



"Interconnectivity: cross-border cooperation in the energy sector - challenges and opportunities" - Ukraine

Valeriy Tsaplin, *Director of Department for Strategic Development and Planning,
National Energy and Utilities Regulatory Commission*

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Legal framework for cross-border cooperation in the power industry. Primary legislation



- Law "On Power Industry", 1997
- Law "On the Principles of Operation of the Electricity Market of Ukraine", 2013
- To replace these Laws, with the support of the Energy Community Secretariat, a draft law "On the electricity market" has been prepared, meeting the requirements of the EU Third Energy Package.

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Legal framework for cross-border cooperation in the power industry. Secondary legislation



Access to the capacity of cross-border networks:

- NERC Resolution of 12.02.2015 №176 "On approval of e-bidding for the distribution of capacity of interstate electrical networks"

Investment in the development of mains and interstate networks:

- The main criterion for inclusion of the investment project in the investment programme upon revision of tariffs is its technical feasibility
 - NERC Resolution of 30.06.2015 №1972 "On approval of the Procedure for the formation of the investment programs of licensees for transmission of electricity through main and interstate power grids and for the production of heat and / or electricity in nuclear power plants, hydroelectric power plants and pumped storage power plants"

Legal framework for cross-border cooperation in the power industry. Secondary legislation (2)



Price regulation of interstate and main networks:

- "Cost +" method
- Criteria of profit adequacy not identified
- Concepts of the Rate of Return and Regulatory Asset Base do not apply
 - NERC Resolution of 26.12.2003 №1456 "On approval of the procedure for the establishment (revision) of the tariff for the licensee on electricity transmission through main and interstate power networks"
 - NERC Resolution of 04.05.2006 №563 "On approval of the Methodology for calculating tariffs for the transmission of electricity through main and interstate power grids, as well as the services of centralised dispatching control of the interconnected power system"

Electrical interconnections of Ukraine's United Energy System (UES)



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Quantitative composition of the interstate transmission lines of the UES of Ukraine



Country	Transmission lines with voltage class (kW), pcs							
	750	500	400	330	220	110	35	6-10
Russian Federation	1	2	1*	6	3	5	-	-
Moldova	-	-	-	7	-	11	1	1
Belarus	-	-	-	2	-	2	1	-
Poland	1	-	-	-	1	-	-	-
Slovakia	-	-	1	-	-	-	1	-
Hungary	1	-	1	-	2	-	-	-
Romania	1	-	1	-	-	-	-	-

* DC transmission line.

Export potential and interstate power flows

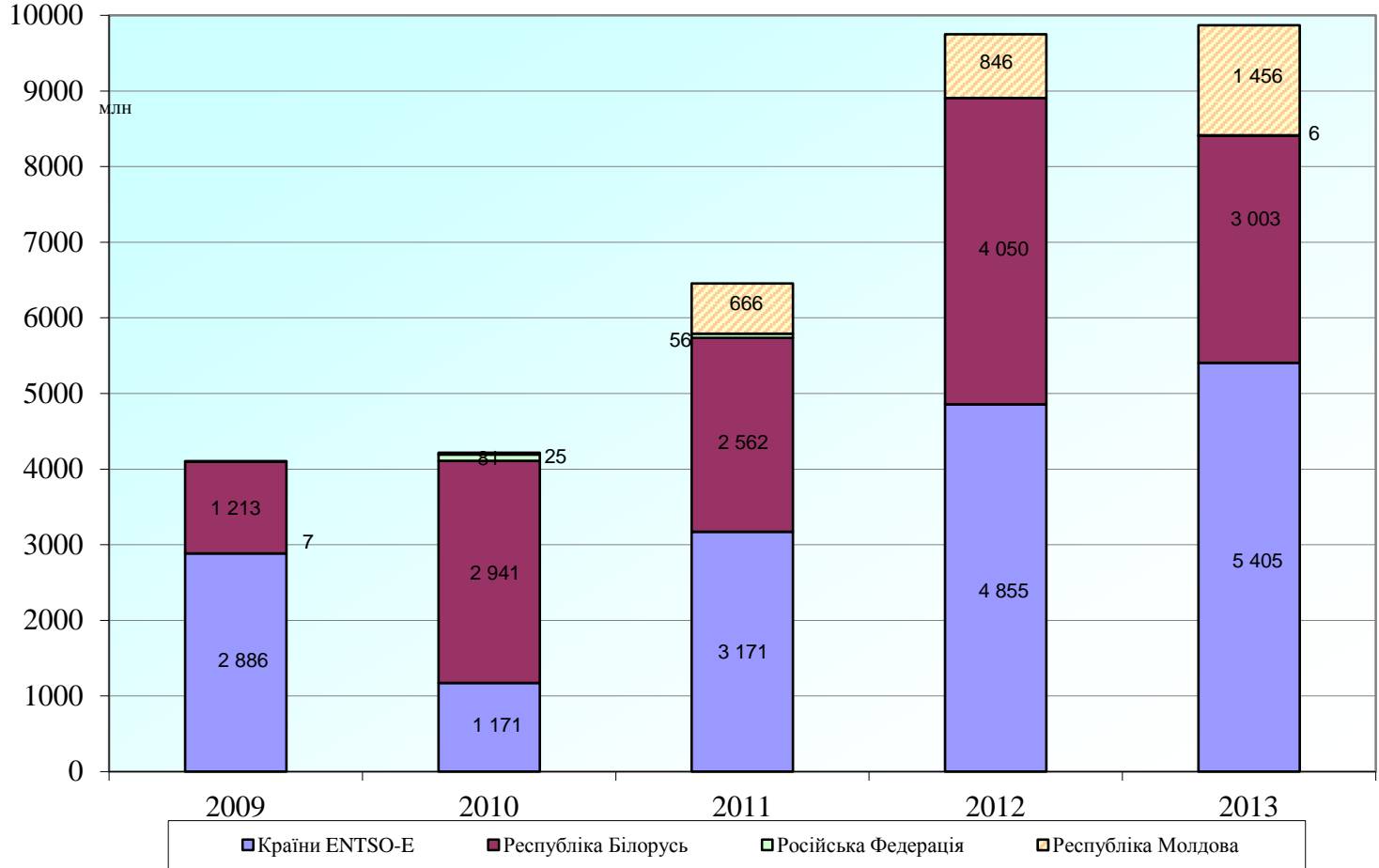


Direction	Capacity, MW
Ukraine → Hungary, Romania, Slovakia ("Island of the Burshtyn TPP")	650
Ukraine → Poland	235
Ukraine ↔ Russian Federation	3000
Ukraine → Moldova	700
Ukraine ↔ Belarus	900

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Electricity exports to Ukraine in 2009-2013



Prospects for Ukraine's cross-border cooperation in the power industry



- A strategic direction of developing the power industry is integration of Ukraine into the EU's single energy market, using the tools offered by Ukraine's membership in the Energy Community of South East Europe
- The main obstacle to cross-border cooperation with the EU is lack of synchronisation of the United Energy System of Ukraine (UES) with the ENTSO-E synchronous zone

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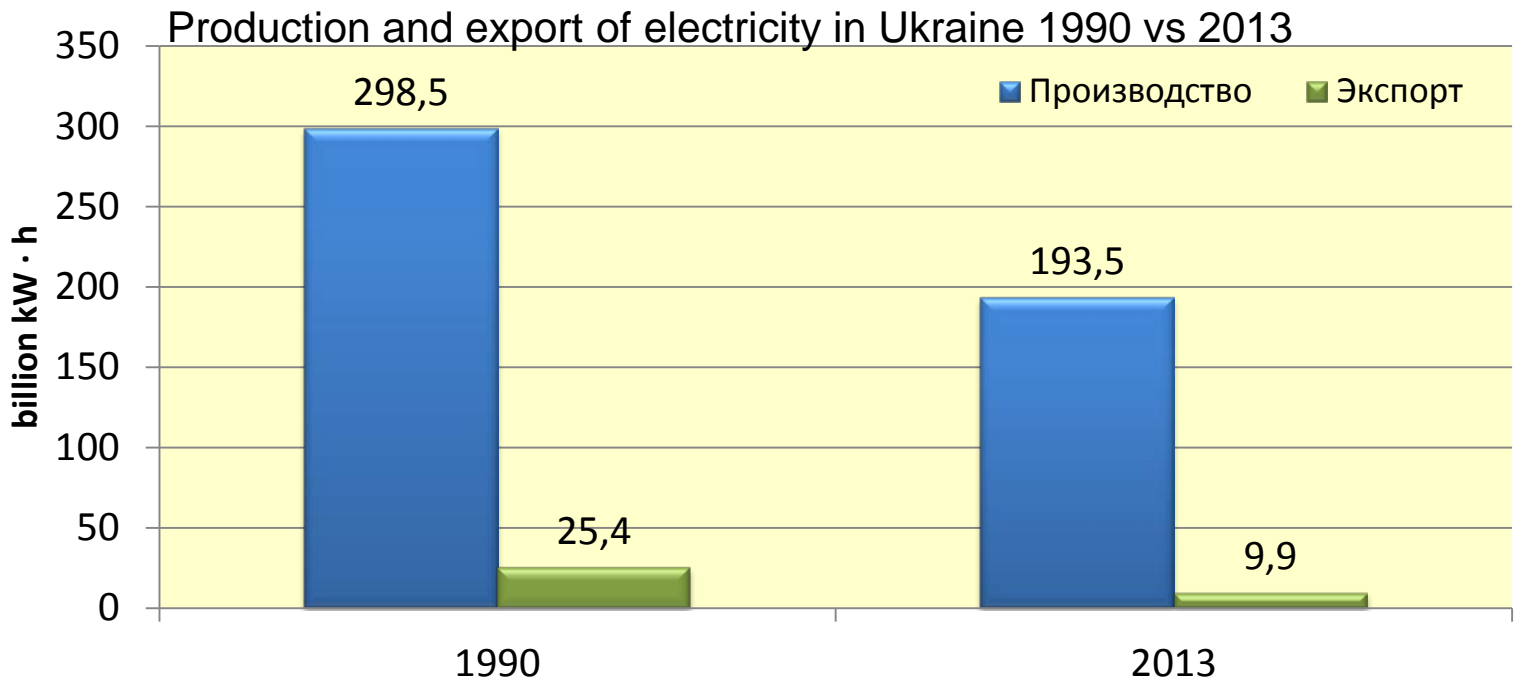


Ukraine's peculiarity - excess of generation and transmission capacities



Since 1990, the production and export of electricity in Ukraine has reduced significantly, so there is an excess of generating and transmission capacities, including interstate ones.

The priority is not the construction of new networks, such as interconnectors, but rather a rehabilitation of current infrastructure, meeting the technical requirements for synchronisation with ENTSO - E synchronous zone



Sources of financing the investments into the development of main (Interstate) networks



Investment programmes of SE NEC Ukrenergo, thous. euros

Sources of financing	2004	2006	2008	2010	2012	2014
Depreciation deductions	16 296	24 768	26 449	28 672	40 271	36 189
Profit from the licensed activity	30 825	42 127	59 773	42 734	72 537	11 835
Other income	908	1 641	2 595	1 899	3 895	3 557
Loans	0	0	8 785	17 916	74 658	82 400
Funds of previous periods	0	169	16 939	10 747	18 947	0
State budget	0	0	0	23 735	25 169	0
Fee for access to capacity	0	0	0	2 240	0	0
Total (VAT excl.)	48 028	68 705	114 541	127 943	235 476	133 982
Total (VAT incl.)	57 634	82 446	137 449	153 532	282 571	160 779

Estimation of investments required for the development of the main (interstate) networks (2016-2018)



Sources of financing	Amount of necessary investments, thous. euros	In particular, by years, thous. euros		
		2016	2017	2018
Funds of enterprises	696 261	152 237	206 453	337 571
Borrowings	255 344	171 020	37 831	46 494
State budget	0	0	0	0
Other	139 299	39 579	52 192	47 527

Measures for synchronisation of the UES of Ukraine with ENTSO-E for 2016-2018



- Introduction of the connection hub to the ENTSO-E Electronic Highway data network;
- Reconstruction of the control systems at power units for primary and secondary control of frequency and power during repairs and reconstruction of thermal power plants' units;
- Setup of a high-speed telecommunications network for the process control of the UES of Ukraine;
- Introduction of the system for monitoring the participation in the primary and secondary control of frequency and capacity of power plants' units at the central dispatch centre of the SE NEC Ukrenergo;
- Introduction of software for calculating the capacity of interstate sections of the UES of Ukraine in accordance with the methodology for calculating the capacity;
- Connection of station control systems (SCS) of power plants to the central controller of the automatic load-frequency control system (ALFC system) of SE NEC Ukrenergo.

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Investment projects in the framework of measures for the integration of Ukraine's UES into ENTSO-E (1)



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Project	Timeframe	Estimated cost for 2016-2018, thous. Euros	In particular, by years, thous. Euros		
			2016	2017	2018
Introduction of the connection node into the ENTSO-E Electronic Highway data network	2015-2017	374	187	187	0
Setup of a high-speed telecommunications network for the process control of the UES of Ukraine	2015-2017	17 882	17 882	0	0
Restoration of operation of 750 kV Khmel'nitsky NPP - Rzeszow.	2016-2018	3 576	1 192	1 192	1 192

Investment projects in the framework of measures for the integration of Ukraine's UES into ENTSO-E(2)



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Project	Timeframe	Estimated cost for 2016-2018, thous. Euros	In particular, by years, thous. Euros		
			2016	2017	2018
Reconstruction of the control systems at power units for primary and secondary control of frequency and power during repairs and reconstruction of thermal power plant units (26 power units)	2015-2018	69 834	28 650	17 906	23 278
Implementation of SCS at power plants	2015-2017	17 190	8 595	8 595	0
Setting up a central regulator of the ALFC system for the purpose of connecting SCSs of power plants to it and connection	2015-2017	1 066	533	533	0

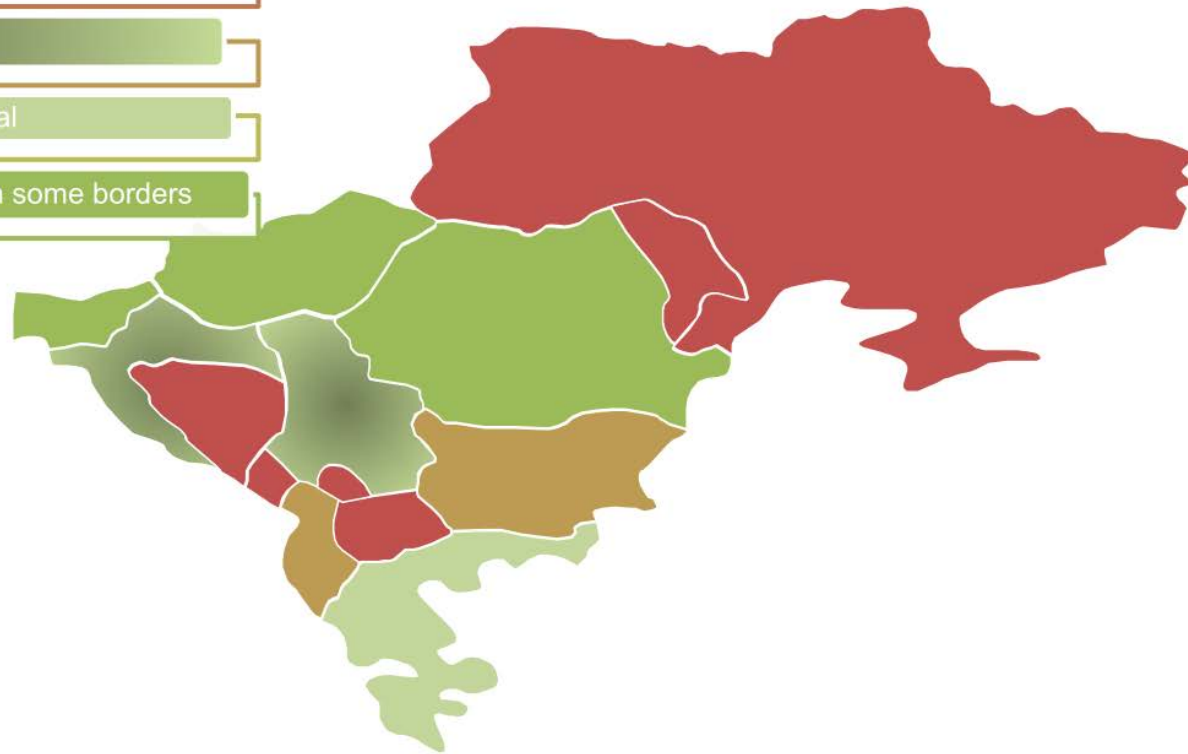


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Regional action plan for opening of the Energy Community market – setting up of Power Exchanges and markets' coupling



- No concrete PX project planned
- PX establishment / servicing on the way
- PX established, not operational
- PX / organised market operational
- Market Coupling implemented on some borders



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Target model for coupling of electricity markets of Ukraine and Moldova

(Recommendations of the Energy Community Secretariat)



Integration of electricity markets of Ukraine and Moldova (1)



- The goal is to introduce a single organised market for the day-ahead trading of electricity between Ukraine and Moldova;
- Implementation should be carried out by transmission system operators of Ukraine (SE NEC Ukrenergo) and Moldova (SE Moldelectrica), and other entities responsible for the operation of the market (SE Energorynok), with the support of regulators, Energy Community Secretariat and the Secretariat of the ENTSO-E;
- The project should be managed pursuant to the concerted cooperation of all stakeholders, as well as international coordination.

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Thank you for your attention!

Valeriy Tsaplin

Director

Department for Strategic Development and Planning

National Energy and Utilities Regulatory Commission,
Ukraine

tsaplin@nerc.gov.ua

**INOGATE Technical Secretariat and Integrated Programme in support of
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