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Policy of innovative development, energy conservation and increase of power efficiency of JSC "Russian Grids"

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I. General provisions.

The policy of innovative development, energy conservation and increase of power efficiency of JSC "Russian Grids" (hereinafter – the Policy) is an internal document of JSC "Russian Grids" (hereinafter also the Company) and defines a set of principles and rules of behaviour (actions) in the following lines of the Company's activity:

- innovative development;
- energy conservation and increase of power efficiency;
- ecology.

This Policy is based on the legislation of the Russian Federation in the field of innovative development, energy conservation and increase of power efficiency and preservation of the environment.

Observance of provisions and requirements of the given document is obligatory for the structural divisions of the Company participating in the following processes:

- realisation of innovative activity and coordination of innovative activity of its subsidiaries and dependent companies of JSC "Russian Grids" (hereinafter – SDC);
- increase of level of energy conservation and economy of power resources in the Company and SDC;
- ensuring minimisation of negative influence of the Company's activity and SDC on environment at realisation of the core industrial activity.

On the basis of the Policy's requirements target programs should be developed in the Company directed on achievement of target reference points of the Policy in sphere of innovative development, ecology, energy conservation and increase of power efficiency.

Development and acceptance of uniform standards of innovative development, energy conservation and increase of power efficiency for SDC Companies, ensuring approval of uniform standards of innovative development, energy conservation and increase of power efficiency in SDC Companies is realised by acceptance of necessary decisions by management bodies of SDC in which the Company has possibility to define decisions accepted by management bodies of SDC and having corresponding power, according to the legislation of the Russian Federation and constituent documents of SDC in an order defined by charters and internal documents of SDC.

In the future the Policy can become a reference point for development of other companies of the electric grid complex of the Russian Federation not entering in SDC Companies.

This Policy takes is placed on an official site of the Company and official sites of SDC of the Company (after its approval by management bodies of SDC as an internal document of SDC).

The bases for development.

Necessity of development and approval of this Policy, and also a number of provisions of the Policy are defined by the Strategy of development of the electric

grid complex of the Russian Federation confirmed by Order of the Government of the Russian Federation from 03.04.2013 # 511-r.

Besides, the objectives and tasks of the Policy, target vision and the basic directions of development of the electric grid complex are defined by the following documents:

1. Power strategy of Russia for the period till 2030, confirmed by Order of the Government of the Russian Federation from 13.11.2009 # 1715-r;
2. The Strategy of innovative development of the Russian Federation for the period till 2020, confirmed by Order of the Government of the Russian Federation from 08.12.2011 # 2227-r;
3. The Government program of the Russian Federation «Power efficiency and power industry development», confirmed by Order of the Government of the Russian Federation from 03.04.2013 # 512-r;
4. The Strategy of development of JSC "Russian Grids", confirmed by the Board of Directors of JSC "Russian Grids" (confirmed by the Board of Directors of JSC "Russian Grids" Minutes # 122 from 07.06.2013);
5. The Regulation of JSC "Russian Grids" about the uniform technical policy in the electric grid complex (confirmed by the Board of Directors of JSC "Russian Grids" Minutes # 138 from 23.10.2013).

Terms and definitions of the Policy are given in appendix 1.

II. The analysis of the current situation, key tendencies and prospects of their change.

The existing problems of the core activity in the electric grid complex according to the reporting data for 2013 and conclusions of the technological audit conducted by independent foreign advisers within the formation of the Strategy of development of JSC "Russian Grids" in 2013 are:

1. **essential losses in grids against foreign peers** – 9,65% as a whole for JSC "Russian Grids" for 2013 (for separate branches of SDC actual losses of electric energy make 25% and above), including:
   - in transmission grids – 4,28% against 3,5% in the comparable foreign electric grid companies;
   - in distribution grids – 8,26% against 7,5% in the comparable foreign electric grid companies.
2. **high share of the out-of-date equipment:**

in the transmission grids:

amount of the equipment with above permitted standard (more than 25 years) service life — for the equipment of substations (SS) and overhead power lines (Conductor): 56% and 61% accordingly;

in the distribution grids:

ampount of the equipment with above permitted standard (more than 25 years, for the Conductor - more than 35 years) service life - for the equipment SS and the Conductor: 61% and 42% accordingly;

3. **high specific operational expenses:** operational costs on the consumer by 40% above the peers through the whole chain of transmission and distribution of electric power;

4. **high specific capital expenditure:** almost 2 times above the countries with a similar climate;

5. **insufficient customer care:** insufficient volume of modern services for consumers;

6. **long restoration:** indicators of average duration of interruption of electrical energy 2 times above the average world level;

7. **high multidimensional requirements on ecology:** legislative requirements from the state to ecological development issues.

III. Target reference points.

Strategic target of the activity of JSC "Russian Grids" is long-term maintenance of reliable, qualitative and accessible power supply of consumers by organisation of as much as possible effective and corresponding to world standards grid infrastructure.

The basic priorities of the policy are:

– **for the electric transmission grid complex -** maintenance and development of the infrastructure, allowing to provide delivery of capacity of stations and transmission of electrical energy in distribution grids, and also maintenance of power integrity (safety) of the state;

– **for the electric distribution grid complex -** long-term maintenance of reliable, qualitative and accessible power supply of consumers at the expense of the organisation of as much as possible effective infrastructure.

Basic principles of the policy are reliability maintenance, increase of efficiency of the activity and security and safety of grids (ecological safety, information security (cybersafety), safety of the personnel) of the electric grid complex of JSC "Russian Grids".

The Policy realisation is directed on achievement of strategic targets of the Company and the set target indicators of efficiency:

– decrease in a degree of losses of electric power by transmission through JSC "Russian Grids" electrical grids by 2017 by 11% against the level of 2012.

– economy of power resources used for industrial-economic needs, not less than by 5**%** a year from the base value of 2012 until achievement by 2018 of average industry values characteristic for the similar foreign companies.

– increase of labour productivity with growth not less than 5% a year until achievement by 2018 of average industry values.

– increase at 2,5% annually till 2018 of a share of purchases of innovative products (works, services) including research and development, against the base value of 5% in 2013 in the general annual volume of purchases.

IV. Principles of realisation of the policy in the field of innovative development, ecology, energy conservation and power efficiency.

For the decision of the specified above problems the following uniform principles in the field of innovative development, ecology, energy conservation and power efficiency are defined:

1. **Purposefulness principle -** a sequence of accurate short-term and intermediate term objectives and priorities providing achievement of strategic targets.
2. **Principle of complex efficiency -** orientation to maintenance of improvement of economic, power, ecological and other indicators of efficiency – throughout all life cycle of facilities of the electric grid complex.
3. **Principle of orientation to practical realisation -** focus on implementation of new technologies, the best accessible nature protection practices and technologies, new expertise and competences, reengineering of business processes.
4. **Principle of customer care -** perfection of interfaces of interaction with users of the grid, maintenance of mutual trust, orientation to perfection existing and formation of new services for users of the grid – at the expense of own efforts and creation of conditions of development of new services on the party of customers and partners.
5. **Openness principle -** expansion of possibilities of interaction with external environment.
6. **Principle of technological leadership -** achievement of the advanced world and domestic level of technological development and ecological safety.
7. **Principle problem solution -** solution of existing and before unresolved issues in the electric grid complex, and also resolution of perspective problems.

V. The basic directions of development.

5.1. Provisions of the Policy in the field of innovative development.

5.1.1. **Basic documents.**

– Federal law from 23.08.1996 # 127-FZ «About science and the state scientific and technical policy»;

– Order of the Government of the Russian Federation from 08.12.2011 # 2227-r «About approval of the Strategy of innovative development of the Russian Federation»;

– Order of the Government of the Russian Federation from 29.05.2013 # 867-r about approval of the plan of measures ("road map") «Expansion of access of subjects of small and medium business to purchases of infrastructural monopolies and companies with the state participation».

5.1.2. **The analysis of the current situation, key tendencies and prospects of their change of the current situation.**

Experience of last years on realisation of innovative activity in SDC of JSC "Russian Grids" allowed to reveal the basic problems constraining possibilities on use of its potential:

1. **Insufficient development** of scientific and technological infrastructure for researches, developments and tests of new technologies;
2. **loss of some scientific reserves;**
3. **backlog on a number of directions** from the foreign peers;
4. **application of traditional methods of economic estimation of investment projects:** effects of decrease in expenses throughout all life cycle of a facility are not considered resulting in putting innovations in a category of inefficient projects in advance;
5. **insufficient synchronisation of innovative-technological development** of SDC of JSC "Russian Grids";
6. **conservatism of purchasing procedures:** complexities at contracting unique researches and developments and purchases of innovative production, services and works;
7. **practice of yearly financing:** complicates realisation of long-term projects, including complex pilot projects;
8. **absence of experience and regular practice of implementation** of innovative processes and equipment;
9. **insufficient level of automation of electrical grids** with a considerable share of "manual" management of electric grid facilities;
10. **absence of the high-grade industry environment for the innovative development** necessary for development and implementation of innovative technologies and solutions.

5.1.3. **The objectives and tasks in the field of innovative development.**

The purpose of innovative development is transition to the electrical grid of a new technological way with qualitatively new reliability characteristics, efficiency, availability, controllability and customer care and it is characterised by the following qualitative reference points:

- **complete installation of active elements in the grid** – the electrical grid as an active system with elements, capable to change parametres and characteristics of the elements themselves and the grid depending on its modes of operation;
- **multiagent approach to management of technological processes** – transition to a flexible adaptive control system providing distributed acceptance of administrative decisions and delivery of operating influences at dynamic formation of algorithms of management;
- **cluster approach to infrastructural modernisation of the electric power industry** – complex modernisation on the basis of a set of elements (all

kinds of generation, grids, loading), forming a complete group capable of independent functioning;

– **formation of new services** with high value added cost — creation of new services for users of the grid with high value added cost, for growth of appeal of the grid for external investors and consumers;

– **complex approach to the grid creation** — complex study of technological, organizational, social and institutional questions, taking into account interests of various subjects of the electric power industry.

The set target achievement is provided on the basis of the solution of the following problems:

– definition of priorities and criteria to choose innovations developed and implemented in interests of the company;

– maintenance of development and implementation of high technologies, creation of conditions for realisation of innovative projects;

– automation of facilities of electrical grids and elimination of "manual" management (transition to unstaffed assets);

– realisation of pilot projects and solutions, estimation of their efficiency;

– rolling out approved innovative projects and solutions in sphere of the core industrial activity;

– distribution of the advanced solutions throughout the entire electric grid complex and territorial grid organisations (TGO);

– creation of an effective system to manage innovative development;

– development of offers on perfection of necessary regulatory framework;

– maintenance of "the friendly interface» for users of the electrical grid;

– creation of conditions for development of innovative and scientific and engineering competences of experts by perfecting staff training programs.

5.1.4. **Priority directions of the policy in the field of innovative development of JSC "Russian Grids" are:**

Development of new technologies and solutions – activity in the field of creation of new kinds of materials, insulation, equipment participating in the core business processes of the company.

Use of unstaffed assets – equipment and materials demanding minimum financial and labour expenses for service during their life cycle.

Digitalization of managerial processes – transition from analogue to digital principle of management of relay automation and automatic protective devices, an automated control system of technological processes, electric power metering and communication systems.

Development multiagent systems – development of principles of interaction in control systems peer-to-peer between elements and systems of electrical grids.

Increase of activity and adaptability of electrical grids – development of properties of the grid for stability improvement to surges in the grid and automatic restoration of a normal operation mode.

Designing new and reengineering of existing business processes from the point of view of complex efficiency - management of industrial assets, management systems, client services, management of life cycle of systems, practice of lean production.

Continuous training of the personnel - implementation of actual for modern conditions technologies of management of human resources.

Perspective technologies in the framework of priority directions of innovative development are given in appendix 2.

5.1.5. **Spheres of innovative activity.**

Innovative activity is realised in the framework of the following basic fields of the Company's activity:

- **Organisation, planning and research and development realisation, management of intellectual property**;
- **Development and implementation of new technologies –** trial and pilot operation, acquisition, installation of new equipment, reconstruction and modernisation;
- **Perfection of business processes and management methods** – improvement of technologies of assets management, operational activity,
- **Interaction with clients and provision of services** – improvement of electric power quality, interaction with consumers of services, comfortable process of grid connection.
- **Management of human (personnel) resources** – training and improvement of experts aimed at development of innovative competences of the personnel of the Company.

5.1.6. **Management of intellectual property.**

Management of intellectual property is understood as the Company's activity on creation, effective utilisation (including possible commercialisation) and protection of intellectual property (IS).

Tasks of management of intellectual property are:

- creation of conditions for effective utilisation of IS in the core activity of the Company and SDC;
- maintenance of effective protection of the rights on IS of the Company and SDC;
- maintenance of effective mechanisms and procedures of commercialisation of IS items;
- increase of level of rationalisation and inventive culture of employees of the Company and SDC.

The basic sources of IS formation: results of research and development, software products and databases created in the framework of the activity of the Company and SDC.

Directions of development of an intellectual property management system in JSC "Russian Grids" and SDC are:

- creation of the information environment for accounting of intellectual property items;
- creation and maintenance of a protection system of intellectual property items;
- creation and management of a system of commercialisation of intellectual property items;
- creation of a vertical structure of intellectual property management;
- creation of a system of motivation of rationalisation and inventive activity of employees.

5.1.7. **The main subjects of the industry system of innovative development.**

Realisation of provisions of the policy demands maintenance of active and efficient management of a system of relations with participants of the process of realisation of innovative activity by means of formation of requirements, development of existing mechanisms and interaction practices:

with scientific and research, industry research organisations and higher educational institutions by means of:

- formation of functional requirements, realisation and examination of researches and developments and projects;
- information and personnel exchanges, mutual programs of improvement of professional skill of the personnel;
- creation and development of centres of competences and professional training in sphere of innovations;
- monitoring of high technologies, carrying out foresight, forecasts, seminars, conferences;
- support of formation and development of scientific and experimental base;
- participation in activity of Technological platforms (TP) and innovative territorial clusters (ITC).

with the industry expert centres, design establishments and professional communities by means of:

- examinations of innovative projects, strategic, conceptual and program documents of the Company and its SDC;
- preparations of feasibility reports under innovative projects;
- joint development of national standard legal certificates and industry standards;

– monitoring of high technologies, carrying out foresight, forecasts, seminars, conferences;

with technological companies of small and medium business by means of:

– managements of requirements and information exchanges;
– assistance in attraction of external resources of innovative activity, review and certification;
– realisation of researches and developments, purchases of innovative production and services;
– participation in the activity of TP and ITC.

with large suppliers of equipment and services and engineering companies by means of:

– formation of functional requirements, researches and developments realisation;
– formation/participation in alliances/consortia;
– participation in the activity of TP and ITC.

with institutes of development of the Russian Federation (Fund of Skolkovo, OJSC "Rusnano", Agency of strategic initiatives and others), venture funds and other structures of innovative infrastructure by means of:

– attraction of investments into own actions and projects of partners-subjects of the industry innovative ecosystem;
– information exchanges, monitoring of high technologies, seminars, conferences;
– participation in various forms of support of projects of institutes of development of the Russian Federation and other structures of innovative infrastructure;
– with consumers, subjects of generation and other subjects of the electric power industry of the Russian Federation by means of:
– formulation of requirements to infrastructure on the party of the consumer and other companies of the electric grid complex, to services;
– communication and other interaction with the industry organisations of subjects of the electric power industry;
– participation in the activity of TP and ITC.

with federal enforcement authorities by means of:

– participation in development/formation of offers on optimisation of regulatory framework of functioning of the electric grid complex and support of the industry innovative activity;
– attraction of investments into own actions and projects through participation in federal target programs;
– expert and analytical support of activity of regulators on issues connected with innovative development.

With a view of effective interaction with the specified subjects of innovative activity a function of the corporate centre of scientific and technical development should be realised, which should act as the driver of innovative development of the industry through carrying out of researches, developments, creation and testing of new technologies and solutions, including:

- carrying out of certified tests of new equipment;
- development of testing techniques, standards and specifications;
- researches and developments realisation through the specialised Fund of support of scientific and innovative activity for creation of new electric equipment and technologies with qualitatively new characteristics;
- carrying out of tests of the equipment developed in the framework of research and development;
- validation and verification of calculation techniques;
- carrying out of standard tests of the new equipment and upgrades;
- carrying out of periodic tests of a current line of the high-voltage equipment manufactured;
- carrying out of control tests of the equipment after failures, technological infringements;
- transfer of technologies directed on definition of perspective researches, having the maximum potential for the electric grid complex.

5.2. Provisions of the policy in the field of energy conservation and increase of power efficiency.

5.2.1. **Basic documents.**

- Federal law from 23.11.2009 # 261-FZ «About energy conservation and increase of power efficiency and about modification of separate acts of the Russian Federation»;
- Order of the Governmental of the Russian Federation from 15.05.2010 # 340 «About the procedure of establishment of requirements to programs in the field of energy conservation and increase of power efficiency of the organisations which conduct regulated types of activity»;
- GOST R ISO 50001-2012 «Systems of power management. Requirements and the application guide».

5.2.2. **The analysis of the current situation, key tendencies and prospects of their change of the current situation.**

The existing situation in the field of energy conservation and increase of power efficiency of the Company and SDC is characterised by the following facts:

- insufficient equipment with electric power metering devices at facilities of SDC. On the average for the Company the equipment share with

modern metering devices makes about 30% from the general requirement for metering devices;

- high consumption level of fuel and energy resources for economic needs and low efficiency of use of motor fuel;
- low economic efficiency of implemented activities: more than 70% of implemented activities do not pay off for term of life of an object of implementation;
- low automation of processes of collecting initial data on consumption of fuel and energy resources, planning and monitoring of execution of actions.

5.2.3. **The objectives and tasks of the policy in the field of energy conservation and increase of power efficiency.**

The purpose of the policy of JSC "Russian Grids" in the field of energy conservation and power efficiency increase is achievement of indicators of efficiency corresponding to average industry values, characteristic for the similar foreign companies, at the expense of increase of power efficiency of basic and auxiliary production processes of SDC of JSC "Russian Grids".

Achievement of the set target is realised on the basis of solution of the following tasks:

5.2.3.1. Decrease (optimisation) of consumption of power resources at all stages of realisation of industrial and economic activities, including:

- decrease in the technological expense of electric energy at its transmission and distribution;
- decrease in the expense of all kinds of the fuel and energy resources bought for the economic objectives used for operation of office and administrative - industrial buildings;
- decrease in the expense of motor fuel by motor transport and special vehicles;
- implementation and effective utilisation of renewable sources of power[1];
- carrying out of actions for optimisation of loading of the main electric grid equipment, adjusting load curves of consumers.

5.2.3.2. Development of a system to manage energy conservation, including:

- optimisation of existing and construction of new business processes in sphere of power efficiency, including with application of principles of power management and development of energy service activity;
- formation of a system of requirements and target reference points in the field of energy conservation;
- development of automated and smart systems of account of all kinds of fuel and energy resources and natural resources.

[1] In the case of non-contradiction to the current legislation of the Russian Federation.

5.2.3.3. Improvement of power efficiency through realisation of purchases, according to requirements of the technical policy of the Company. Studying and application of the advanced foreign and domestic experience on energy conservation, improvement of professional skills of personnel.

5.2.4. **Priority directions of the policy in the field of energy conservation and increase of power efficiency.**

5.2.4.1. **Working out and development of new technologies in sphere of power efficiency, application of modern technical solutions directed on increase of power efficiency.**

- Implementation of power saving equipment and modern technical solutions and technologies, including:
  - implementation of the equipment with high indicators of efficiency, including wires and cables with raised transmission capacity, transformers with the lowered losses in core and windings, power lines with application of high-temperature superconductivity;
  - implementation of flexible power lines created on the basis of converting engineering of a new generation, asynchronized systems with use of microprocessor systems of automatic control and regulation;
  - application of electric energy storage – devices, for partial or full division in time of processes of generation and current consumption of electric energy;
  - application of optical and electronic instrument transformers of current and voltage;
  - creation of full-automatic unstaffed substations, digital substations;
  - development of new design solutions, equipment, systems and methods of monitoring of power lines and transformer substations;
  - alignment of loading of phases in electrical grids up to 1 kV;
  - installation of transformers with balancer sets for 0,4-20 kV;
  - transfer to higher voltage rating of facilities of the electrical grid;
  - transfer of grids up to 1 kV to three-phase execution on all length and transfer of consumers to three-phase connection;
  - increase of performance of utility equipment at substations, including frequency regulators on engines of cooling transformers, waste-heat recovery of transformers for heating buildings;
  - reduction of duration of maintenance service and Conductors repair, including performance of work under voltage;
  - use of wires of Conductors with raised transmission capacity;
  - application of power equipment with the combined system of cooling M/D/DC;
  - creation of power clusters with use of intellectual technologies;
  - realisation of technical actions for maintenance of indicators of electric power quality in the framework of requirements of standard documents;

- Reduction of expense of fuel and energy resources for economic needs:
  - increase of thermal resistance of buildings and structures;
  - optimisation of modes of operation of systems of ventilation and air conditioning;
  - implementation of systems of automated or smart management of current collectors and heating systems;
  - application of power equipment of buildings corresponding to established indicators of power efficiency;
  - application of heat pumps for heating and hot water supply of buildings;
  - implementation of modern systems for automated management of lighting;
  - rationing of specific expenses of electric, thermal energy and natural resources used for economic needs of industrial facilities;
  - transfer of heating of buildings, structures and constructions from electricity to gas;
  - implementation of actions for rational use of water;
  - installation of automatic control systems of regulatory type for heating of buildings;
  - application of power saving lamps, installation of power saving lighting fixtures;
  - application of "light tubes» for replacement of electric lighting;
  - implementation of systems of recuperation of heat of ventilation.
- Performance of research, developmental and technological works, implementation and commercial use of their results, transfer of power efficient technologies (superconductivity, equipment on power electronics), including:
  - development of technical solutions on use of power efficient equipment at reconstruction and modernisation of electric grid facilities;
  - development and implementation of new power efficient equipment and technologies, including for smart grids;
  - implementation of devices and equipment, using the superconductivity phenomenon;
  - search and organisation of transfer of the most positive experience and technologies;
  - implementation of small generation and renewable generation (proceeding from economic efficiency) for replacement of used fuel and energy resources (solar batteries, heat pumps, soil heat exchangers, heat utilising systems, isolated heat-cold storage devices, etc.), including:
    - electricity supply of isolated areas or zones with high cost of connection to the unified electrical grid;
    - partial replacement of utility consumption of electric energy of substations and economic needs.

5.2.4.2. **Development and perfection of electric power metering systems:**

- Implementation of smart metering devices of the electric power, including:
  - realisation of programs of perspective development of electric power metering systems of SDC;
  - priority financing of realisation of programs of development of power resources accounting;
  - preparation of offers on perfection of the regulatory framework, stimulating electric grid companies, consumers on development of smart systems of power resources accounting;
  - creation of automated systems of formation of full and authentic data on volume of rendered services in transmission of electrical energy, including to residential customers who have no individual metering devices;
  - regulation of mutual relations of grid organisations with subjects of the wholesale and retail markets of electric energy (capacity) in sphere of commercial metering of electric energy;
  - regular control of conformity of actual and contractual mode of consumption of electric energy (capacity).
  - implementation in SDC of typical specialised software products in sphere of formation of volume of rendered services in transmission of electrical energy and balances of electric power in grid elements;
  - implementation of electric power demand response management systems.

5.2.4.3. **Development of energy service activity.**

For the purpose of attraction of extratariff sources of financing of actions in the field of energy conservation and increase of power efficiency and return of investments from received at implementation of actions effect projects should be realised on the basis of energy service contracts.

The increase in a share of energy service contracts used at realisation of programs of energy conservation and increase of power efficiency of SDC, and also increase in a share of such contracts which are carried out by dependent energy service companies of the Company for the companies, not belonging the Company, should be realised by perfection of contractual relations between economic entities, including:

- development of typical contracts, rules, regulations, typical schemes and models of organisation of energy service activity;
- entering necessary changes into regulatory framework;
- formation of uniform typical documents and techniques simplifying procedures of conclusion of energy service contracts.

5.2.4.4. **Optimisation of a business process management system.**

Perfection and organisation of a business process management system provides an essential gain of complex efficiency of the electric grid complex through the following directions:

- Perfection of business processes at transmission and distribution of electric power, including:
  - decrease of idling losses of transformer equipment;
  - replacement of overloaded, installation and commissioning of additional power transformers with lowered degree of losses;
  - reduction of duration of maintenance service and repair of power lines, including performance of work under voltage;
  - calculation of optimum installation sites and implementation of reactive power compensation devices;
- Control over observance by consumers of requirements to ratio of reactive and active power (tg φ). Perfection of operational and technological management, including:
  - optimisation of established modes in grids by voltage level and optimum loading of Conductors in distribution grids;
  - performance of measurement of values of electric power quality in control points and certified tests;
  - installation and commissioning of fault locators in electrical grids, optimisation of topology of electrical grids;
  - formation of balances of active and reactive power and electric energy for control of losses broken down by electrical distribution grids of the level of SDC, a branch of SDC, Distribution Zone, substations, separate feeding centres, and also feeders and power lines;
- Increase of efficiency of interaction with electric power consumers, including:
  - revealing non-metered and non-contracted consumption of electric energy;
  - use of various tariff menus of consumers taking into account a category of reliability of electricity supply;
  - development of measures of stimulation of consumers and grid companies applying reactive power compensation devices.
- Implementation till 2016 of a uniform system of power management in the entire group of companies "Russian Grids", including organisation and carrying out of internal audits of a power management system of the Company and SDC and its certification.
- carrying out of energy inspections for analysis of use of power resources, including:
  - carrying out of instrument check of the process equipment, industrial facilities, health estimation of metering points of consumed (transmitted, generated, supplied) fuel and energy resources, including analysis of use of fuel by motor transport and special vehicles;

- carrying out of organizational actions, collection and analysis of organizational and engineering specifications of facilities of SDC, generalisation and analysis of the given information;
- registration on the basis of results of energy inspection of a power certificate of SDC and organisation of examination of the power certificate in a self-regulating organisation.

- Management of requirements to bought production for application of modern power efficient equipment and technologies (taking into account requirements of government programs and regulatory legal acts in the field of power efficiency of the equipment), including:
  - formation of requirements to power efficiency of the bought equipment and production for needs of the Company (in the technical policy, the energy conservation program, technical requirements on purchase of new equipment);
  - formation of tender documentation on purchase of new equipment and work performance for new construction, reconstruction, re-equipment and modernisation.
- Perfection of organizational and standard-methodical base of management of energy conservation and increase of power efficiency, including:
  - development of organizational-administrative documents and regulations, on maintenance of rational use of power resources, rationing of indicators of energy conservation and power efficiency;
  - development of techniques of measurement of values of electric energy quality delivered (transmitted) through electrical grids of SDC;
  - formation of offers in the technical policy of the Company regarding indicators of power efficiency of the equipment, buildings and structures, transport;
  - development of organizational-administrative and methodical documents in the field of carrying out of spot-checks on revealing non-metered and non-contracted electric energy consumption with informing on ways of theft of electric power and methods of their revealing, identification of reserves of energy conservation;
  - development of regulating documents regarding creation of a system of rationing of specific expenses of fuel and energy resources for core industrial activities of SDC;
  - preparation of offers for regulatory legal acts on observance by consumers of ratio of active and reactive power and measures of stimulation of consumers and grid companies applying reactive power compensation devices.
- Reduction of the expense of fuel and lubrication materials by motor transport:
  - optimisation of transport routes and loading of vehicles and special equipment;

- toughening of control over consumption of fuel and lubrication materials; increase of transparency and check of reporting documentation on consumption of fuel and lubrication materials.
- application of means of control over the expense and remaining amount of motor fuel (calibration of tanks, use of fuel gauges);
- use of fuel cards for payment of motor fuel;
- implementation of systems of monitoring and geopositioning of motor transport, carrying over of responsibility for operational integrity of geopositioning gauges to drivers;
- carrying out of organizational and technical actions directed on increase of efficiency of engines (fuel additives, observance of interservice intervals, etc.);
- application of devices and systems reducing idle run of engines;
- gasoline and diesel fuel replacement by other kinds of motor fuel (liquified gas, etc.), use of electric vehicles.

- Development and realisation of awareness-raising measures in the field of energy conservation and increase of power efficiency, including:
  - conducting organizational and awareness-raising work with the personnel of the Company and SDC on realisation of energy conservation actions;
  - dissemination of the best and advanced practices of SDC in the field of decreasing electric power losses and expenses on utility and economic needs.
- Development and realisation according to the Personnel and Social Policy of a complex of actions in the field of human resource management, aimed at personnel maintenance of programs on energy conservation and power efficiency and creation of mechanisms motivating the personnel for effective performance of programs.

5.3. Provisions of the policy in the field of ecological development.

5.3.1. **Basic documents.**

- The Water Code of the Russian Federation from 03.06.2006 # 74-FZ;
- The Land Code of the Russian Federation from 25.10.2001 #136-FZ;
- The Forestry Code of the Russian Federation from 29.01.1997 # 22-FZ;
- The Town Planning Code of the Russian Federation from 29.12.2004 # 190-FZ;
- Federal law from 10.01.2002 #7-FZ «About preservation of the environment»;
- Federal law from 04.05.1999 #96-FZ «About ambient air protection»;
- Federal law from 24.06.98 #89-FZ «About production and consumption wastes»;
- Federal law from 21.02.92 #2395-1 «About mineral resources»;

– Federal law from 30.03.1995 # 52-FZ «About sanitary and epidemiologic well-being of the population».

– GOST R ISO 14001-2007 «Systems of ecological management. Requirements and the application guide».

5.3.2. **The analysis of the current situation, key tendencies and prospects of their change of the current situation.**

1. **Influence of power installations on fauna** – electric grid facilities are dangerous facilities regarding electric shock and a physical barrier at migration of birds.
2. **Electromagnetic and noise influence** – passage of Conductors and location of substations among inhabited structures.
3. **Polluting emissions of motor transport** – pollution of ambient air with emissions of motor transport running.
4. **Presence of hazardous industrial waste** – presence of the equipment containing trichlorodiphenyl, lead and its compounds.
5. **Deforestation under construction and operation of electric grid facilities** – use of land plots under electric grid facilities (ROWs in forestland, parks).
6. **Landscape pollution by electric grid facilities** – presence of facilities foreign to a natural landscape (presence of Conductors, outdoor switchgear, substations among housing estates and recreation areas of people).
7. **Conformity to requirements of the legislation of the Russian Federation** on ecology, the nature protection legislation.

5.3.3. **The objectives and tasks of ecological development.**

The purpose of ecological development is minimisation of negative influence of the electric grid complex on environment, rational use and reproduction of natural resources, plant and animal life protection.

Achievement of the set target is provided on the basis of solution of the following tasks:

- maintenance of ecological safety and rational wildlife management, prevention and liquidation of emergencies leading to negative ecological consequences;
- perfection of a nature protection activity management system, involving personnel in activity on reduction of ecological risks, improvement of indicators of influence on components of environment and maintenance of rational wildlife management;
- formation of ecological obligations taking into account prospects of development of the electric power industry, re-equipment, perfection of technological processes of transmission and distribution of electric power, realisation of actions for energy conservation;

– ensuring innovative development in sphere of maintenance of ecological safety and rational wildlife management with application of the best nature protection practices and the best available technologies.

5.3.4. **Priority directions of the policy in the field of ecology increase.**

5.3.4.1. **Application of ecologically "clean" technologies in electrical grids**, including:

– exclusion of polluting substances, used in electric equipment (oil, trichlorodiphenyl, lead), rationing of emissions, transfer of motor transport to gas, development of electric vehicles;
– observance of requirements of the legislation and standards on ecology. Certification on conformity to requirements of standards of series ISO 14000 and GOST R ISO 14000.

5.3.4.2. **Decrease in influence of the electric grid complex on fauna and flora**, including:

– application of innovative solutions (high-rise, composite poles, self supporting insulated conductors, packaging of substations);
– installation of antinoise screens in a residential area;
– exclusion of nesting of birds on Conductor poles, application of the Conductor with containment etc.;
– repair of drainage, water drains, installation of filters;
– scrap metal recycling (poles, package transformer substations, transformers);
– perfection of business processes on management of nature protection activity for the purpose of creation of a system of ecological management (SEM), as a part of the management system;
– organisation of a system of ecological audits.

5.3.4.3. **Reproduction of natural resources at construction and operation of electrical grids**, including:

– recreation of natural resources occupied under reconstruction and construction of electric grid facilities (planting of greenery of premises);
– land recultivation under electric grid facilities;
– actions for biological reproduction;
– participation in federal programs of reproduction of flora and fauna.

VI. Control over realisation of the policy and its actualisation.

6.1. Realisation of the policy in the field of innovative development.

6.1.1. Innovative activity in the Company is based on uniform methodology of innovative development which is directed on formation of a complex control system and consists of the following basic stages including all cycle of innovative development in the Company (from idea to commercialisation):

6.1.1.1. Search of solution of existing and perspective problems on the basis of benchmarking of technologies in the world, prioritization of offers in directions, definition of top-priority researches, including on the basis of:

- a system of analysis of existing actual problems and arrived offers for their solution;
- acquisition, transfer of necessary technologies (purchase of separate technologies, patents and other IS items);
- purchase of off-the-shelf technologies and solutions (acquisition in the market and implementation of technologies at third party companies).

6.1.1.2. Carrying out of own researches and developments (realisation of research engineering and development work), including:

- research and development planning, proceeding from financing limits, including with external financing attraction (development funds, participation in federal target programs);
- organisation of carrying out and examination of researches;
- registration of the rights to developments and management of intellectual property.

6.1.1.3. Carrying out of trial operation and realisation of pilot projects, including:

- efficiency estimation (including economic) of a pilot implementation;
- selection and substantiation of a facility for a pilot implementation;
- tests, certification of equipment.

6.1.1.4. Scaling and roll out implementation, including:

- selection of places of implementation with the greatest economic benefit;
- planning of the investment program, external financing attraction (development funds, federal target programs), participation in purchasing activity;
- planning of production programs.

Actions for scaling and implementation are realised through formation of scenary conditions, methodology of implementation, setting up and control over KPE.

6.1.2. The mechanism of realisation of the Policy in sphere of innovative activity is the Program of innovative development of JSC "Russian Grids" (hereinafter – the Program), which is formed for a 5 year period and should include:

- actions for innovative development;

- indicators of efficiency reflecting realisation of the objectives and tasks of this Policy;
- data about resources and terms of realisation of innovative projects;
- a short-range plan of realisation of the Program.

Part of the Program of innovative development is the research and development Program.

Depending on degree of importance the Program actions are assigned with the following status:

- **strategic initiatives** – provide planning at the level of JSC "Russian Grids", coordination and control from the Company of actions of SDC for development and-or integration and test of concrete innovative solutions having key meaning for realisation of top-priority directions of this Policy;
- **local actions** – own actions of SDC for development and implementation of new equipment and the best practices aimed to solve own tasks of SDC.

The Program is updated on a regular basis at change of essential conditions in the field of innovative development (change of financial plans, priorities of this Policy, KPE, regulatory documents, etc.)

The Program of innovative development is approved by the Company's Board of Directors, a report on its realisation is annually prepared to be sent to federal executive authorities (Ministry of Energy, Ministry of Economic Development, Ministry of Education of Russia).

6.2. Realisation of the policy in the field of energy conservation and increase of power efficiency.

6.2.1. Process of energy conservation and power efficiency increase consists in formation of a complex management system which is based on a uniform methodology (requirements, regulations, standards), based also on GOST R ISO 50001, consists of the following key stages:

6.2.1.1. The analysis of a range of problems, "bottlenecks" in electrical grids from the point of view of power resources consumption, including on a basis of:

- carrying out of energy inspections;
- formation of accurate balances of electric power;
- monitoring and benchmarking of technologies, advanced practices in the world.

6.2.1.2. Formation and realisation of programs for reliable electric power metering data as a basis for the program on energy conservation and increases of power efficiency, including:

- perfection of existing metering systems;
- automation of collection of indicators of electric power consumption;
- maintenance of an information exchange with participants of the market.

6.2.1.3. Formation and realisation of programs on energy conservation and power efficiency increase, including:

- decrease in losses of electric power at transmission and distribution;
- decrease in consumption for utility needs;
- decrease in expenses for other fuel and energy resources.

6.2.2. The mechanism of realisation of the Policy in the field of energy conservation and power efficiency increase is the merge Program of energy conservation and increase of power efficiency of the Company.

The energy conservation Program is formed at levels of SDC and the Company as a whole for a 5 year period with annual actualisation and should also include an objective list of actions of branches of SDC in the field of energy conservation and increase of power efficiency providing achievement of set target indicators.

Programs of energy conservation of SDC should include:

- a list of actions, the main effect from implementation of which, is energy conservation and increase of power efficiency with substantiation in technical necessity and economic efficiency;
- dynamics of change of volumes of consumption of fuel and energy resources taking into account actions planned to realisation;
- values of target indicators of the Company, SDC and branches of SDC for a 5 year period for all kinds of consumed fuel and energy resources taking into account actions planned to realisation;
- an objective list of actions of branches of SDC in the field of energy conservation and increase of the power efficiency providing achievement of set target indicators.

The main principle of formation of Programs of energy conservation is the principle of technical and economic efficiency of implemented actions which provide for achievement of target indicators, both by decrease in consumption of power resources, and by economic criteria, providing payback of actions throughout life cycle.

6.3. Realisation of the policy in the field of increase of ecological activity.

The mechanism of realisation of the Policy to increase ecological activity is the uniform Program of ecological development of the Company (hereinafter — the Program).

The Program of ecological development is formed at levels of a branch of SDC, SDC and the Company as a whole. Programs should be formed for a 5 year period with annual actualisation and should include:

- a list of actions, the main effect from implementation of which is increase of the Company’s ecological activity. The Program actions should be justified regarding technical necessity and effect, including economic efficiency;

- a system of target indicators of efficiency and indicators of ecological activity;
- dynamics of change of target indicators of efficiency taking into account actions planned to realisation.
- values of target indicators of the Company, SDC and branches of SDC for a 5 year period. The set target values should be based on results of the analysis of the current level of ecology, be achievable and meet the requirements of the legislation and regulatory legal acts in the field of ecology.
- an objective list of actions of branches of SDC to increase ecological compatibility, providing achievement of set target indicators.

6.4. Target management system and control over realisation of the Policy of innovative development, energy conservation and increase of power efficiency of JSC "Russian Grids".

For maintenance of realisation of this Policy it is necessary to develop a management system:

- creation and organisation of functioning of coordination and executive structures both carrying out and providing management and realisation of the policy;
- creation of effective tools of stimulation of activity and dissemination of provisions of the Policy at all levels of management and in all fields of the Company's activity.

At the Company's level in the framework of realisation of provisions of the Policy the following functions (table 1) should be realised:

Table 1. The structure of participants of realisation of the Policy in the Company.

Structure of participants of process of realisation of innovative activity in the Company	Realised functions in the Company
Board of Directors	Approval of strategic documents (strategy, functional policies), programs of innovative development, ecology, energy conservation and increase of power efficiency of the Company, and also control over their realisation.
Management Board	Approval of strategic documents (strategy, functional policies), programs of innovative development, ecology, energy conservation and increase of power efficiency of the Company and their presentation to the Board of Directors for approval.
General Director	Approval of orders, regulations, local statutory acts and other internal documents of the Company, instructions for realisation of the Policy and programs.
Specialized committees at the Board of Directors: • of investment, technical policy, reliability, power efficiency and innovation	Representation of recommendations to the Board of Directors of the Company concerning innovative activity, ecology, energy conservation and power efficiency increase.

Structure of participants of process of realisation of innovative activity in the Company	Realised functions in the Company
• strategy	
Supervising First Deputy of General Director	High-level definition of objectives, management and control over innovative activity, ecology, energy conservation and power efficiency increase. Organisation of development and coordination of program and strategic documents, formulation of problems of industrial activity and technological priorities. Responsible for the organisation of realisation of the Policy in the Company.
Department supervising questions of the Policy	Development and organisation of approval of programs of innovation, ecology, energy conservation and power efficiency increase, control over their realisation, formation of reports, development of typical regulatory and organizational-administrative documents. Operational administration, control, organisation and coordination of actions for the programs.
An expert organisation	An organisation involved in methodical work, examination and delivery of recommendations concerning innovative development, energy conservation and increase of power efficiency, ecology.
Scientific and technical council	Examination and development of recommendations for management bodies on strategic, conceptual and program documents, pilot projects, priorities and other questions of scientific and technical development, development of requirements.
Technical council	Acceptance of technical solutions on designing, maintenance, diagnostics, repair and operation of electric grid facilities, equipment and systems.

At level of SDC in the framework of the Policy implementation the following functions (table 2) should be realised:

Table 2. The description of the structure of participants in the course of the Policy realisation in SDC of JSC "Russian Grids"

Subjects participating in realisation of innovative activity in SDC	Realised functions in SDC
Board of Directors	Approval of functional policies, programs of innovative development, ecology, energy conservation and increase of power efficiency of SDC, and also control over their realisation.
Management Board	Approval of functional policies, programs of innovative development, ecology, energy conservation and increase of power efficiency of SDC and their presentation to the Board of Directors for approval.
General Director	Approval of orders, regulations, local statutory acts and other internal documents of SDC, instructions for realisation of the Policy and programs.
Supervising Deputy General Director	Planning, management and control over realisation of actions of SDC on innovative activity, ecology, energy conservation and power efficiency increase. Responsible for the organisation of realisation of the Policy in SDC.
Department (departments) supervising questions of the Policy in SDC	Development of plans and documents concerning innovative activity, ecology, energy conservation and increase of power efficiency in SDC, reports on their realisation, regulatory and organizational-administrative documents in SDC, operational administration and control of innovative activity. Organisation of interaction with functional divisions.
Technical councils (if any)	Examination and delivery of recommendations concerning realisation of the technical and operational policy

Principles and lines of the Company's activity and its SDC concerning technical, economic, personnel development, maintenance of complex and ecological safety are defined in separate policies of the Company:

- technical, including on formation of the interconnected technical requirements on the most progressive technical solutions, restrictions and application of those or other technical solutions, implementation of equipment and technologies directed on increase of a technological level of processes of transmission, transformation and distribution of electric power, managerial processes, operation and development of the electric grid complex of the Company;
- economic, including in directions of tariff regulation, business planning, accounting of non-material assets, control and audit;
- investment, including in directions of territorial development and planning, formation of the general scheme of placing, investment planning, realisation of investment programs and projects, pricing;

- personnel and social, including on management and training of personnel, social development;
- maintenance of complex safety and corruption counteraction, including in directions of maintenance complex and information security.

6.5. Management of risks of the Policy of innovative development, energy conservation and increase of power efficiency of JSC "Russian Grids".

Sections of the policy refer to high risk spheres of the Company's activity, especially regarding realisation of innovative activity — breakthrough innovations, therefore special attention is required towards a managerial process of risks.

The structure of management of risks of the policy is given in table 3.

Table 3. Management of risks of the Policy

Group of risks	Risk description	Management tools
Technical	1. Development of existing, not competitive solutions. 2. Choice of inefficient solutions and technologies for implementation. 3. Delays of implementation of the solution because of excessively difficult equipment or technology. 4. Technological infringements at misoperation of the innovative equipment. 5. Ecological emergency situations connected with non-observance of operating procedures for equipment or assets. 6. Ecological emergency situations connected with excess of a standard term of operation of equipment or assets.	• forecasting including with use of tools of forsight-researches, benchmakring (1, 2); • accent on advanced solutions based on new physical principles (1, 2); • maintenance of wide industry and out-of-the-industry cooperation (1, 2, 3); • management of requirements taking into account life cycle of innovations (1, 2, 3); • monitoring of technologies, search of analogues of the equipment or technology (1, 2, 3); • organisation of expert support of innovative activity, stimulation of display of innovative activity (3, 4); • professionalization of activity – activity distribution between various subjects of an innovative process possessing unique or critical competences (1, 2, 3, 4, 5); • replacement of out-of-date assets and equipment by modern samples, formation of requirements to purchasing, investment and operational activity taking into account provisions of this Policy (4, 5, 6).
Economic	1. Absence of demand from the market for the developed products and services. 2. Risk of high price of received solutions, shortages of resources on realisation of projects. 3. Failure of "pilot" projects of development and implementation of new technologies, not tested techniques, complexities with use of new equipment. 4. Incorrect estimations of cost and terms of actions. 5. Illegal use of intellectual property of the Company, loss of benefit from its commercialisation. 6. Reduction of volumes of the investment program.	• forecasting including with use of tools of forsight-researches, focus on the advanced solutions, benchmarking (1, 2); • dialogue with consumers, market monitoring (1, 2); • management of requirements, taking into account life cycle of facilities and equipment (4); • maintenance of wide industry and out-of-the-industry cooperation (1, 2); • diversification of innovative activity – investment in various or replacing solutions (1, 3); • complex estimation of investment and not investment risks of realisation of innovative activity (2, 4, 6); • protection of intellectual property and commercialisation of innovations in Russia and abroad (5); • distribution of risks between participants or risk insurance (3, 6); • use of extratariff sources of financing, including energy service contracts (6).

Organizational	1. Change of regulatory framework in sphere of realisation of provisions of the Policy. 2. Overloaded work of members of teams of key projects. 3. Absence of required human and material resources and assets (including owing to their absence in Russia). 4. Discrepancy to requirements of the Policy of a current qualifying profile of employees. 5. Resynchronization between SDC or between the Company and SDC in innovative activity, activity in sphere of energy conservation and power efficiency, ecology. 6. Insufficient coherence with adjacent fields of activity (investment, purchasing and operational). 7. Absence of an exchange of experience on realisation of projects inside SDC of the Company. 8. Low level of observability and monitoring of realised projects.	• participation in formation of regulatory framework (1), including: – formation of offers for federal bodies of legislative and executive power; – formation of offers for regional executive authorities. • maintenance of wide industry and out-of-the-industry cooperation (5, 6, 7, 8); • distribution of risks between participants or risk insurance; • organisation of expert support (2); • stimulation of display of innovative activity (3, 4); • support of development of domestic knowledge, competences, manufactures and infrastructure (3); • personnel training with demanded competences, creation and development of centres of competence and professional training in sphere of innovations, basic chairs, etc. (4); • development of a system of interaction with counterparts, including developers and suppliers (5, 6); • modification of local statutory acts and organizational-administrative documents (1); • regular monitoring of activity, including regarding arising problems (6, 7, 8); • carrying out of awareness-raising events, publishing of literature, information resources for the personnel and partners (4); • search, analysis and distribution of the best practices, organisation of team actions for an exchange of experience, analysis of problems and planning of activity with participation of employees of the Company and SDC (7); • implementation of automated systems of projects monitoring (8).

6.6. **Updating (actualisation) of the Policy** is carried out as required, but at least once in five years under a decision of the Board of Directors of the Company.

The basis for preschedule updating (actualisation) of the Policy is:

– essential change of external factors and the general context of realisation of the Policy and the Company's activity as a whole, including:

- adoption of new statutory acts, national strategy or other documents of national importance in the power industry and the electric grid complex;
- essential change of rates or characteristic of development of domestic economy;
- occurrence of new technologies, essentially changing conditions and possibilities of realisation of this Policy.

– essential change of internal conditions of realisation of the Policy, including preschedule achievement of target values established in this Policy.

VII. Appendix 1. Terms and definitions.

7.1. Terms and definitions in the field of innovative development.

Innovative activity — a complex of scientific, technological, organizational, financial and commercial actions directed on realisation of innovative projects, and also on creation of innovative infrastructure and its maintenance.

An innovative project — a complex of actions limited on time and resources, directed to receive an innovation, its pilot approbation, implementation, commercialisation of scientific and (or) scientific and technical results.

Innovation – the end result of the innovative activity which has received an embodiment in the form of a new or advanced product (merchandise, work, service), a production process, a new marketing method or an organizational method under the activity, organisation of workplaces or in external relations.

Intellectual property (IS) — results of intellectual activity and means of individualization of legal entities, products, works, services and enterprises equal to them, which have the right protection. **Items of intellectual property** are: inventions, useful models, industrial samples, know-how, programs for electronic computers (software), databases, company names, trade marks and service marks, commercial designations.

Smart power system – a customer centric electric power system of a new generation based on a multiagent principle of management of its functioning and development, the creation of which is directed on maintenance of an effective utilisation of all kinds of resources for reliable, qualitative and effective power supply of consumers of energy at the expense of flexible interaction of its subjects (generation, electrical grids and consumers) on the basis of modern technological means and a unified smart control system.

A pilot project — a project the structure of which provides for application of innovative technical solutions (new engineering, control systems, protection and diagnostics etc.) for the purpose of their approbation and testing.

The Program of innovative development — a corporate program document of top level defining target indicators, directions of innovative activity, key innovative projects and providing actions, necessary resources.

Management of life cycle – new approaches to analysis of efficiency, selection, development and implementation of investment, innovative solutions and equipment, based on the account of total cost of ownership of a facility at all stages: designing, development (manufacture), operation, utilization (decommissioning).

A complex industry system of innovative development – co-ordinated organised environment and a system of relations of subjects of innovative activity, on a regular basis co-operating with the Company and with each other with a view of realisation and achievement of innovative priorities of the electric grid complex, including sharing of resources and risks of innovative activity.

7.2. Terms and definitions in the field of energy conservation and increase of power efficiency.

The fuel and energy resource – an energy carrier, the energy of which is used or can be used at realisation of economic and other activity of the Company. Fuel and energy resources used at facilities of the Company refer to: electric energy, thermal energy, natural gas, coal, oil products, including gasoline, diesel fuel, black oil, kerosene.

Industrial-economic needs – consumption of thermal energy, electric energy, motor (diesel, petrol) and other fuel, natural gas, black oil, coal, water of drinking and technical quality.

Energy conservation – realisation of organizational, legal, scientific, technical, technological, economic and other measures directed on reduction of volume of used energy resources at preservation of corresponding useful effect from their use (including volume of made production, performance of work, rendered services).

Power efficiency – characteristics reflecting the relation of effect from use of power resources to consumption of power resources, made with a view of receipt of such effect, with reference to production, a technological process, a legal entity, an individual businessperson.

The Program in the field of energy conservation and increase of power efficiency (the Energy Conservation Program) – a document defining recommendations, concrete actions, volume and terms of their performance on energy conservation and increase of power efficiency, directed on achievement of indicators of energy conservation for a certain period, and also responsible officers.

A system of power management – a set of interconnected or co-operating elements used for development and implementation of the power policy and power objectives, and also processes and procedures for achievement of these objectives

A power certificate – a document made by results of energy inspection and containing the information on equipment with metering devices of used power resources, on volume of used power resources, on size of losses of transmitted power resources, on energy conservation potential, including on an estimation of possible economy of power resources, on a list of typical actions for energy conservation and increase of power efficiency.

7.3. Terms and definitions in the field of ecological development.

The Program of ecological development – a complex document describing concrete actions for organisation and performance of nature protection activity in the company, directed on achievement of ecological objectives and tasks, with indication of terms of performance of the main actions, financial parametres of actions, projected executors.

Ecological management – the Company's activity directed on formation and realisation of the ecological policy and management of ecological aspects of activity of the company in the framework of the general system of administration management.

Appendix 2. Perspective technologies in the framework of priority directions of innovative development.

	Directions	**Technologies**
1	New technologies and solutions	1. In the field of creation of equipment and technologies on the basis of high-temperature superconductivity: – current-limiting circuit breaker of 35-220 kV – power transformers of 10-220 kV – AC cable lines of 20-220 kV, including cryostatting systems, cables, connecting muffs, current leads – DC cable lines of 3-110 kV, including cryostatting systems, cables, connecting muffs, current leads, converters 2. In the field of creation of electric grid storage devices of electric power of big capacity: – storage batteries with big power capacity (NAS, Li-Ion, supercapacitors) 3. In the field of creation of equipment and technologies of protection of electrical grids from external climatic influences: – icing monitoring systems, prevention of icing and wind caused failures and overload of Conductors for electricity transmission – instruments for fault location of polymeric insulators on 110-750 kV Conductors – heavy-duty composite aluminium conductors with raised mechanical and electroconductive characteristics – wires with anti-icing covering on metal surface (including with nanotehnology application) 4. In the field of creation of relay protection, automation and control systems: – integrated systems of monitoring of transient state in real time – ultrafast digital protection of autotransformers – software-technical complex of a model of power grid to calculate steady conditions and transients for Relay Protection and Automatic Equipment and managements of modes 5. In the field of creation of power efficient equipment for reliability and safety of functioning: – short-circuit current limitation devices of 35-500 kV on the basis of semi-conductor devices and mechanical tripping devices – wires with improved electroconductive characteristics, self-supporting insulated wires (SIW) – phase shifters of 220-500 kV – gas-filled power lines of 220-500 kV with load-centre substations in megacities – Secondary Distribution Switchgear, SF6 insulated of 110 - 220 kV outdoor installation with vacuum-operated

		switches – explosion-proof oil-immersed equipment of 6-220 kV – equipment for 0.95 kV grids – reclosers of 6-20 kV
2	Unstaffed assets	– technologies of all-around automation of substations – technologies of diagnostics of an energised facility – technologies without medium maintenance and overhaul for a whole life cycle – application of unstaffed equipment for a whole life cycle (transformers in distribution grids, poles, wires)
3	Digitalisation of managerial processes	– digital substations on the basis of Secondary Distribution Switchgear, SF6 insulated with digital interface; – optical digital current and voltage transformers, Relay Protection and Automatic Equipment and automatic process control system with digital interfaces – Systems of monitoring and diagnostics of the power equipment with digital interfaces – Phasor Measurement Units (PMU) with WACS/WAPS implementation – integrated systems of relay protection and automation on the basis of vector and hypervector measurements (WAPS) – technologies of analogue-digital transducers
4	Multiagent systems	– reference architecture and a test centre of smart grid (development, check and adjusting of solutions on elements, complexes, parts of an electric power system and an electric power system as a whole of new models of management with application of multiagent control systems) – complex solutions for power clusters of smart grid – decentralised control systems, active devices and equipment with possibility of change of electric characteristics of elements and grid topology at change of circuit-operation mode characteristics of the electrical grid – integration and management of distributed generation, creation and integration of a virtual power plant – peer-to-peer control systems between elements and systems of electrical grids
5	Activity and adaptability of	– adaptive devices for change of electric parametres of the grid, including: - series compensators

	electrical grids	- technologies of "flexible" power lines (FACTS) - static (thyristor-controlled) compensators - phase shifters - operated shunt reactors - reactive power compensation devices of a new type – logic automation, Relay Protection and Automatic Equipment with self-regulated set point – technologies of self-healing of elements of the grid after technological failures – a digital online grid model
6	System engineering of business processes	– control systems (CAD, ERP, automated management system for maintenance and repair, automatic process control system, project management system, etc.) – intellectual property management systems – management systems (energy, ecological, innovative management, etc.) – client services, DMS/OMS
7	Continuous staff traning	– look-ahead staff training – new subjects in higher educational institutions for new solutions and technologies – creation of training centres and test facilities – innovative competitions, seminars, conferences