



**Today's Trends of Safety Regulation in  
the field of Electrical Power  
Engineering**



**ROSTECHNADZOR**



**FEDERAL BUDGETARY ENTERPRISE  
SCIENTIFIC AND ENGINEERING  
CENTRE  
ENERGY SAFETY**

# Today's Trends of Safety Regulation in Electric Power Industry



FEDERAL BUDGETARY ENTERPRISE  
SCIENTIFIC AND ENGINEERING CENTRE  
ENERGY SAFETY

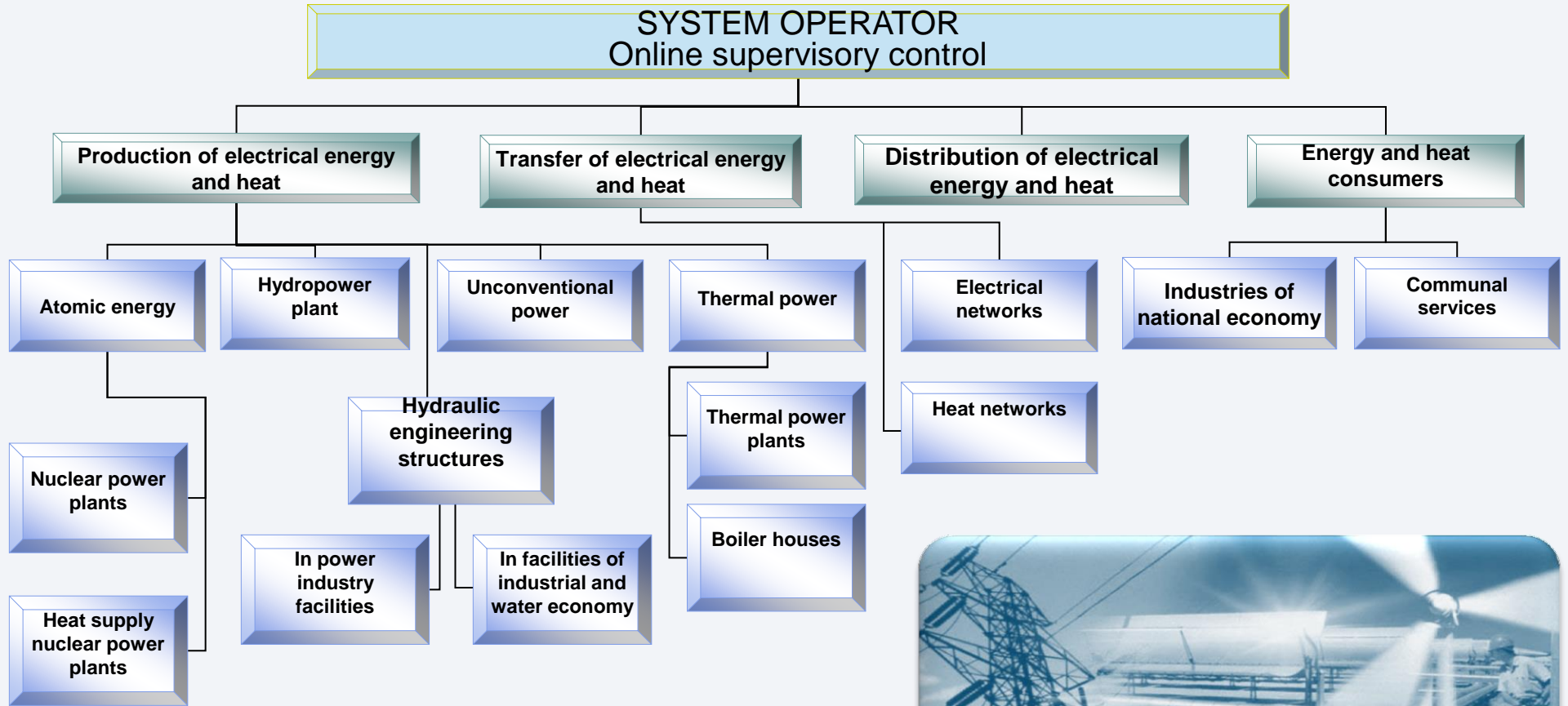
## CONTENT

1. Improving the regulatory framework in electric power industry.
2. Analysis of violations to establish feedback between violations and their prevention in electric power industry.
3. Remote training of Rostekhnadzor inspectors on topical issues of control and regulatory activities and regulatory control.
4. Developing and introducing risk-oriented approach in control and supervisory activities.
5. Developing and introducing methods and system of remote control of safety of energy facilities.

# Structure of electric power industry of the Russian Federation



**FEDERAL BUDGETARY  
ENTERPRISE  
SCIENTIFIC AND ENGINEERING  
CENTRE  
ENERGY SAFETY**



# Main objectives of control and regulation in electric power industry



FEDERAL BUDGETARY ENTERPRISE  
SCIENTIFIC AND ENGINEERING CENTRE  
ENERGY SAFETY

SAFETY

- ❖ Exclusion of accidents with heavy consequences for physical and juridical persons

RELIABILITY

- ❖ Generation of power/water supply

EFFICIENCY

- ❖ Uninterrupted operation

- ❖ Reduction of accident risk

- ❖ Environmental safety, etc.



REGULATORY  
CONTROL

MANAGEMENT

SUPERVISION,  
MONITORING

- ❖ Federal laws, regulatory legal acts, codes and standards, methodologies
- ❖ Safety of operation: personnel qualification, monitoring, maintenance, repair, life extension, reconstruction, modernization
- ❖ Enhancing liability for safety, administrative and criminal liability for violation of safety standards
- ❖ Assessment of compliance, checks of compliance, control under permanent supervision regime
- ❖ Safety of operation/personnel qualification.



Improving the regulatory legal framework in electric power industry is one of the tasks in ensuring that the Russian Federation's energy complex is safe, reliable and efficient. An updated, complete and sufficient regulatory framework also facilitates efficient governmental energy supervision.



## Key laws of the Russian Federation in electric power industry:

- On electric power industry
- On the use of atomic energy
- On safety of hazardous production facilities
- On safety of hydraulic engineering structures
- On energy saving
- On heat supply
- On protection of the rights of juridical persons and individual entrepreneurs when exercising governmental control/supervision and municipal control
- etc.



Activities on drafting the set of regulatory legal acts, federal codes and standards, reliability and safety requirements in electric power industry are important as they are a basis for ensuring energy security of the Russian Federation.

Rostekhnadzor currently modifies the relevant laws of the Russian Federation, including the area of control and supervisory activities.





## Regulatory legal acts being modified:

1. Federal Law “On electric power industry”
2. Federal Law “On heat supply”
3. Federal Law “On the basics of state and municipal control (supervision) in the Russian Federation”
4. Federal Law “On energy saving and improvement of energy efficiency and on amending individual legal acts of the Russian Federation”.



## Regulatory legal acts being modified (cont'd):

5. Decree of the Government of the Russian Federation “On investigation of causes of heat supply accidents and on recognizing some of the provisions of the accident cause investigation rules in power industry invalid”.
6. Decree of the Government of the Russian Federation “Rules of accident cause investigation in electric power industry”.
7. Decree of the Government of the Russian Federation “On amending the rules of establishment of guarded zones of the facilities producing electrical power and special conditions of using lands located in the boundaries of such zones”



Violations are analyzed to establish and prevent accident causes. Accidents occurred in power industry **are characterized by the presence of common attributes.**

Among main accident causes in power industry – **insufficient regulatory control** of activities on ensuring reliability and safety of the energy facilities, and insufficient introduction of **innovative technology** that facilitate the detection of **accident precursors** under permanent operation regime of the energy facilities.

**Based on the cause analysis, changes are made to the Rules of accident cause investigation in electric power industry, priorities are determined when selecting facilities for inspection.**



## Main accident causes in power industry:

- *non-compliance with timing and required scope of maintenance and repair of equipment and devices;*
- *absence of standby communication channels between energy facilities and control point;*
- *lack of control of technical examination of equipment;*
- *violation of the order of operating switchings and lack of interaction in the switching teams;*
- *poor control of technical condition of supervisory communication means and the way their operation is organized;*
- *human errors.*
- *lack (failure to perform) of actions to replace overworn and obsolescent equipment;*
- *expiry of equipment lifetime;*



Commissioned by Rostekhnadzor, FBE SEC Energy Safety conducts methodological webinars for Rostekhnadzor inspectors in electric power industry.

Main themes of the webinars are topical issues of regulatory control and accident root cause analysis in electric power industry.

This new practice has proved to be good. It has to be noted that a large number of participants from Rostekhnadzor territorial offices are able to take part in the webinars.



The total number of facilities supervised by Rostekhnadzor in Russia is about 4 million, including:

- 626 power plants;
- over 24 thousand small (process) power plants;
- over 116 thousand boiler houses;
- over 2 million km of electrical network facilities; over 480 thousand switchyards; over 200 thousand cable lines;
- over 2 million power consumers.



## Principle of control activities

Limited resources and admissible costs do not allow the regulator to exercise **total control**.

Therefore, **selective control** is a fundamental principle of the governmental agencies' and Rostekhnadzor's control activities – **just a selected number of facilities**, not all of them, are subject to inspection at a certain moment in time.



Methods of risk-oriented approach to control and supervisory activities in electric power industry is being developed. The number and variety of facilities make the selection of a standard approach difficult.

Risk-oriented approach suggests division of supervised power facilities by attributes which justify the priorities when selecting facilities for inspection.

Classification by degree of potential accident risk is the best proven one.

Classifying the power facilities as critical ones is most important.





Critical facilities of the fuel and energy complex are facilities whose failure will lead to system blackout in the Unified National Power System, loss of management of the economy of the Russian Federation, a constituent territory of the Russian Federation or a administrative territorial unit, its irreversible negative change (collapse), or significant decrease in the security of the population's vital functions.

## Introducing remote methods of control and supervisory activities



FEDERAL BUDGETARY ENTERPRISE  
SCIENTIFIC AND ENGINEERING CENTRE  
ENERGY SAFETY

One of the recent tasks is to develop a proposal for remote safety management of the facilities supervised by Rostekhnadzor on the basis of monitoring of the technical state of the facility components.

For remote monitoring, online information on the parameters of the technical state of the components measured during monitoring in the energy facilities should be provided.



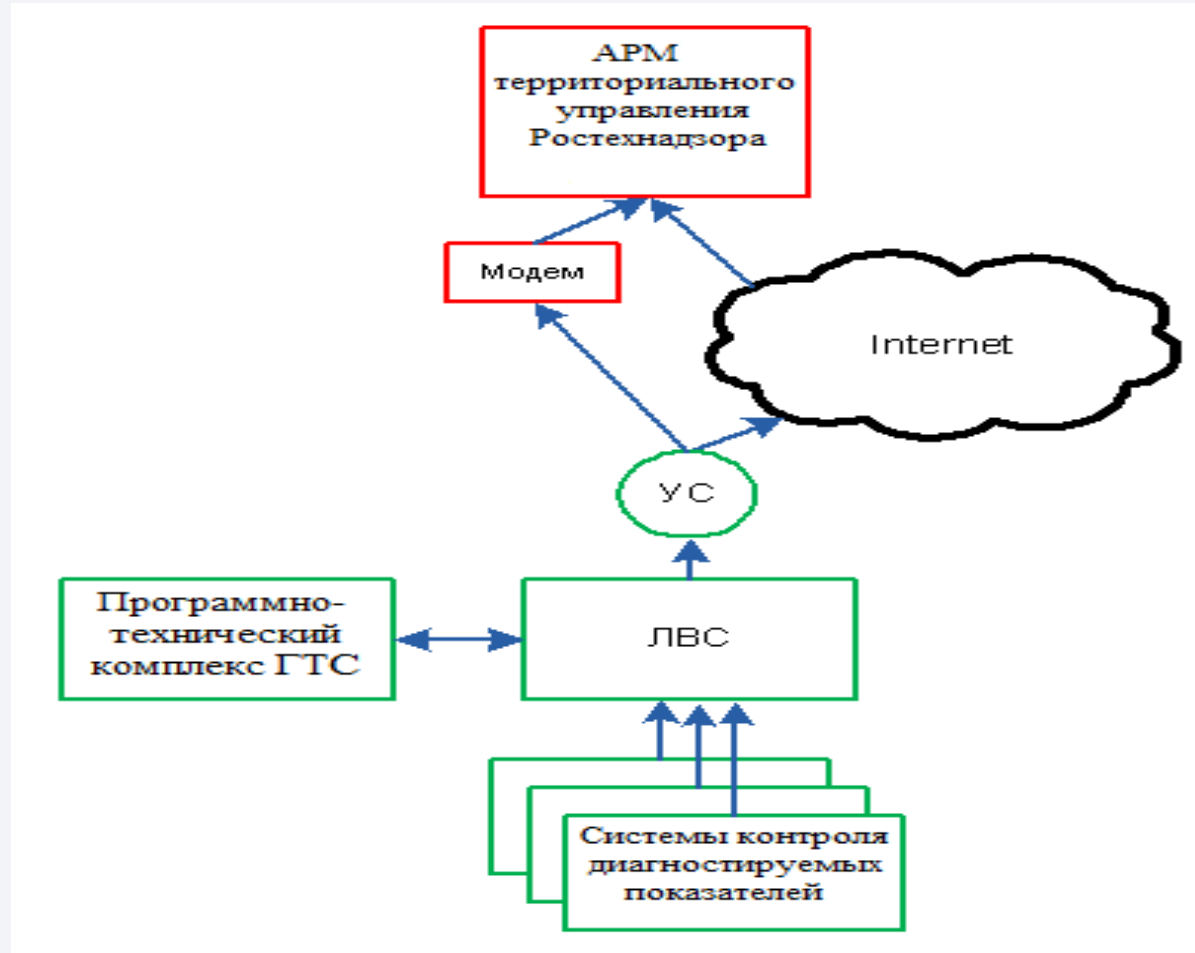
FBE SEC Energy Safety evaluates the capabilities of developing Rostekhnadzor's Complex Informational Support System and communication to automate the information supply process in the regime of permanent control of the technical state and safety of hydraulic engineering structures of the hydropower plant.

For the other power facilities, the capability of remote safety monitoring is still analyzed and assessed in terms of appropriateness of establishing remote monitoring.

# Proposal for System



FEDERAL BUDGETARY ENTERPRISE  
SCIENTIFIC AND ENGINEERING CENTRE  
ENERGY SAFETY



System of automated remote monitoring of hydraulic engineering structures

# Conclusions



FEDERAL BUDGETARY ENTERPRISE  
SCIENTIFIC AND ENGINEERING CENTRE  
ENERGY SAFETY

Federal state supervision in the field of electric power industry of the Russian Federation includes some experience of safety regulation of the electric power industry facilities.

The power industry facilities have been under state supervision for only 10 years now. Previously, they were under departmental supervision.

Hence, there are certain challenges in the area of regulatory control.

There is no licensing of activities performed in the electric power industry facilities.

International cooperation in power industry is not extensive enough, therefore there are no results of comparative analyses of regulatory activities in the BRICS countries.



It appears important to discuss and plan out activity within international cooperation of the BRICS association to share regulatory experience in the safety issues, investigation of blackouts in electric power industry, training of the staff who control and supervise the activities in electric power industry, including the activities of the system operator (real-time operations control).



Licensing is an important issue to be discussed. Is licensing in electric power industry necessary after all?

There are large facilities that are crucial for energy security of the country. Blackouts in such facilities are a threat to the population's vital functions. The large energy facilities may experience accidents with human victims, great losses and harm for the population and the environment. Is licensing capable of enhancing the safety of the facilities?



International cooperation under the current presidency of the Russian Federation in the BRICS association is important to share experience in the issues of:

- ❖ The role of the national regulator in the areas of energy efficiency and energy saving;
- ❖ How we perform our safety control and supervision at the consumer's power installations.

There is also a number of other important issues to be discussed for a mutual benefit of all the BRICS nations.





*Thank you for your  
attention!*

Inna Kaliberda, Ph.D., Deputy Director, FBE SEC Energy Safety  
Tel. +7(926)903 - 4735 [i.kaliberda@enerb.ru](mailto:i.kaliberda@enerb.ru)