

1. polycrystalline - 52.9%
2. monocrystalline - 33.2%
3. amorphous and the like - 13.9%

So polycrystalline solar panels in terms of production occupy a leading position in the world.

INTELLECTUAL POWER SYSTEM WITH ACTIVE-ADAPTIVE NETWORK

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The power grid complex in the Russian Federation mainly develops by traditional principles today. The power grid complex should go to innovative way of development, otherwise, in the future it will not be able to meet the necessary requirements. It is a prerequisite for the formation of the concept of Intellectual power system with active-adaptive network (IPS AAN). Its creation is linked with the development of the following technologies:

- Flexible Alternative Current Transmission Systems (FACTS)
- Overhead line and DC link based on modern converter devices with microprocessor control
- Wide Area Measurement Systems (WAMS) - checking the parameters of the electric network mode online, with using modern technical equipment of processing and transmitting information.
- High-speed communication
- Microprocessor technology for information processing and equipment control

For the IPS AAN with the necessary properties, in the near future requires the development of innovative technology platform, which includes the following main directions:

- modern equipment with improved economic and environmental characteristics
- automatic control systems in pre-emergency and normal modes
- possibility of connection with new automatic systems, which using renewable, recycled and alternative energy sources
- New information resources and technologies to assess situation and take quick and correct decisions
- Competent scientific, design and educational foundations
- These directions are based on the following technologies:
- Fault current limiters (switching, superconducting, or semiconducting)
- The energy storage devices of different types and applications
- Devices based on high-temperature superconductivity
- Self-diagnosis system of equipment "on-line" mode

- Optical measurement systems and digital substations, based on its
- Modern systems of relay protection, emergency and security management;
- Multi-chamber insulator arrester
- Frequency-dependent resistors to limit the high-frequency switching and lightning surges
- Software and information management systems

Intellectual power system with active-adaptive network it is a grid of new generation, based on the principle of multipurpose management of its work and development. The goal of the IPS AAN is the rational using all types of resources (natural, social, industrial, human) for reliable, qualitative and effective electricity supply of consumers.

THE MAIN PROBLEMS OF POWER ENGINEERING AND POSSIBLE SOLUTION

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Nowadays, electricity is playing a huge part in our life. Today, humanity cannot do anything without such an amazing achievement: neither to cook, nor to rest, etc. But it is not so simple with electricity, is not it? Electricity consumption is increasing every day and every hour. Moreover, it follows that energy problems only grow daily.

The first problem that stands out is connected with the exhaustibility of raw materials for electricity generation, and in fact today about 80% of electrical energy is generated from such resources. Also, this problem is complicated by the fact that raw materials for energy are distributed unevenly [1].

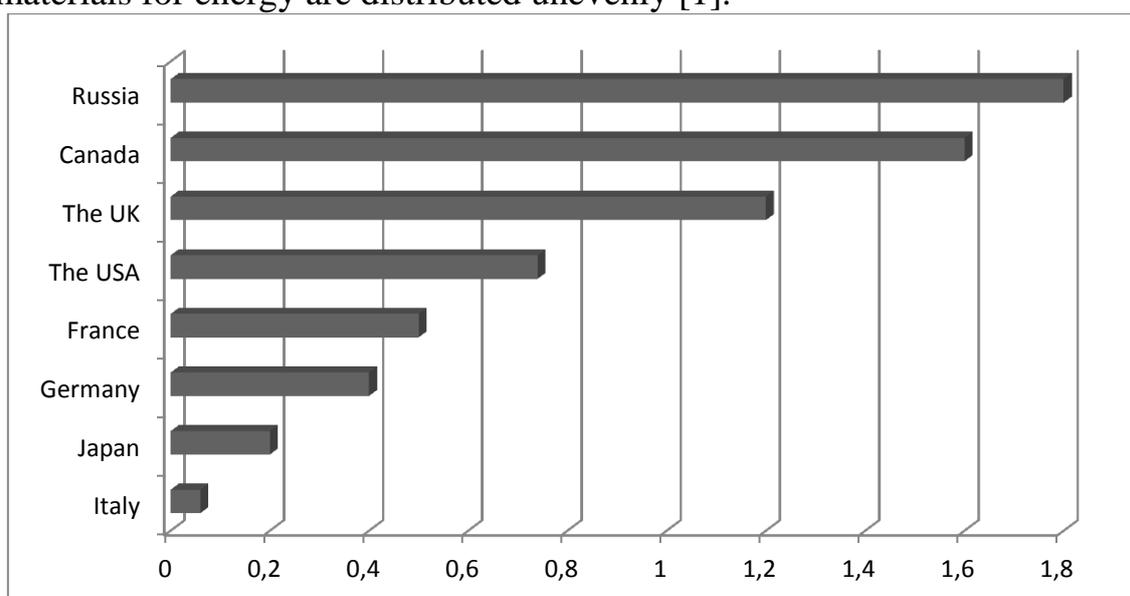


Fig. 1. Energy supply of the countries of the G-7 and Russian Federation (the ratio between the capacity of energy resources to the amount of their consumption)