

SEE POWER TRANSMISSION INFRASTRUCTURE AND POSSIBILITIES FOR WHOLESALE TRADING IN THE REGION

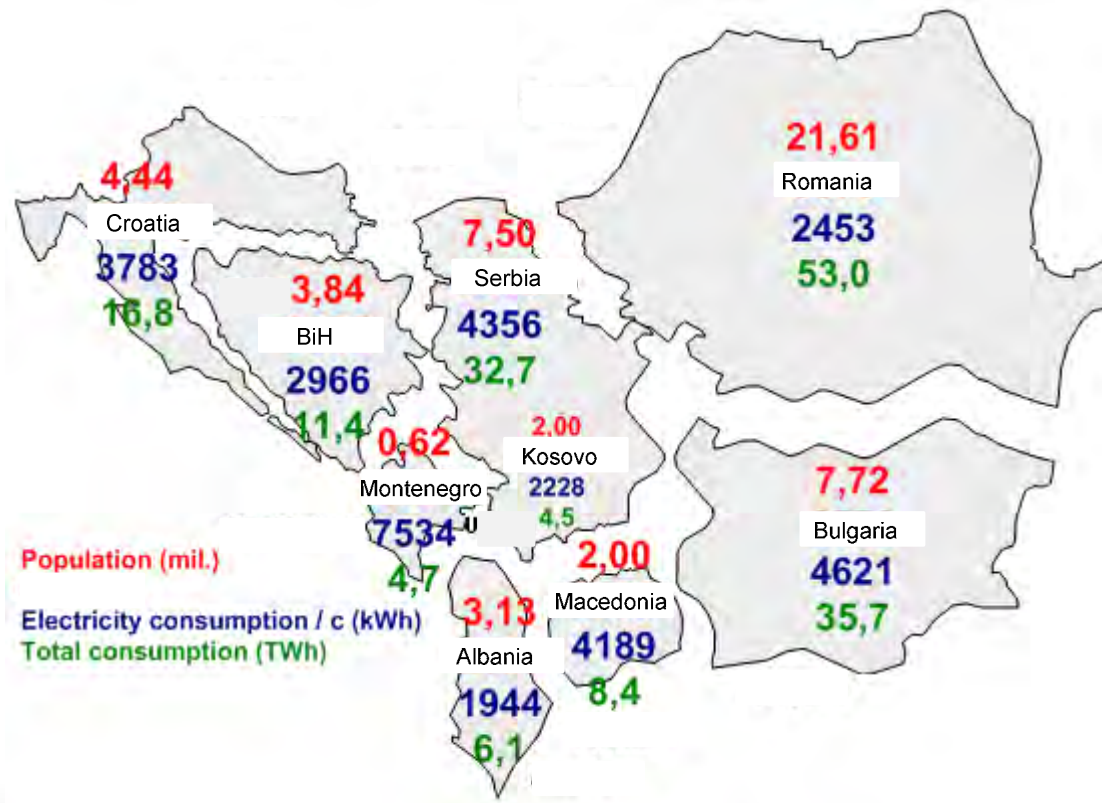
Davor Bajš

Energy Institute Hrvoje Požar
Zagreb, Croatia

CONTENTS

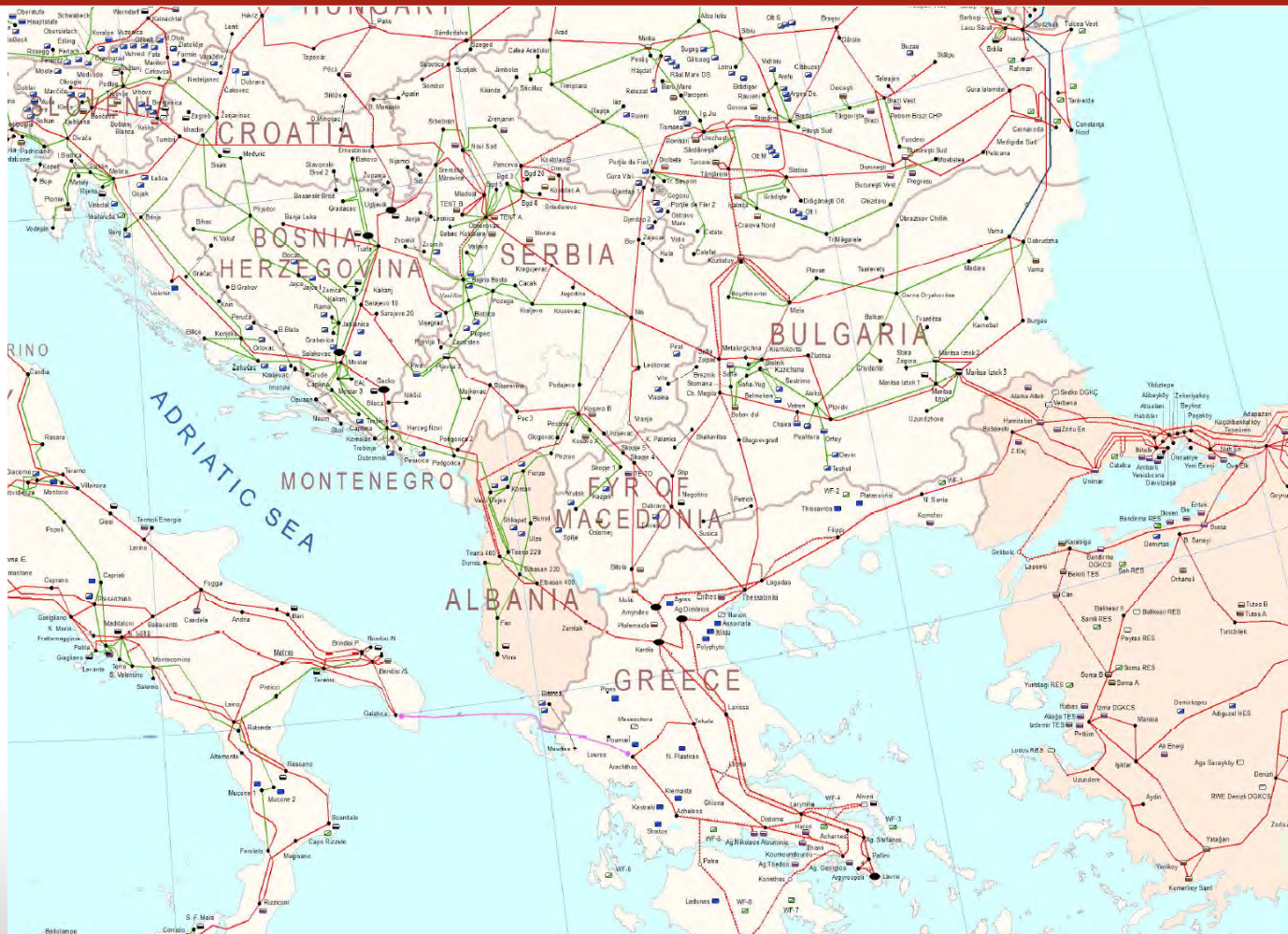
- 1. SEE BASIC DATA**
- 2. TRANSMISSION INFRASTRUCTURE**
 - Overview
 - Interconnections
 - Cross-border trading
 - Congestion management
 - Future exchanges
- 3. NEW TRANSMISSION PROJECTS**
- 4. CROATIAN TRANSMISSION NETWORK**
- 5. NETWORK DEVELOPMENT IN CROATIA**
- 6. CONCLUSIONS**

SEE BASIC DATA



- o 9 TSOs, different system
- o ~50 mil. people
- o ~30 GW, 230 TWh
- o 4 TWh/yr - 56 TWh/yr
- o peak loads 0,7 GW - 9 GW
- o 3500 kWh/capita
- o hydrology dependence, old facilities
- + **Turkey** - as big as SEE

TRANSMISSION INFRASTRUCTURE



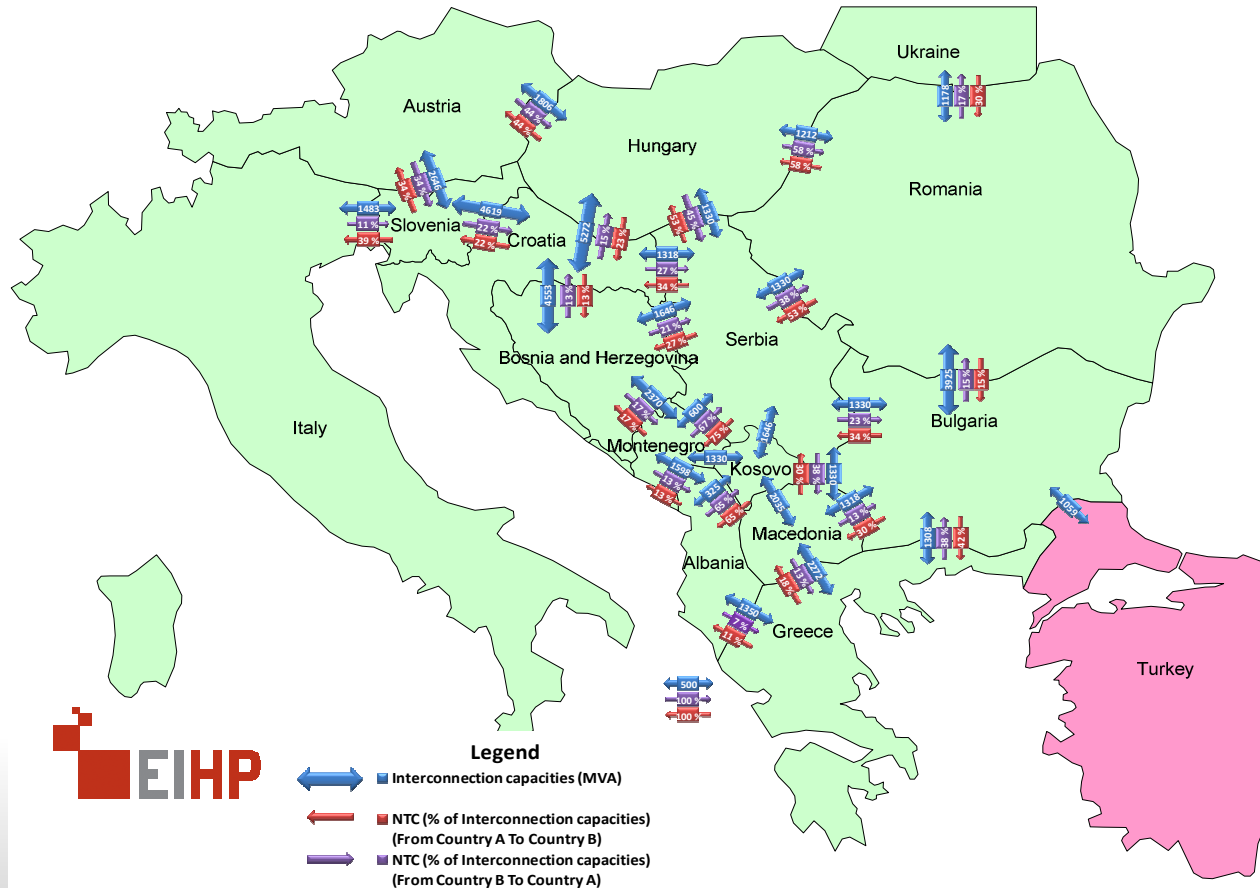
TRANSMISSION INFRASTRUCTURE - INTERCONNECTIONS



- o 36 tie-lines 400 kV
- o 18 tie-lines 220 kV
- o Well-meshed network
- o Reliable 400 kV network
 - Low number of failures
 - Low probability of outages
- o Large number of TSOs and national borders

TRANSMISSION INFRASTRUCTURE – CROSS BORDER TRADING

SEE NTC values are significantly lower than installed cross border capacities



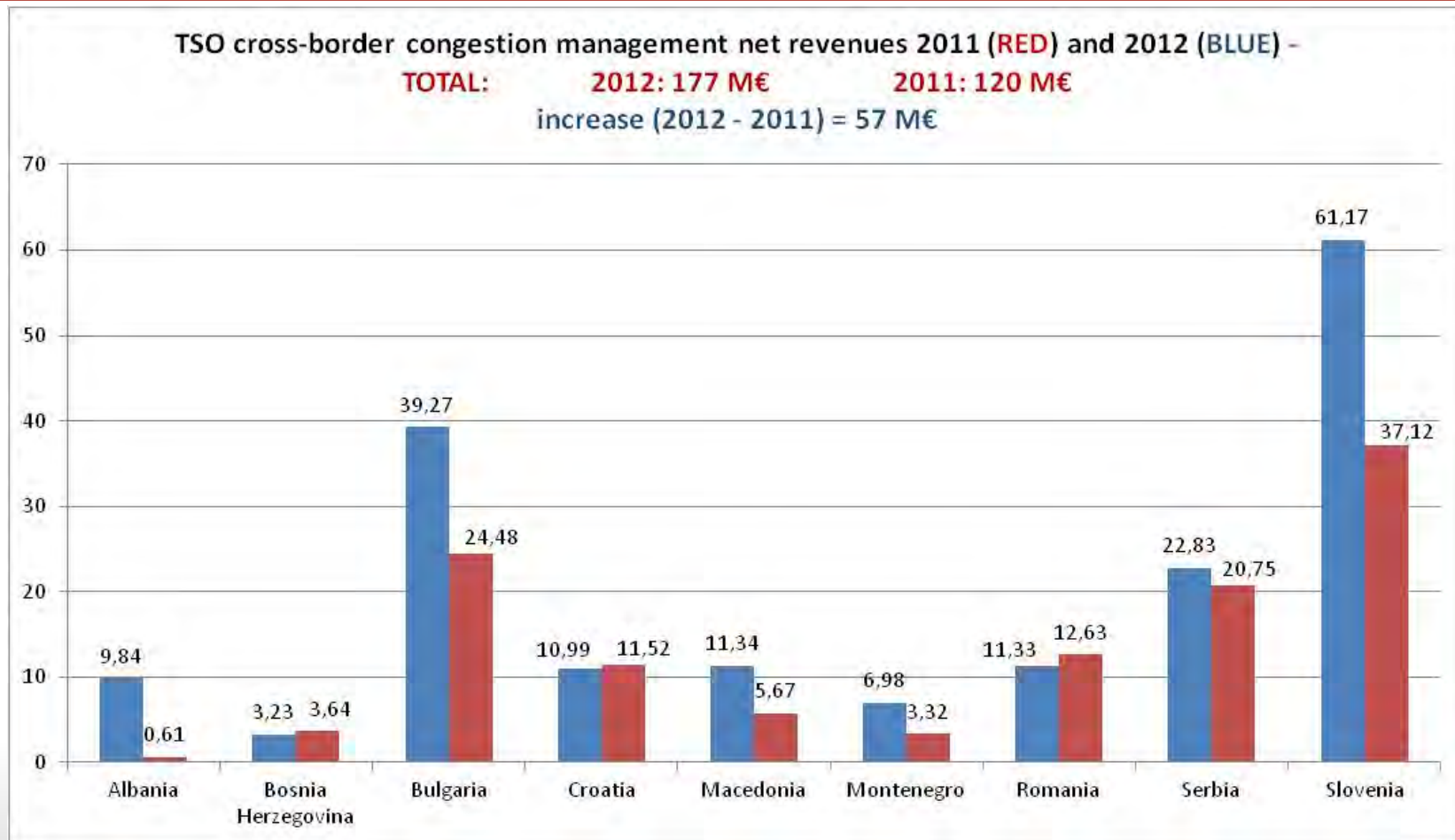
Low NTC values

- lower than expected volumes of electricity trade in the region,
- collection of significant congestion revenue by TSOs, and
- the exercise of market power of national electricity producers

TSOs intend to construct new interconnection lines

Low-cost actions to increase NTC values are available

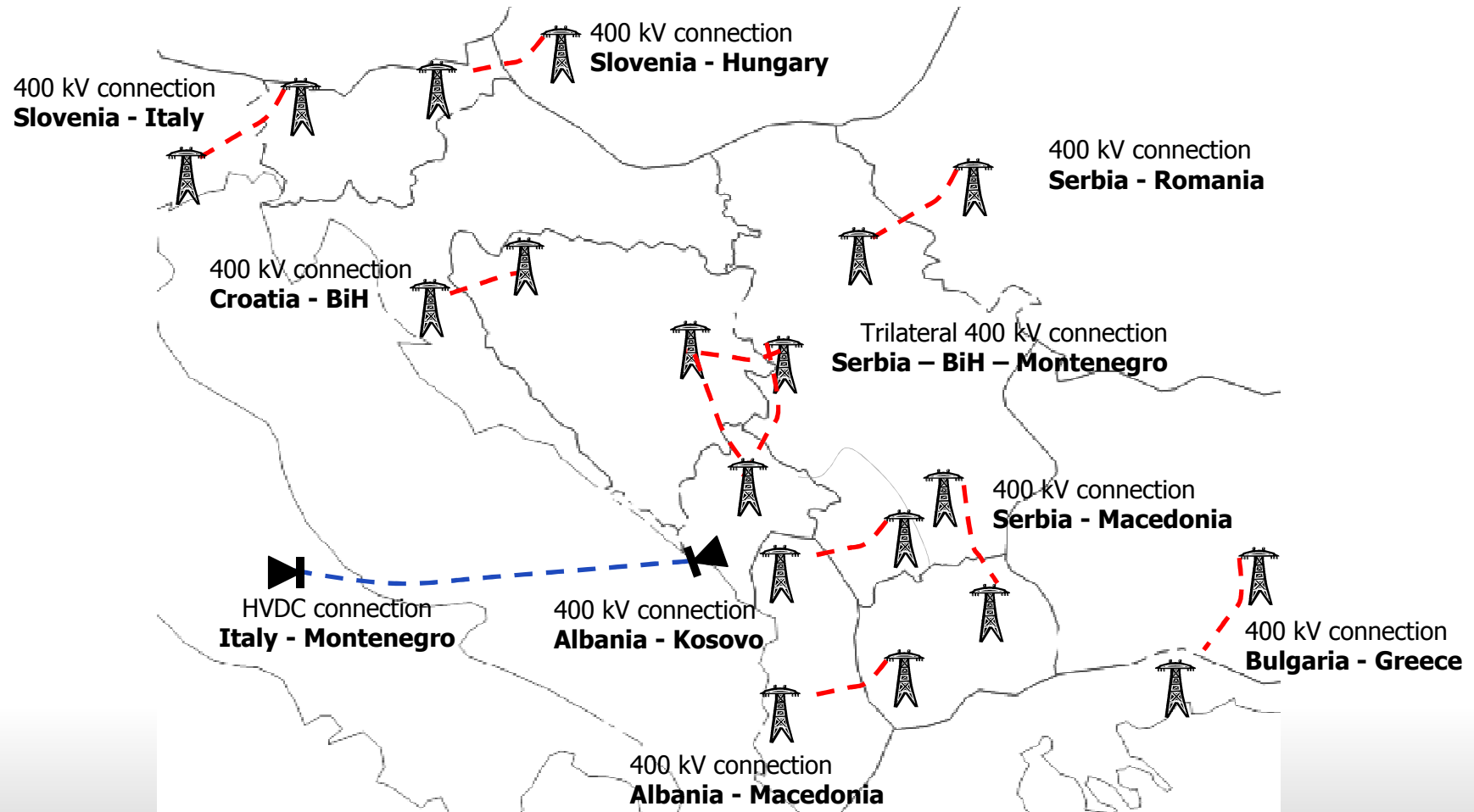
TRANSMISSION INFRASTRUCTURE - CONGESTION REVENUES



TRANSMISSION INFRASTRUCTURE - FUTURE EXCHANGES

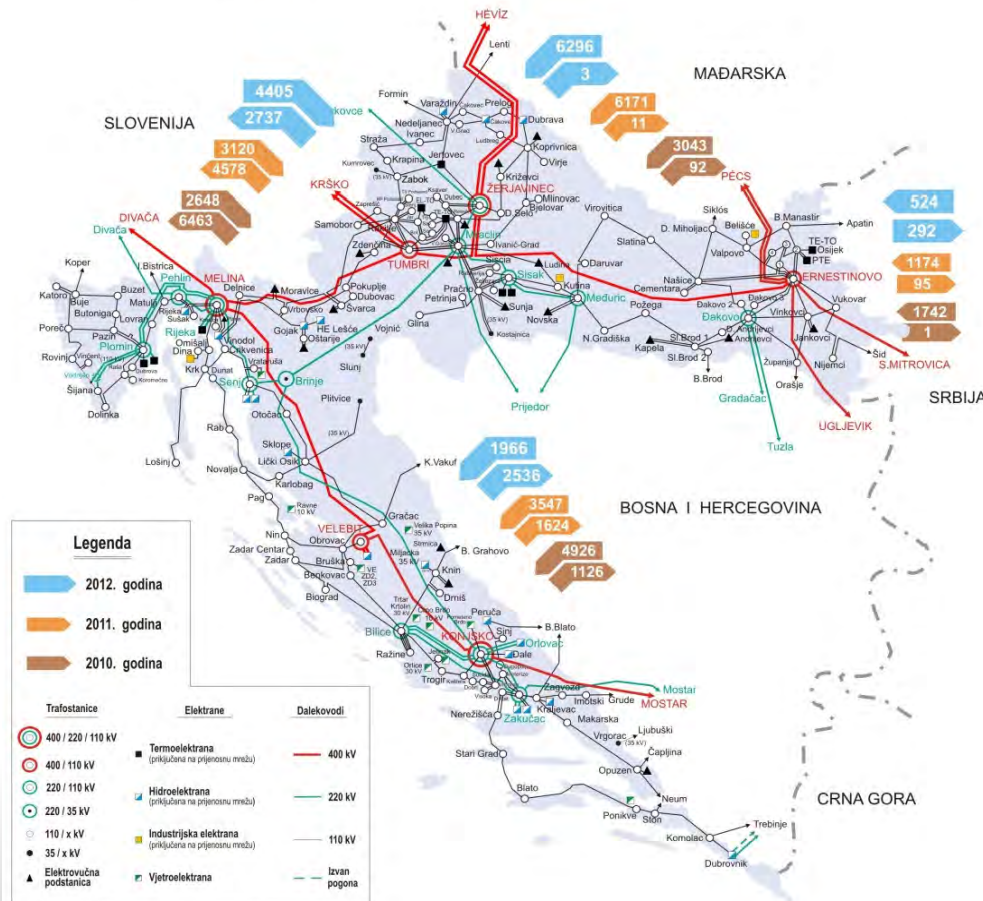


NEW TRANSMISSION PROJECTS



CROATIAN TRANSMISSION NETWORK

Shema hrvatskog elektroenergetskog sustava s razmjenom električne energije po granicama (GWh)



- ~ 7.500 km of 400 kV, 220 kV and 110 kV lines
- ~200 substations
- Seven 400 kV tie-lines (3 are double-system circuits)
- Annual import 4 - 7 TWh
- Third party exchanges around 6 TWh
- Highly reliable network

NETWORK DEVELOPMENT IN CROATIA



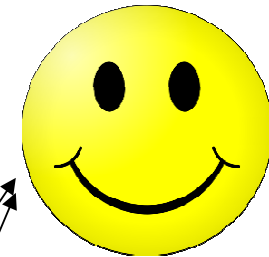
- **Key drivers:**
 - New generation (TPPs, HPPs, WPPs)
 - Network ageing
 - Regional market activities

- **Total investments (10 years)**
 - 1 billion €

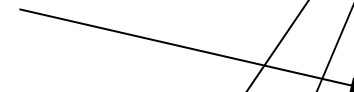
- **Main activities:**
 - Network revitalization
 - New transmission facilities construction
 - Application of new technologies (conductors, electronic devices)

CONCLUSION

SEE TRANSMISSION INFRASTRUCTURE



SEE WHOLESale TRADING



CROATIAN TRANSMISSION INFRASTRUCTURE



POSSIBILITIES FOR WHOLESale TRADING
IN AND THROUGH CROATIA



THANK FOR YOUR ATTENTION



Bajs Davor, Ph.D.

Researcher
ENERGY INSTITUTE HRVOJE POŽAR
Savska cesta 163, 10001 Zagreb, P.O.Box. 141, Croatia
phone: +385 1 6326 102
fax: +385 1 6040 599
web: www.eihp.hr
e-mail: dbajs@eihp.hr