

# **GENERATION MARKET MODELING & INTERVIEWS ON INTEGRATION BARRIERS**

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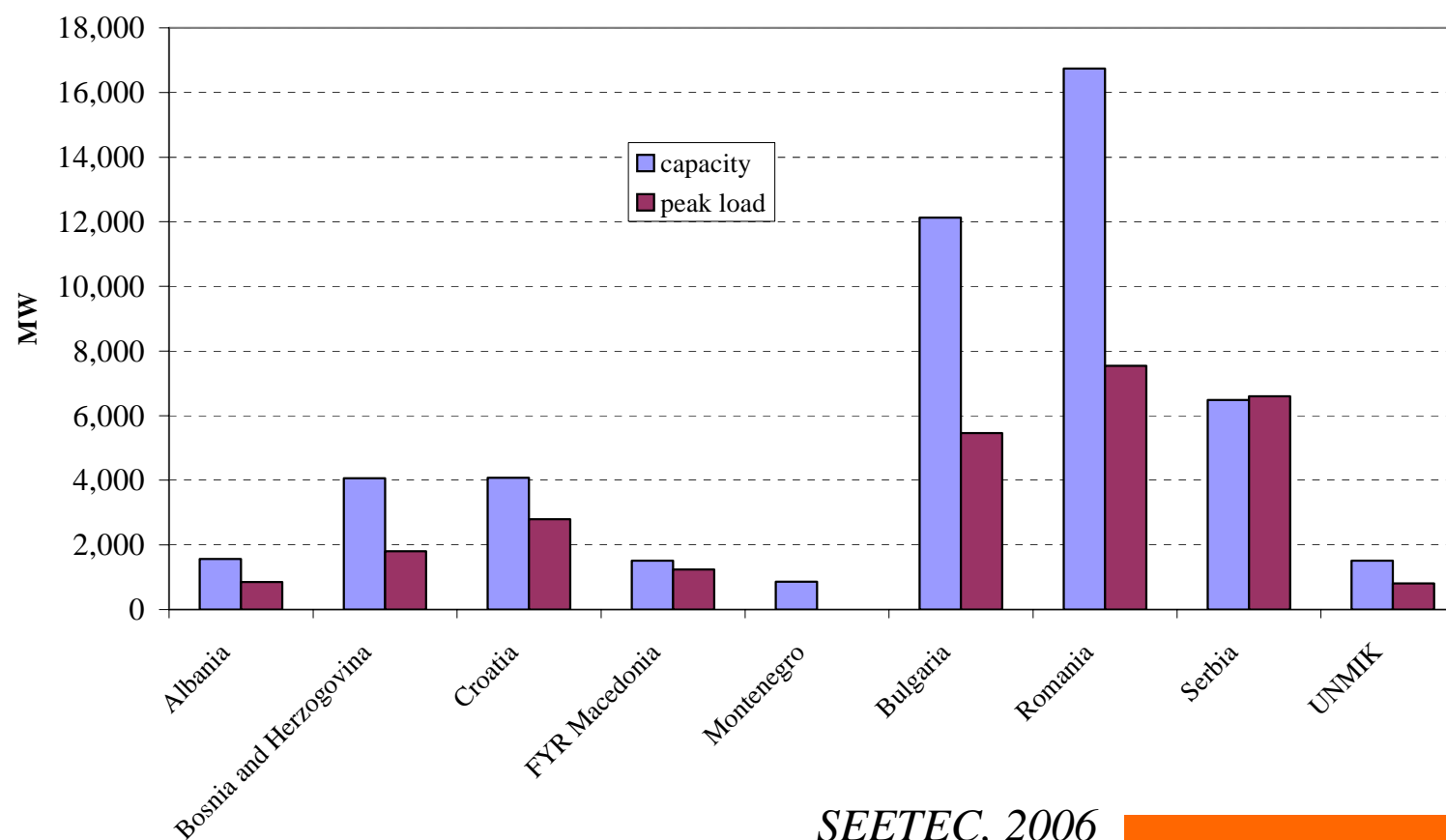
András Kiss

Michael LaBelle

Budapest, February 25, 2008

# SECTOR BACKGROUND – 1

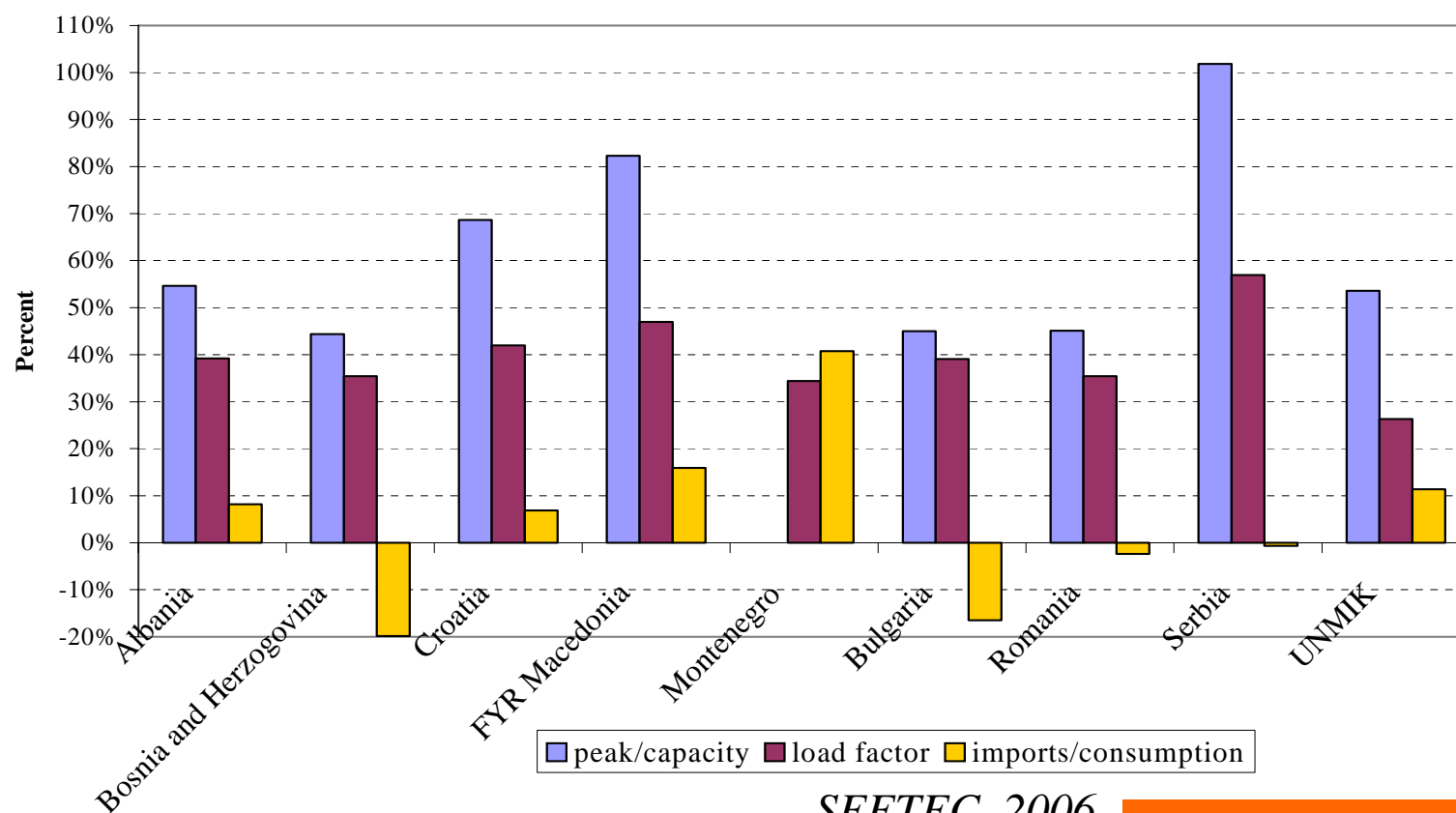
**SEE Capacity and peak load 2004**



*SEETEC, 2006*

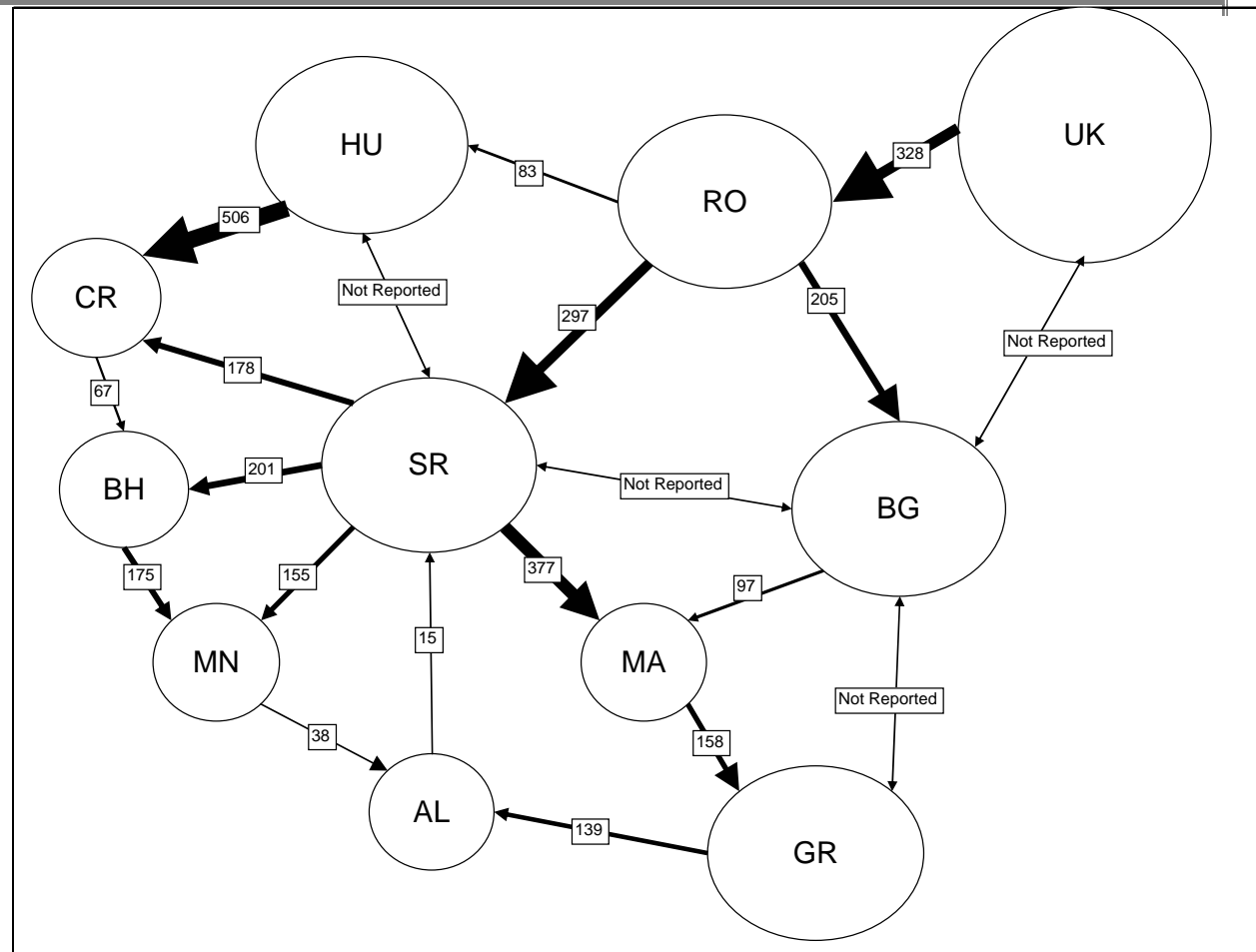
## SECTOR BACKGROUND – 2

### SEE adequacy, load factor and imports



SEETEC, 2006

# REGIONAL FLOWS, 2007 JULY PEAK LOAD



*June-August Report*

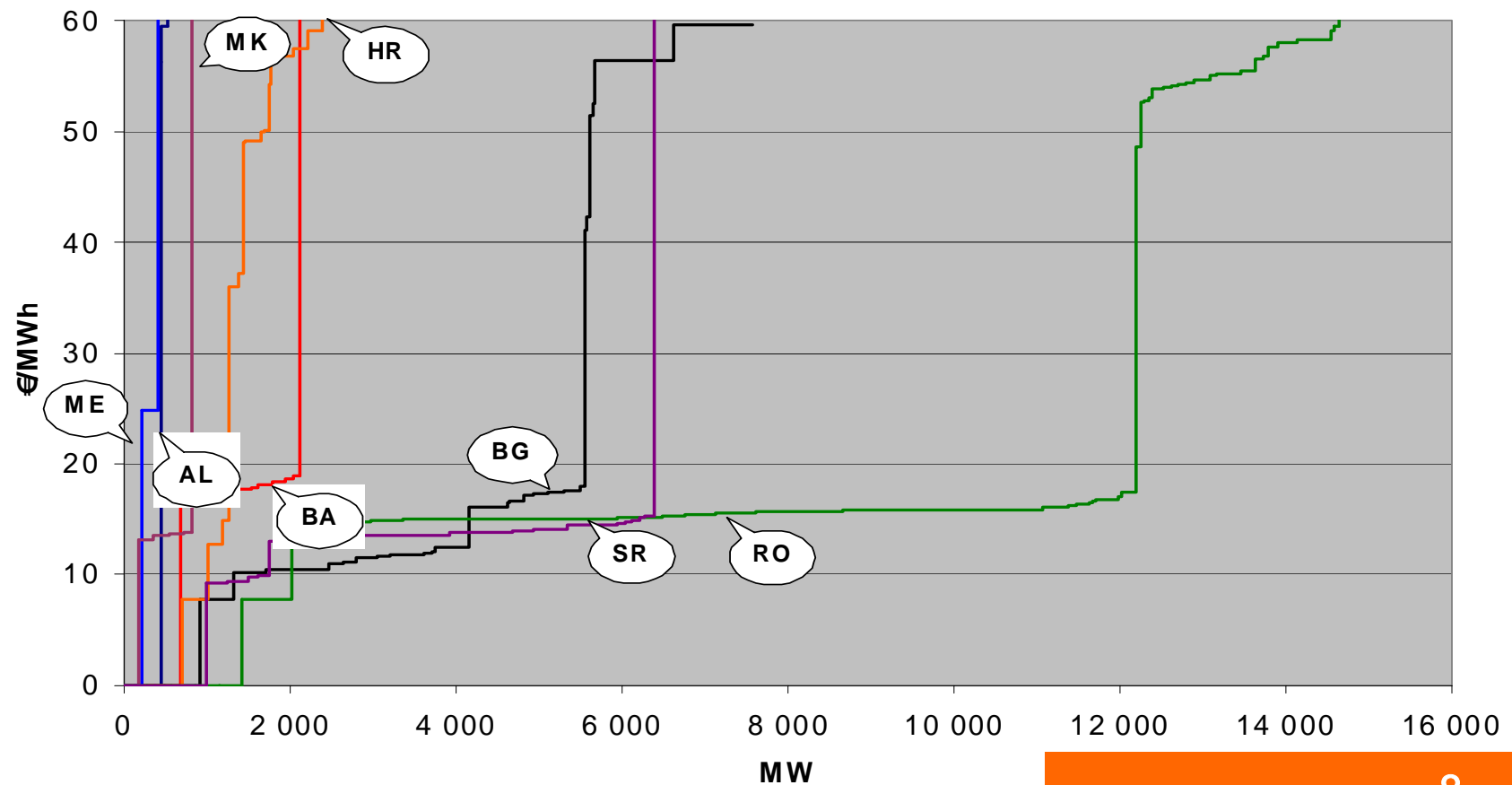
# GENERATION MARKET MODELING

- Apply economic theory to simulate complex market outcomes
  - Competitive Benchmark Analysis
  - Partial market equilibrium model
- Ex ante tool to establish
  - what outcomes (in terms of prices, production, trade etc.) an efficiently working market would yield;
  - what separated sub-markets could develop in a geographically dispersed region;
  - whether any producer has the incentives and means to exercise its market power (if it exists); and
  - what the overall market outcome could look like if producers freely exercised their market power.

- Production decision based on MC
- Generators are price takers
- Base scenario: thermal unit availability: 90% (hydro: 30%)
- Demand price elasticity: -0.1
- CB allocation is efficient (extract rent from price differences)
- Network constrained perfect competition

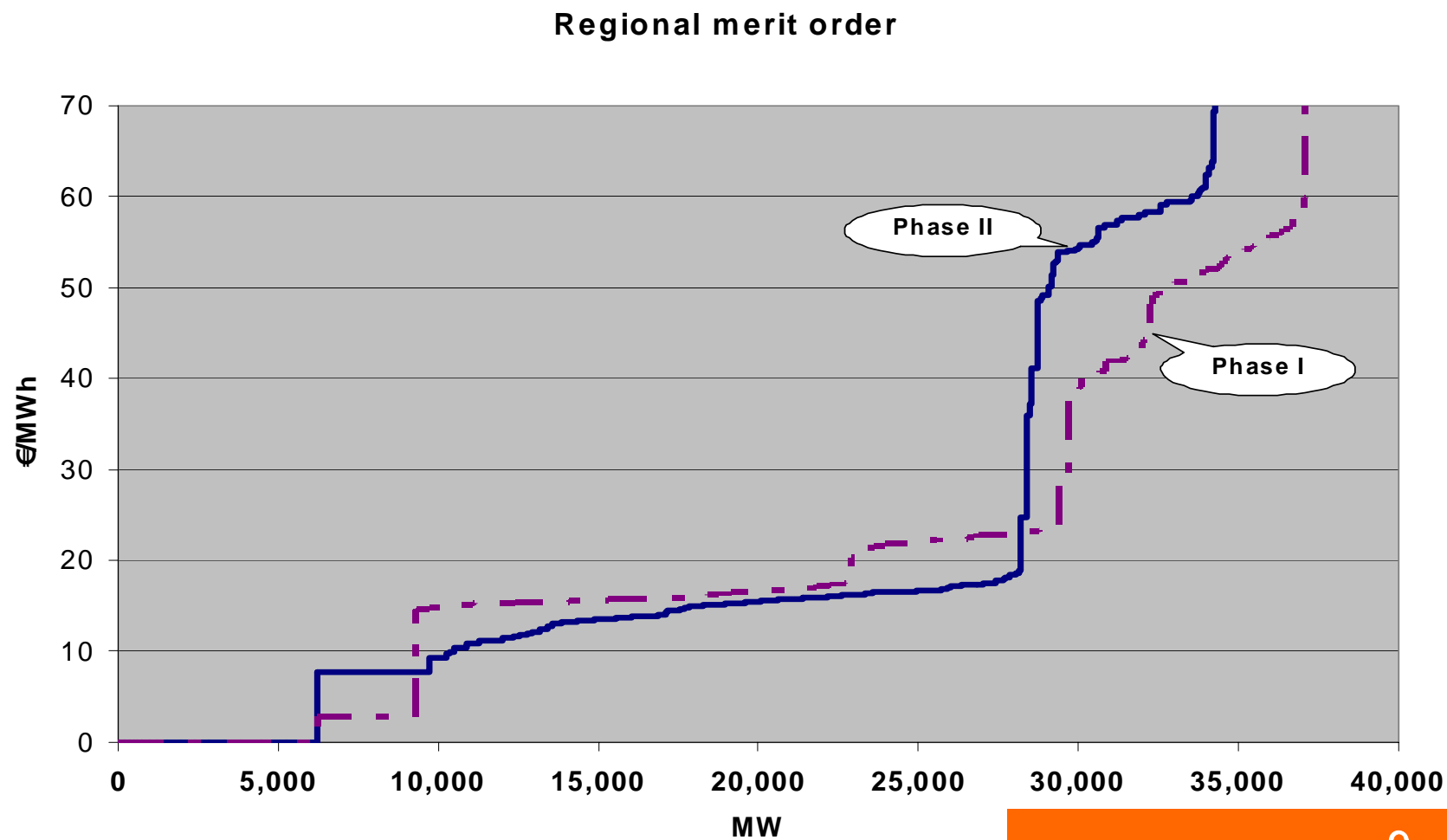
## INPUT - estimated merit order for each market

Merit order in each SEE market



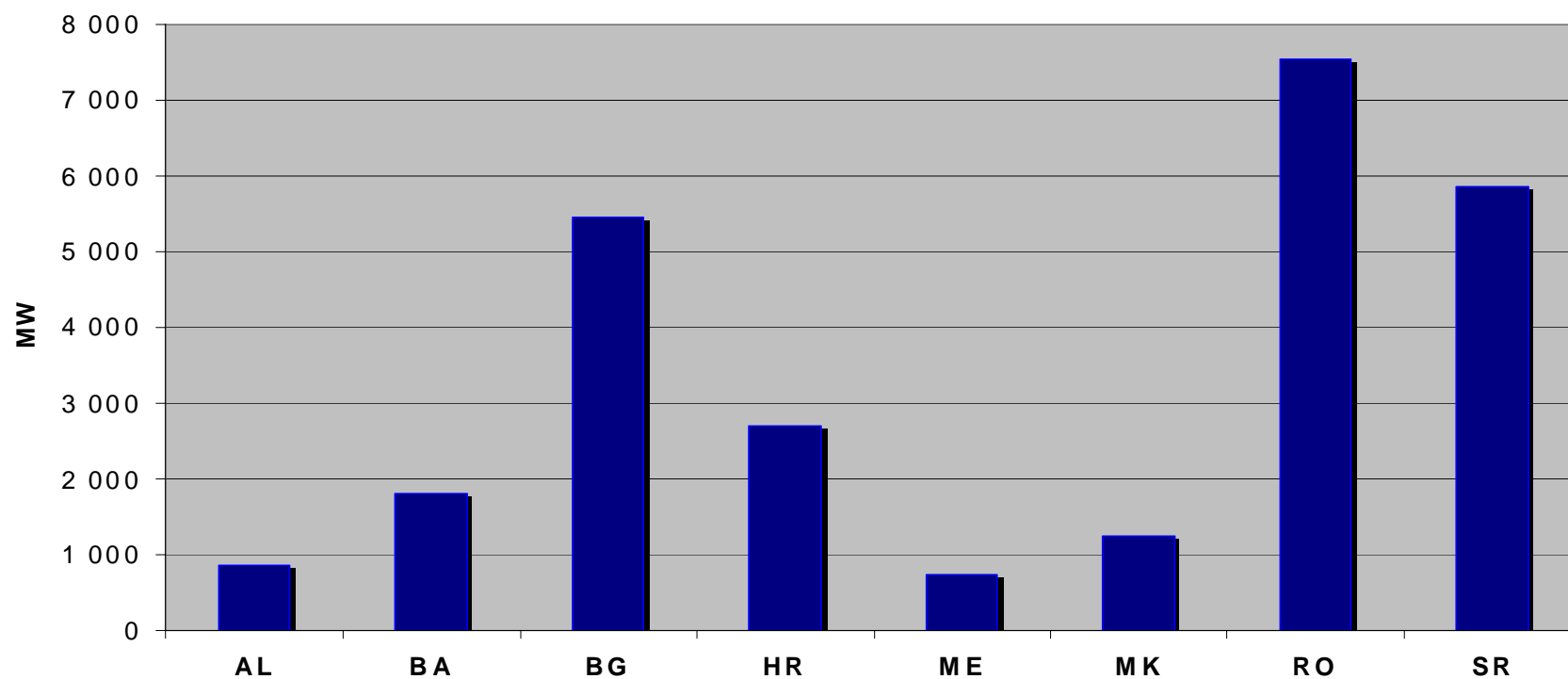


## INPUT - *estimated regional merit order*



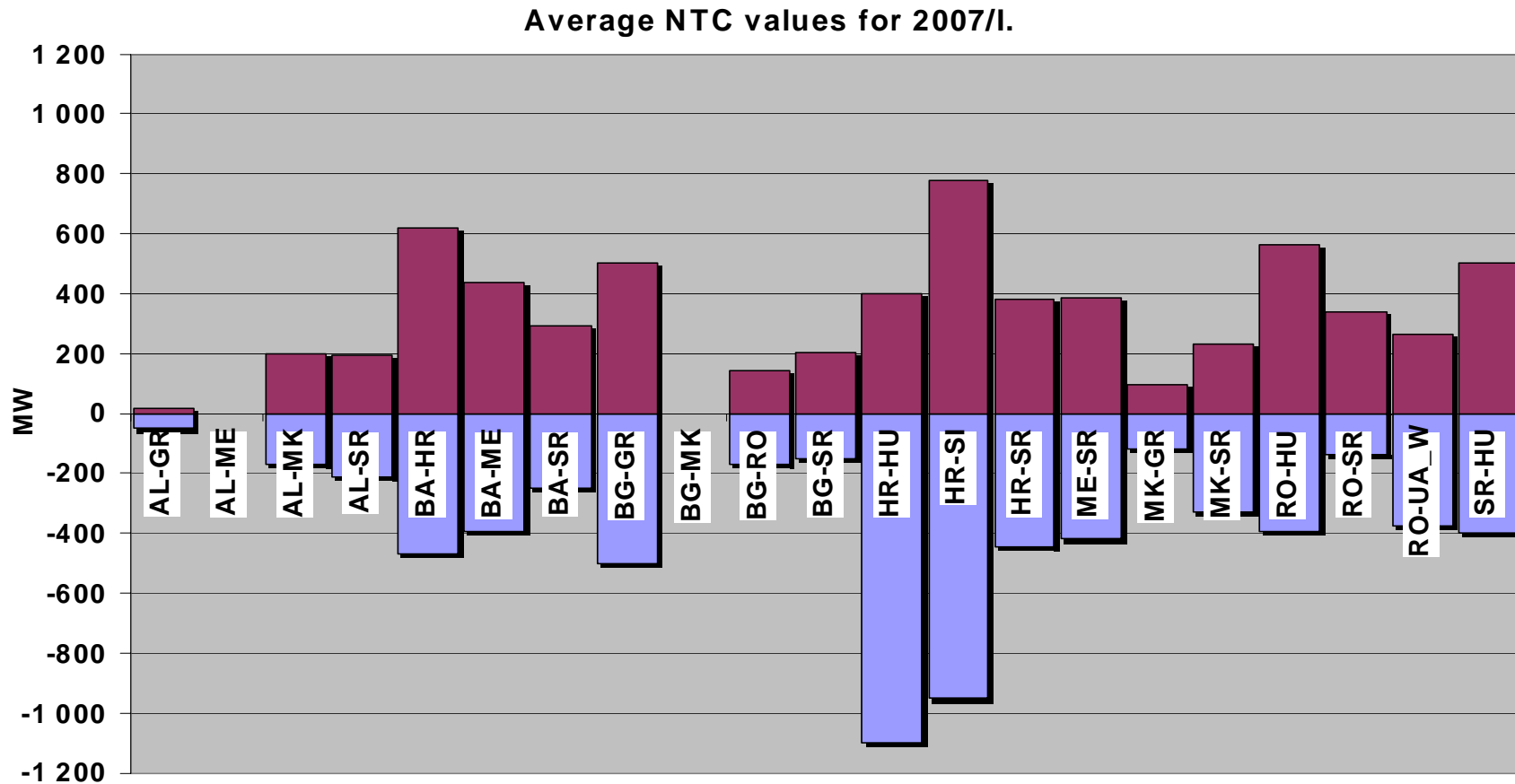
## INPUT - peak demand, January 2006

Peak demand in SEE markets

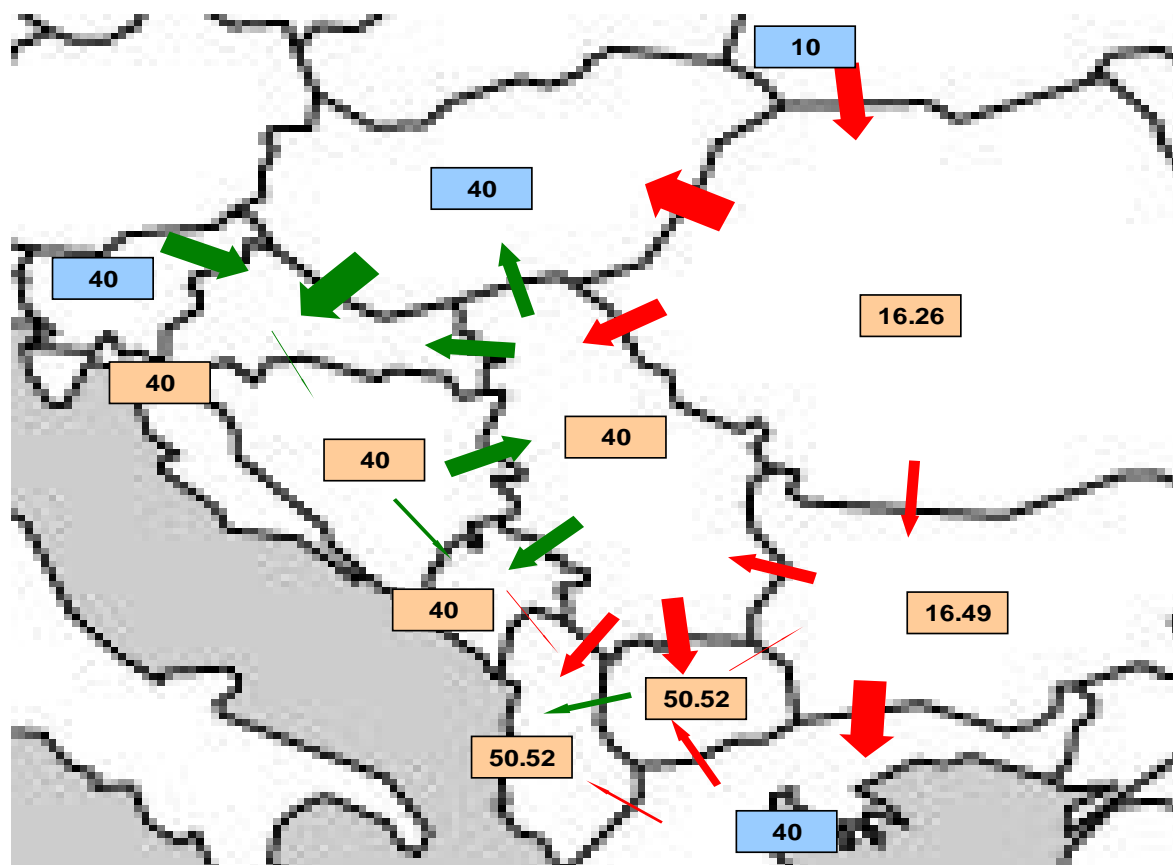


*Assumed price elasticity of demand: -0.1*

## INPUT – monthly average NTC values (network constraint)



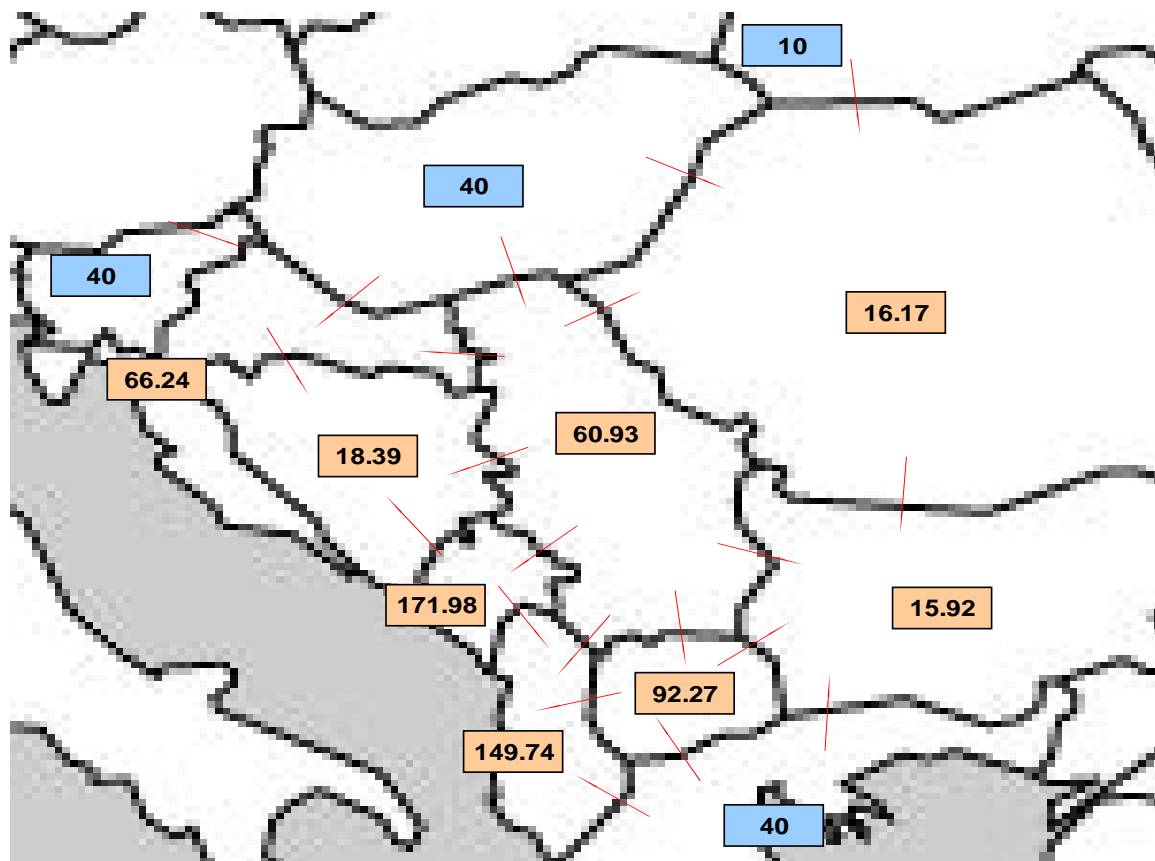
## RESULT – Base Scenario



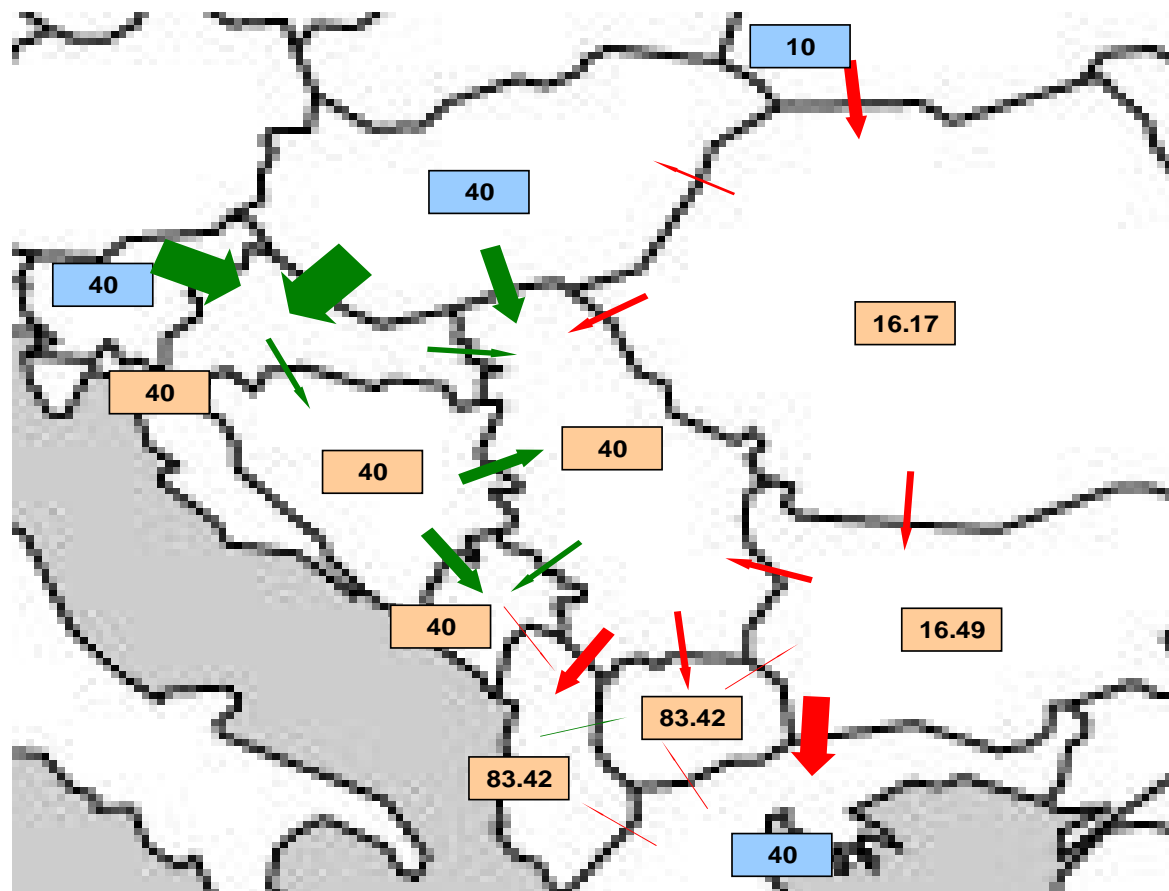
## SOME EASY LESSONS

- Bulgaria, Romania: low-cost net exporters, congested.
- High-priced sub-region: Albania and Macedonia
- Central and western part of the SEE region is non-congested, although still a net importer from Hungary and Slovenia.
- Alignment of the central and western part of the SEE region to the northwest holds true for quite a wide range of Hungarian and Slovenian market prices: from 25 €/MWh to 83 €/MWh.
- SEE region is a *net importer* from Hungary and Slovenia when the north-west price is below 59 €/MWh, and *net exporter* otherwise.

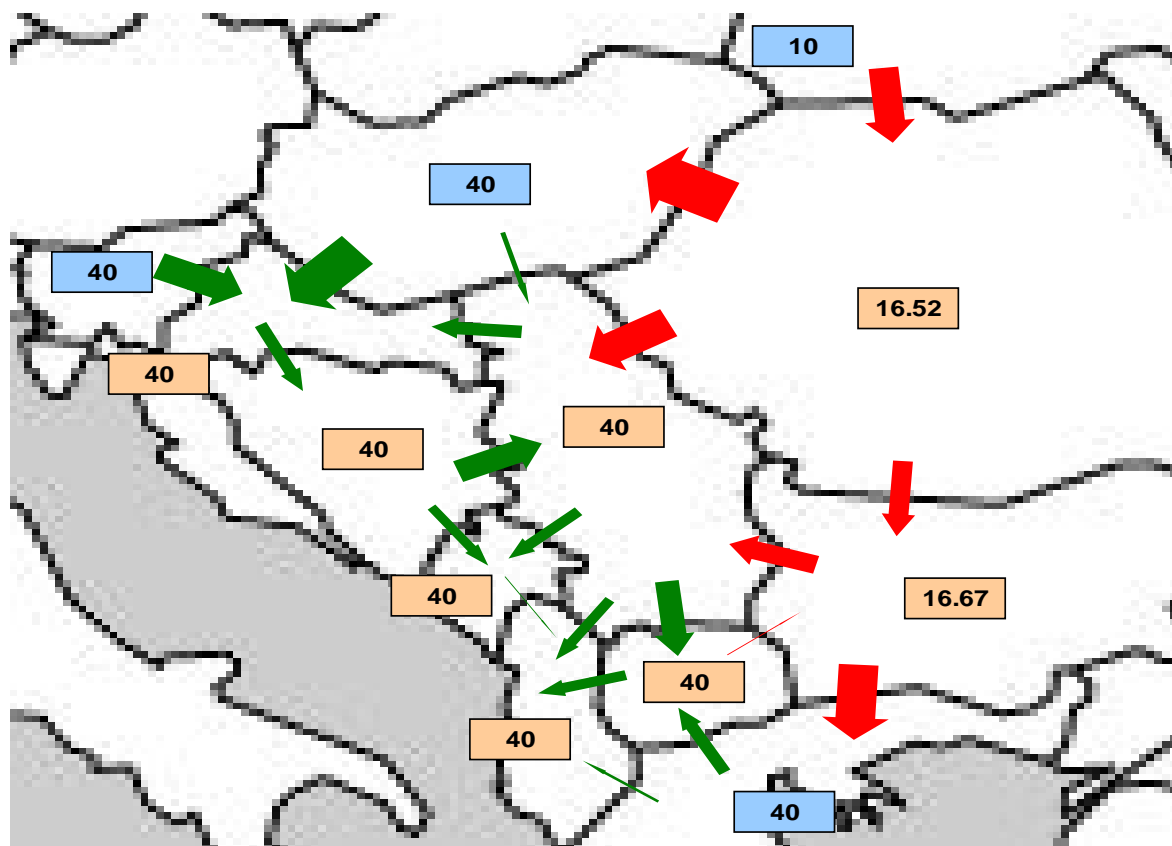
## RESULT – No Trade Scenario



## RESULT – Minimum NTC scenario

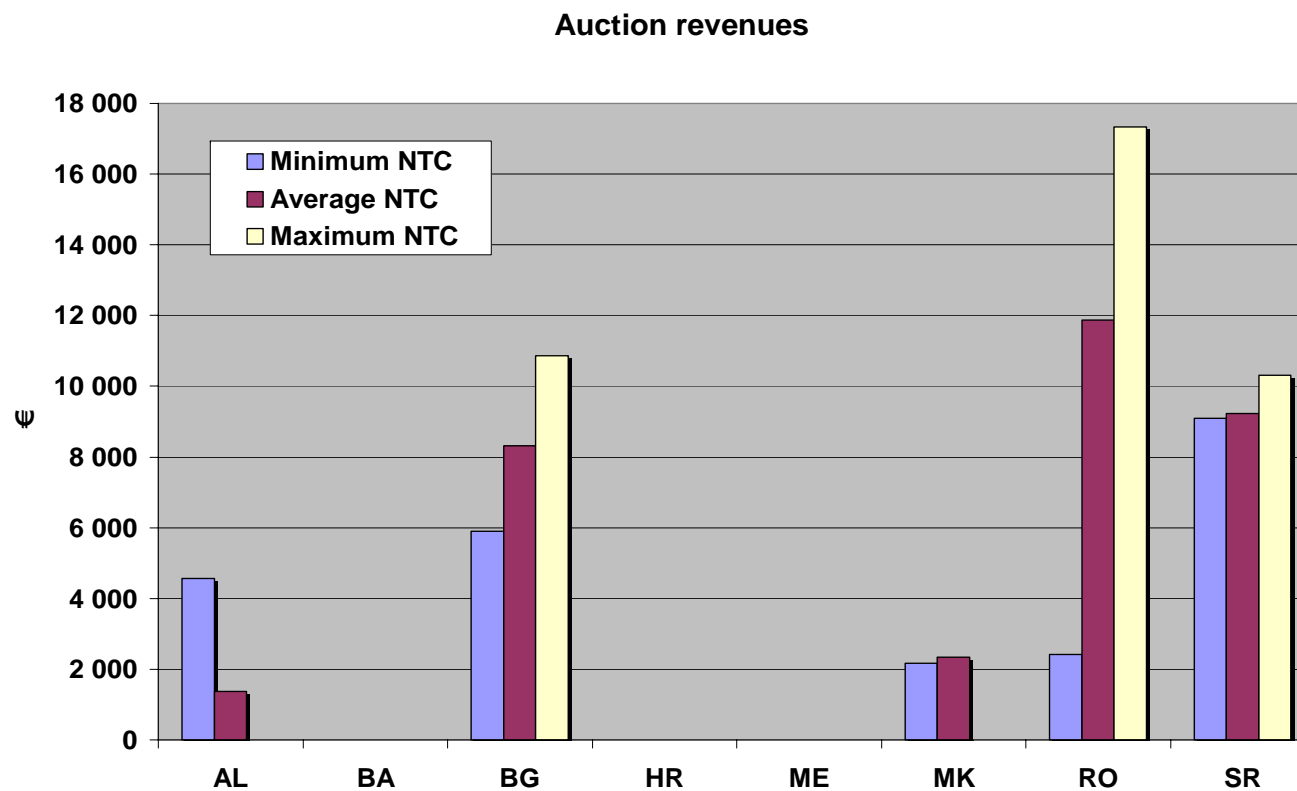


## RESULT – *Maximum NTC scenario*

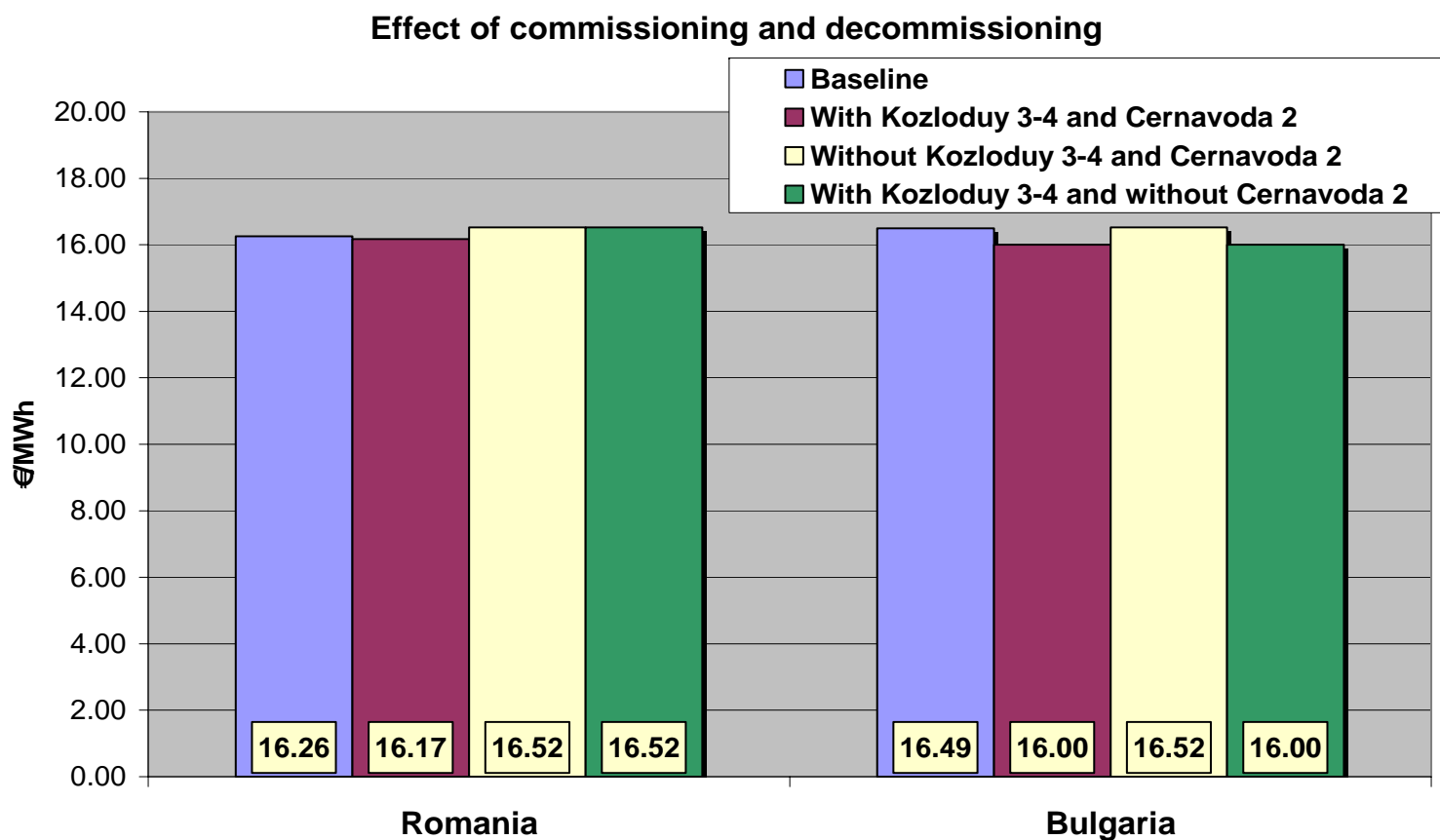




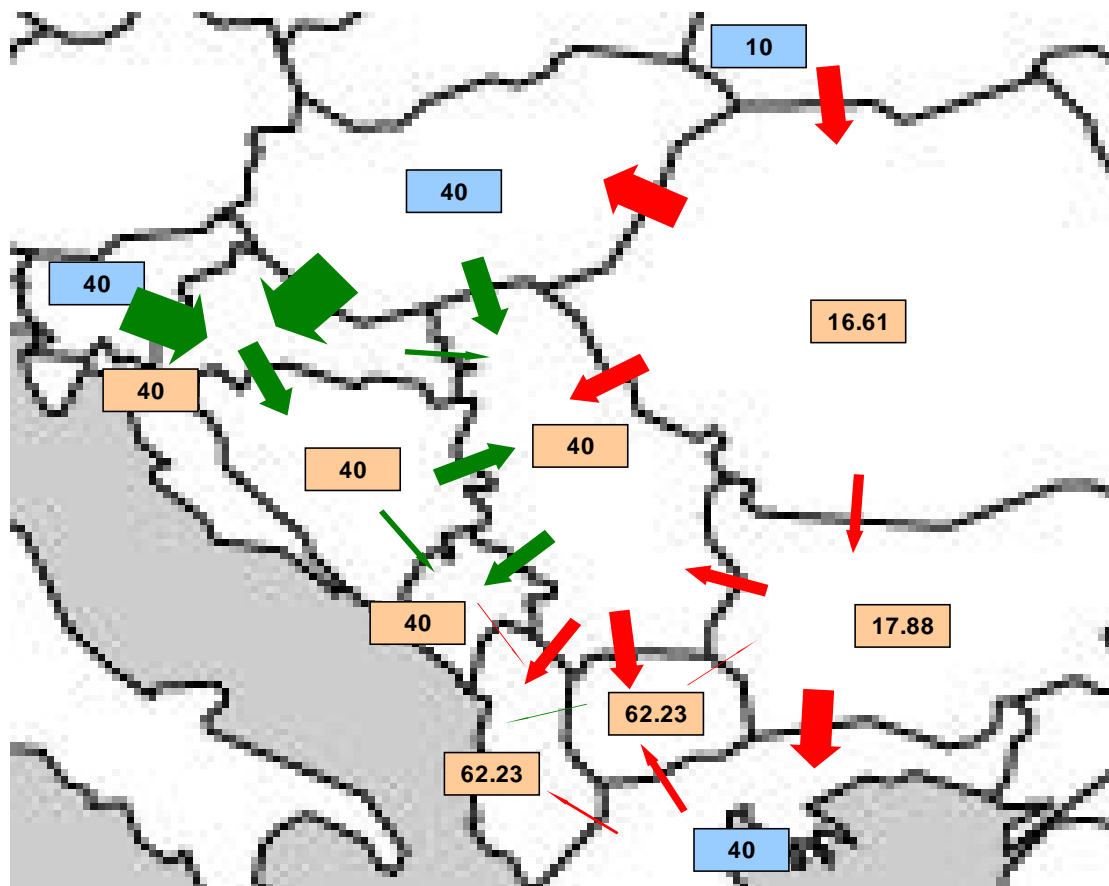
## RESULT – *Estimated hourly auction revenues*



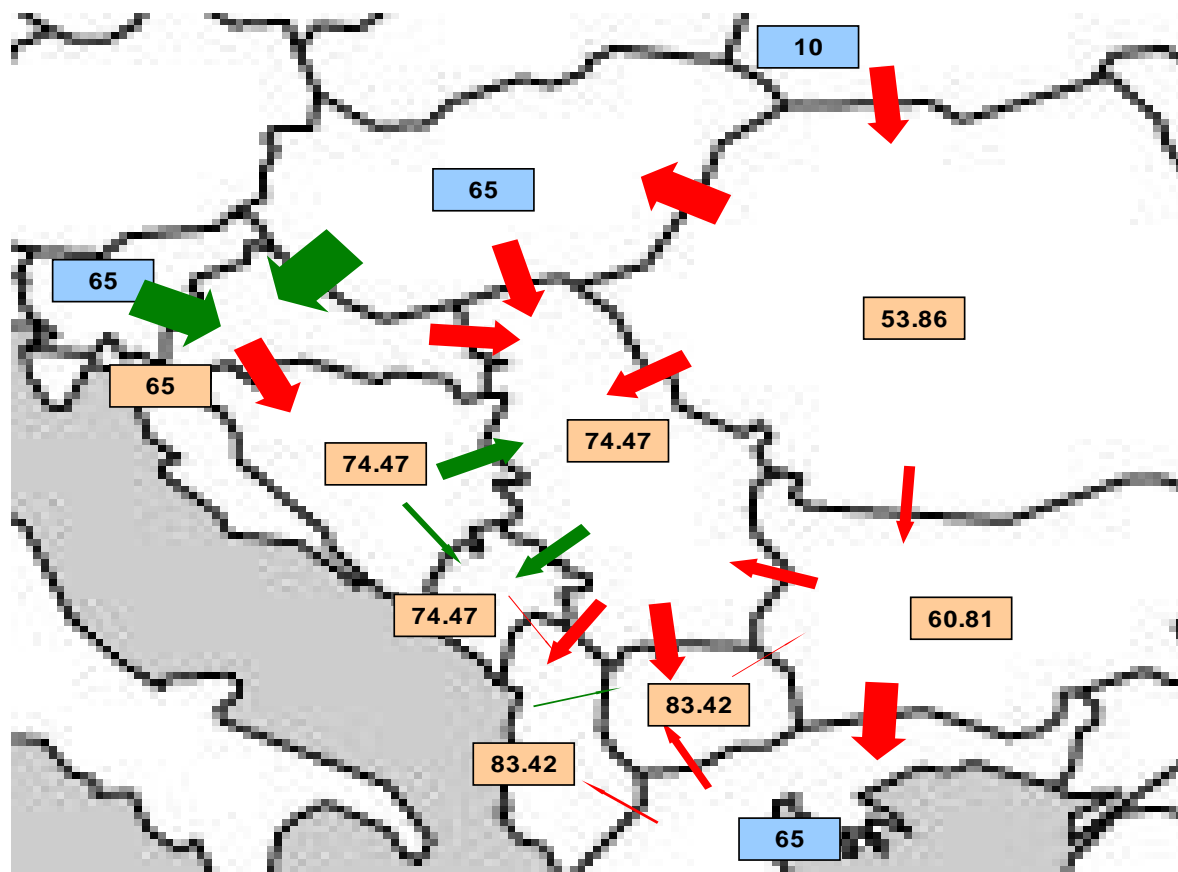
## RESULT – Price impact of decommissioning



## RESULT – *Reduced thermal unit availability (70%)*



## RESULT – *Reduced thermal unit availability (50%)*



## SOME ADDITIONAL LESSONS

- Market prices in Romania and Bulgaria are not affected by trade restrictions
- Restrictions result in extreme prices in Albania and Macedonia
- Maximum trade (integration) is beneficial for many (price drop, auction revenue)
- The regional price effect of nuclear decommissioning (commissioning) is negligible
- Assumption about poor availability of installed capacity reproduces high regional prices
- Under the current ownership structure, it is very likely that most state owned generation companies have market power within their own markets which they could use to raise market prices in a liberalized scenario

# CONCLUSIONS

- Moderate data collection and analysis improves transparency / understanding tremendously
- Might be a major tool to reveal 'stories' promoted by powerful local players (physical vs artificial shortage)
- SEE MMP experiences could be useful when developing the prospective EU market monitoring system
- The US system of an 'independent market monitor' can be useful in case of scarce resources at the Regulator

## QUESTIONS FOR DISCUSSION

- Causes of high SEE regional prices?
  - Demand outlook?
  - Physical or artificial shortage?
  - Causes of relatively low unit availability?
  - Any role of regulated generation prices?
  - Trade distortions?
- Please fill in the short questionnaire!

## INTERVIEWS ON BARRIERS TO INTEGRATION



- Perspective of 10 individuals involved in the SEE market
- Diverse opinions: evolutionary vs. impatient
- Opinions not cross checked with legislation/regulations
- Anonymity given
- Five categories of issues

## FIVE KEY OBSTACLES (SLIDE 1)

- Export & import discrimination
  - Priority of public service obligation
  - Inconsistent NTC/ATC and artificially low NTC
- Uncoordinated regional activities
  - Licensing requirements
  - Auctions, information and closing times
  - [With CAO may change soon]

## FIVE KEY OBSTACLES (SLIDE 2)

- Responsibilities of institutions
  - Greater authority for national regulators
  - Effective grid codes
  - International institutions important
- Lack of effectively unbundled utilities
- Regional action
  - Define boundaries and work together