Prospects for distributed small-scale generation systems in the Far East of Russia

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Structure

1. The concept of the RF Government on energy efficiency and development of small-scale generation systems

2. Current status and plans for development of small-scale distributed generation systems in the Far East Russia

3. Approach to the introduction of distributed small-scale generation systems in the Far East of Russia

Prospects for distributed small-scale generation systems in the Far East of Russia

1. The concept of the RF Government on energy efficiency and development of small-scale generation systems

Key documents of Russia on this issue

Key federal documents:

- Federal Law "On Electric Power» № 35-FZ
- Presidential Decree of 04.06.2008, the number 889 "On some measures to improve energy and environmental efficiency of Russia's economy"
- Orders of the President of Russia on the basis of an expanded meeting of the Presidium of RF State Council 02.07.2009 g.
- Several resolutions of the Government of Russia

Are in preparation of strategic development documents of the RF power:

- The project "Energy Strategy of Russia until 2030"
- Project "State program of energy conservation and efficiency before 2020"

and instruments for regional development of Russian Far East (RFE):

- The project "Strategy of socio-economic development of the Far East and the Baikal region until 2025 "
- The project "Strategy of development of electric power by RFE prior to 2020"

The signal "from above"

The objectives of federal policy:

Reducing harmful effects on the environment

+ Reduction in energy intensity of GDP (40% 2007 to 2020)

+ Measures for energy conservation

+ Modernization of energy infrastructure

+ Increased use of **renewable energy sources (RES)**

Implementation mechanism involves:

- development of ***State Energy Efficiency Program for the period up to 2020***
- introduction of **regulatory requirements** for production and consumption of energy
- adoption of the Federal Law ***"On energy saving and improve energy efficiency "***
- **administrative measures** of sectoral and territorial management in order to improve energy efficiency
- measures of **financial, tax and tariff policy**
- introduction of new technical regulations
- measures of scientific and industrial base efficiency, training
- increased use of distributed small-scale energy systems and its implementation in the regions

Key features of the concept: expert reviews (1)

The role of the executive authorities (federal and regional level):

- using **target-oriented approach** in developing multi-level structure of ***Energy Efficiency Programs*** for all regions

But :

- require clarification of the problem of **competitive incentives** for the development of energy conservation and efficiency of the economy, improving the **investment climate**, international cooperation in new technologies, expertise and private investment.

Key features of the concept: expert reviews (2)

The role of local communities:

- There does not define any independent role of local communities
- risks of bureaucracy and formalism developed in the performance of regional programs:
  - for the development of "low energy" or distributed small-scale energy systems and high-quality programming at the municipal level require **individual optimization of the parameters** of power facilities;
  - implementation of energy efficiency programs at the local level implies a business initiative **"from below",** community-based organizations complex infrastructure projects, involvement, formation and concentration of **local** financial, human and technological resources.

Key features of the concept: expert reviews (3)

Special item **on the Far East**:

- possibility of free (unregulated) **prices** for energy services consumers from newly commissioned facilities generate
  - In the case of such a decision on free pricing, potential investors in new generating facilities in the Far East will be able to minimize the political risks associated with tariff regulation, and self-assess the commercial risks of investment.

Key features of the concept: expert reviews (4)

The role of the JSC "RusHydro“:

- Russia's largest energy state corporation develops distributed small-scale energy systems in some regions of Russia
  - to ensure the initiation of renewable energy resources projects, training, preparation of draft laws and regulations
  - to demonstrate the opportunities and success of distributed small-scale energy systems
  - to develop institutions to support the local energy

Key features of the concept: expert reviews (5)

Sensitive approach to renewable energy:

- Definition: *"the energy efficiency of electric power is the ratio of electrical energy supplied to consumers spent for these purposes from non-renewable energy sources"* **(35-Federal Low)**

- Emphasis on reducing environmental impact
- Federal parameters for consumption of electricity using renewable energy
  - by 2010. - 1,5%,
  - by 2015 - 2,5%,
  - by 2020 - 4,5%.
- Criteria to identify objects of power to renewable energy
- Incentives and support measures are focused on the renewable energy accession to **electricity network**

Key features of the concept: expert reviews (6)

Clarification of the meaning of terms is needed

- *Small-scale, alternative, local, renewable energy, distributed generation, decentralized energy supply, etc*.
- The inaccuracy of the terms and exists in Russia a different understanding of the content of concepts often **creates artificial problems working with statistical data** and **prevents the differentiation of public policies on energy efficiency**

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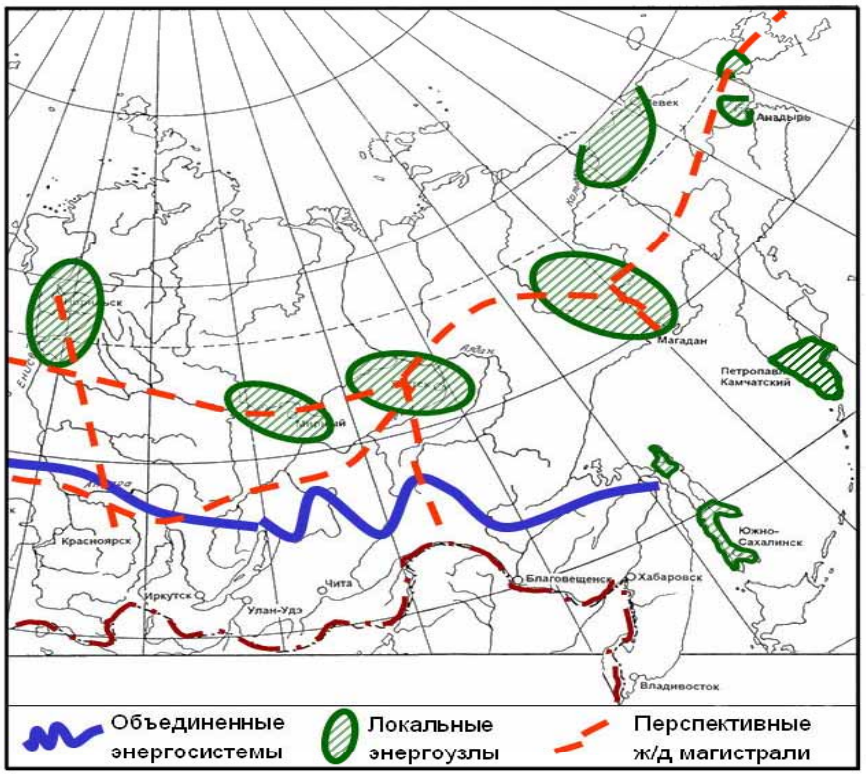
2. Current status and plans for development of small-scale distributed generation systems in the Far East Russia

The most territory of the RFE is not included in the zone of central power supply



Zones of central power supply in RFE:

- **Isolated energy systems**
- **United energy system Vostok**

According to the Institute of Energy Systems im.L.A.Melenteva SB RAS (Irkutsk)

A. Diesel power generating units in RFE power supply

The share of diesel power in total electricity production in regions of RFE is **12-15%** in contrast to other regions of Russia, where the figure is less than **1%**

Characteristics:

- Depreciation of equipment is about 80%.
- High price of fuel
- Seasonal limited periods of delivery
- Necessity of large stockpiles of fuel
  - lead to its high losses - up to 20%.
  - Transportation costs in the most remote customers make up 70-80% of the cost of fuel
- Significant financial support of federal and regional budgets
  - The most problem is worst in Yakutia, Kamchatka Krai, Sakhalin region and other regions.

B. Renewable energy sources (RES) in the RFE currently used slightly

- **Geothermal power plants** (total capacity - **83,7 MW**)
  - in the Kamchatka region (3): *Pauzhetskaya GPP, Upper-Mutnovskaya, Mutnovskaya GPP*
  - in the Sakhalin region (2): *Mendeleyev GPP, Okeanicheskaya GPP*
- **Small hydro** power plant
  - in the Kamchatka (2): *Tolmachovsky HPP-1 (**2,2 MW**) , Bystrinskaya HPP (**1,7 MW**)*
  - in the Sakhalin region: *Matrosskaya small-HPP*
- **Wind power unit** (only two in RFE)
  - in the Chukotka: *Anadyr (**2.5 MW**)*
  - in the Kamchatka: *Bering Island (**0.5 MW**)*

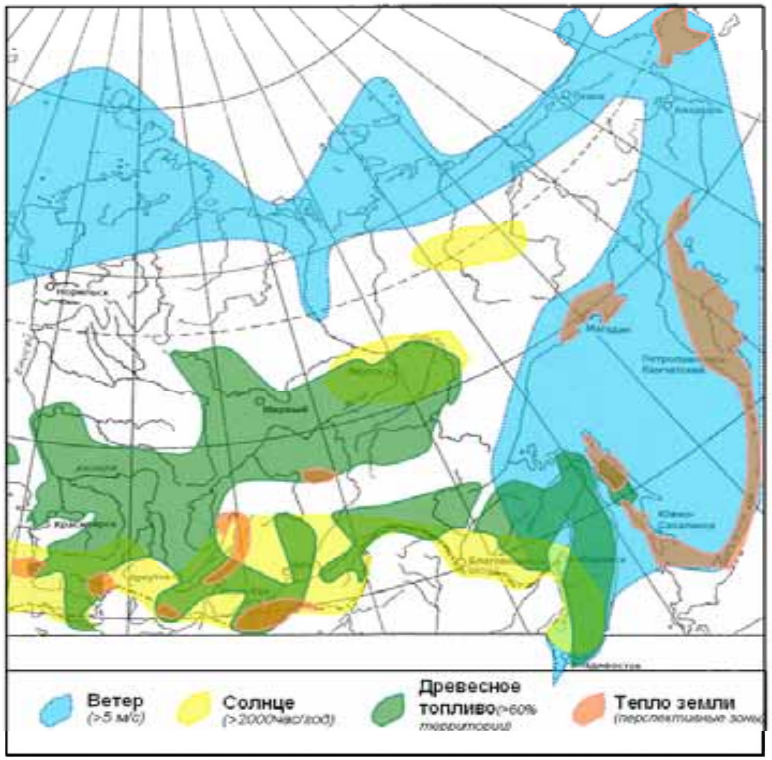
Main directions of development of distributed small-scale generation systems in the RFE

1. Reconstruction and **modernization** of existing diesel power units
2. The use of **local fuels**
   - coal and hydrocarbon deposits of local
3. Development of **distributed small-scale generation systems based on renewable energy sources (RES)**
   - Plans placement of RES generation systems in a specific local area depend on the capacity of renewable energy.
   - To be optimal design of systems, which in each case may include a combination of different types of generating sources

The potential of renewable energy in the Eastern Siberia and Far East of RF

In Eastern Siberia and the Far East are concentrated:

- **80% of the gross geothermal potential**
- almost **60% of wind power capacity**
- and more than **70%** of the capacity of small streams Russia.



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Plans placement of small-scale generation systems in RFE

Draft Energy Strategy of Russia stipulates that by 2020 the total input capacity of renewable energy in the Far East (in the moderate scenario) would be about 112 MW,

of which:

- **Small HPP - 30,7 MW**
- **Wind power - 21,9 MW**
- **Geothermal power plants - 59,8 MW**

The share of RES of total electricity production in the Far East will remain at 1% .

In some areas, this value significantly exceeds the average, for example, in the Kamchatka region, it is 15%

Regional Energy Efficiency Programs

Will:

- Adoption of the *State Program of Energy Conservation and Energy efficiency by 2020*
- Development of each region of its Program including:
  - Special task to develop small-scale generation facilities and renewable energy until 2020 in the region

A revised **structure of the project** depends on the quality of regional programs, timely research capacity of RES and completed feasibility studies

Public funding **of the project** depends on:

- Projects will be included in the new edition of the Federal Program *"Economic and social development of the Far East and Baikal Region until 2013"* in the course of its adjustment and extension until 2018
- priorities of the "*Strategy of socio-economic development of the Far East and the Baikal region in 2025*"

Can renewable energy projects to attract investors?

Factors that create attractive incentives for foreign investors:

- certain status of RES projects,
- technical and methodological preparedness,
- their inclusion in the list for the partial funding from the federal budget

Features of RFE regions:

- **Primorsky region** - the most economically promising and convenient transport region, the availability of expertise, resources, wind energy (the experience of building windfarms in o.Russkiy) and small hydropower.
- **Khabarovsk Krai, the Jewish Autonomous Region** - the high number of sunny days per year, availability of professional experience in the production of small windfarms.
- **Amur region** - the Law (2005) "On the development of innovative renewable energy in the Amur region, have experience in cooperation with JSC" RusHydro ", the presence of various kinds of renewable energy capacity
- **Kamchatka, Sakhalin** - the greatest diversity of renewable energy resources, local demand, associated with fishing and other seasonal activities;
- **Yakutia, Magadan and Chukotka** - the need for such generation systems for the development of rich natural resources and meet energy demand of local industrial units and other consumers

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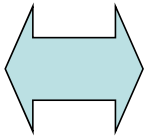
3. Approach to the introduction of distributed small-scale generation systems in the Far East of Russia

Need to clarify the approach to renewable energy in the RFE

- In the long term will continue to be the concentration of population and industry in selected centers with **low population density in the rest of the Far East**
- Now in practice interest in the implementation of power systems using renewable energy is often not connected with optimization of energy supply local consumers, but rather finding the original commercial projects.
- Russia's state policy in terms of energy based on renewable energy, with the implementation of the Far East should be adapted to the conditions and objectives of **local development** and **local communities**.

"Local Power" - a constructive methodological approach

- the problems of localized energy demand



- special direction of energy, capable of solving these problems

The concept of ***local energy***: *"Local governments and citizens exercised their right to self-assured and safe receipt of the energy they need quality and price"* (A.Becker,Ph.D.,prof. , A.Solonitsyn,Ph.D., Vladivostok).

The object of state support for RFE should be the local energy, which includes as an element of "generation system“

Local communities are becoming the **center of decision-making** and initiating the most effective way of energy areas to search for optimal design solutions supply for the local area

Local energy systems (LoES)

- The approach gives ***a criteria*** for evaluating the effectiveness of the RES or other projects:
  - Maximum effect of combining, optimization and development of different types of generation systems and renewable energy resources in the local territory
- The main technical unit is the ***local energy system*** (LoES):
  - LoES is comprehensive, complete power systems include power generation, networks (local, inter-village and linking with major energy systems), the means of correction at the side of the generation and customers, remote control, and so on.

Tactics of local communities

- Overcoming the **investment barrier** that prevents the introduction of new energy systems using renewable energy:
  - Federal investment resources as the starting condition
  - Participation JSC "RusHydro", which is able to conduct several such projects in the Far East
  - Cooperation of local territories to reduce the individual costs for research, design, procurement of equipment and provision of advisory and promotional services, to attract qualified professionals, share information and experience.
- Factor in increasing the capacity of investment in LoES is the **expected effect of business development**, raising "the capitalization of local areas“
  - Local Energy Efficiency and Development Program should be based on the prospects for business development.

Cooperation between Japan and Russia

- Cooperation between Japan and Russia in this field will help the Far East to implement the **modern advanced technology** in small-scale generation facilities
  - The experience of cooperation in the project at the Wind power system (Russky Island) is the first one in the Far East.

- The **scale and spheres of cooperation** may be broader than the choice of technology and equipment supply
  - Active contacts at the local level will stimulate the development of Russo-Japanese cooperation in other types of business in such areas - fishing and fish processing, logging and wood processing, transport, trade, etc.

SUMMARY (1)

Two levels of implementation:

- **“Local level" - has become a priority focus** of bottom-up initiatives, to support specific projects of energy on the local community level
  - reliance on the brightest local leaders and initiators of projects
  - formation of municipal energy efficiency programs, which take into account local characteristics and development of the territory
- **"All-Russia" level - Defines a general framework and conditions**
  - to adapt the individual local initiatives and projects to the priorities of Russia in the field of energy efficiency, incorporate them into the national system for planning, management, support (financial, methodological, informational, etc.).

SUMMARY (2)

What is supposed to be done :

- development of municipal and regional energy efficiency programs in the Far East of Russia;
- identification of experts and enthusiasts in the local energy, as well as interested local leaders and businessmen in the Far East;
- institution-building interactions, the accumulation of skills and information to compensate for the lack of skilled professionals and experience in the Far East;
- support and analysis of the experiences of demonstration models LoES in the Far East;
- demonstration of successful first development experience of the local energy;
- increasing opportunities for international cooperation of Russia and Japan in this field and promote a wide awareness of local communities of the Far East on the availability of such opportunities

SUMMARY (3)

Russo-Japanese cooperation in the development of local energy, in my opinion, has great prospects associated with the implementation of advanced scientific and technological advances in the use of natural energy potential of the territories of the Far East, their well-balanced and environmentally careful development, as well as the possibility of expanding Russia - Japanese contacts at the community level.

Thank you for your attention!

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