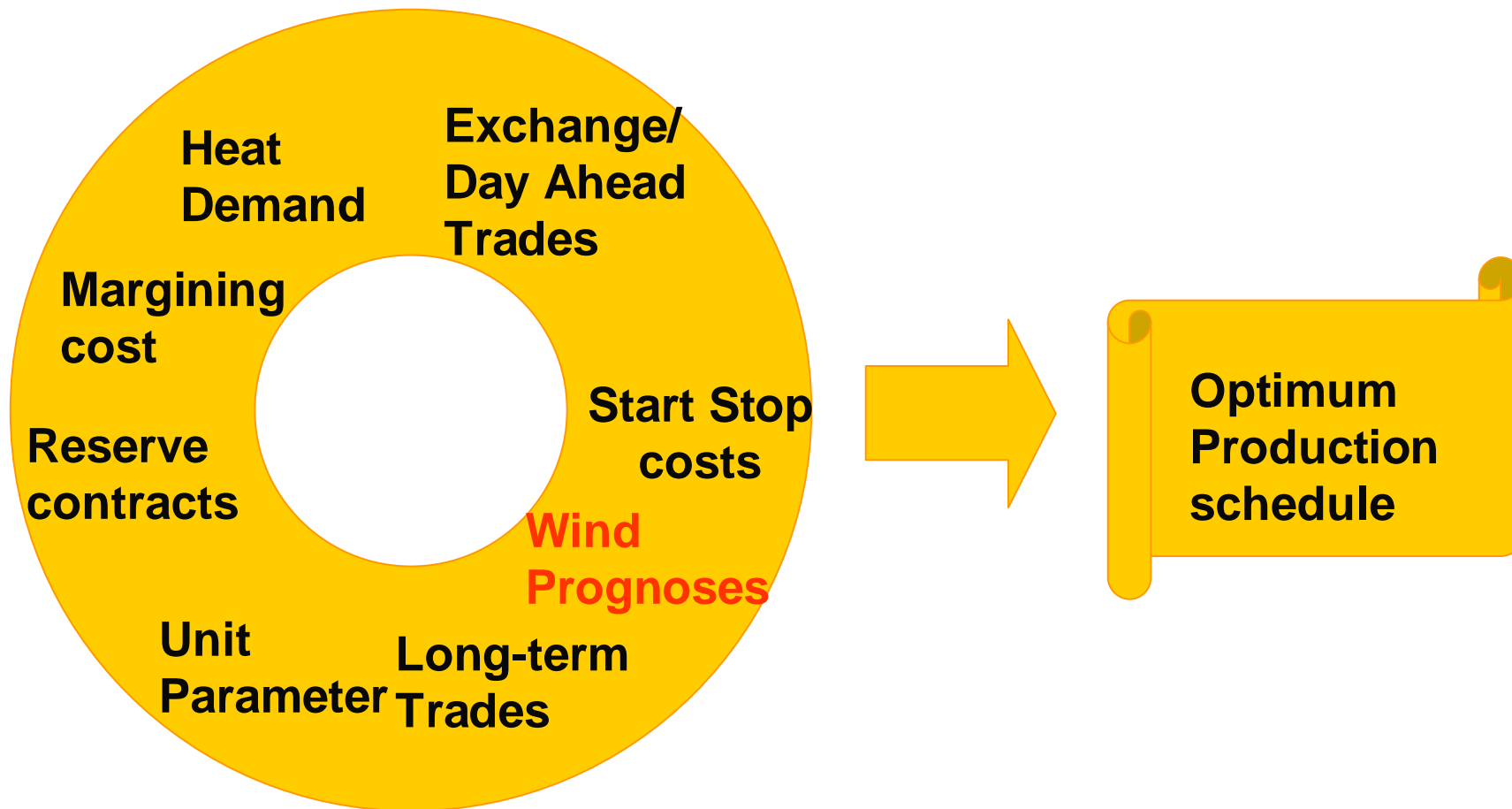
- Fuel cost (incl. transportation)
- Carbon cost
- Maintenance cost
- Minus subsidies

Exchange Price Limit

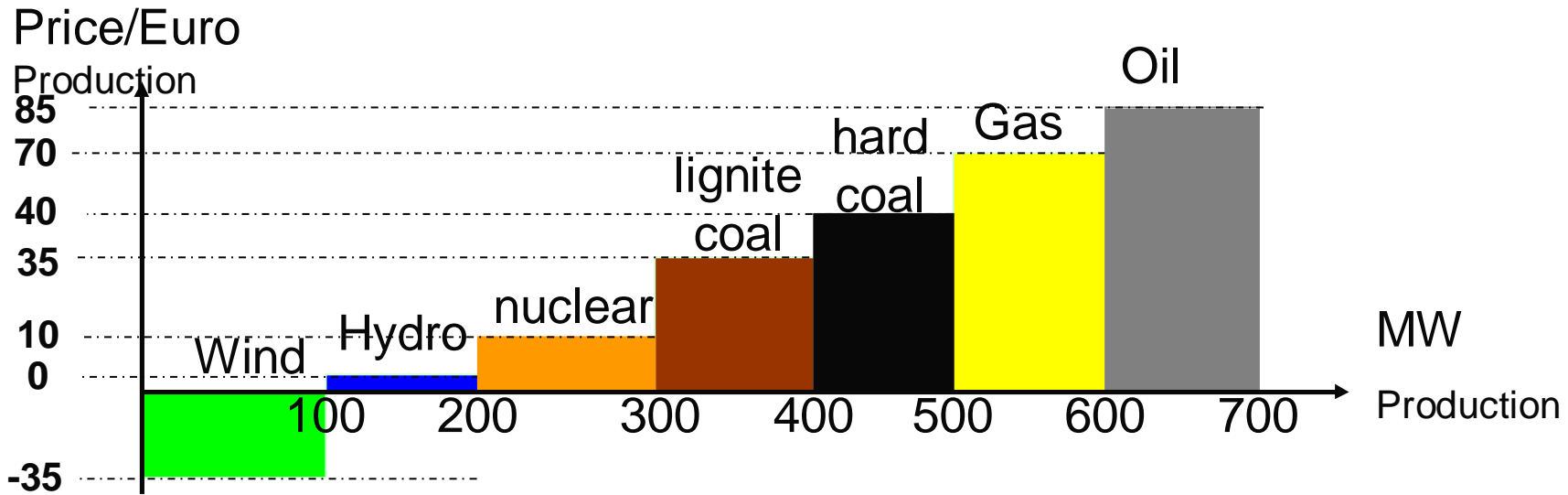
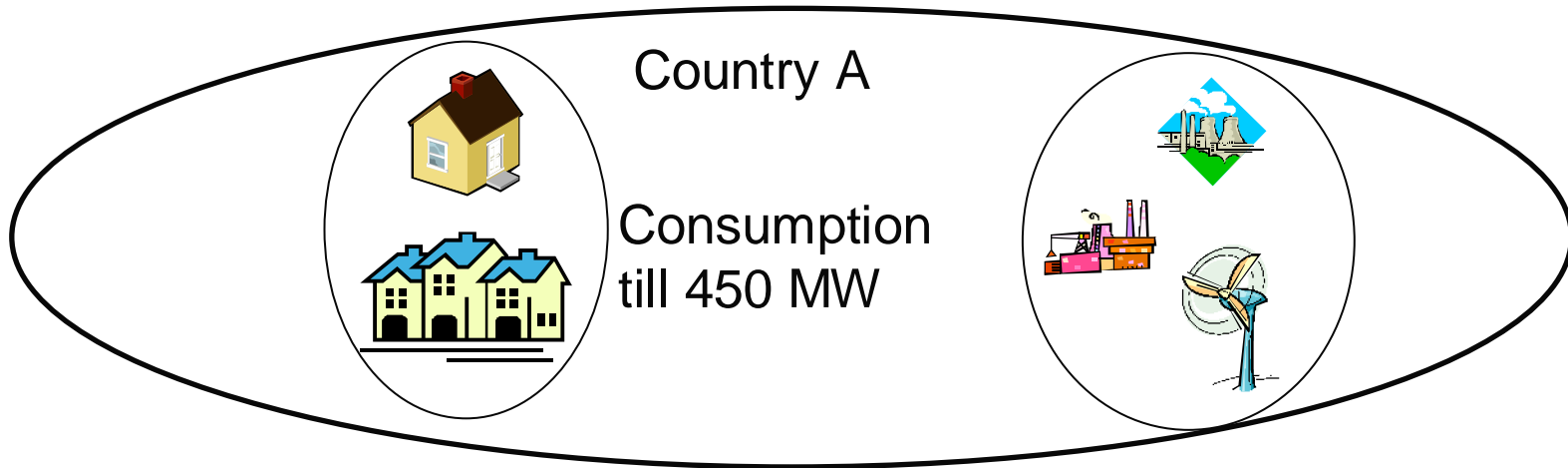
Example: Margining cost (Exchange Price Limit)



Optimisation Problem

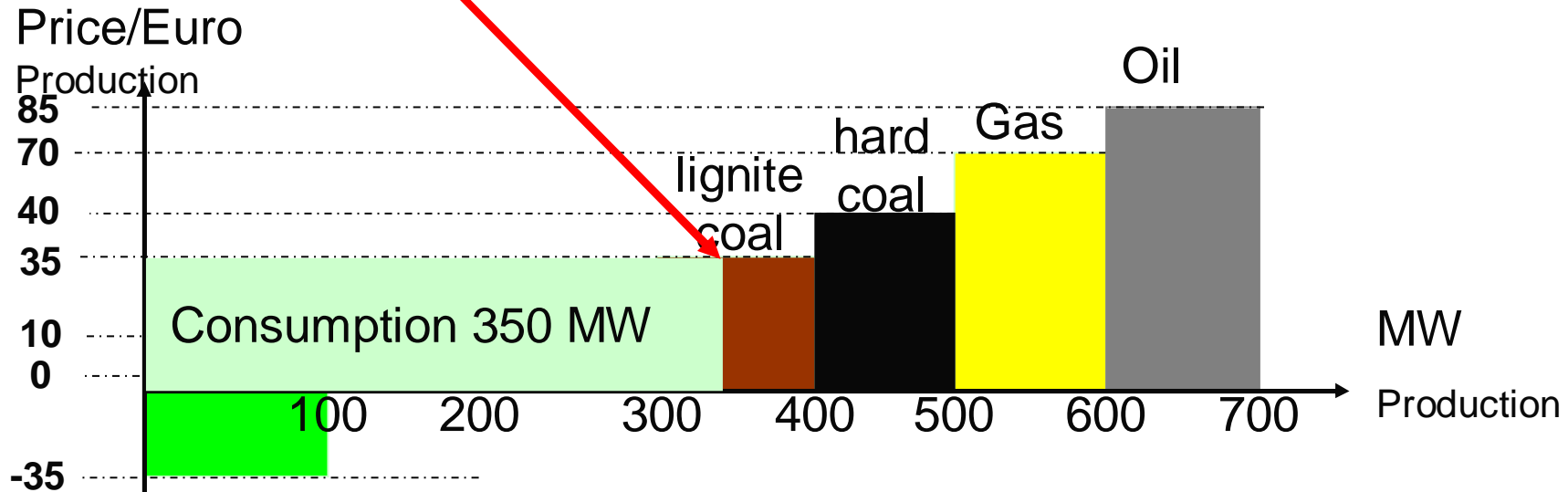
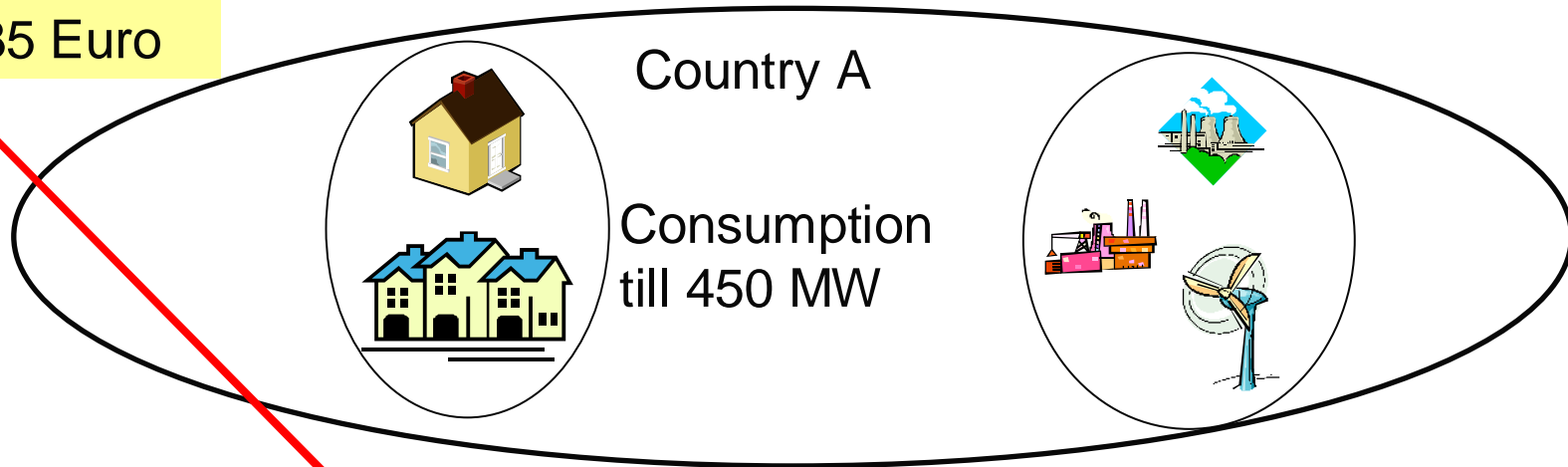


Whole Sale Market Price



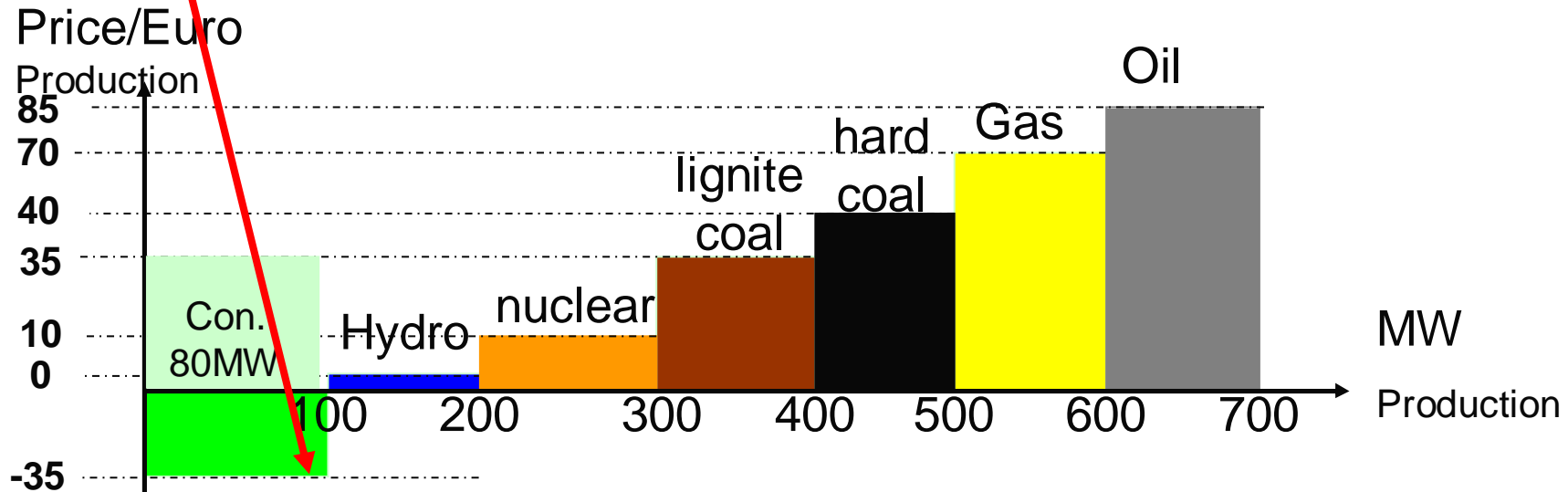
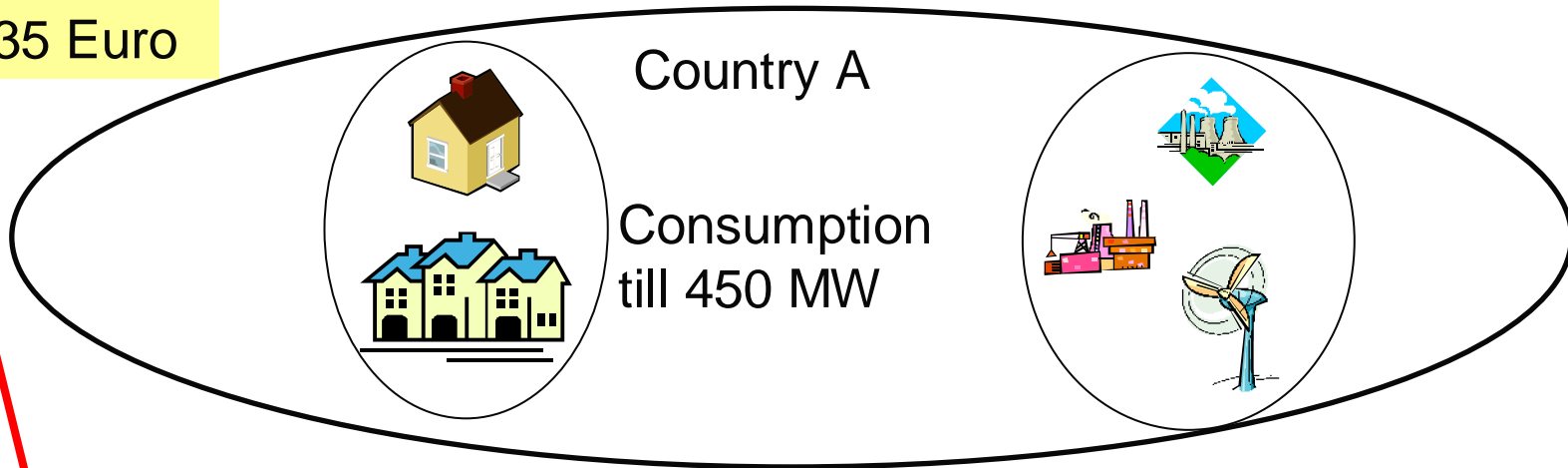
Whole Sale Market Price

Price 35 Euro



Whole Sale Market Price

Price -35 Euro



Thank you for your attention!

ERROR: syntaxerror
OFFENDING COMMAND: --nostringval--

STACK:

```
/Title  
( )  
/Subject (D:20080929171015+02'00')  
/ModDate  
( )  
/Keywords  
(PDFCreator Version 0.9.5)  
/Creator  
(D:20080929171015+02'00')  
/CreationDate  
(werner_dan)  
/Author  
-mark-
```