



Energy Systems  
Institute,  
Russia



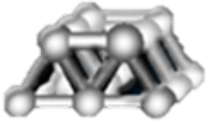
Technical  
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St. Petersburg  
Energy Institute  
of Advanced Training



CRIS

**International Conference on  
Problems of Critical Infrastructures  
integrating**

**6<sup>th</sup> Conference of International Institute for  
Critical Infrastructures**

**with**

**6<sup>th</sup> International Conference on Liberalization and  
Modernization of Power Systems**



**CONFERENCE PROGRAM**



Saint Petersburg  
Russia  
June 25-27  
2015

Technical Support



Power & Energy Society™

IEEE PES Russian (Siberia) Chapter  
IEEE PES German Chapter

International Conference on Problems of Critical Infrastructures, Proceedings. Edited by Z.A. Styczynski and N.I. Voropai. – Irkutsk, Energy Systems Institute, 2015

ISBN 978-5-93908-130-6

The Proceedings contain the papers presented at International Conference on Problems of Critical Infrastructures integrating the 6<sup>th</sup> Conference of International Institute for Critical Infrastructures with the 6<sup>th</sup> International Conference on Liberalization and Modernization of Power Systems, which was held on June 25-27, 2015, in Saint Petersburg, Russia. It can be useful for scientists, engineers, post-graduates and students, who deal with the problems of energy systems as the critical infrastructures.

ISBN 978-5-93908-130-6

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## The City

St. Petersburg was founded in 1703. It was the first really European style city in Russia and it is undoubtedly one of the most beautiful cities in the world with its incredible architecture and nature. Over more than 300 years of its history St Petersburg has accumulated all the grandeur of the Russian Imperial Court and become one of the largest centers of culture, science and industry. Created by Peter the Great as a port in the Baltic sea, it was essentially a “window to the West” for Russia, combining the best of the West and the East.

St. Petersburg, a marvelous Russian city, often called “Venice of the North” is a home to the Hermitage Museum, the Kirov Ballet of the Mariinsky Theater and much more. St. Petersburg is a city of canals and bridges, many of which are known around the world for their original design and decoration. The city can boast its splendid parks and gardens laid out in the 18<sup>th</sup>-19<sup>th</sup> centuries.

The most beautiful city of Russia is waiting to unveil its treasures just for you...

## The Conference

International Association “International Institute for Critical Infrastructures” (CRIS) was founded in the late 1990s as a platform for cooperation between the representatives of academia and industry dealing with the problems of critical infrastructures (electric power, pipeline, communication, transport, and other systems, as well as computer networks) in order to share experience and harmoniously integrate these technologies.

CRIS organizes technical conferences on topics related to critical infrastructures (China, the USA, Sweden, Vietnam and Germany) and workshops with invited participants on specific topics (Sweden, France, the USA, Germany, India and Cyprus).

The forthcoming International Conference on “Problems of Critical Infrastructures” to be held on June 25-27, 2015 in Saint Petersburg, Russia will integrate the 6<sup>th</sup> Conference of International Institute for Critical Infrastructures with the 6<sup>th</sup> International Conference “Liberalization and Modernization of Power Systems”, which was organized in 2000 and has been held once every three years.

The Conference will be held by Energy Systems Institute, Siberian Branch of the Russian Academy of Sciences, St. Petersburg Energy Institute of Advanced Training, Ministry of Energy of the Russian Federation, Universities of Dortmund and Magdeburg, Germany, and Fraunhofer Institute, Magdeburg, Germany with the technical support of IEEE PES German Chapter and IEEE PES Russian (Siberian) Chapter.

**Working languages** of the joint conference are English and Russian. Simultaneous translation will be provided. The papers and PPT presentations must be prepared in English.

## Topics of the Conference

- Problems of development and operation of critical infrastructures
- Integration of critical infrastructures
- Cyber-physical security of critical infrastructures
- Modeling of critical infrastructures
- Operation control of critical infrastructures
- Planning of the critical infrastructure development
- Integrated development and operation of critical infrastructures

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# The Conference Program

2015 June 26, Hotel Novotel.

<b>8.00-9.00</b>	Registration
<b>9.00-9.20</b>	Welcome Address
<b>9.20-11.00</b>	Session 1
<b>11.00-11.20</b>	Coffee break
<b>11.20-13.00</b>	Session 2
<b>13.00-14.00</b>	Lunch
<b>14.00-15.40</b>	Session 3
<b>15.40-16.00</b>	Coffee break
<b>16.00-17.40</b>	Session 4
<b>17.40-18.00</b>	Discussion



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Novotel St Petersburg Centre is a four star hotel situated in the historical centre of St. Petersburg a stone's throw from Nevsky Prospekt with its bar scene, nightlife, shopping and main attractions. The hotel features 233 spacious rooms, 9 meeting rooms, fashionable French restaurant, cozy Lobby Bar, La Brioche Deli-Counter with assortment of fresh homemade cakes, free Wi-Fi Internet, free fitness centre with hammam to relax, concierge services, ATM, exchange office, free parking and visa support.



## Session 1

### **1. Online Dynamic Security Assessment System for Power System Monitoring and Control**

Iryna Chychykina, Martin Wolter, Zbigniew Antoni Styczynski, Chris Oliver Heyde, Rainer Krebs  
Germany

### **2. Possible Consequences for the European Energy Sector from Violations of Russian Gas Transit through Ukraine**

Sergey Senderov, Sergey Vorobev, Victor Rabchuk  
Russia

### **3. Models for the Determination of Reliability Criteria in the Planning of a Liberalized Electric Power System**

Yury Chukreyev, Mikhail Chukreyev  
Russia

### **4. Save HVDC Overlay Grid Operation Using Redundant and Cascaded System Operation Methods**

Florian Sass, Anne-Katrin Marten, Dirk Westermann  
Germany

### **5. Investigation of a New Average Value Based Load Shedding Concept to Secure Critical Infrastructures in Case of Emergency**

André Richter, Ines Hauer, Zbigniew Styczynski, Martin Wolter  
Germany

## Session 2

### **6. Role of Power System Relays in a Large Scale Physical Attack**

Anamitra Pal, Mina Youssef, Anil Vullikanti, Achla Marathe, Stephen Eubank, Madhav V. Marathe, and Christopher L. Barrett, James S. Thorp, Arun. G. Phadke, and Virgilio A. Centeno  
USA

### **7. A Matroid Theory Approach to Constructing the Sparse Attacks on Power System State Estimation**

Michael Khokhlov  
Russia

### **8. Cyber Security of Russia's Energy Infrastructure as a Component of National Security**

Liudmila Massel, Aleksei Massel  
Russia

### **9. Vulnerability Analysis of the State Estimation Problem under Cyber Attacks on WAMS**

Irina Kolosok, Elena Korkina, Liudmila Gurina  
Russia

### **10. Problem of Nuclear Power Plant Integration into Belarusian Power System**

Alexander Mikhalevich, Tatsiana Zoryna  
Belarus

## Session 3

### **11. Scalable Heuristics for Planning, Placement and Sizing of Flexible AC Transmission System Devices**

Vladimir Frolov, Scott Backhaus, Misha Chertkov  
Russia, USA

### **12. Development of a Method for Detecting Systematic Errors in Electric Power System Measurements**

Anna Glazunova, Evgenii Semshchikov  
Russia

### **13. Modeling the Dynamics of Isolated Electric Power Systems: Methodology and Algorithms**

Svetlana Solodusha, Konstantin Suslov, Dmitry Gerasimov  
Russia

### **14. Critical Variables under Stochastic Disturbances**

Irina Golub, Oleg Voitov, Evgeny Boloev  
Russia

### **15. Integrated Infrastructural Energy Systems – Challenges for Russia**

Nikolai Voropai, Valery Stennikov, Sergey Senderov, Evgeny Barakhtenko, Oleg Voitov, Lidiia Kovernikova, Tamara Oshchepkova, Liudmila Semenova  
Russia

## Session 4

### **16. Analysis of Mechanisms of Blackout Development in Electric Power Systems**

Dmitry Efimov  
Russia

### **17 The Inspection of the Technical State of Critical Infrastructure Facilities**

Aleksandr Nazarychev, Aleksei Tadzhibaev, Yury Solovyev  
Russia

### **18. Modeling and Tasks of Dispersed Energy Storage for Secure and Optimal Operation in Distribution System**

Tatiana Sokolnikova, Konstantin Suslov, Natalia Moskalenko, Christian Klabunde, Przemyslaw Komarnicki  
Russia, Germany

### **19. Pricing Mechanism for Electricity Demand Management to Optimize Operation of Power Supply Systems**

Natalia Aizenberg, Elena Stashkevich  
Russia

### **20. Determination of an Energy Efficiency Index for Power Systems**

Konstantin Suslov, Vladimir Stepanov, Zbigniew Antoni Styczynski  
Russia, Germany

## Poster Papers

### **21. The Major Outage in South Vietnam in 2013: The Nature of Blackout, Security Measures and Strategy of National Power System Modernization**

Pham Trung Son, Nikolai Voropai  
Vietnam, Russia

### **22. The Current State of Cyber Security in Russia's Energy Systems and the Proposed Activities for Situation Improving**

Aleksei Massel, Liudmila Massel  
Russia