

# Security of Supply from a UCTE Perspective

DRAFT

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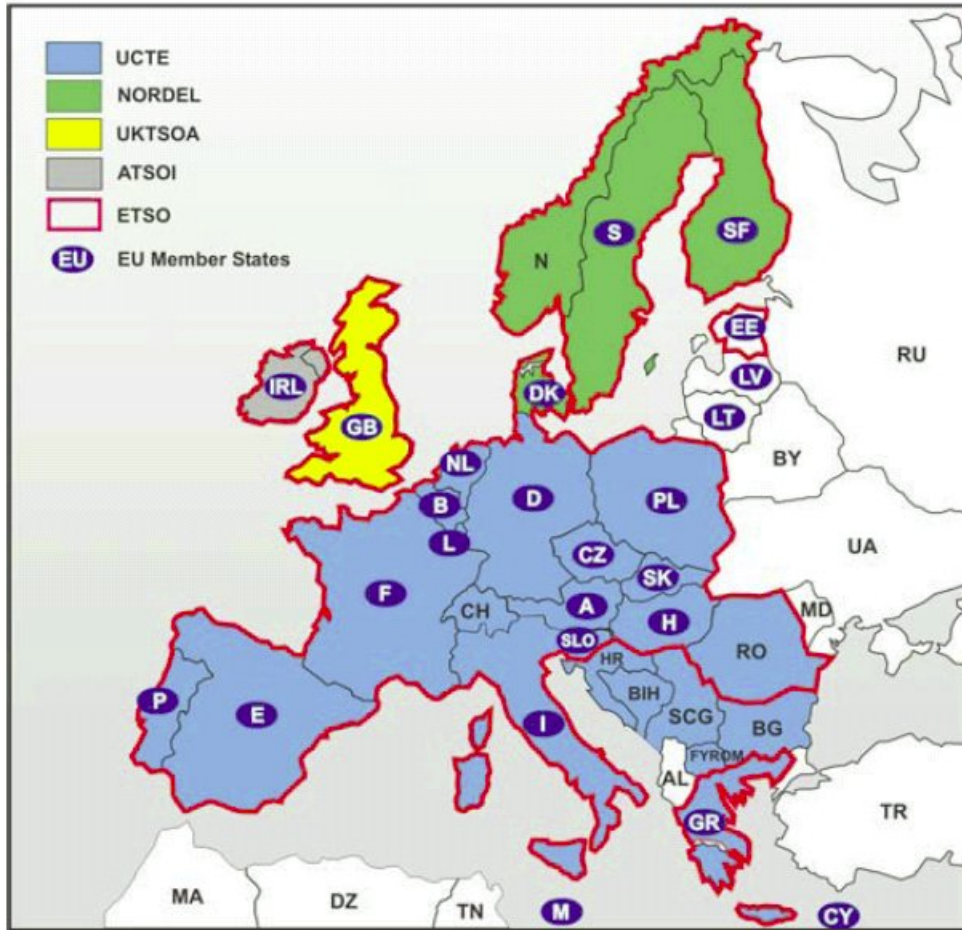
Eltra

# Security of Supply

- Adequacy
  - Energy:
    - The security of supply is the ability of the system to provide the demanded amount of **energy** (MWh) for customers at a given grid quality
  - Production and transmission capacity:
    - The reliability of supply is the ability of the system to provide the demanded amount of **power** (MW) at a any time
- Operational security:
  - The ability of the system to resist sudden disturbing events (such as sudden disconnection of lines or power stations)

Only adequacy of production capacity will be discussed

# The UCTE System Adequacy Forecast 2005-2015



## UCTE Objectives

maintain the security of operation in the interconnected power system supply

22 countries

450 Million people

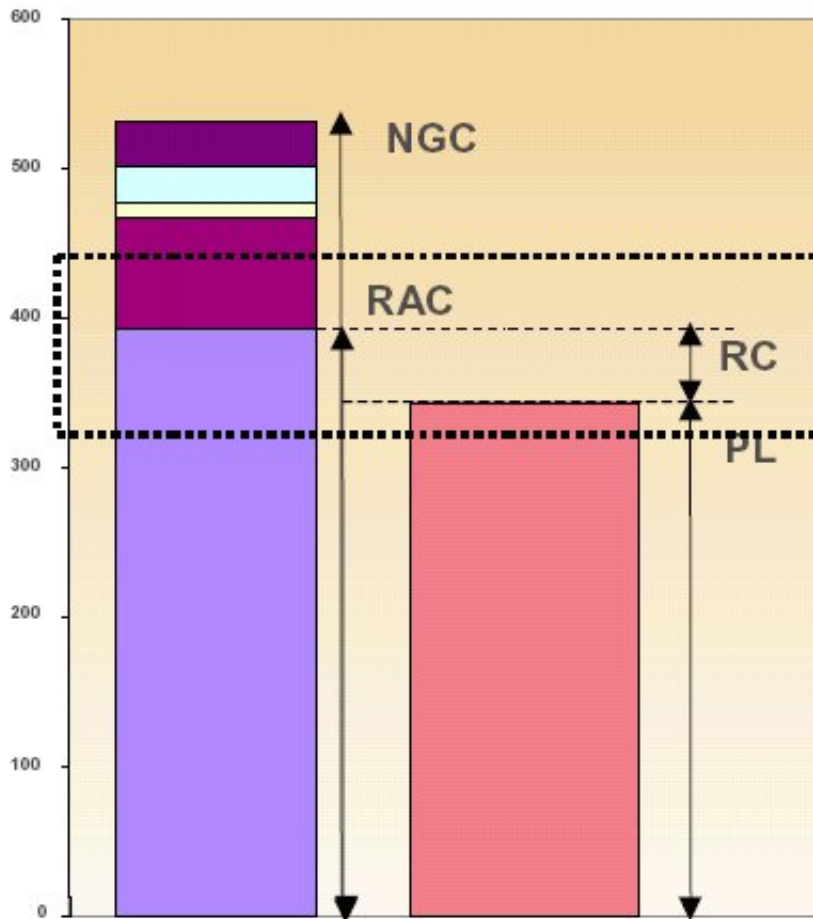
2300 TWh

# Outline of UCTE SAF

## (System Adequacy Forecast)

- Generation Adequacy Assessment
  - Forecasts of demand peaks and generation capacity
  - Estimation of *Remaining Capacity* (RC)
- Transmission Adequacy Assessment
  - Interconnections and internal grids
- Market driven cross border flows are not considered
- Forecast horizon extended to 10 years

# UCTE Methodology Assessing Generation Adequacy



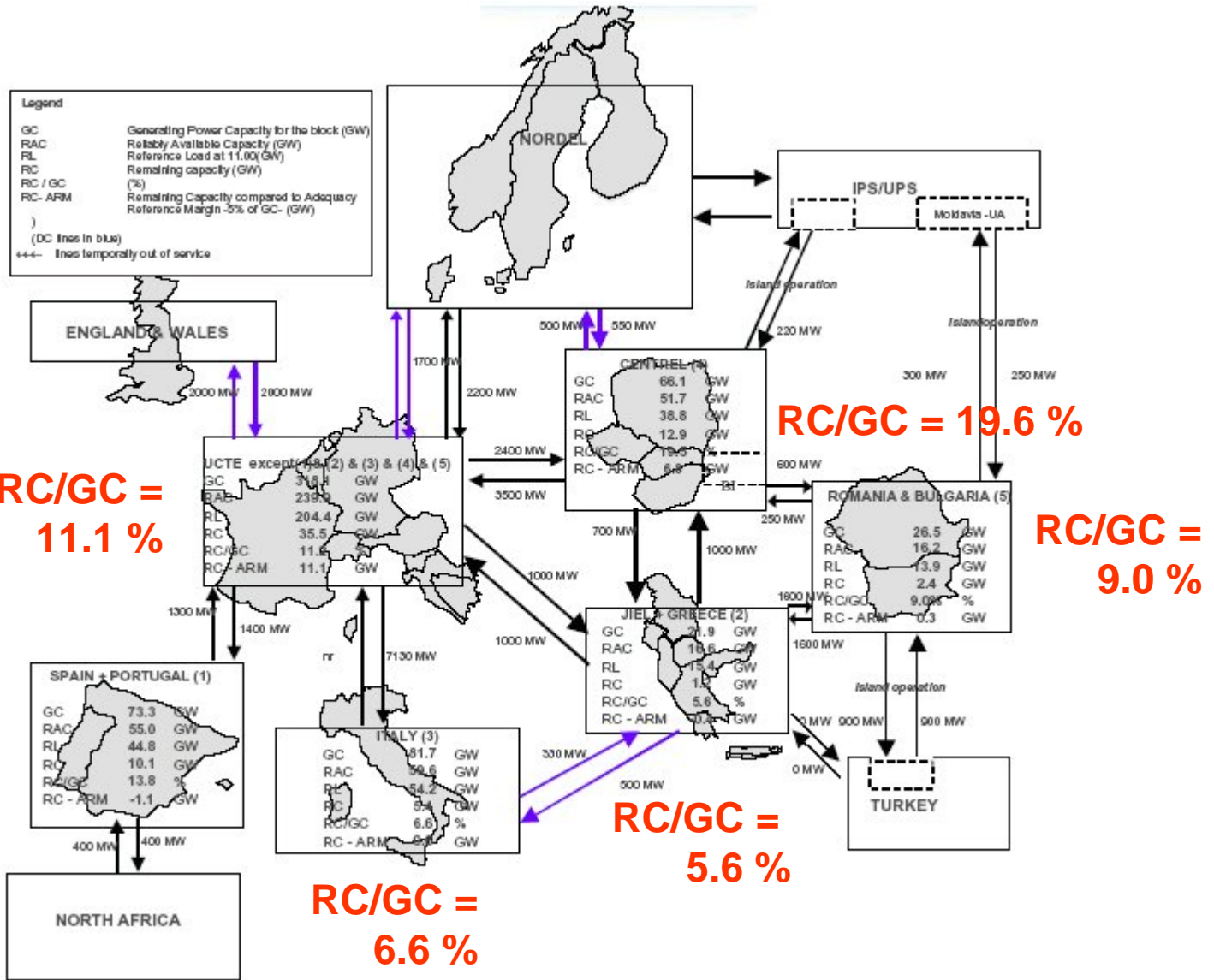
NGC: National Generating Capacity

RC: Remaining Capacity

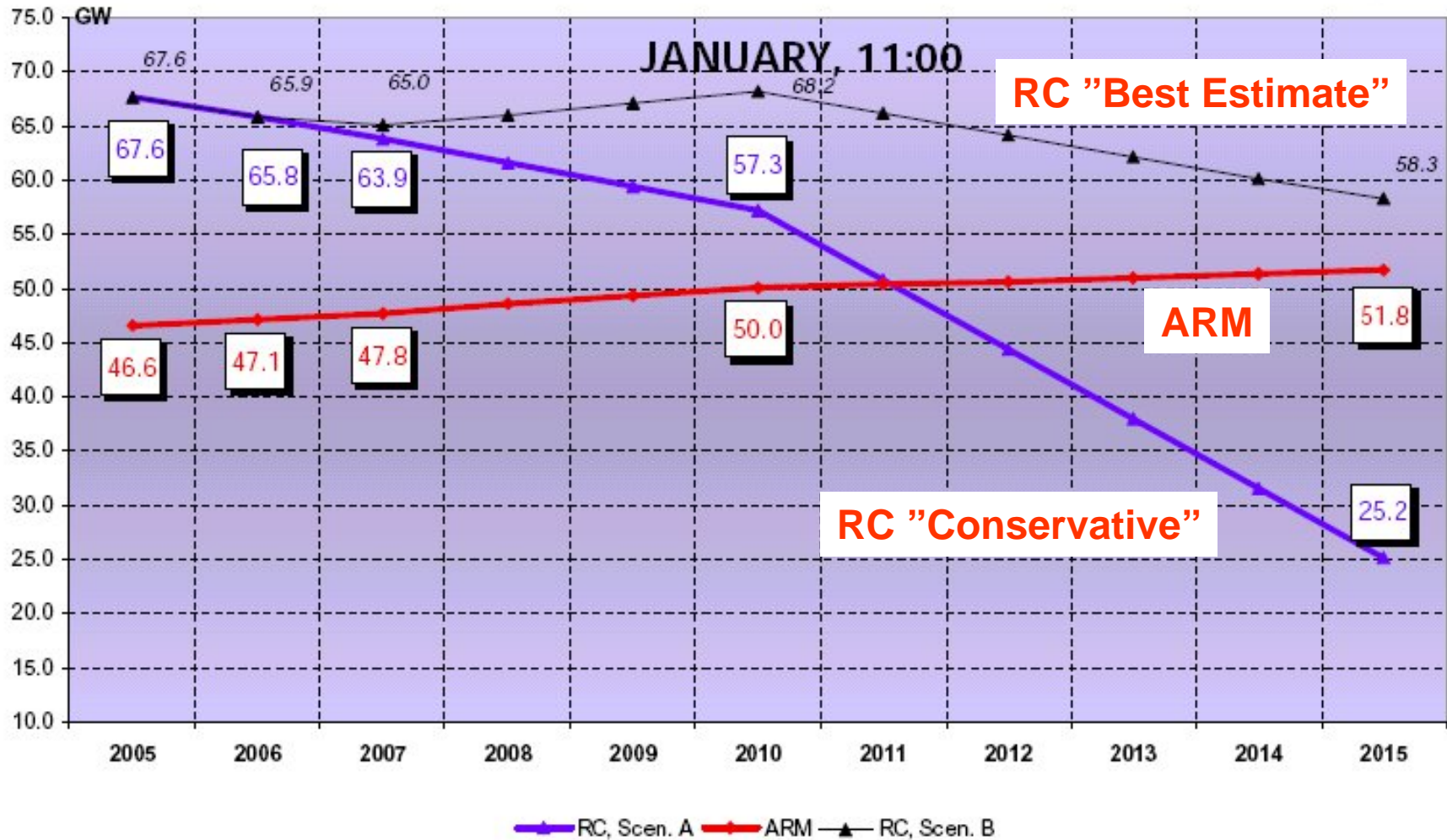
ARM: Adequacy Reference Margin

- Reliably available capacity
- Outages (thermal plants)
- Non usable capacity
- System services reserve
- Overhauls
- Peak load

# January 2005



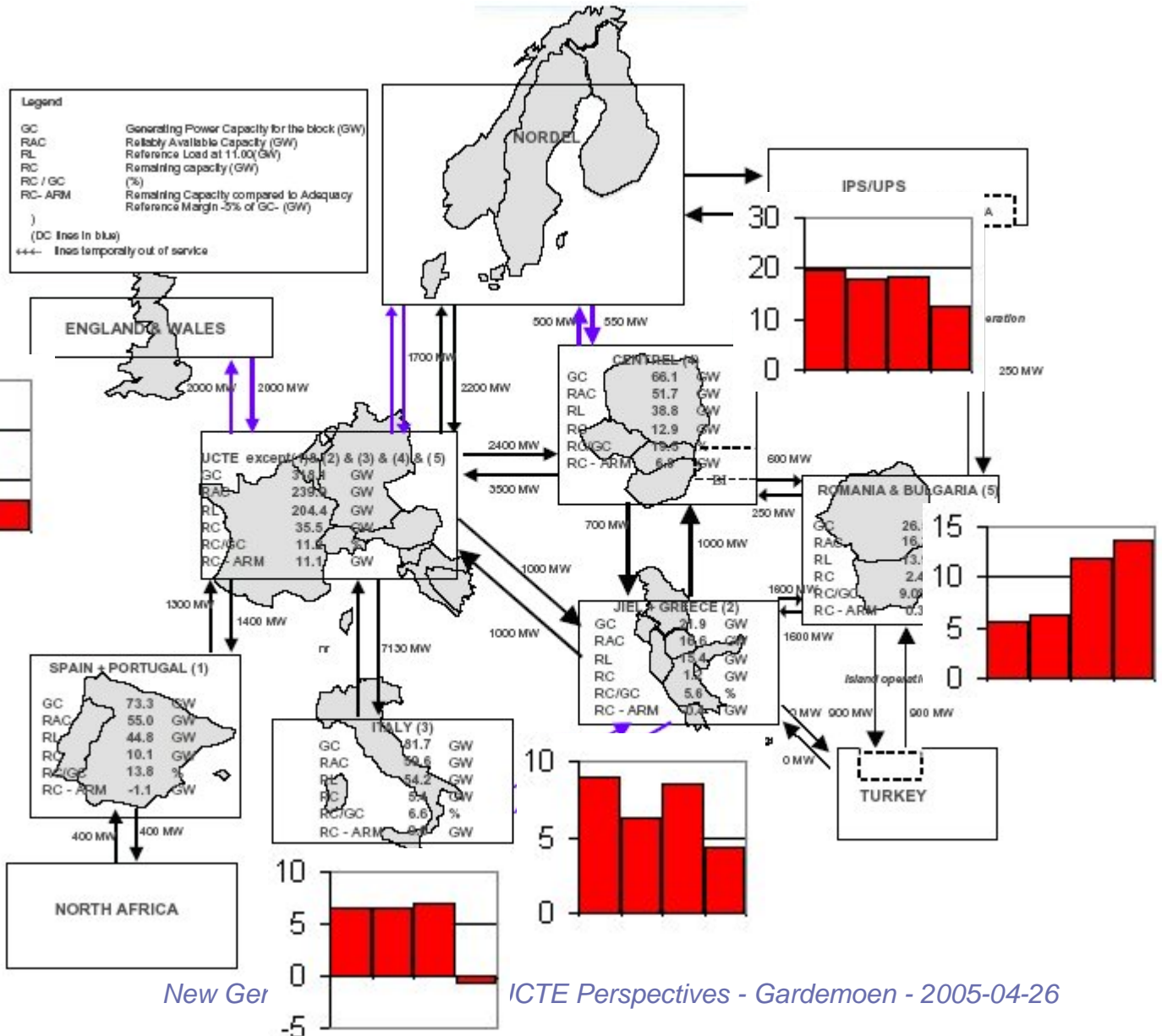
# UCTE Main Results



RC: Remaining Capacity

ARM: Adequacy Reference Margin

# RC/GC % January 2005-07-10-15





# UCTE Statements

- Security will be at risk after 2010 if further investments are not decided in due time
  - even before if extra decommissioning occur before that time horizon
- In 2015 an additional Remaining Capacity of 12 to 14 GW would be necessary to match the ARM in the main UCTE block.
- For some countries, network reinforcements will be the way to compensate national potential lack of Remaining Capacity at peak load.

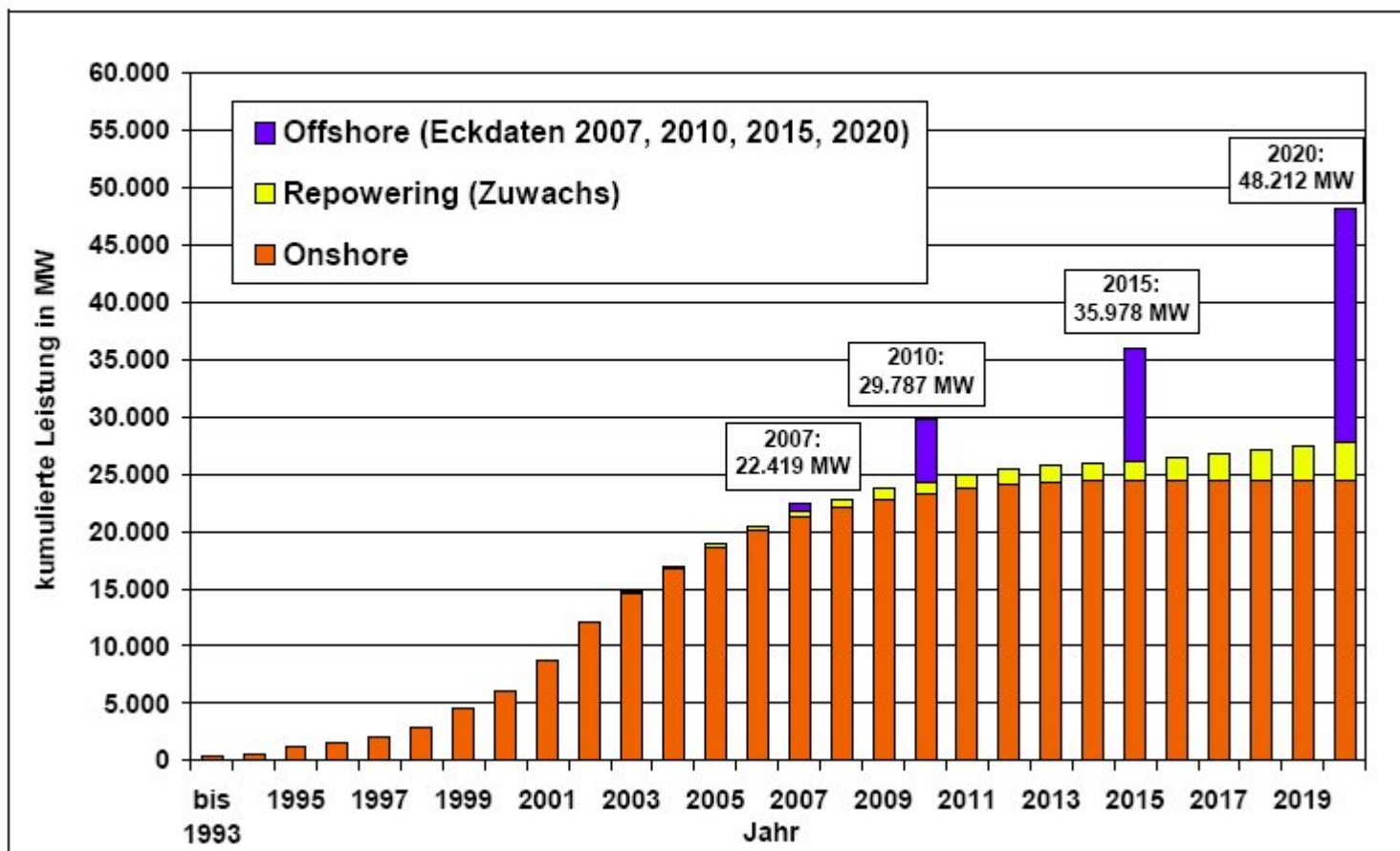
The UCTE forecast does not discuss, which measures could encourage producers to invest in new production units

## Integration of Wind Energy in Germany

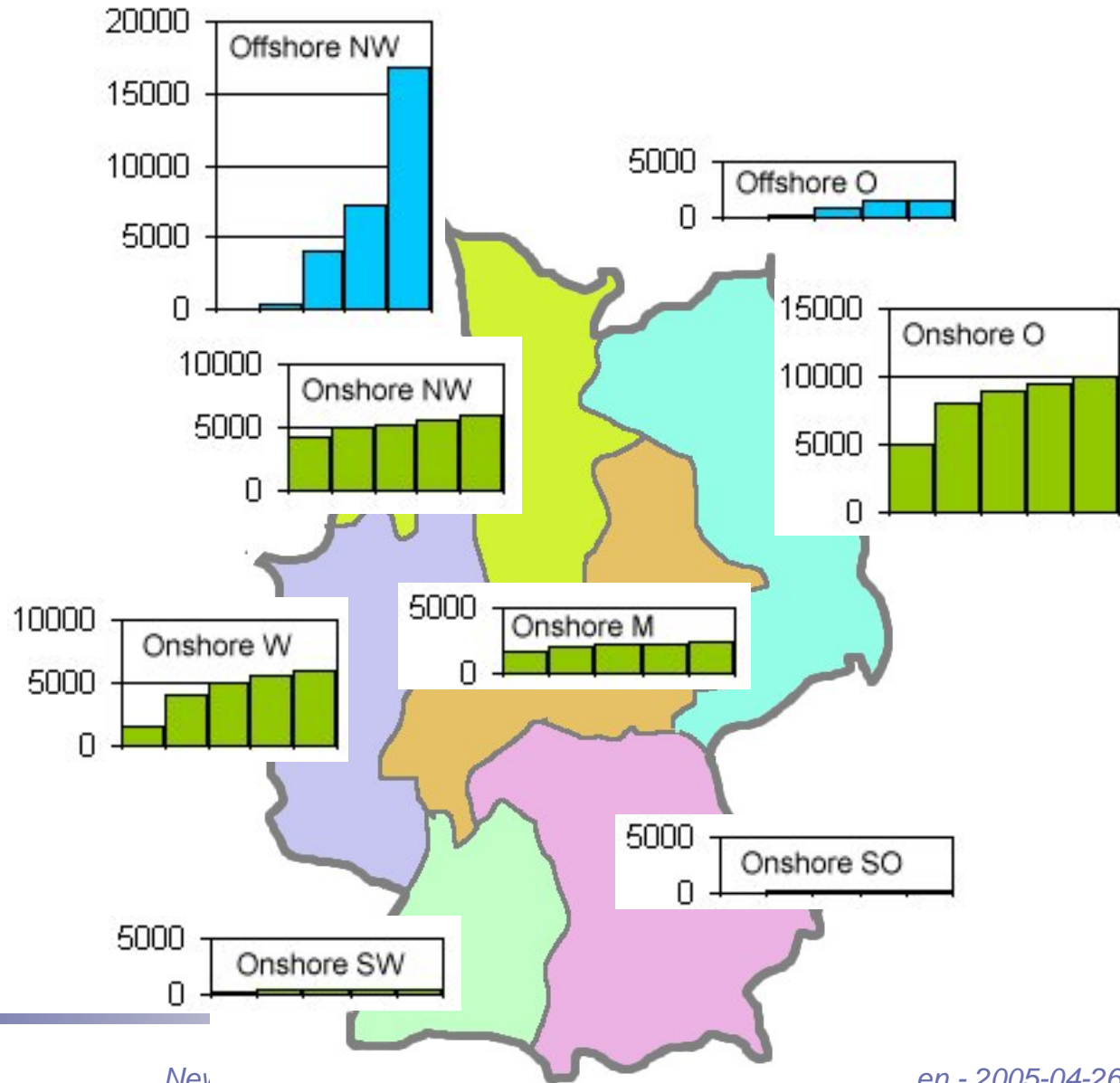
- Background of study:
  - Share of electricity from renewable energy at least 12.5 % by 2010 and 20 % by 2020
- Study objective:
  - Thorough analyses for the years 2007, 2010, 2015 and 2020
  - Specify necessary infrastructural measures
- Outcome:
  - Analyses for the years 2007, 2010 and 2015
  - 15 % of electricity from 36,000 MW wind power in 2015
  - Identification of need for upgrade and extension of grid
  - Additional analyses planned for part 2 of the study

# Ambitious German Wind Power Plans

Abbildung 2-21: Prognose der Windenergieentwicklung in Deutschland an Land und Offshore bis 2020 (kumuliert) – Szenario „Beschluss dena-Fachbeirat“



# Regional Wind Power Distribution 2003-07-10-15-20



## Consequences for System Security and Market?

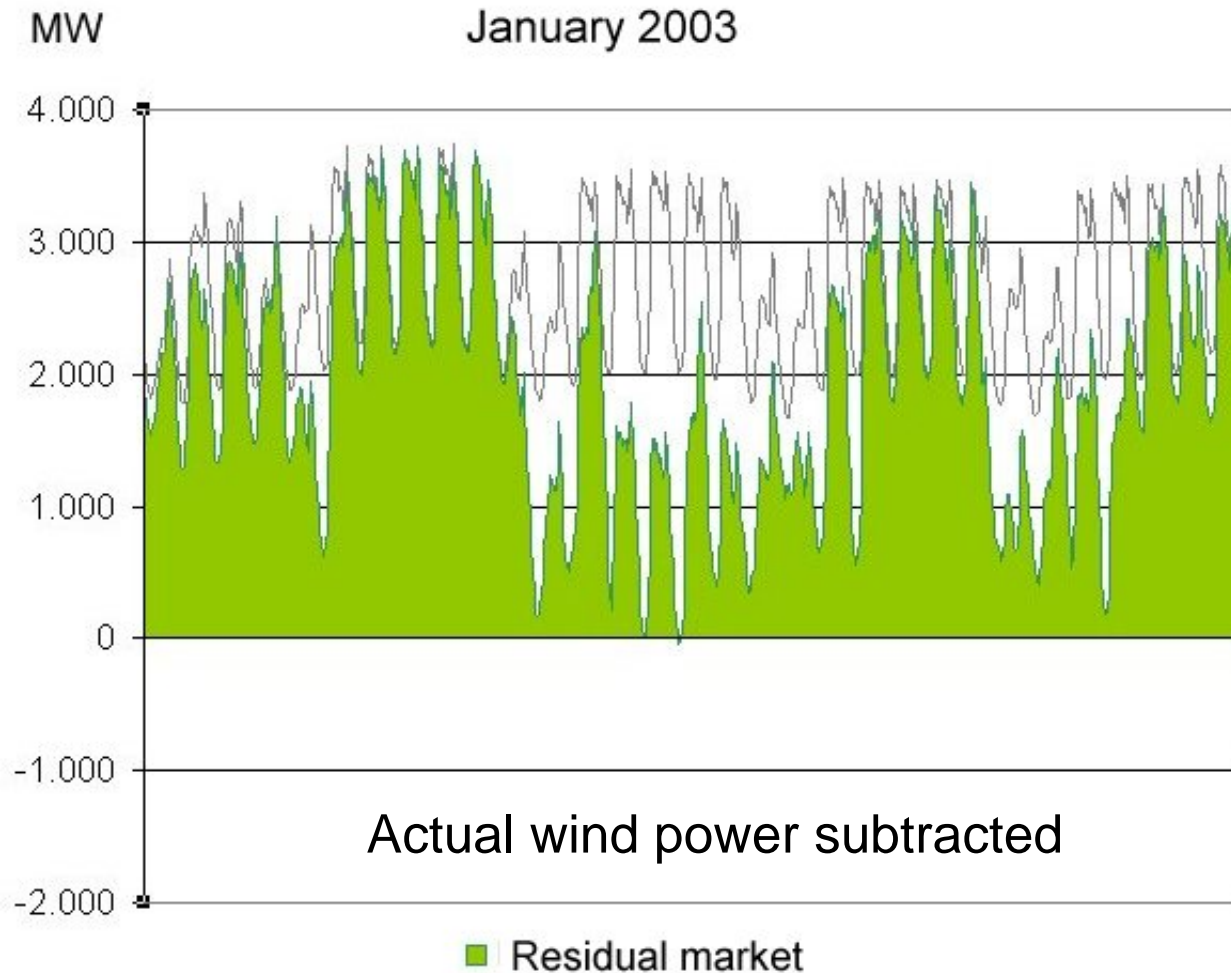
- Certain faults could violate UCTE-rules, even in 2003
- New grid codes, improved wind turbines and other measures are supposed to solve the problem
- In certain situations surplus of electricity will flow to neighboring countries
- Large scale wind power in Germany will deteriorate system security in neighboring countries
- During periods with high wind power generation transfer capability on interconnections are expected to be low or zero

**How will the international electricity market perform under such conditions?**

At Eltra we have some experience with wind energy exceeding 20 % of the electricity consumption

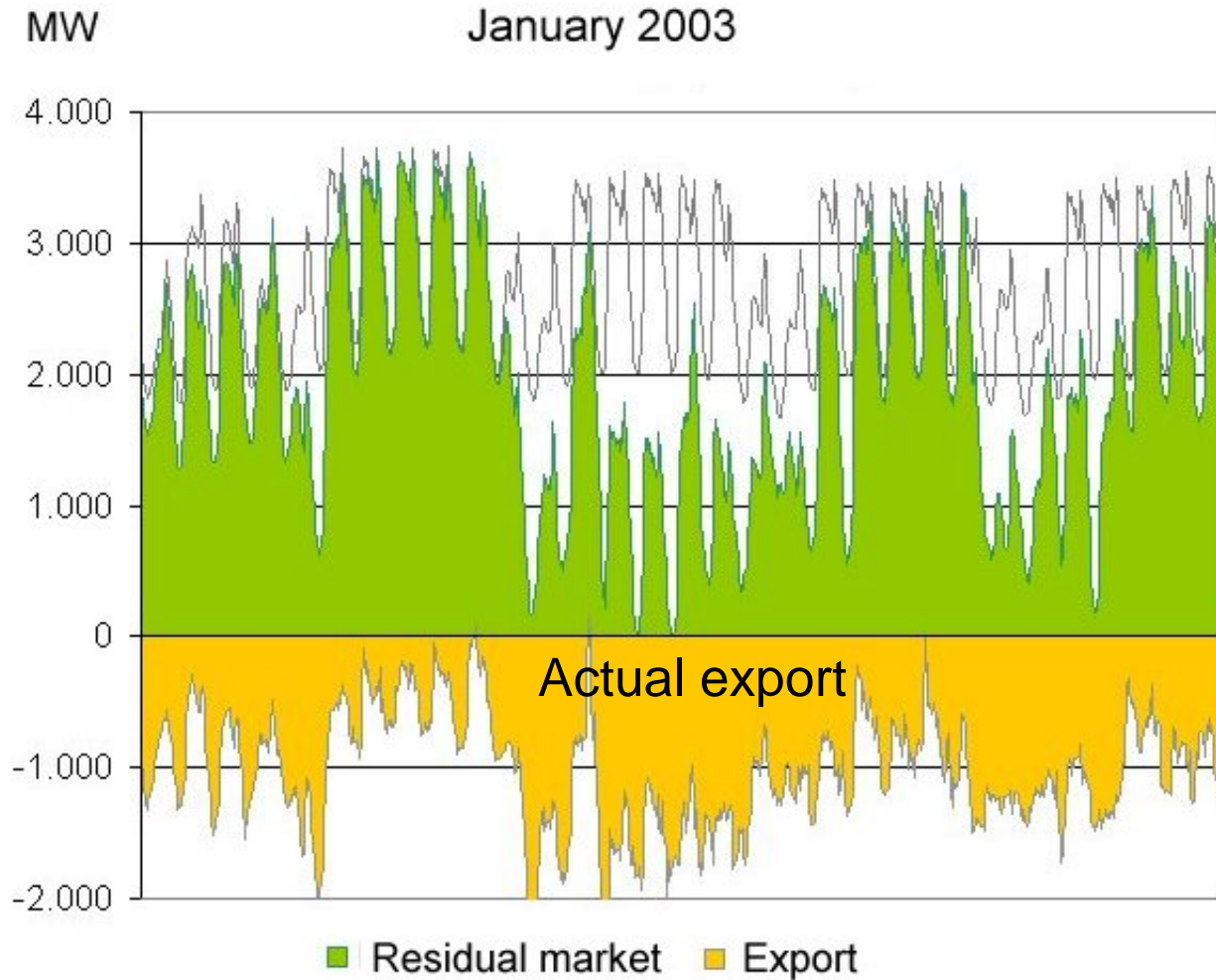


# The Residual Market



**A poor domestic market for traditional base load units**

# Export Caused by Priority CHP

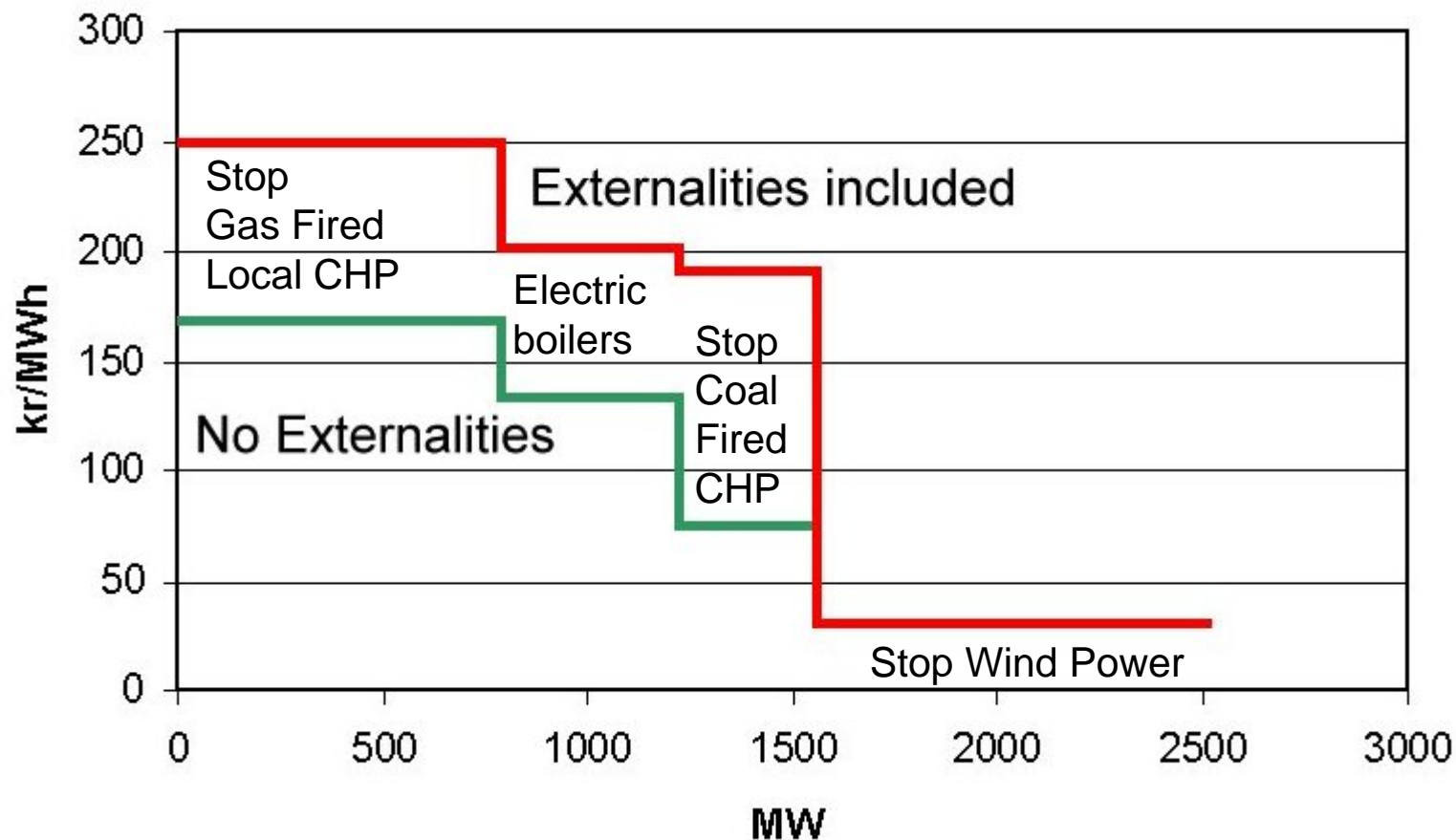




## When Wind Power Exceeds 20 %

- The domestic market for base load generation is gone...
- New flexibility must be added to the system
  - CHP units have 3 modes of operation:
    - heat only
    - electricity only
    - combined heat and power
  - Flexible electrical loads
    - Heating water for district heating systems
    - Heat pumps
    - Hydrogen production by electrolysis plants
- Only economic criteria can lead to the optimum solution
- The electricity market offers the necessary tools...

# Incremental cost for decreasing production



Data: RES-Report DEA Oct. 2001

# The European Perspective

- In countries with a high share of volatile generation (such as wind power) producers will be very reluctant to invest in new traditional base load units
- In the future security of supply is not only a question of sufficient production capacity, but will rather depend on a production system with the right package of qualities
- There will be an increasing need for more flexible types of thermal power plants
- If the market design encourages investments in more flexible power schemes, the market players will find the right solutions
- Strong interconnections and efficient market coupling across borders can smooth out volatile market prices and support the confidence in future among investors