




**INNOVATIVE ENERGY DEVELOPMENT IN RUSSIA'S
EAST USING SMALL-SCALE AND RENEWABLE
ENERGY SOURCES: PROSPECTS, PROBLEMS,
INTERNATIONAL COOPERATION**

*B. Saneev, I. Ivanova, T. Tuguzova
Energy Systems Institute SB of RAS, Irkutsk, Russia*

*Speech at the 4th Japan-Russia Energy and Environment Dialogue,
Niigata, November 15, 2011*

1



Russia completed the work on preparation of a large number of policy documents determining the strategic development of the economy and energy in the East of the country until 2030 in the context of energy cooperation between Russia and NEA countries, such as

- "Energy Strategy of Russia until 2030",*
- "Program for Creation of a Unified System of Gas Production, Transport and Supply in East Siberia and the Far East with Potential Gas Export to the Markets of China and other APR Countries" (Eastern Gas Program),*
- "Strategy of Socioeconomic Development of the Far East and the Baikal region until 2025",*
- "Strategy of Socioeconomic Development of Siberia until 2020",*
- "Energy Development Strategy of East Siberia and the Far East until 2030",*
- "Program for Development of Oil Refining Capacities in East Siberia and the Far East", etc.*

These documents suggest a considerable increase in mutually beneficial supplies of Russian energy resources to the markets of China, Japan, Korea, and other NEA countries.

The 4th Japan-Russia Energy and Environment Dialogue, Niigata, 15 November 2011

2

 **BASIC STUDIES ON EASTERN ENERGY POLICY OF RUSSIA,
CONDUCTED BY ENERGY SYSTEMS INSTITUTE, SB OF RAS,
IN 2006-2009**

In the framework of the Energy Strategy of Russia 2030

- The strategy for energy development in East Siberia and the Far East until 2030
- The study on prospects for electric power industry development in Russia until 2030

Ordered by the regional authorities

- The concept of providing stable operation of energy facilities and energy security of **Sakhalin region** until 2020 – ordered by Administration of Sakhalin region
- The strategy for energy development in **Amur region** until 2010 and for the time horizon until 2030 – ordered by Administration of Amur region
- The strategy for electric power industry development in **Chukot Autonomous Area** until 2020 – ordered by Administration of Chukot AA and JSC “Chukotenergo”
- The strategy for energy development in **Irkutsk region** until 2010 and for the time horizon until 2030 – ordered by Administration of Irkutsk region
- The energy strategy of **Sakha Republic (Yakutia)** until 2020 and for the time horizon until 2030 – ordered by the Government of Sakha Republic (Yakutia)


3

The 4th Japan-Russia Energy and Environment Dialogue, Niigata, 15 November 2011

PLAN OF PRESENTATION

- 1. Role of renewable energy sources in electricity production in Russia***
- 2. Energy supply to consumers in Russia's East: current state and problems***
- 3. Efficiency estimation of small-scale energy development options***
- 4. Prospects and problems in implementation of projects for construction of renewable energy sources***

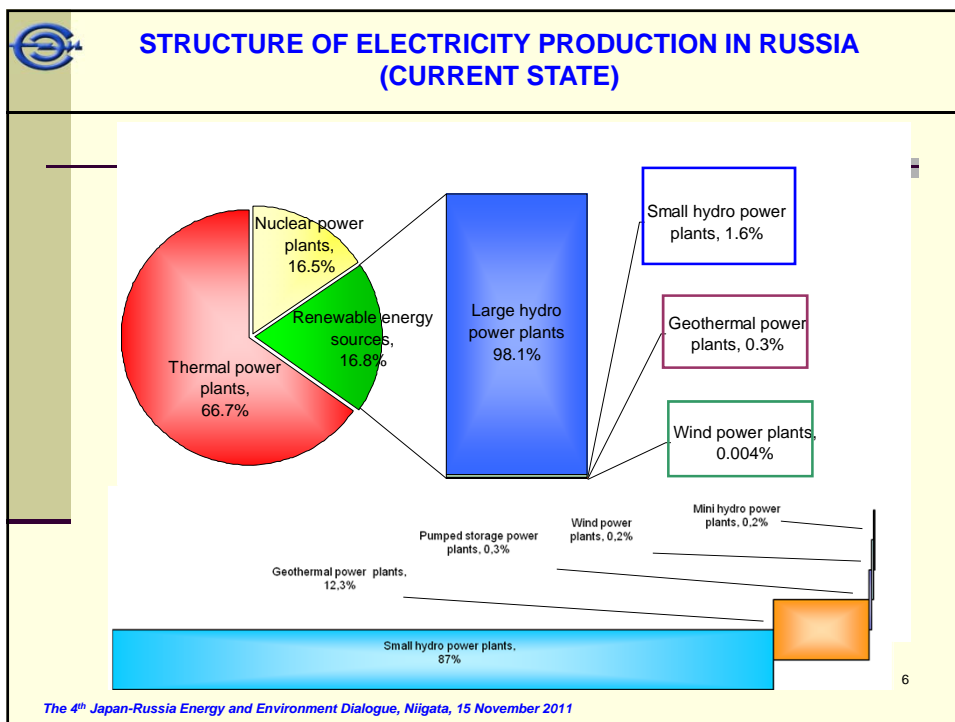
4

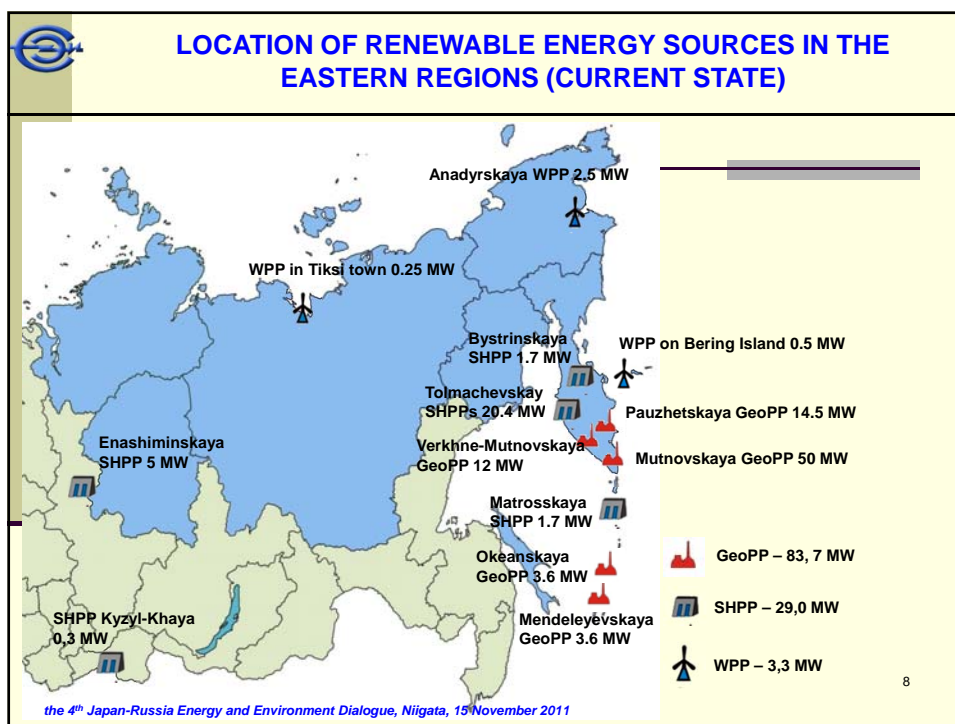
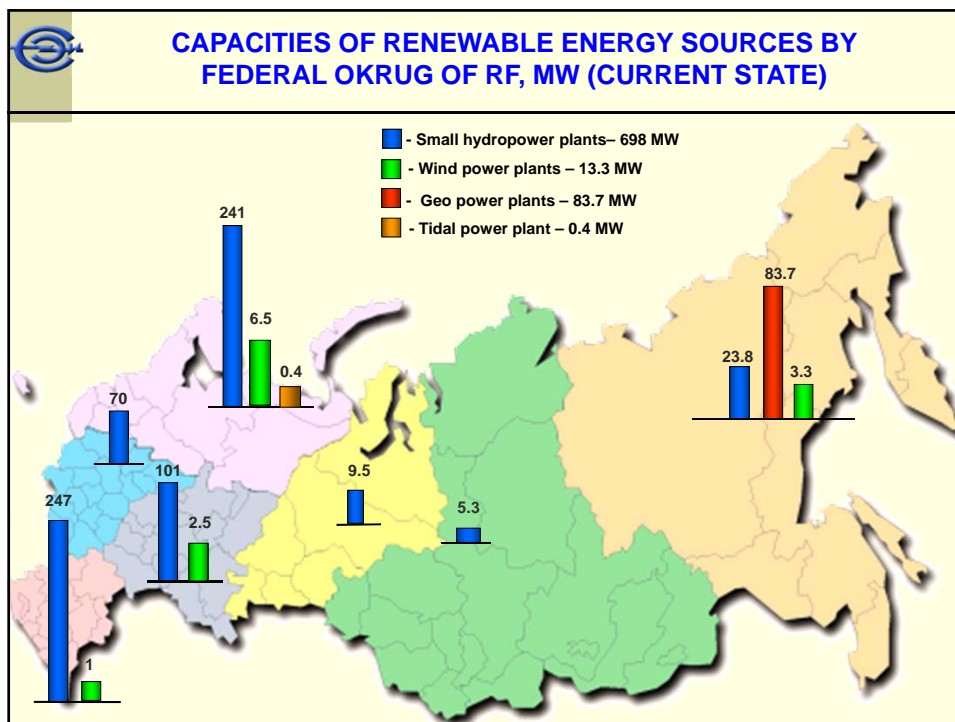


1. ROLE OF RENEWABLE ENERGY SOURCES IN ELECTRICITY PRODUCTION IN RUSSIA

5

The 4th Japan-Russia Energy and Environment Dialogue, Niigata, 15 November 2011








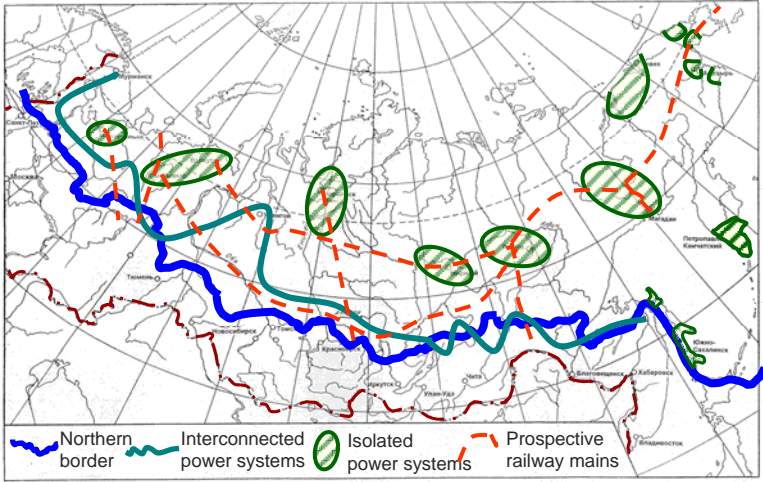
2. ENERGY SUPPLY TO CONSUMERS IN RUSSIA'S EAST: CURRENT STATE AND PROBLEMS

9

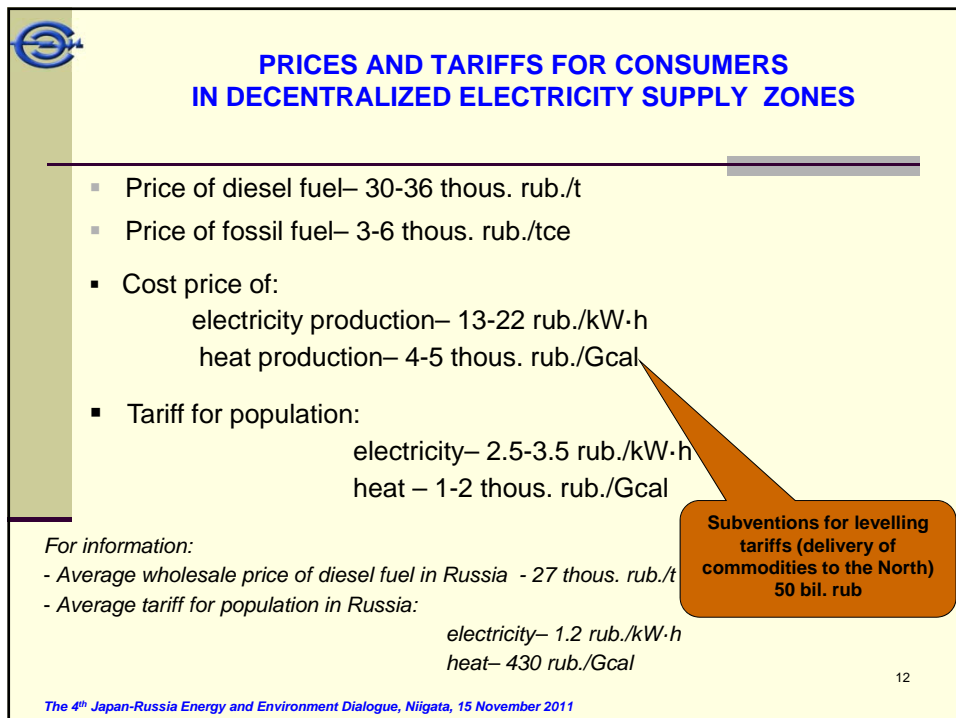
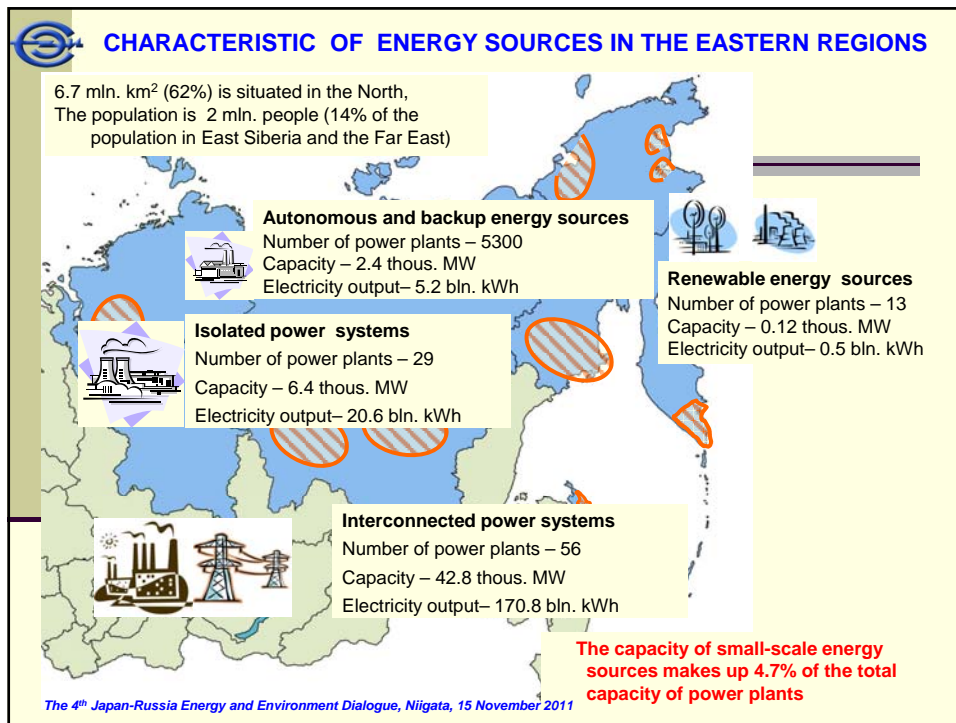
the 4th Japan-Russia Energy and Environment Dialogue, Niigata, 15 November 2011




ZONING OF RUSSIA'S TERRITORY IN TERMS OF POWER SUPPLY CENTRALIZATION



**THE ZONE WITH DECENTRALIZED ELECTRICITY SUPPLY IN THE EAST OF RUSSIA
OCCUPIES MORE THAN 60% OF THE TERRITORY**






3. EFFICIENCY ESTIMATION OF SMALL-SCALE ENERGY DEVELOPMENT OPTIONS

13

The 4th Japan-Russia Energy and Environment Dialogue, Niigata, 15 November 2011



RATIONAL DIRECTIONS IN DEVELOPMENT OF SMALL-SCALE ENERGY

- reconstruction and upgrading of existing energy sources;
- connection to electric power system;
- construction of mini cogeneration plants on local fuels (coal and hydrocarbons from local deposits);
- involvement of renewable energy sources;
- construction of low-capacity nuclear power plants.

14

The 4th Japan-Russia Energy and Environment Dialogue, Niigata, 15 November 2011

3.1 Connection to centralized electricity supply

Electricity tariff, cent/kWh

Diesel fuel tariff – 800 USD/t

Consumer load, MW

- 1
- 2
- 3
- 5

Length of transmission lines, km

Zone of autonomous electricity supply

Zone of centralized electricity supply

In isolated power systems in the northeast up to 25-75 km

In the eastern interconnected power systems up to 30-90 km

With rise in loads the economically efficient distances for connection to power systems increase

Connection to centralized electricity supply is efficient for consumers located at a 75-90 km distance from supply centers

The 4th Japan-Russia Energy and Environment Dialogue, Niigata, 15 November 2011

3.2 Construction of mini cogeneration plants on local fuels

Payback period, years

Electric capacity of coal-fired mini cogeneration plants, MW

- 8
- 4
- 1,5

Electricity tariff, cent/kWh

Gas prices, USD / thous.m³

Conversion to gas is efficient

Diesel fuel price, USD/t

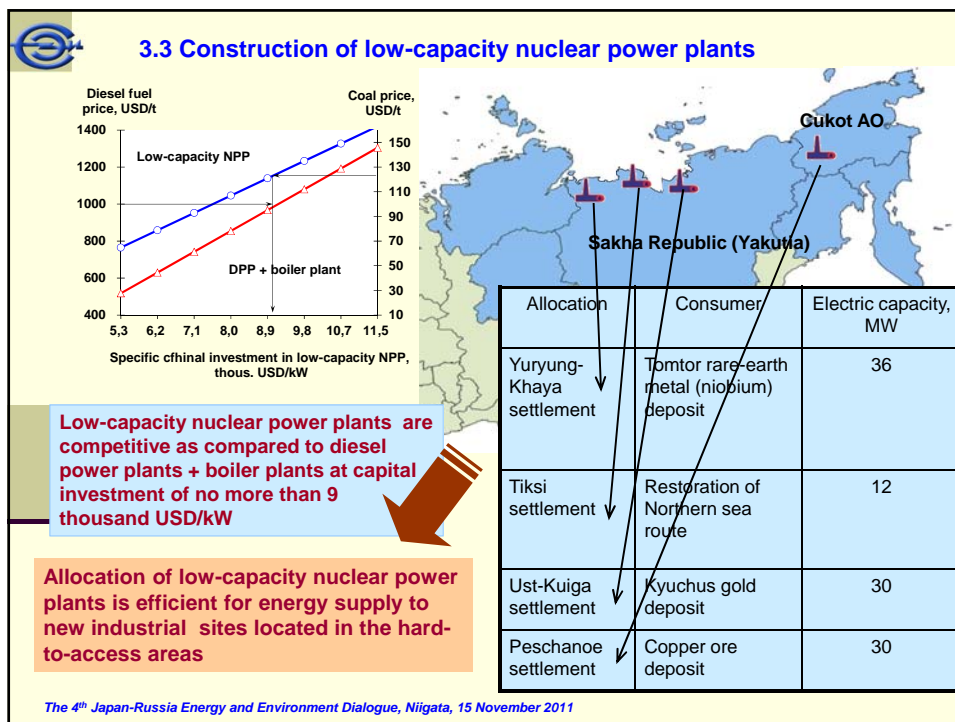
Diesel power plant capacity, MW

- 0,4
- 1
- 2
- 3

Electricity production cost at cogeneration decreases two-fold against diesel power plant

Allocation of mini cogeneration plants is efficient near coal deposits and natural gas fields or in the buffer area of gas pipeline routes

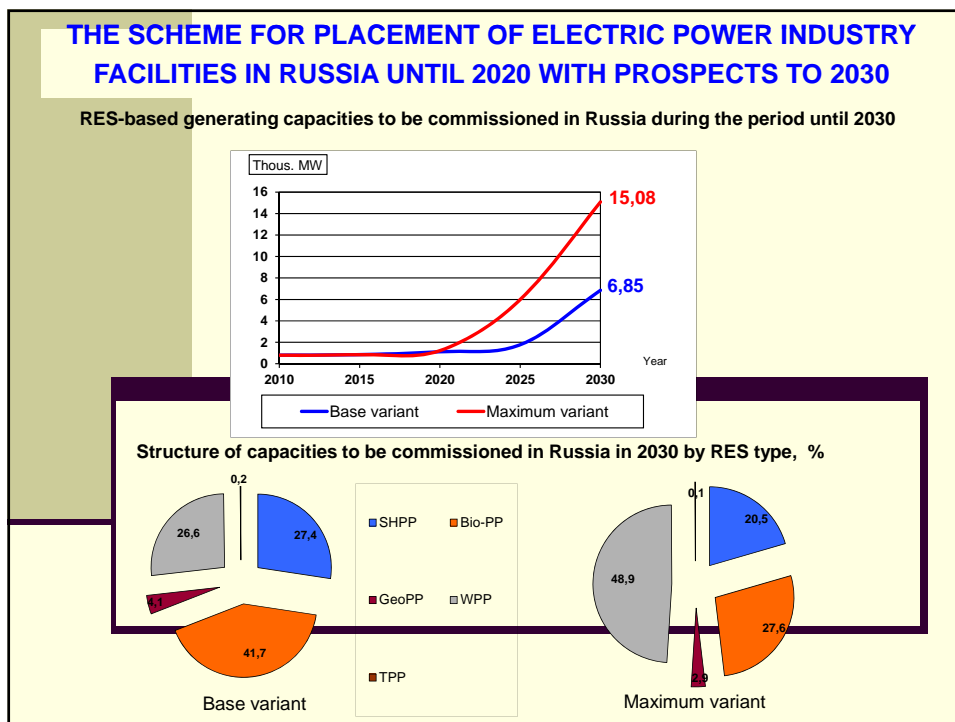
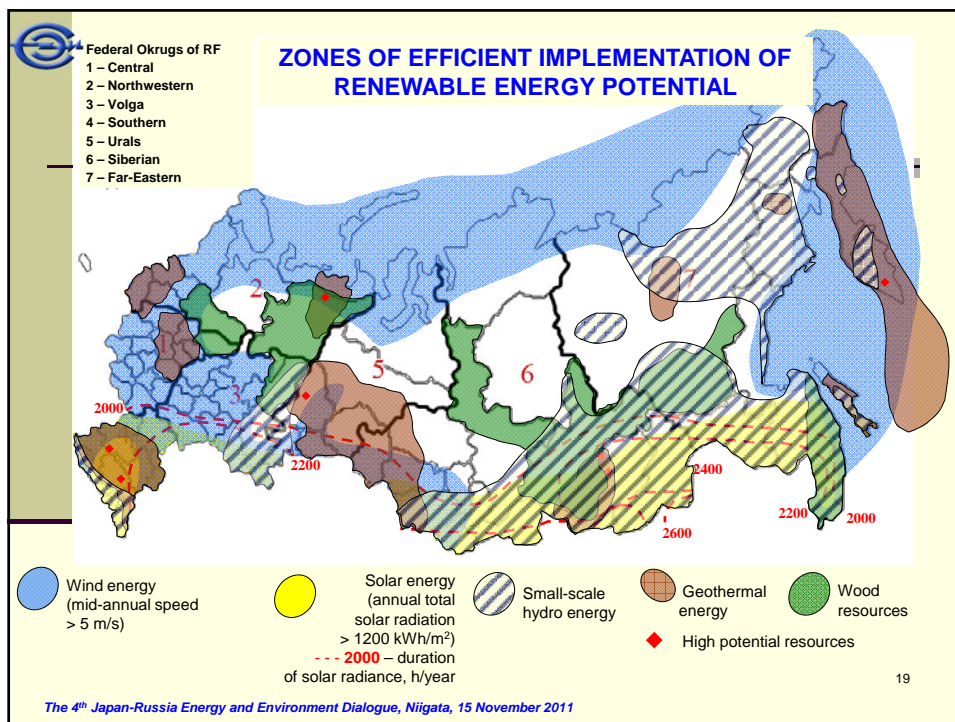
The 4th Japan-Russia Energy and Environment Dialogue, Niigata, 15 November 2011

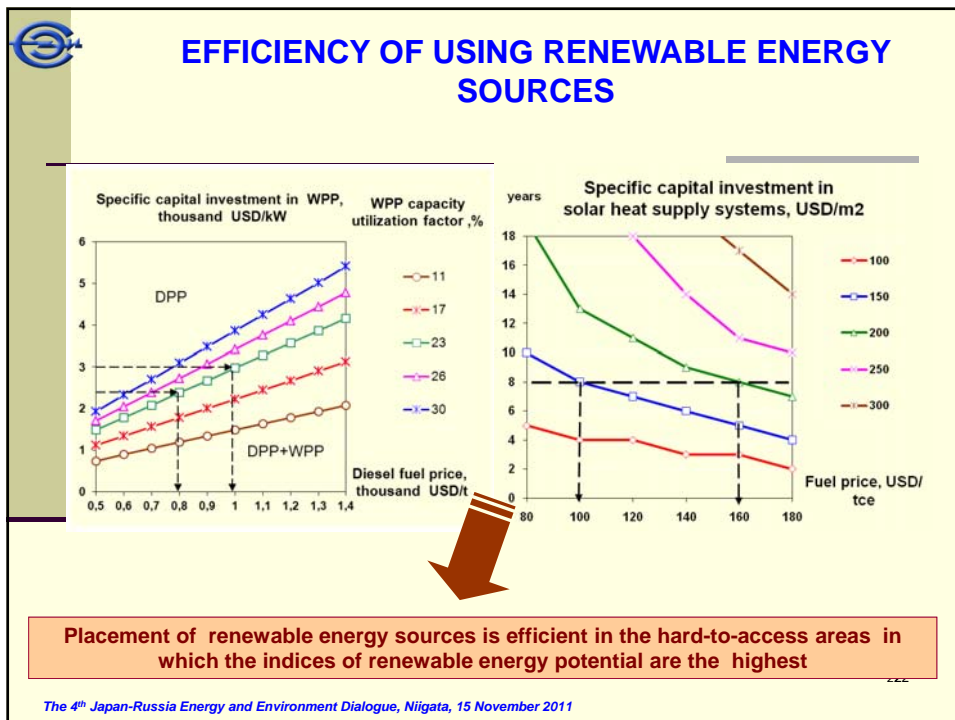
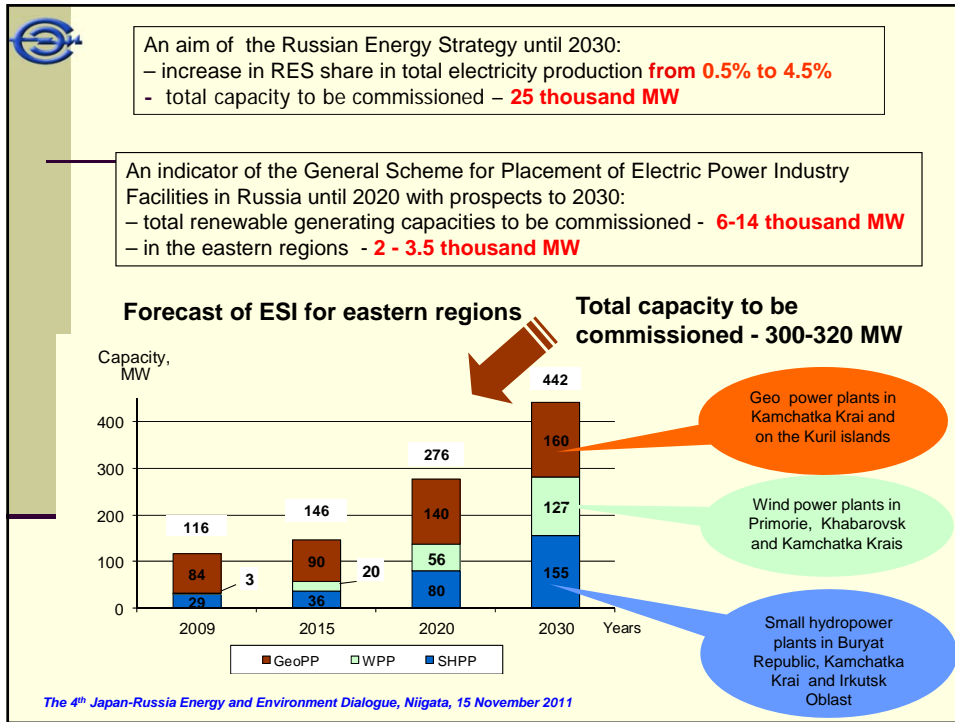


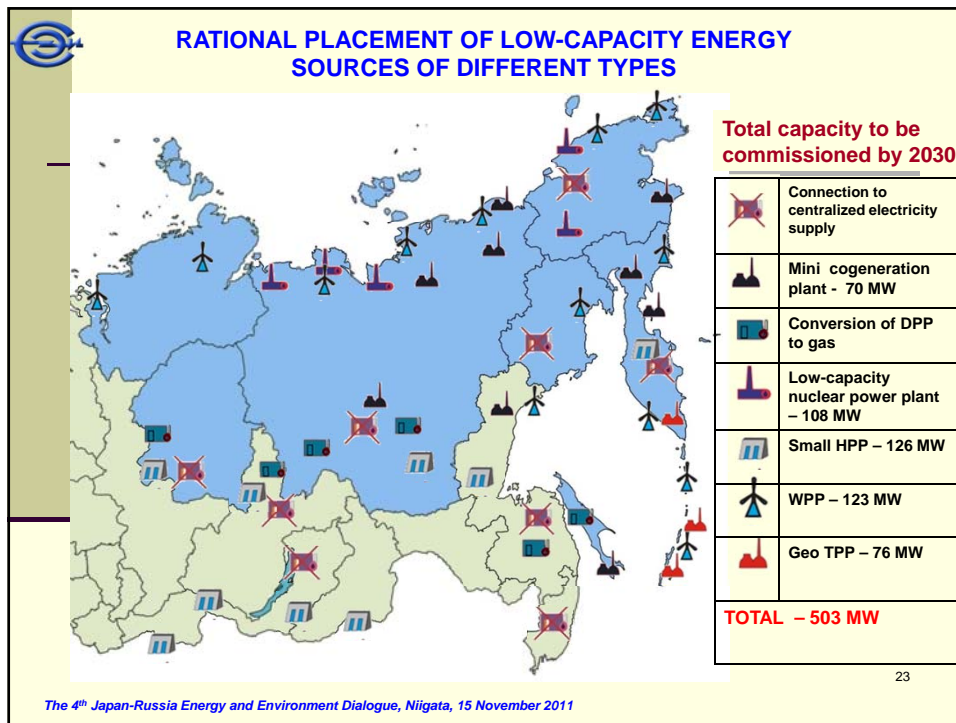
4. PROSPECTS AND PROBLEMS IN IMPLEMENTATION OF PROJECTS FOR CONSTRUCTION OF RENEWABLE ENERGY SOURCES

18

The 4th Japan-Russia Energy and Environment Dialogue, Niigata, 15 November 2011








BARRIERS TO DEVELOPMENT OF RENEWABLE ENERGY SOURCES IN RUSSIA

- **Institutional:**
 - insufficient legislative basis in the sphere of RES;
 - ineffective system of measures intended to meet environmental constraints;
 - unwillingness of authorities to participate in funding the investment projects
- **Financial:**
 - absence of federal financing mechanisms;
 - insufficient internal and foreign investment capital;
 - high cost of special equipment;
 - lack of long-term loans on acceptable terms.
- **Informational:**
 - insufficient information about technologies and possibilities of their application;
 - lack of reliable data on the indices of renewable energy resources;
 - negative experience of RES operation.

The 4th Japan-Russia Energy and Environment Dialogue, Niigata, 15 November 2011



DIRECTIONS IN COOPERATION BETWEEN RUSSIA AND REPUBLIC OF KOREA IN THE FIELD OF RENEWABLE ENERGY SOURCES

- *Legislative framework*
- *System of state stimulation*
- *System of preferential taxes and crediting*
- *Mutually beneficial deliveries of equipment*
- *Joint investment in projects*
- *Information exchange*

25

The 4th Japan-Russia Energy and Environment Dialogue, Niigata, 15 November 2011



Thank you for your attention

26