

**PRESENTATION BY MR. TAHIR JAFAROV,  
CHIEF POWER ENGINEER OF THE STATE AGENCY FOR  
ALTERNATIVE AND RENEWABLE ENERGY SOURCES OF THE  
REPUBLIC OF AZERBAIJAN, AT THE CONCLUDING MEETING OF  
THE 21st OSCE ECONOMIC AND ENVIRONMENTAL FORUM**

Prague, 11 to 13 September 2013

**Increasing stability and security: Improving the environmental footprint of  
energy-related activities in the OSCE region**

**Session II: Strengthening policy and regulatory frameworks and fostering international  
co-operation to promote renewable energy and energy efficiency**

Slide 1

Reducing the environmental impact in the energy sector

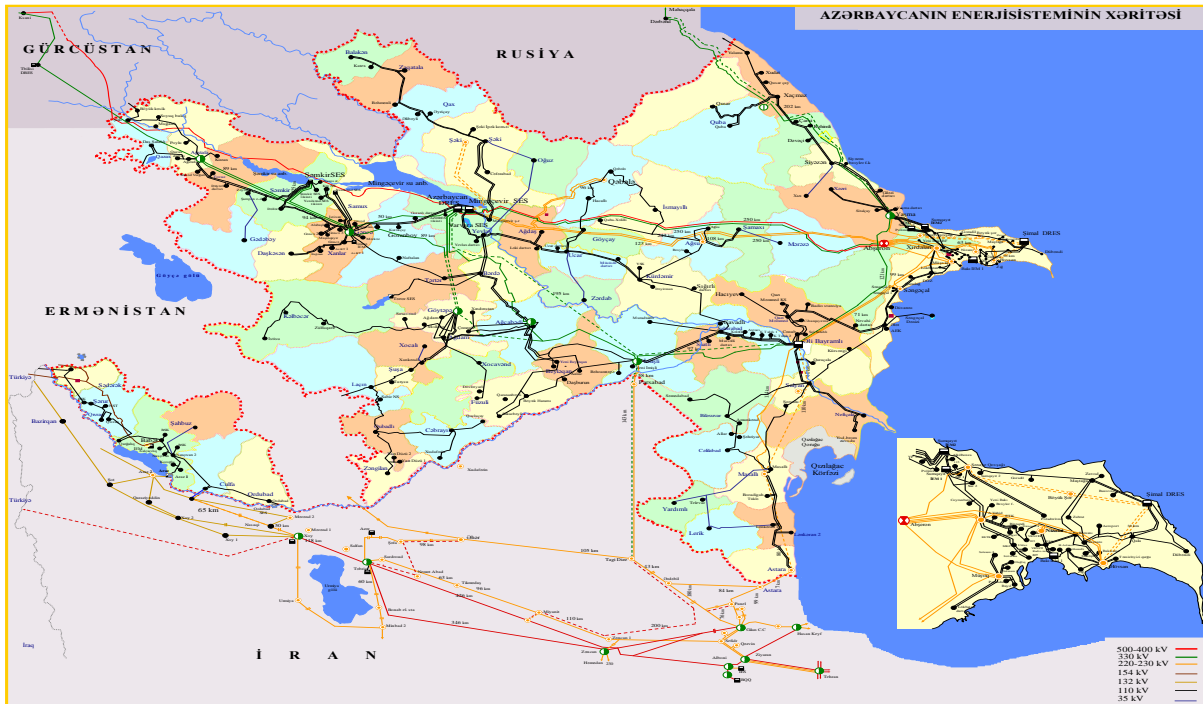
Slide 2

Current situation in Azerbaijan's energy industry:

- Installed generating capacity of the national power supply system:
  - By 2001 it was 5,181 megawatts;
  - By 2012 it had reached 7,198 megawatts;
  - By 2020 it is scheduled to reach 8,000 megawatts.
- Over the last ten years, the generating capacity of Azerbaijan's energy system has grown by 40 per cent.

Slide 3

Map of the energy system of the Republic of Azerbaijan



Slide 4

Construction of new power plants and renovation of existing ones:

- New gas turbine power plants have been commissioned in recent years:
  - Sumgait power plant with a capacity of 525 megawatts;
  - Shimal thermoelectric power plant with a capacity of 400 megawatts;
  - Dzhanub thermoelectric power plant with a capacity of 780 megawatts;
  - Baku thermoelectric power plant with a capacity of 106 megawatts;
  - Seven modular power plants with a total capacity of 850 megawatts;
- Four generating units have been replaced with new ones at the Mingchevir hydroelectric power plant;
- Generating units one to eight have been modernized at the Azerbaijan thermoelectric power plant with a capacity of 2,400 megawatts.



No.	Name of power plant	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
18.	Fizuli hydroelectric power plant													25
<b>Total</b>		<b>5,021.4</b>	<b>5,074.7</b>	<b>5,054.7</b>	<b>5,054.7</b>	<b>5,054.7</b>	<b>5,054.7</b>	<b>5,315.7</b>	<b>5,420.1</b>	<b>5,570.1</b>	<b>6,199.5</b>	<b>6,199.5</b>	<b>6,199.5</b>	<b>7,004.5</b>
18.	Nakhichevan thermoelectric power plant (1993)	84						60						
19.	Nakhichevan modular power plant								87					
20.	Araz hydroelectric power plant (1970)	22												
21.	Vaikhyr hydroelectric power plant							4.5						
22.	Bilyav hydroelectric power plant										20			
<b>Total for the Republic</b>		<b>5,127.4</b>	<b>5,180.7</b>	<b>5,160.7</b>	<b>5,160.7</b>	<b>5,160.7</b>	<b>5,160.7</b>	<b>5,402.2</b>	<b>5,593.6</b>	<b>5,743.6</b>	<b>6,373.0</b>	<b>6,393.0</b>	<b>6,393.0</b>	<b>7,198.0</b>

Slide 6

Strengthening energy supply links with neighbouring countries

In order to ensure the safe and stable operation of Azerbaijan's energy system, the electrical link has been strengthened through the construction of new high-voltage power transmission lines (500 kilovolts and 230 kilovolts) with neighbouring countries (Georgia and Iran).

The Mukhranis-Veli 500-kilovolt power transmission line has been completely renovated as part of the planned Azerbaijan-Georgia-Turkey-European Union (EU) energy corridor, a 500/400-kilovolt high-voltage direct current back-to-back station is being installed in the Georgian-Turkish border region and the concluding stage of work to hook it up to the participating countries' energy systems is currently under way.

A link to the Russian Federation is provided by the 330-kilovolt Derbent power transmission line and the recently constructed 330/110-kilovolt Khachmaz substation.

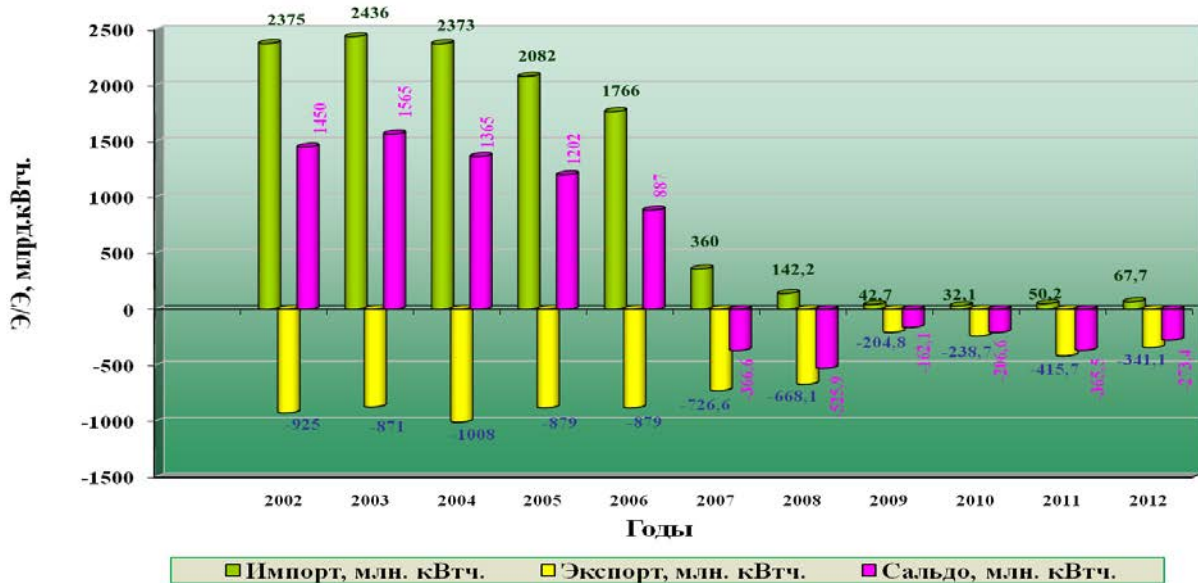
Slide 7

In order to improve the transmission capacity of the Azerbaijan-Georgia-Turkey-EU European energy corridor, and in the future the transmission capacity between the Central Asia Regional Economic Cooperation (CAREC) and the EU, it is necessary to increase the cross section of the 500- and 330-kilovolt power transmission lines along the entire length of the corridor and construct new substations.

To that end, we suggest preparing a feasibility study on linking the CAREC countries' energy systems with the Azerbaijan-Georgia-Turkey-EU energy corridor by means of Trans-Caspian submarine power cables.

Slide 8

Import and export of electric power during the period 2002 to 2012:



[Y-axis: electric power in billion kilowatt-hours; X-axis: years 2002 to 2012, import in million kilowatt-hours (first column for each year), export in million kilowatt-hours (second column for each year), balance in million kilowatt-hours (third column for each year)]

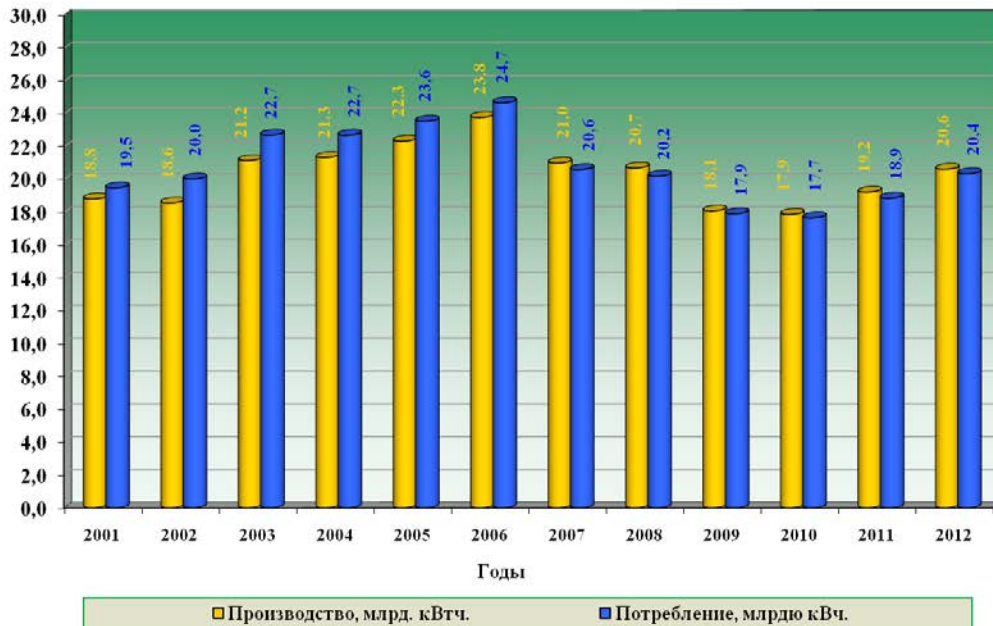
Slide 9

Electric power production and consumption during the period 2001 to 2012:

- In 2001, 18.8 billion kilowatt-hours of electric power were produced and 19.5 billion kilowatt-hours were consumed. The difference of 0.7 billion kilowatt-hours was covered by imported electric power;
- By 2012, electric power production stood at 20.6 billion kilowatt-hours and consumption at 18.8 billion kilowatt-hours. Azerbaijan is becoming an exporter of electric power and the country's export potential is currently estimated at 8 billion kilowatt-hours per year.

Slide 10

Electric power production and consumption during the period 2001 to 2012



[Production in billion kilowatt-hours (first column for each year), consumption in billion kilowatt-hours (second column for each year)]

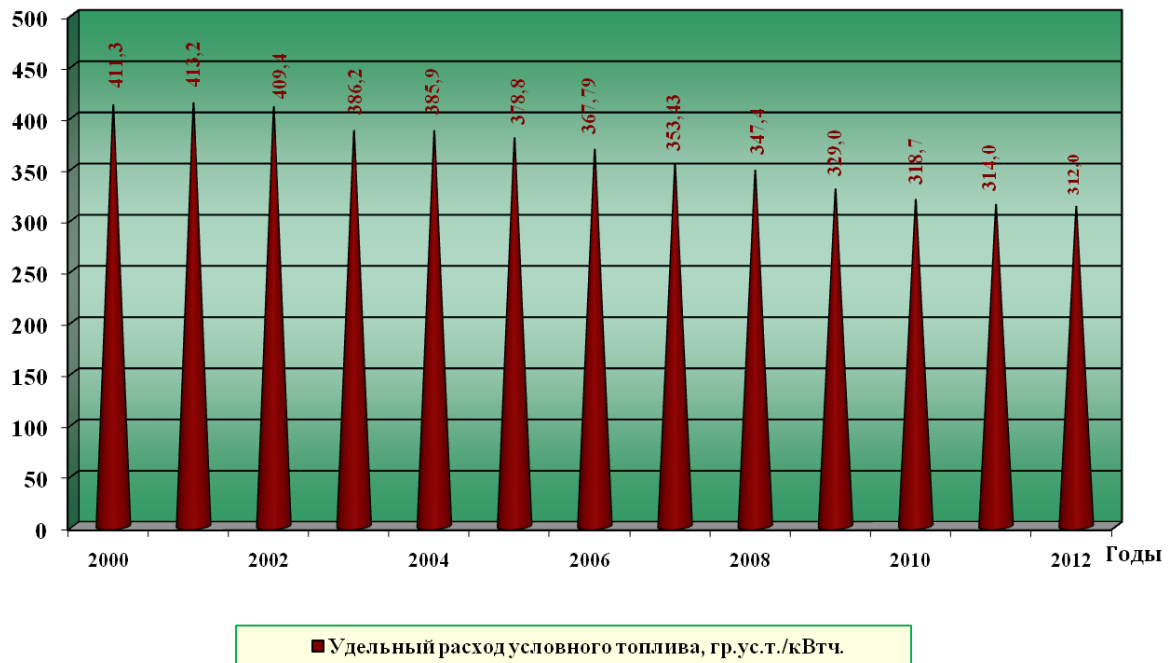
Slide 11

Energy efficiency:

- Thanks to energy-efficiency measures in the energy industry, electric power consumption fell from 23.8 billion kilowatt-hours in 2006 to 18.8 billion kilowatt-hours in 2012;
- The use of high-performance technologies in electric power production means that over the last ten years fuel consumption fell from 413 grams per kilowatt-hour to 312 grams per kilowatt-hour, which resulted in an average annual saving of 1.5 million tons of fuel and a 4.1 million ton reduction in atmospheric emissions. There are plans to reduce fuel consumption to 260 grams per kilowatt-hour by 2020, which will reduce atmospheric emissions by an additional 2.5 million tons.

Slide 12

Fuel consumption in the energy system during the period from 2000 to 2012



[Rate of fuel consumption in gram of fuel equivalent/kilowatt-hours]

Slide 13

Losses within Azerbaijan's energy system:

- Thanks to large-scale investment in the energy system in recent years, the country's potential as an exporter of electric power has increased and fuel consumption has decreased, but this has had little impact on reducing losses within the energy system. Thus, as was mentioned earlier, electric power consumption fell during the period 2006 to 2012, but losses did not reach the desired level;
- By 2020 it is proposed to reduce electric power losses within the energy system to the level adopted in developed countries in accordance with international standards:
  - In the case of transmission networks, from the current 4.3 per cent to 2.8 per cent;
  - In the case of distribution networks, from the current 16 per cent to 6.5 per cent.



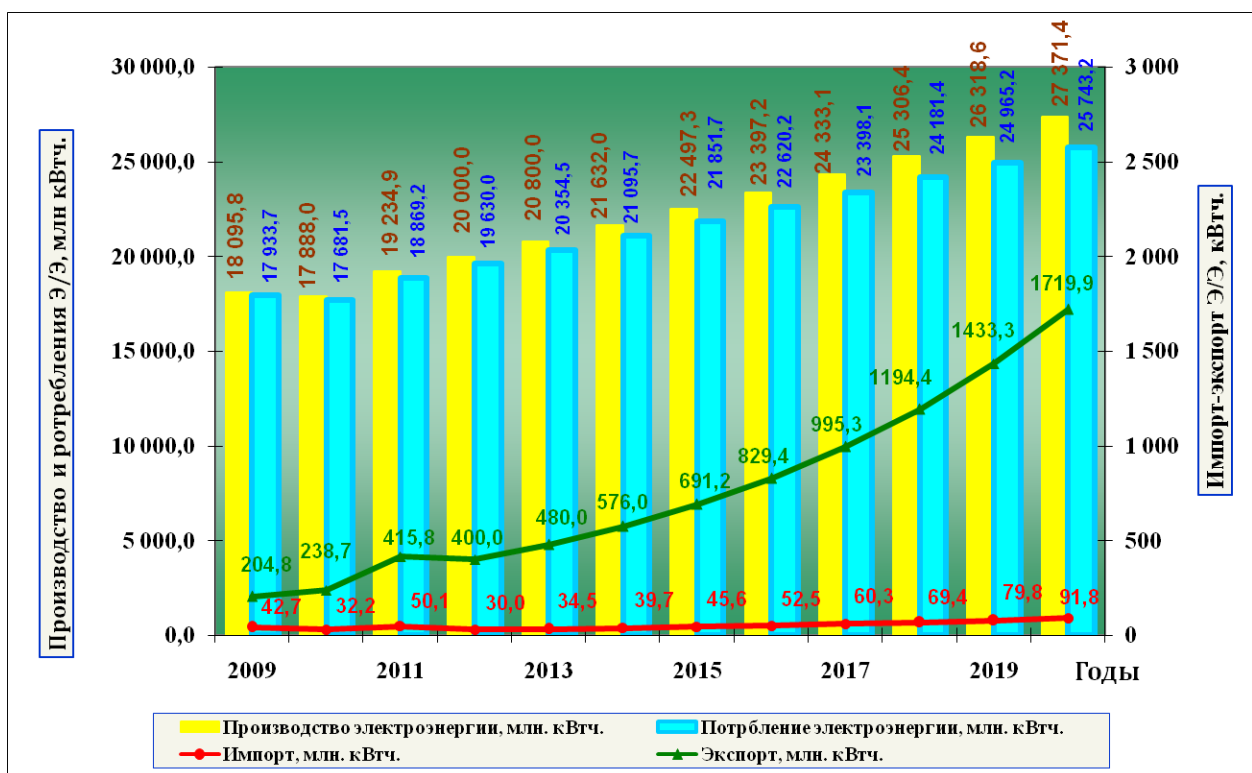
Slide 14

Prospects for the development of electric power in Azerbaijan:

- There are plans to raise generating capacities to more than 8,000 megawatts, which will make it possible to increase the export of energy resources in a more high-tech form, i.e. electricity;
- The diagram below shows the targets for electric power production, consumption, export and import up to 2020.

Slide 15

Energy balance forecast up to 2020



[First Y-axis: production and consumption of electric power in million kilowatt-hours, second Y-axis: import and export of electric power in kilowatt-hours, X-axis: years 2009 to 2019, production of electric power in million kilowatt-hours (first column for each year), consumption of electric power in million kilowatt-hours (second column for each year), circle plotted on the line equals import in million kilowatt-hours, triangle plotted on the line equals export in million kilowatt-hours]

Slide 16

State policy on renewable energy sources:

- Replacing natural gas with renewables is the main way of reducing atmospheric emissions in the production of electric power;

- Improving legislation;
- Developing the private sector;
- Financial support by the State and subsidies;
- Developing modern technologies;
- Research and development, sharing information;
- Education, training and promotion of environmentally friendly energy.

Slide 17

State strategy for the use of alternative and renewable energy sources from 2012 to 2020:

- Identification of the main areas for the generation of electric and thermal power using renewable energy sources;
- Development of a regulatory framework for renewable energy sources;
- Preparation of promotional events on the use of renewable energy sources;
- Application of alternative and renewable energy sources in various economic sectors.

Slide 18

Since 1 February 2013, the State Agency for Alternative and Renewable Energy Sources has, as the central executive body concerned with renewable energy sources and energy efficiency, been responsible for:

- State policy and regulation;
- Effective organization and co-ordination of activities;
- Exercise of State control.

Slide 19

The Alternative Energy limited liability company established under the auspices of the Agency is responsible for:

- Design;
- Development;
- Equipment for energy production, design of units and facilities, construction and operation;

- Infrastructure-related work.

Slide 20

Hydropower is the most important source of renewable energy.

In 2010 hydropower accounted for 18 per cent of the electric power generated, and other types of renewables for 1 per cent.

By 2020 the share of renewables will account for 20 per cent. Azerbaijan currently has approximately 1,000 megawatts of hydropower capacity at its disposal and there are plans to introduce an additional capacity of 62 megawatts.

Slide 21

Azerbaijan has at its disposal economically sound wind energy potential amounting to approximately 800 megawatts. The shores of the Caspian Sea are the most promising in this respect.

Making use of solar energy, which is estimated at 5,000 megawatts, is a task for the future involving relatively high initial investment costs.

There is potential for using geothermal energy for the purpose of energy saving in terms of heat production.

Slide 22

The main current tariffs:

- 2.5 euro cents per kilowatt-hour for small hydroelectric power plants;
- 4.5 euro cents per kilowatt-hour for wind turbines.

Azerbaijan is searching for solutions to problems regarding environmental protection and rational use of natural resources.

Slide 23

The Gobustan hybrid power plant established in 2011:

- Wind-driven power station – 2.7 megawatts;
- Solar power station – 1.8 megawatts;
- Biogas power station – 1 megawatt;
- Use of heat pumps;

Total capacity – 5.5 megawatts.

Slide 24

Potential of renewable energy sources in Azerbaijan

Type of renewable energy source	Capacity in megawatts
Solar energy	>5,000
Wind energy	>4,500
Bioenergy	>1,500
Geothermal energy	>800
Small hydroelectric power plants	>350
Total	>12,150

Slide 25

Thank you for your attention!