



REPORT

by Viktor PAULI

SO-CDO for UES CEO

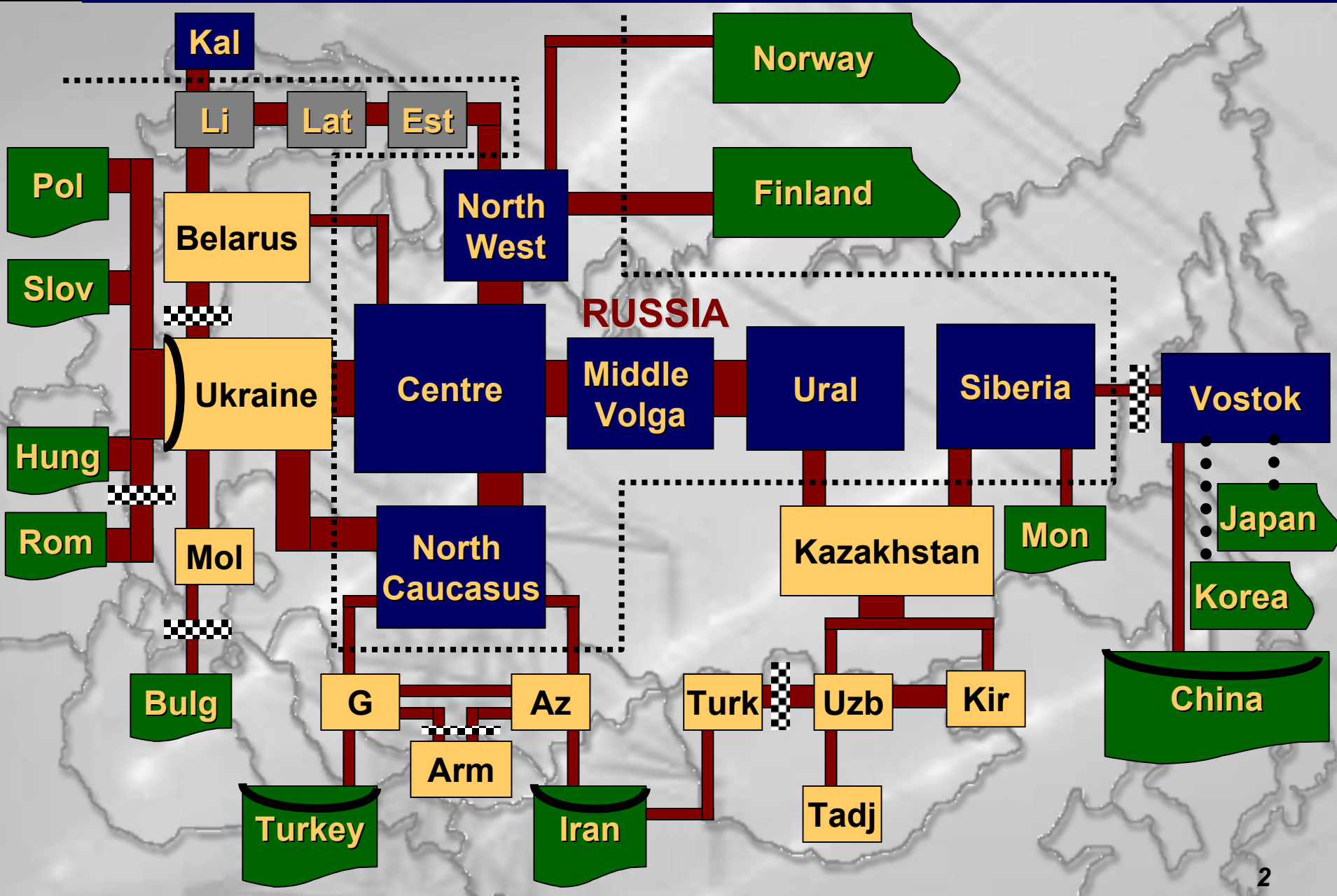
AT CIGRE REGIONAL CONFERENCE

***«The Future of European Electric Power
Industry in the Synchronous Operation of
East-West Interconnection»***

*St-Petersburg,
September, 19 2003*



UES OF RUSSIA AND ITS NEIGHBOURS





POWER TRANSFERS BETWEEN UES OF RUSSIA AND NEIGHBOURING SYSTEMS

	million kWh
Byelorussia – export	3727.9
Estonia – import	325.4
Latvia – export	1149.6
Lithuania – import	2309.5
Georgia – export	408.6
Azerbaijan – export	1026.3
Kazakhstan – import	540.4
Ukraine – export	228.8
Moldova – export	440.3
UPS of Russia is synchronized via Kazakhstan with energy systems of Uzbekistan, Kyrgyz, Tajikistan	

Electric power suppliers are
implemented to separated regions of:

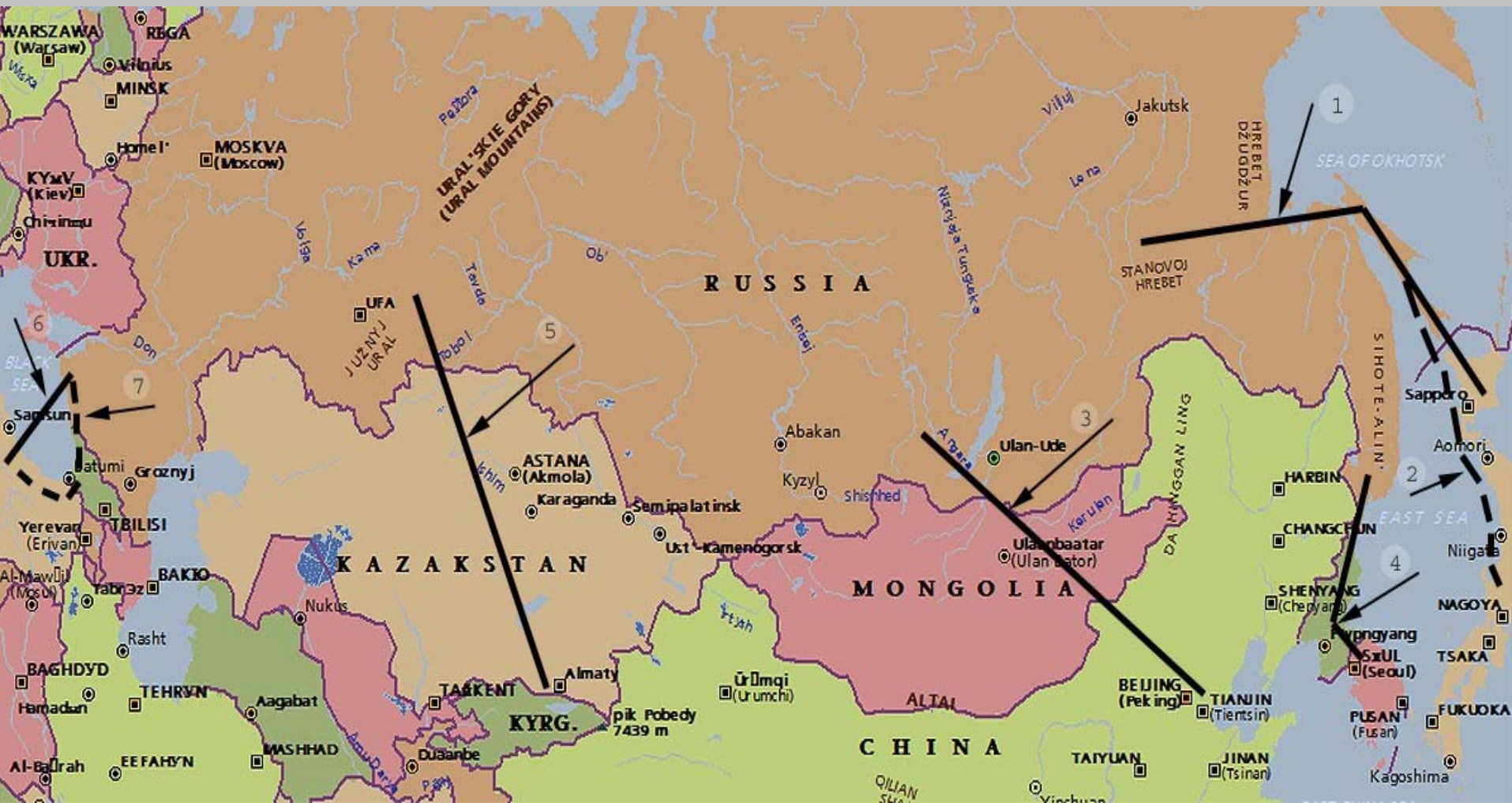
Norway – export	224.5
China – export	151.2
Poland – export	572.1
Turkey – export	92.8
Finland - export	7697.8

TOTAL:

$$+ 13628 - 2635 = 10993 \text{ MV}$$



LINKS BETWEEN UES/IES AND ASIAN ENERGY SYSTEMS AT SYNCHRONIZATION





EUROPEAN SYNCHRONOUS ZONES

UES/IES – EASTERN SYNCHRONOUS ZONE

*UES of Russia operates synchronously with
13 energy systems of CIS and Baltic states*

NORDEL – NORTHERN SYNCHRONOUS ZONE

UCTE – WESTERN SYNCHRONOUS ZONE





PREREQUISITES FOR SYNCHRONOUS ZONES INTEGRATION

-  ***The process of political integration in Europe and EU enlargement combined with growing of the European countries to increasing the amount of electricity trade, to ensuring the reliable energy supply and diversifying energy sources***
-  ***The existence of the ready powerful grid infrastructure interface between Western and Eastern European synchronous zones – 750-400-220 kV lines, plus long operation experience and improved technological operation level of UES/IES***
-  ***Non-synchronous integration option will involve high unjustified expenses and will rather lead to isolation, not integration***



ADVANTAGES OF SYNCHRONOUS ZONES INTEGRATION

-  ***Establishment of a single trade and economic environment and enlargement of electricity trade possibilities***
-  ***Mutual assistance at emergencies, increased survivability and stability of the energy systems***
-  ***Possibility for better use of generation capacities and primary energy resources***
-  ***Reduced costs for further infrastructure interface development***
-  ***Increased electricity (frequency) quality, harmonization of standards and reduced costs for implementation of these standards***



BASIC DECISIONS



October, 3, 2001
EU – Russia summit



The task of preparation for UES/IES – UCTE synchronization is mentioned as the one of mutual interest (V. Putin, G. Verhofstadt))



February, 10, 2003
Joint Russian-French Statement on cooperation in energy sphere



«...one of the best decisions for integration of electricity industry in Europe is the synchronization of the energy system of UCTE and UES/IES of Russia...» (V. Putin, J. Chirac)



February, 11, 2003
The Meeting of the Government Committee of Russia on cooperation with EU

The assignment to Ministry of Power of Russia in cooperation with other interested Ministries and energy companies to proceed working for partnership between EU-Russia in electricity sphere and to pay attention to the issues of possibilities, terms and Europe and Russia energy systems synchronization aspects in particular

BASIC DECISIONS

UCTE ANNUAL ASSEMBLY

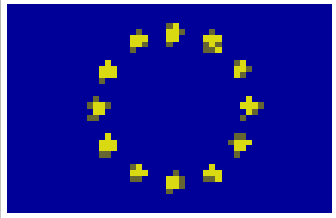


UCTE Annual Assembly on May, 7, 2003 on the results of the first stage of study of RAO UESR proposal on UCTE, CIS and Baltic states energy systems connection in the decision mentioned, that:

There are no main objections against the realization of such a connection

Establishment of a special Project Group is needed for studying the issues necessary to come to a decision on synchronization

On the results of UCTE study on powerflow at East-West energy systems synchronization in the case of getting the outer financial resources also it is possible to launch working out the Technical Assignment for feasibility study for the project of parallel operation of UCTE, CIS and Baltic states energy systems



Europa

REPORT OF EUROCOMMISSION

Report of European Commission (Brussels, May, 13, 2003)
“On Energy Policy in Context of EU Enlargement and in Relation to Neighboring and Partner Countries”

“The option of integration to synchronous or parallel operation which is the same is being actively supported and pushed forward by the Russian side both at political and technical levels. Commission shares the opinion that this integration option has some advantages but the other thing is also clear – in order to realize the integration of UCTE and RAO UESR it is necessary to solve a variety of technical problems as well as corresponding issues of commercial infrastructure development”

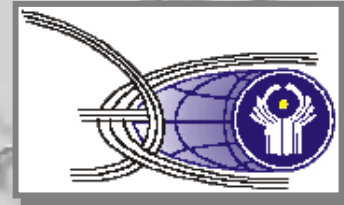
«In this connection Commission believes that the project of energy systems’ integration shall be regarded as a project of European priority interest. And in this regard it could get financial support in the frameworks of Trans-European Synchronously Interconnected System (TESIS) development”

BASIC DECISIONS



CIS EPS - EUROELECTRIC

***Meeting between the President of CIS EPS
A. Chubais and the President of
EUROELECTRIC H. Haider on June, 23,
2003***



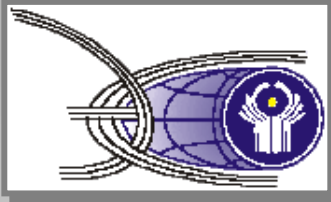
The Minutes of the Meeting

The importance of getting the initial results of UCTE study on CIS, Baltic and UCTE energy systems synchronization possibility

EUROELECTRIC supported the UCTE initiative on conducting the full-scale feasibility study on the subject

The agreement to conduct joint seminar on November, 13-14, 2003 in Brussels on market launch, environment and synchronization. The seminar will become a basis for initiating a political discussion on all the problems considered.

LAUNCHING OF THE PREPARATION PROCESS



After discussing the results of UCTE study on powerflow at East-West energy systems synchronization on a meeting between President of CIS EPC A. Chubais and President of UCTE M. Fuchs on July 2003 in Moscow the following decisions were adopted:



- The issues of UCTE – UES/IES synchronization are considered as a high-priority task in relationship between Europe and CIS**
- The Parties agreed to fulfill a joint study in order to prepare and forward the project of UCTE – UES/IES synchronization and planned the following nearest tasks:**
 - creation of the organizational structures in UCTE and in UES/IES with separated (independent) top levels of control on September 2003**
 - establishment of a Joint Project Group for working out and reaching the agreement on Work Specification in 2003 and the following working out the Technical Assignment for feasibility study for the project of parallel operation**



INTEGRATION PRINCIPLES

- *East-West synchronization as the existing interconnections (without their partition)*
- *Equal partner rights (mutual proposition of only necessary requirements and conditions)*
- *Mutual preservation of the achieved quality and reliability level for integrating energy systems operation (without any aggravation)*
- *Agreed procedure for changing the power exchange schedule in case of network constraints*
- *Transit of electricity to interface through the third countries' energy systems within UCTE and UES/IES accordingly*
- *The reliability of the establishing super-interconnection and establishment of the high-effective dispatching control system in the transcontinental synchronous zone are the issues of particular importance*



TECHNICAL TASKS

- *Primary frequency regulation by UES/IES according to UCTE requirements (no quality aggravation)*
- *Centralized secondary frequency and power regulation for eastern zone including reserved high-speed information system*
- *Maintaining the necessary reserves of active power and its distribution*
- *Realignment of the automated counter-emergency systems given the new energy system configuration*
- *Restoration of operation of the currently unused interface lines as well as equipment and substation automated systems*
- *Dispatching operators training including international counter-emergency training tests*



PREPARATION FOR SYNCHRONIZATION WITH WEST EUROPE STATES



RAO UESR DIRECTIVE

(18.09.2002 No. 524)

“On improvement of quality of primary and secondary frequency regulation in UES of Russia”

Laying the legislative frameworks for frequency regulation according to UCTE requirements

Modernization of primary frequency regulation equipment at all power plants according to today's regulatory requirements

Modernization of regulation systems and equipment at the selected power plants in order to use them for normative primary and automatic secondary frequency regulation



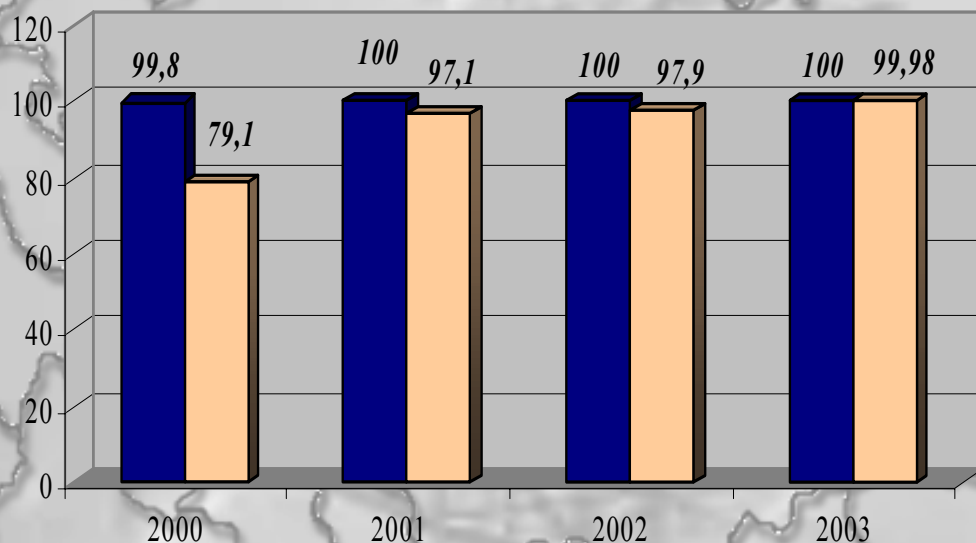
THE RESULTS OF THE TECHNICAL PREPARATION OF UES OF RUSSIA FOR SYNCHRONIZATION

Frequency control quality improvement - Highlights

2000 г. – estimation of power plants' primary control systems

2001 г. – development of technical references and adjustments of control systems according to the requirements

2002 г. – Implementation of UCTE margins to frequency control: $50 \pm 0,05$ Гц



■ Time of operating (%) with frequency $50 \pm 0,2$ Hz (CIS Standard 13109-97)

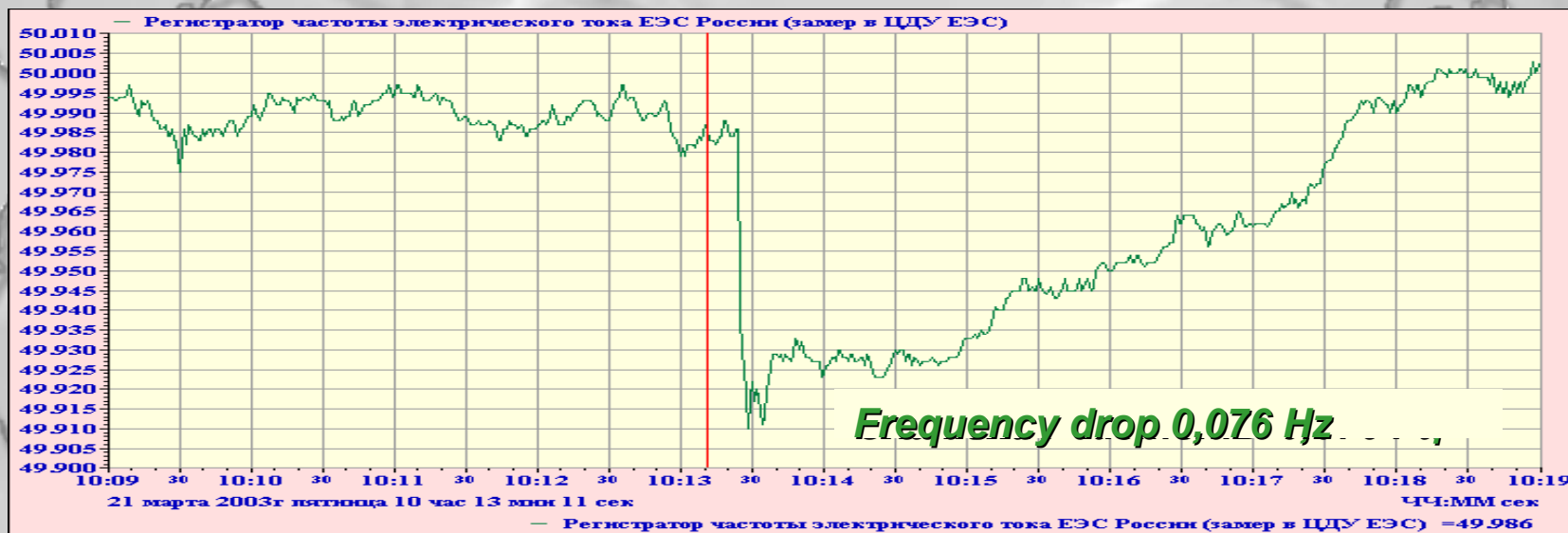
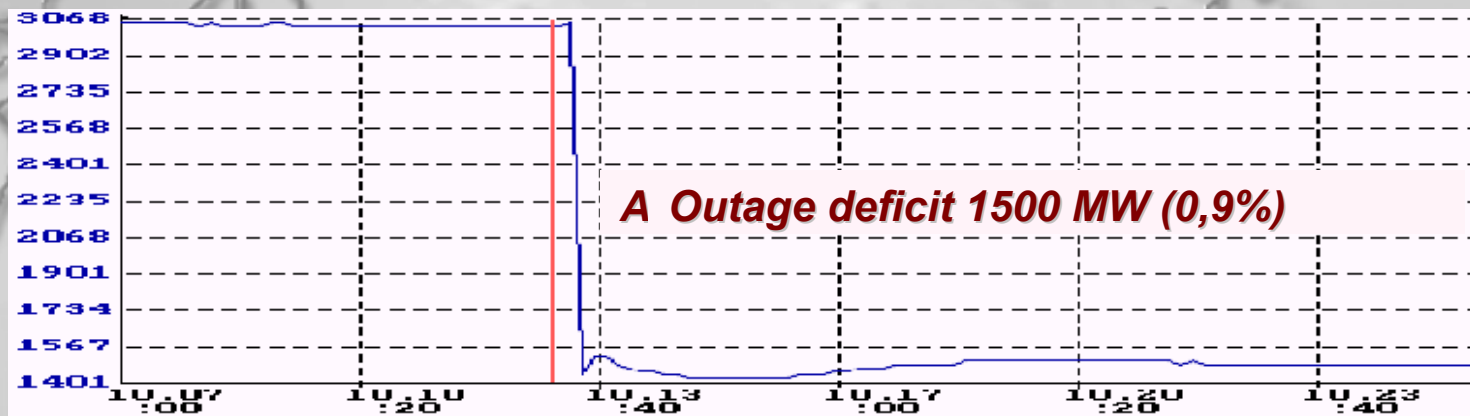
■ Time of operating (%) with frequency $50 \pm 0,05$ Hz (UCTE requirements and RAO UESR Directive No. 524)

2003-2005 г.г. – further development of frequency control system



OSCILLOSCOPE TRACE OF FREQUENCY DROP AT OUTAGE DEFICIT = 1500 MW

**Total power of synchronous energy systems at the moment of
outage deficit amounts to 171000 MW**





IMPLEMENTATION STEPS FOR STARTING SYNCHRONIZED OPERATION

- Establishment the UES/IES body in the frameworks of Commission for Operational and Technological Coordination of CIS Energy Systems Parallel Operation for working out and adopting the single rules of operation, technical coordination of synchronous operation, reliability control, coordination of synchronous operation with UCTE and neighboring interconnections that would manage to discuss and prepare decisions officially together with UCTE***
- Inter-government agreement of CIS and Baltic states adjoining the interface designating the mission of East-West energy systems synchronization as a common task for long-term outlook***
- Common decision by EU, Russia, Ukraine, Belarus, Moldova and Baltic states on preparation to UCTE – UES/IES synchronization***



NEAR-TERM MEASURES

Implementation of Chubais – Fuchs decision dated 02.07.2003:

- **Establishment of working bodies for carrying out the feasibility study on UCTE – UES/IES synchronous operation – joint standing UCTE – UES/IES project group and organizational structures in the frameworks of UCTE and UES/IES with independent control – September 2003**
- **Design and coordination Technical Assignment for feasibility study – December 2003**
- **Carrying out the feasibility study for synchronization operation including:**
 - **technical evaluation of simulation of synchronization options**
 - **development of common interaction rules for interconnections, defining the legal/contractual terms including responsibility distribution among the Parties**
 - **development of interaction scheme for settlement centers of transcontinental synchronous zone**



CONCLUSION

1. *There is no alternative to cooperation in energy field in Europe*
2. *Lack of action in this direction could lead to loss of partners and to worsening situation in local area energy supply in particular*
3. *Synchronous option means a long-term confidence among the partners needed for enlarging markets and cooperation*
4. ***Synchronous operation means:***

- ***Single Energy Market***

- ***Single Energy Technology Market***

- ***Single Capital Market***

