



Godišnjica ponovnog povezivanja prijenosne mreže kontinentalne Europe
Anniversary of the Reconnection of the Continental Europe Transmission Grid



Croatian Transmission System Operator Ltd. and UCTE Reconnection – Ten Years After

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President of Management Board

**„10th Anniversary of the Reconnection of the
Continental Europe Transmission Grid Europe”**

Zagreb, 10th October 2014

INTRODUCTION



- Electricity system is the basic infrastructure, and electricity is the precondition of the society to function
- In time, national electric power systems in Europe were continuously developed and interconnected
- In time, regional associations of energy entities integrated
- The biggest association of energy entities in Europe in the second half of 20th century was UCTE



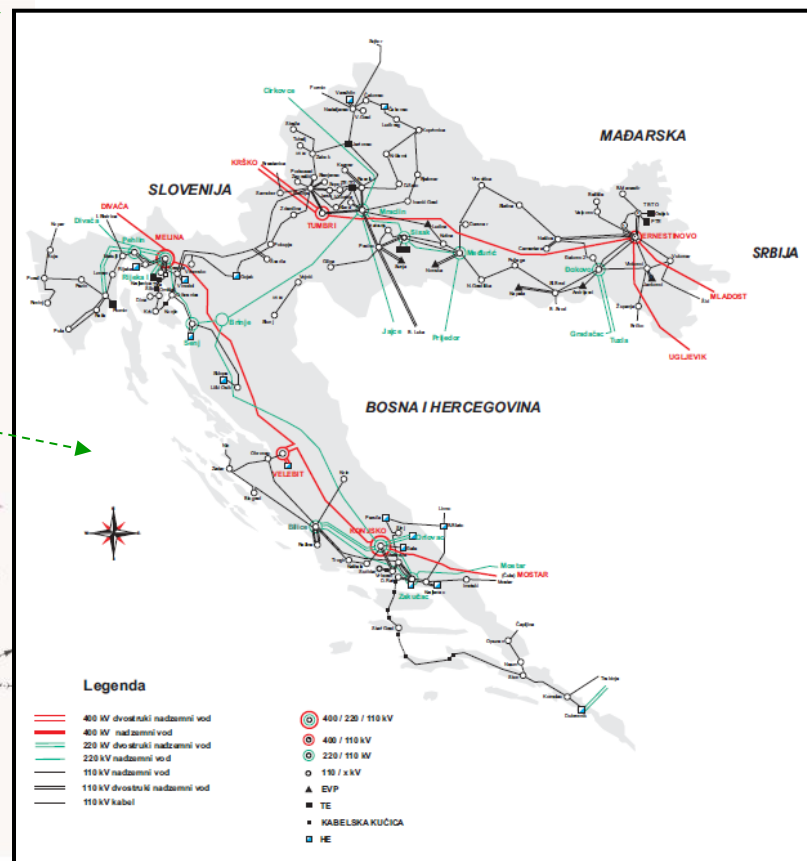
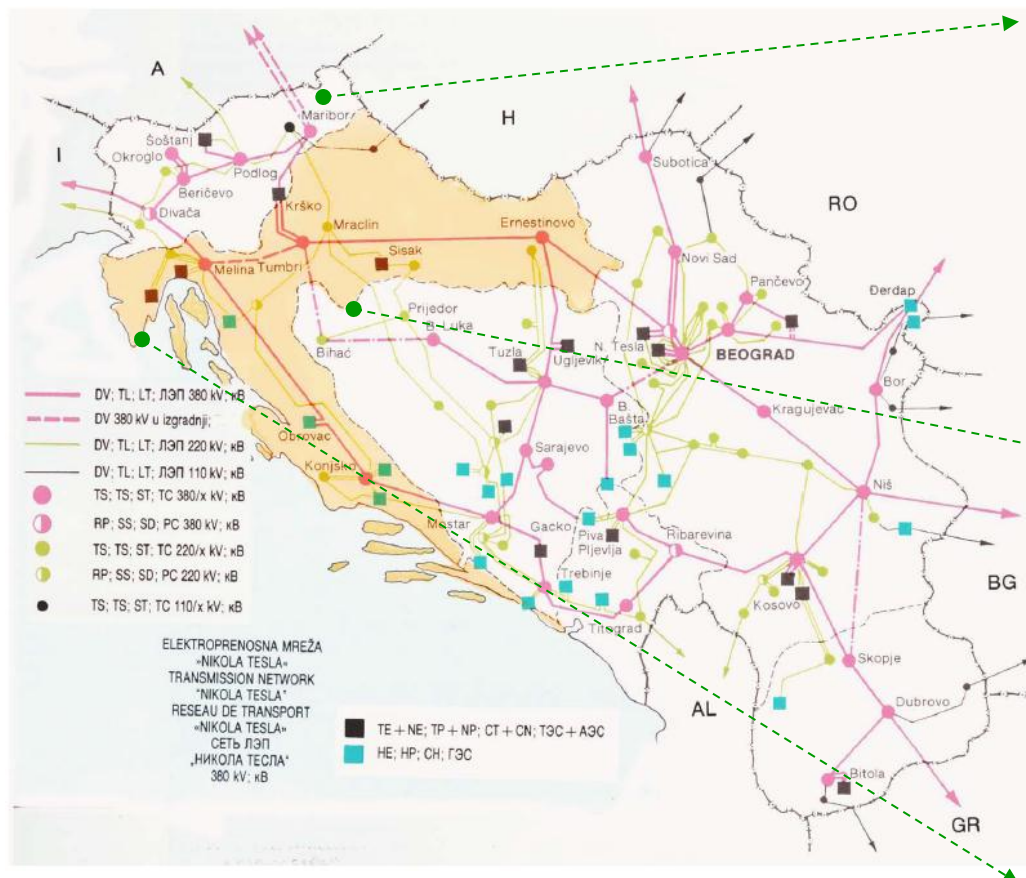
ELECTRICITY TRANSMISSION IN CROATIA



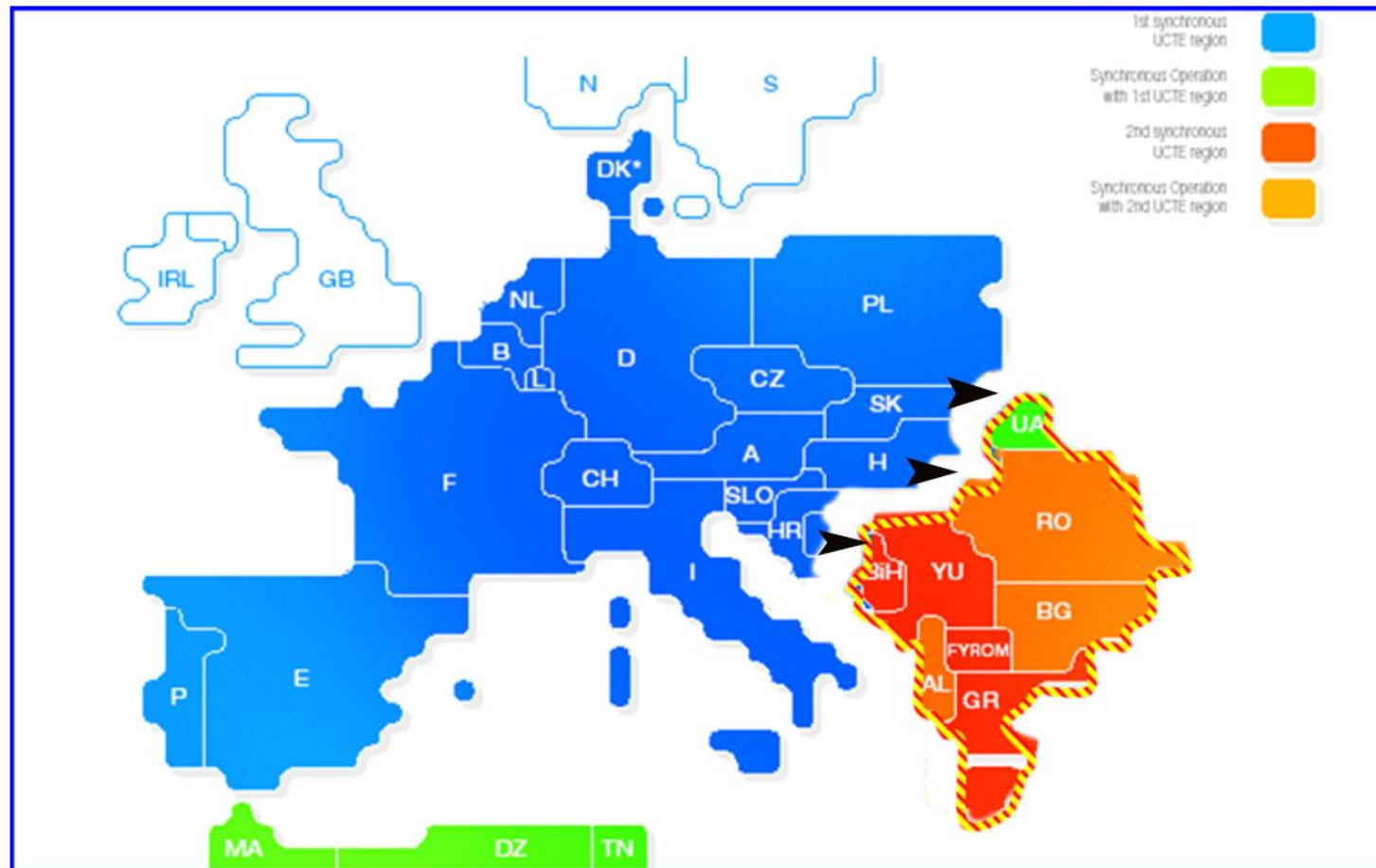
- Organized electricity transmission in Croatia goes until 1956 (Elektroprijenos)
- Electricity transmission as business activity had various organizational forms and from 1990 is a part of Croatian national utility (Hrvatska elektroprivreda)
- Croatian Transmission System Operator Ltd. of today was incorporated in present form as of 2013, organized according to ITO (independent transmission operator) model, and regulated by HERA (Croatian Energy Regulatory Agency)



TRANSMISSION GRID OF FORMER YUGOSLAVIA AND CROATIA BEFORE SPLITTING IN 1991



SPLITTING UCTE TO 1ST AND 2ND ZONE



PRECODNITIONS FOR RECONNECTION



- **Political** (approval of all stakeholders)
- **Technical** (reconstruction of infrastructure and reconnection algorithm and procedure)
- **Financial** (assurance of funds fro reconstruction of existing and contraction of new infrastructure)
- **Organizational** (decisions, UCTE teams and working groups, and also teams of involved countries)



CROATIAN ELECTRICITY SYSTEM BEFORE RECONNECTION (2003)



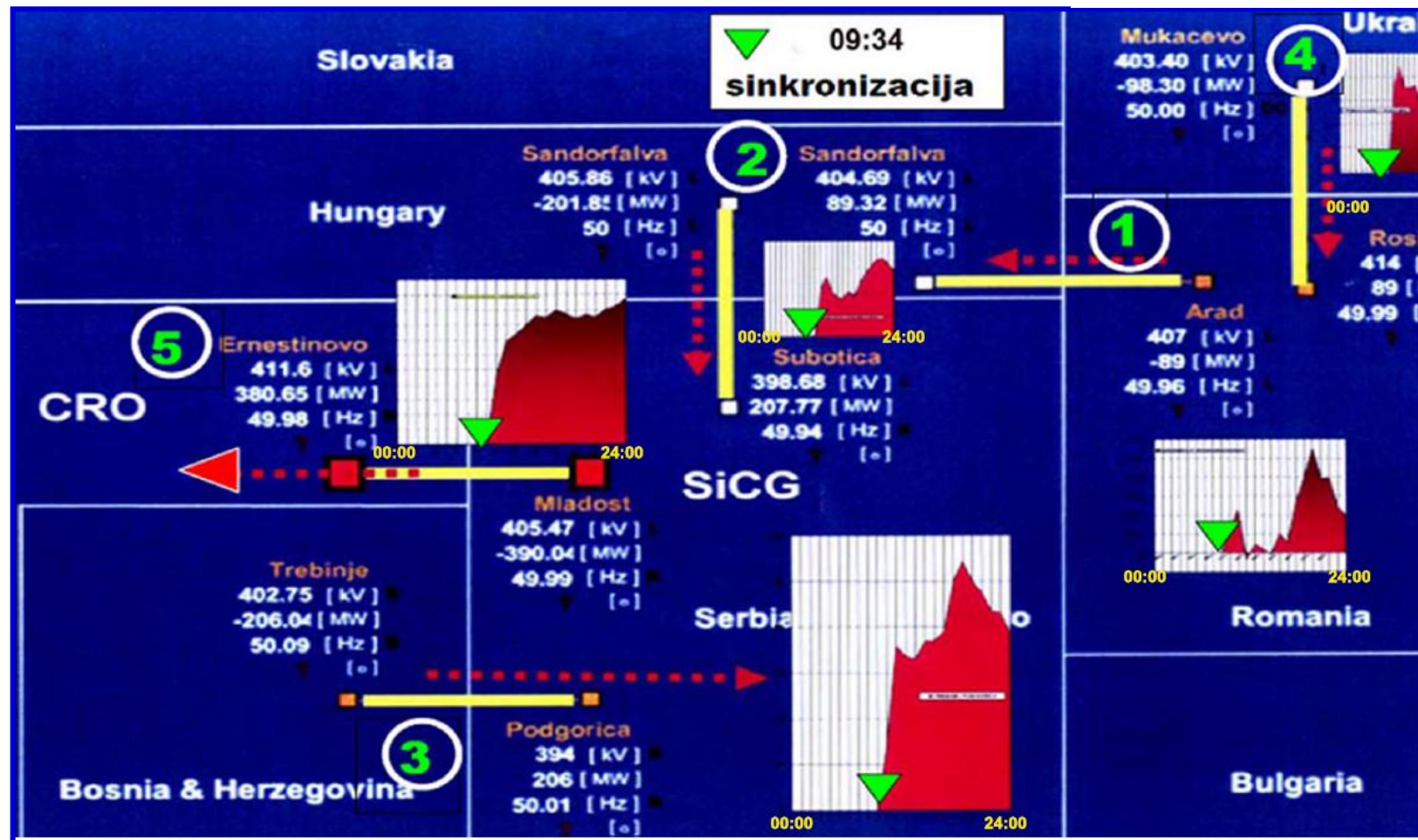
CONTRIBUTION OF REPUBLIC OF CROATIA TO RECONNECTION



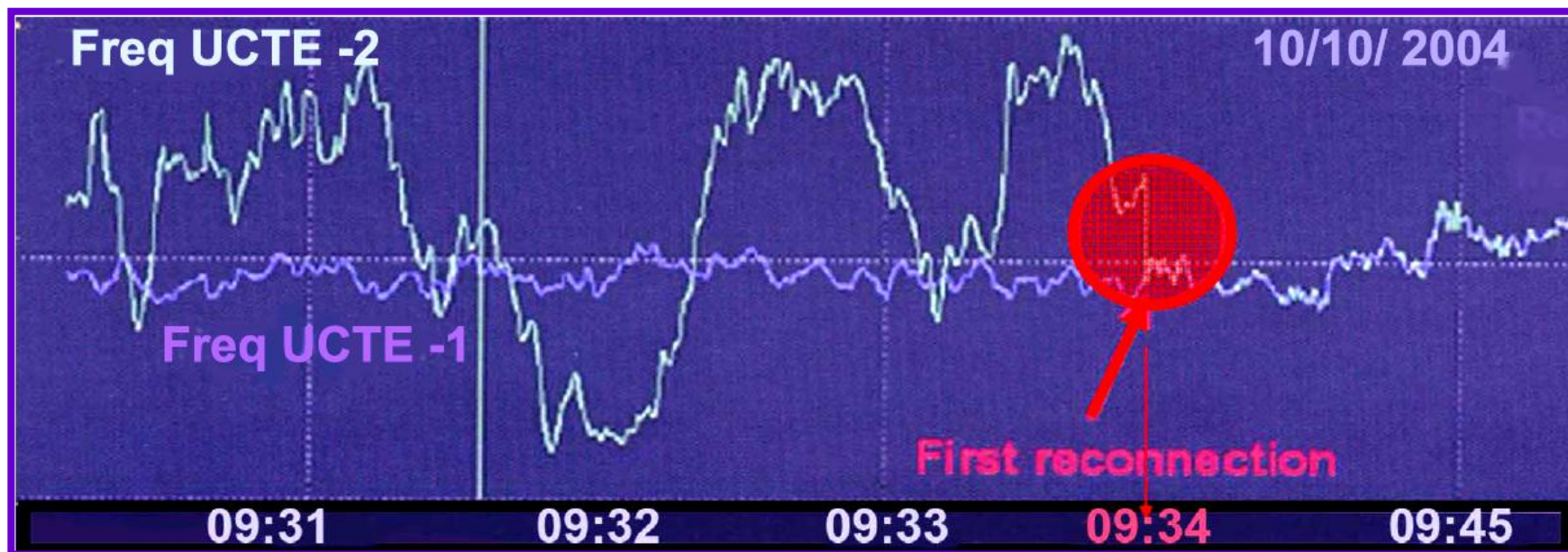
- Construction of substation 400/220/110 kV Žerjavinec and new construction of substation 400/110 kV Ernestinovo with reconstruction of adjoining overhead lines in the period from 2002 to 2004 (total of 130 millions EUR)
- Active participation in preparation of technical realization of reconnection and co-convenorship of UCTE Executive Team for North-South Resynchronization
- On 10th October 2004 when the reconnection was conducted from National Control Centre in Zagreb hosting and ensuring the infrastructure



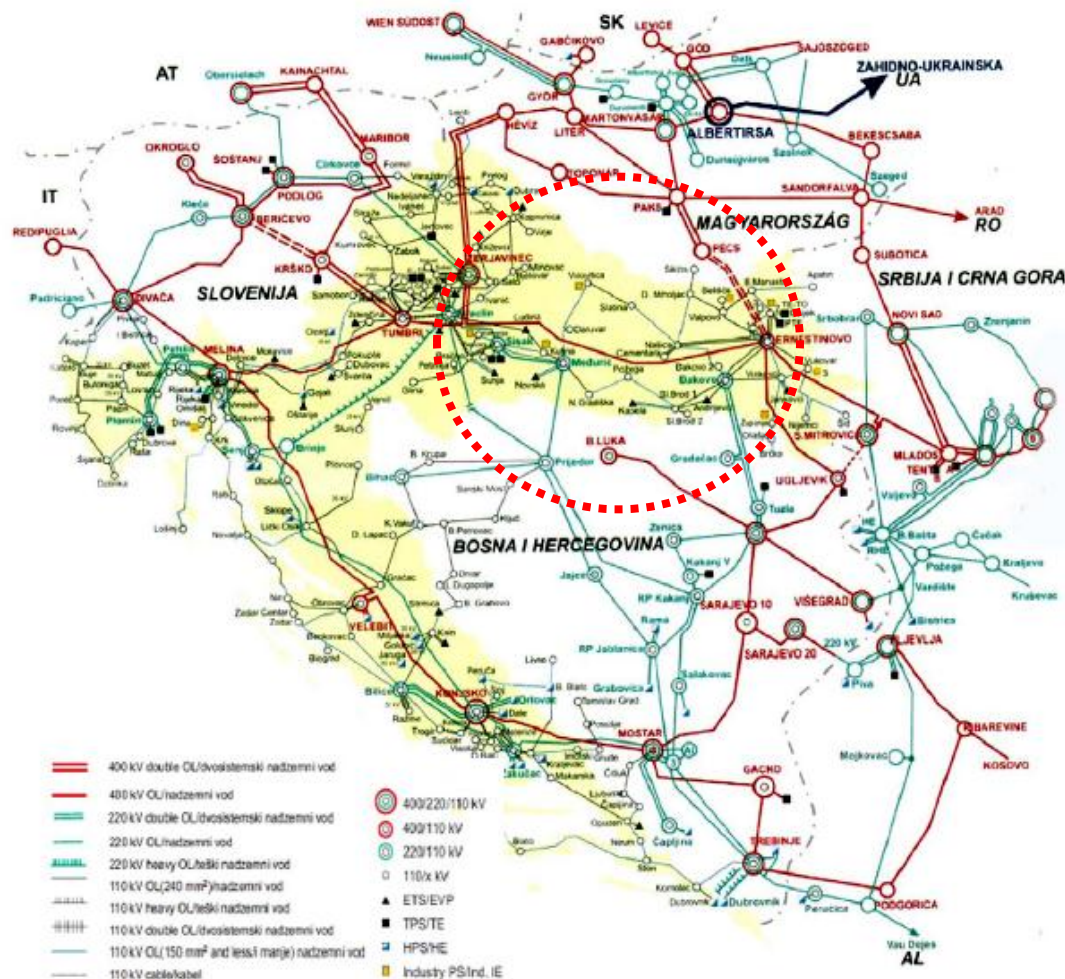
STEPS OF RECONNECTION OF 1ST AND 2ND SYNCHRONOUS ZONES ON 10th October 2004



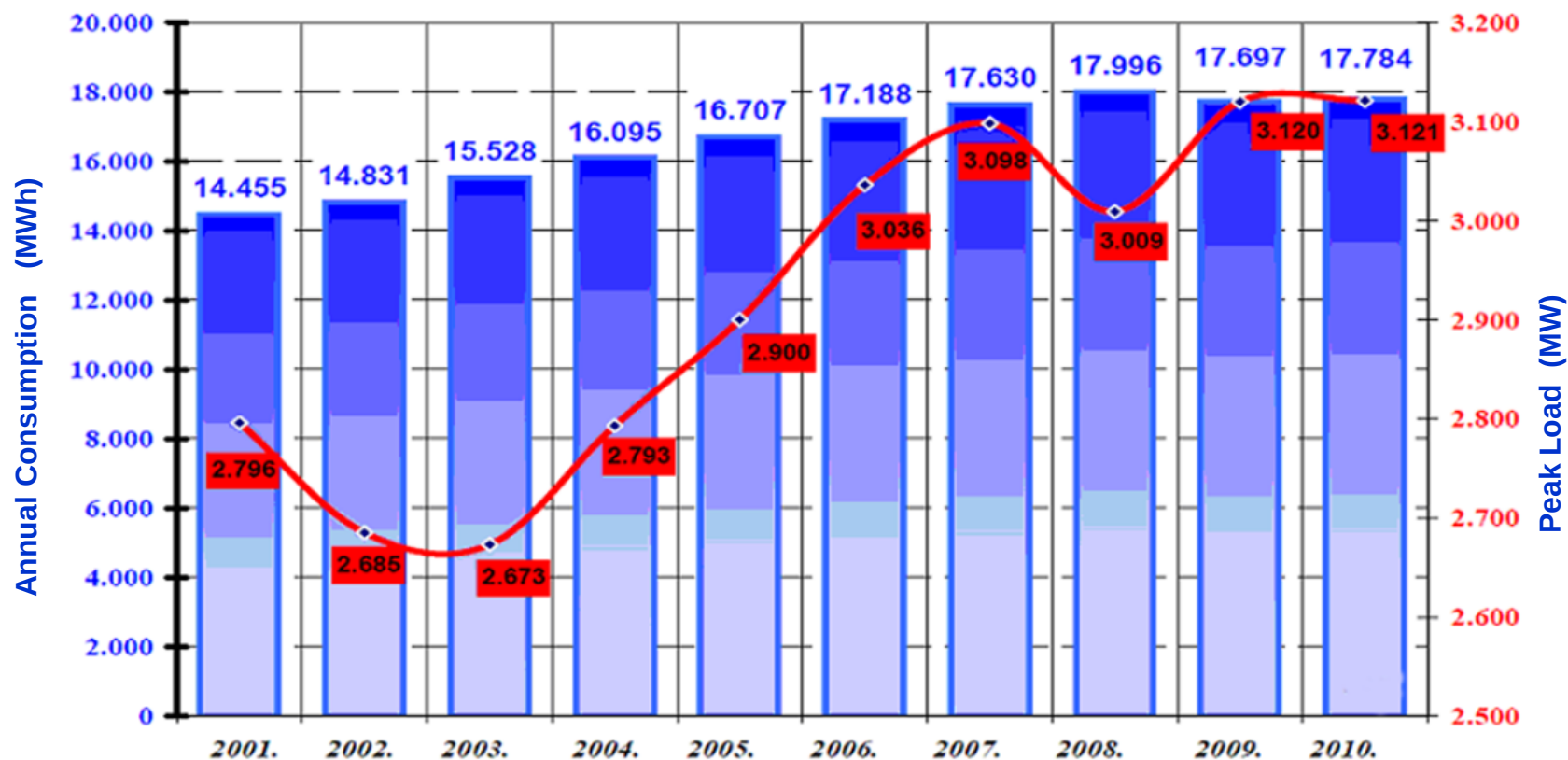
FIRST SYNCHRONIZATION OF 1ST AND 2ND SYNCHRONOUS ZONES ON 10TH OCTOBER 2004



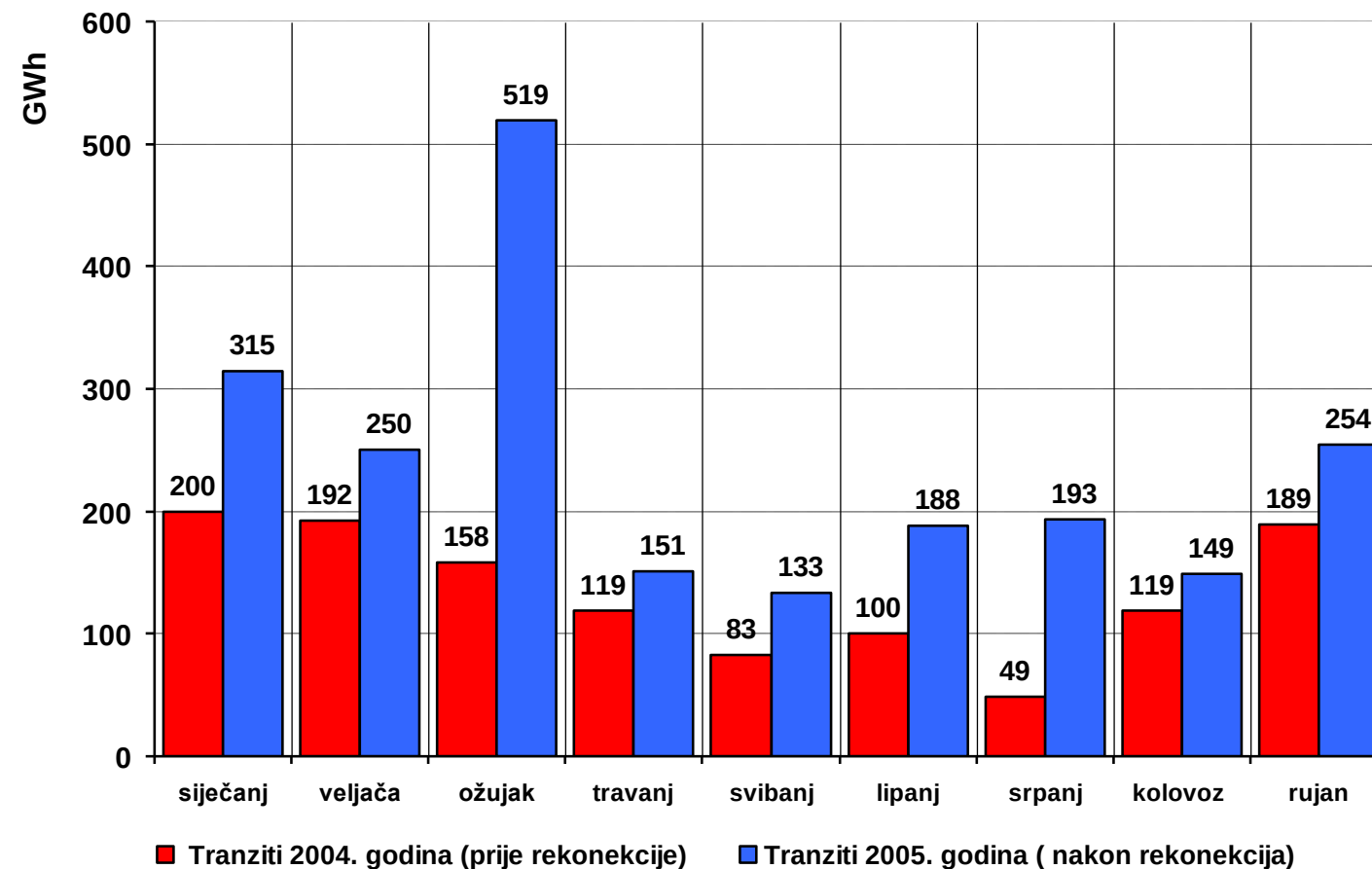
CROATIAN ELECTRICITY SYSTEM AFTER RECONNECTION (2004)



OPERATIONAL CHANGES AFTER RECONNECTION

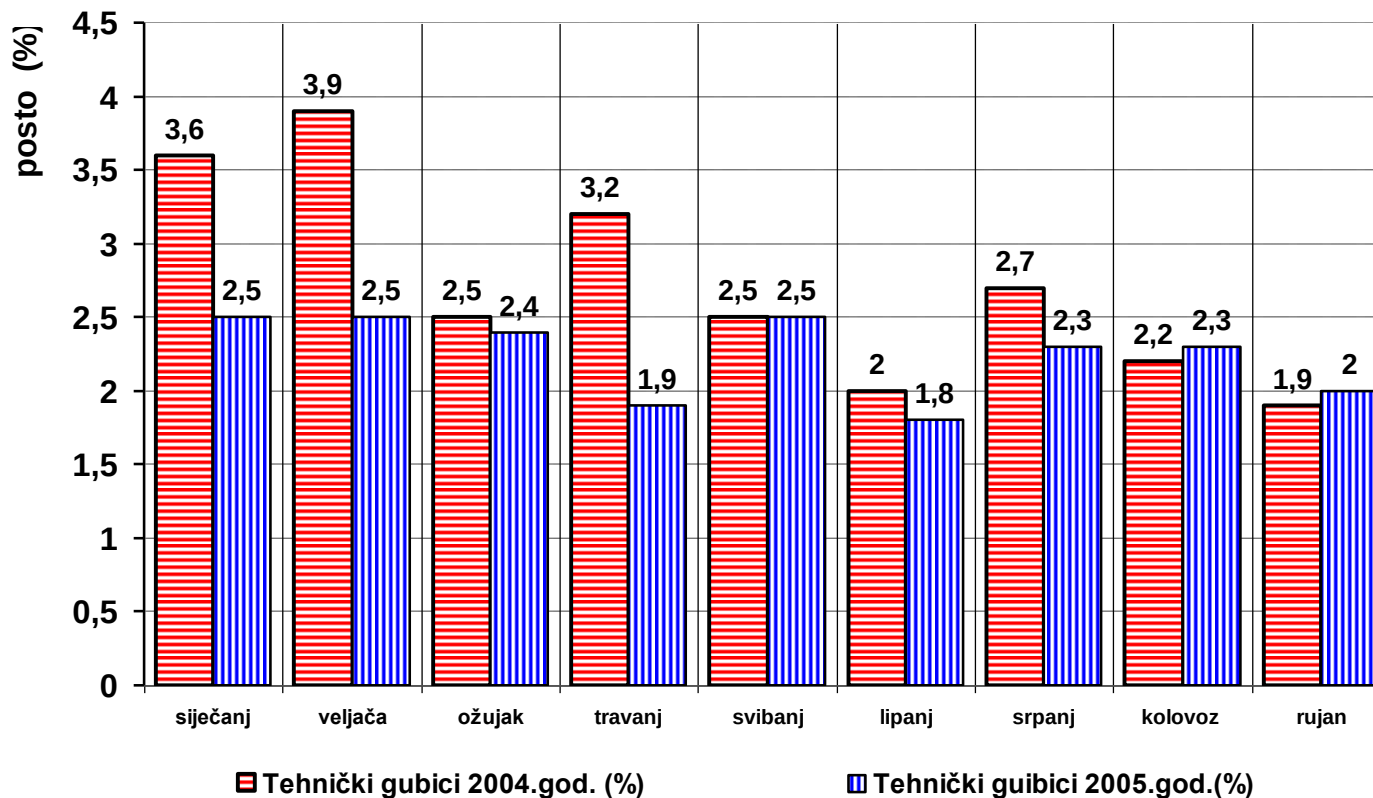


COMPARISON OF MONTHLY TRANSITS OF ELECTRICITY IN 2004 AND 2005



Transit in I-IX 2005
77% higher than transit
in
I-IX 2004.

COMPARISON OF LOSSES IN CROATIAN TRANSMISSION GRID IN 2004 AND 2005

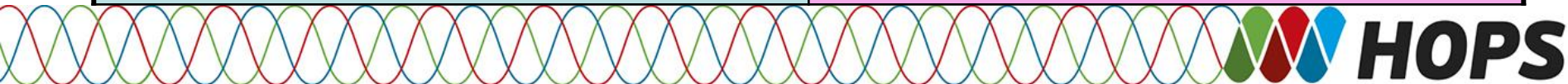


**Losses in I-IX 2005
Lower than losses in
I-IX 2004**

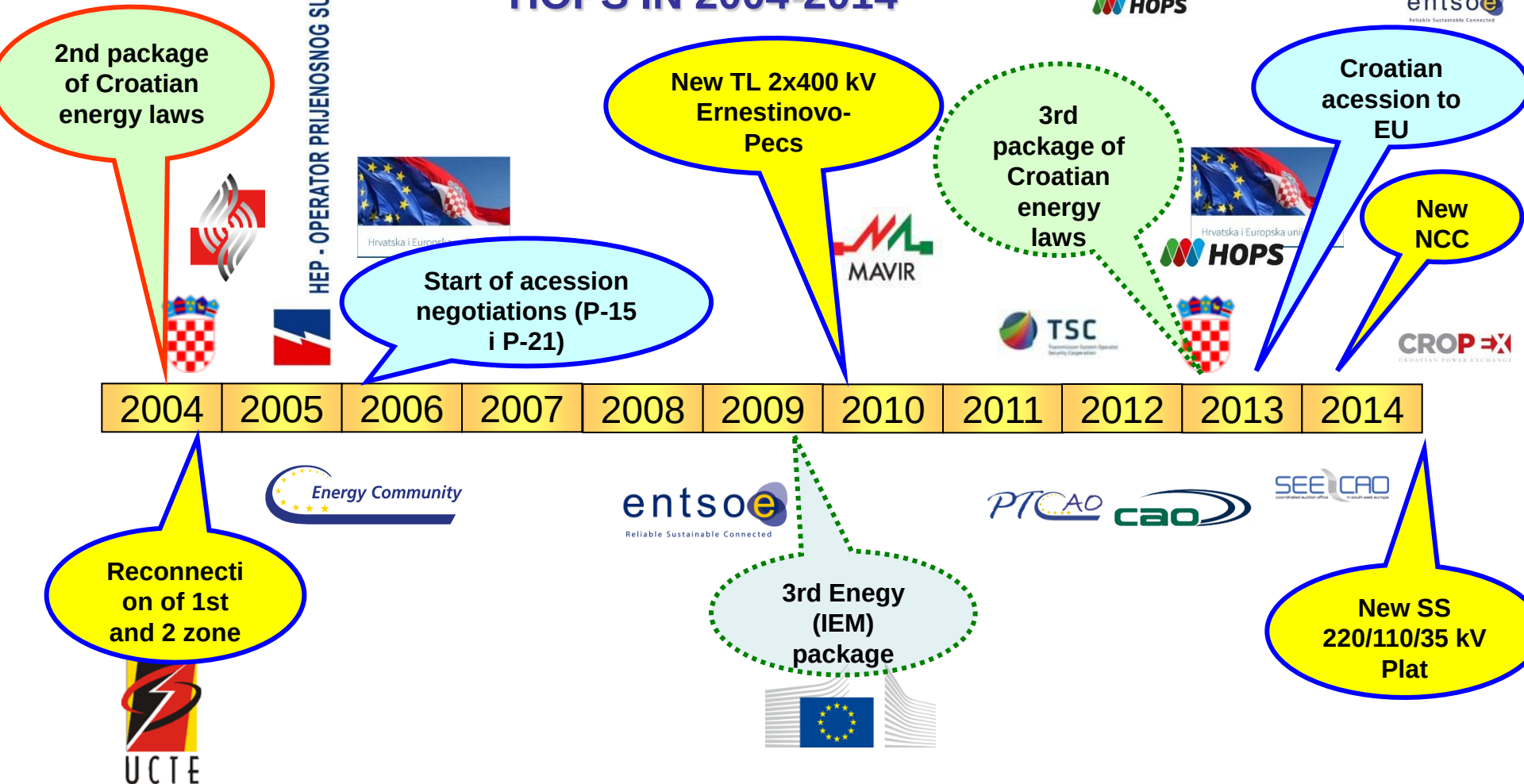
MAIN CHARACTERISTICS OF ELECTRICITY SYSTEMS AT THE TURN OF THE 20TH AND 21ST CENTURIES



At the end of 20th century (before the reconnection)	The beginning of 21st century (after the reconnection)
Modest energy interconnections and scope of IT systems	Significant increase of interconnections and of scope of IT systems
Monopoly of national vertically integrated utilities	Liberalisation and electricity market development
Limited exchange and electricity transit	Cross-border capacity auctions
	Inter-compensation mechanism (ITC)
Bilateral trade of electricity	Power exchanges and market coupling
In focus – security at the level of each system and technical aspects of system operation	Regional coordination of security system operation (RSC-TSC, CORESO)
	In focus – security of supply and customers



TIMELINE OF MAIN DEVELOPMENTS CONCERNING HOPS IN 2004-2014



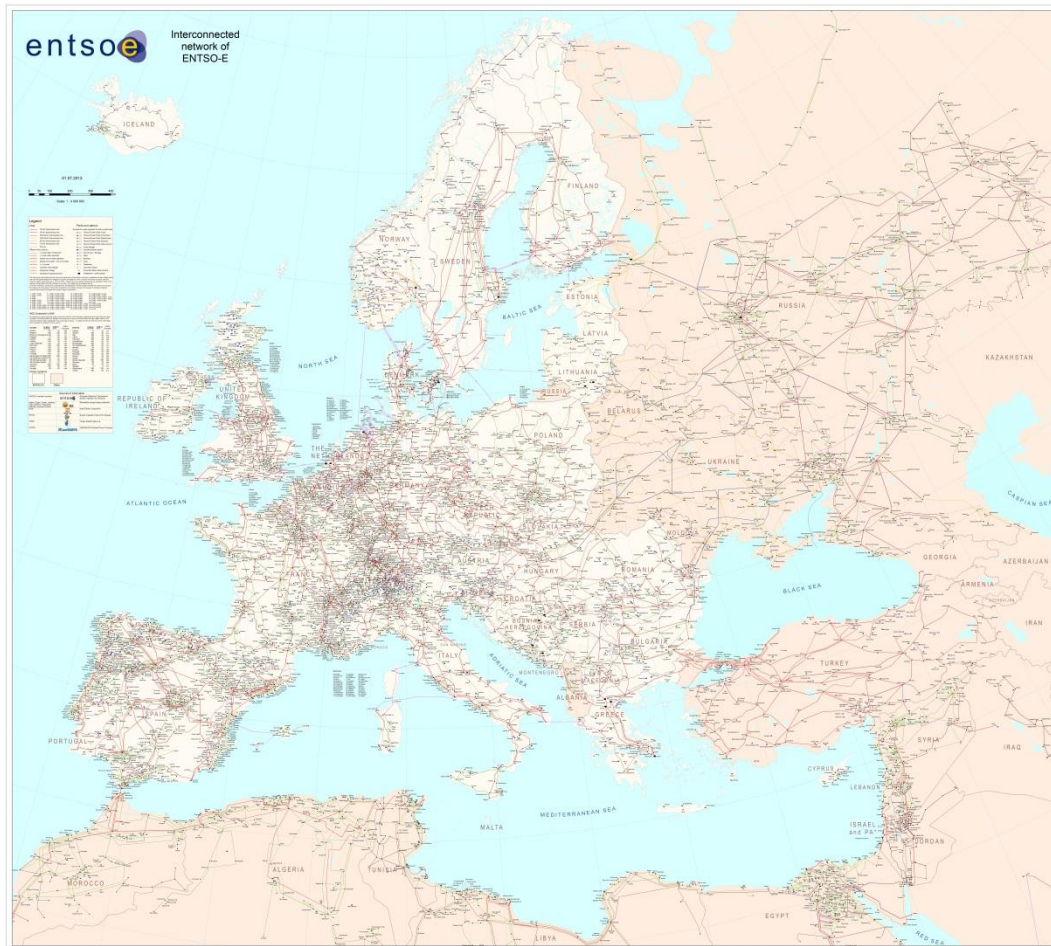
CONTRIBUTION OF RECONNECTION



- Connected systems are a technical basis for electricity system development
- The reconnection enabled more intense integration processes regarding system operation and informatics data exchange
- With reconnection of systems the electricity security of supply increased
- Successful reconnection is one more confirmation of the TSOs' cooperation which evolved soon into ENTSO-E
- The reconnection was an important step in creation of single European transmission system

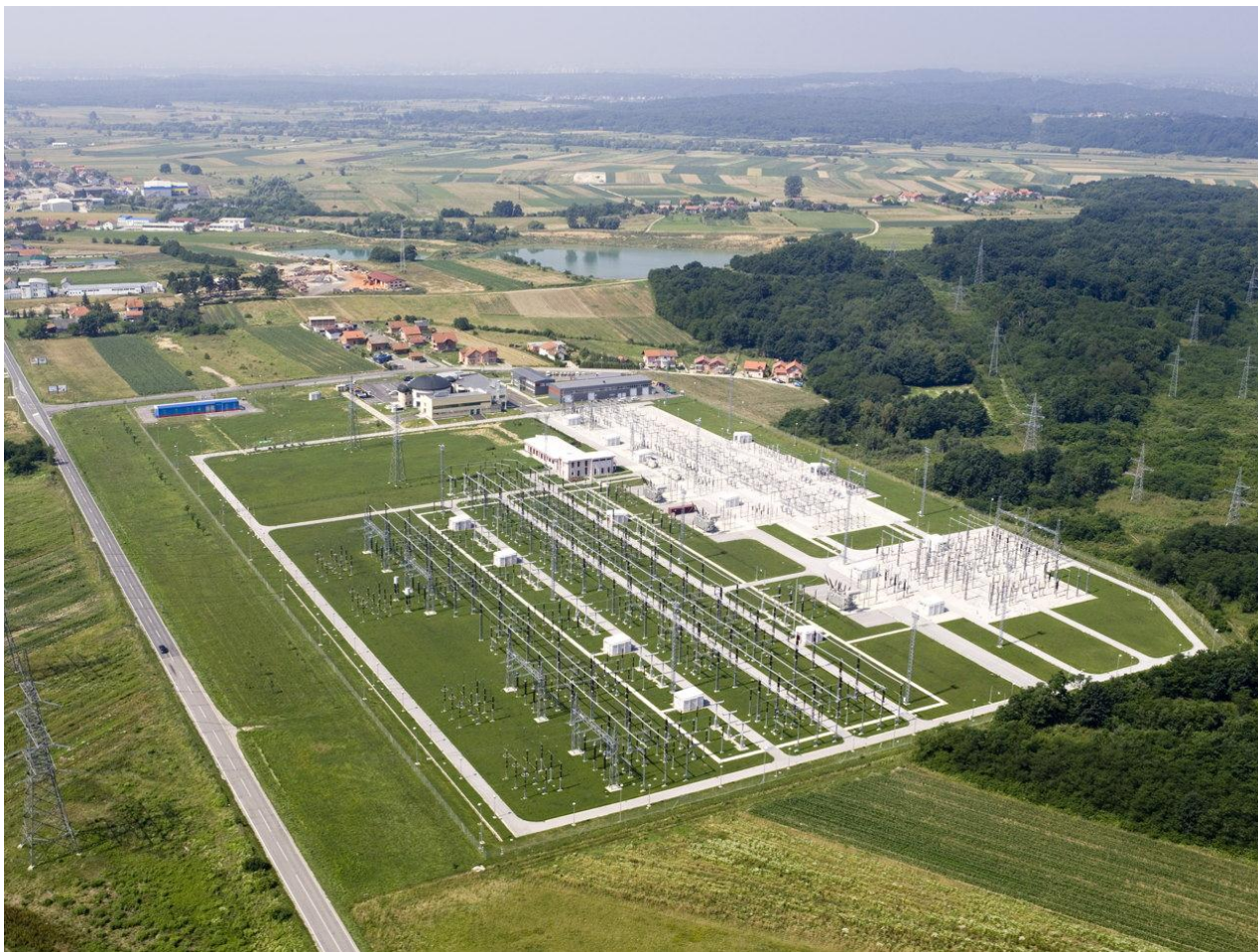


SINGLE EUROPEAN ELECTRICITY TRANSMISSION SYSTEM



Zagreb, 10.10.2014., 10th Anniversary of the Reconnection of the Continental Europe Transmission Grid., M.Mesić

**THANK YOU
FOR YOUR ATTENTION!**
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