



RENEWABLE ENERGY IN THE EASTERN REGIONS OF RUSSIA: STATE AND FORECASTS

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2. *Characteristic of energy sources in the areas of decentralized and unstable energy supply of the eastern regions*
3. *Resolutions of the Government of the RF on stimulation of renewable energy development in the zones of wholesale and retail markets*
4. *Forecast of renewable energy development in the Energy Program - 2035*
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*Speech at the 8th Japan-Russia Energy and Environment Dialogue,
 Niigata, November 4, 2015*

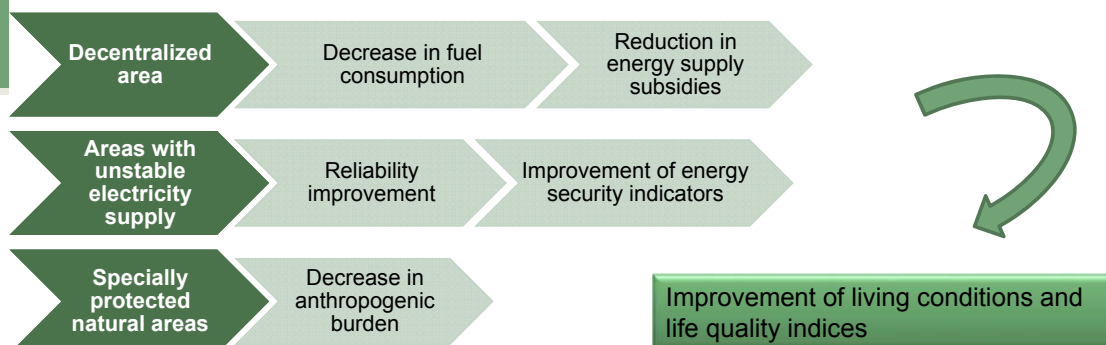


CURRENT STATUS OF RENEWABLE ENERGY IN RUSSIA

INSTALLED CAPACITY OF RES

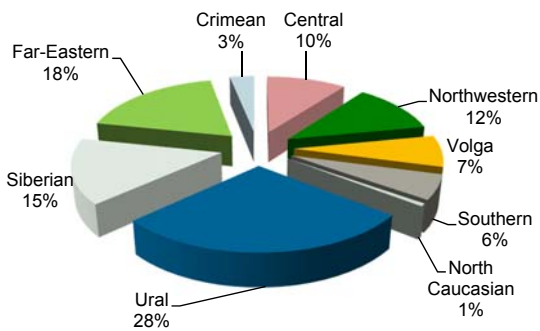
Share of RES:
 in the installed capacity of power plants – 0,3%

RES	Russia, total	Crimean Federal District	Eastern regions
Small hydropower plants < 25 MW	390	-	49,1
Wind power plants	103	89,0	3,9
Solar power plants	230	227,3	1,3
Geo power plants	77,6	-	77,6
Tidal power plant	1,5	-	-
TOTAL	802,1	316,3	131,9

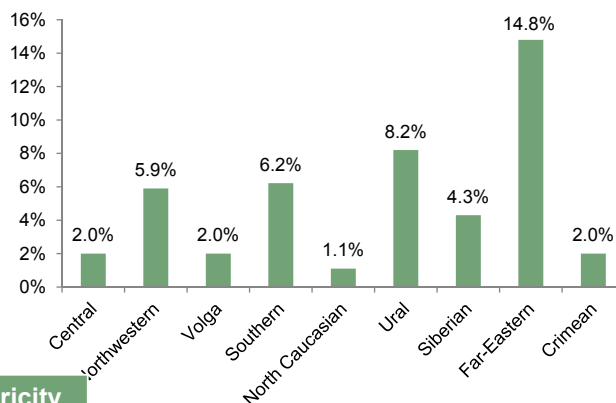




DISTRIBUTION OF SMALL-SCALE STATIONARY POWER PLANT CAPACITIES BY FEDERAL DISTRICT



Share of small-scale power plants in the capacity of thermal power plants

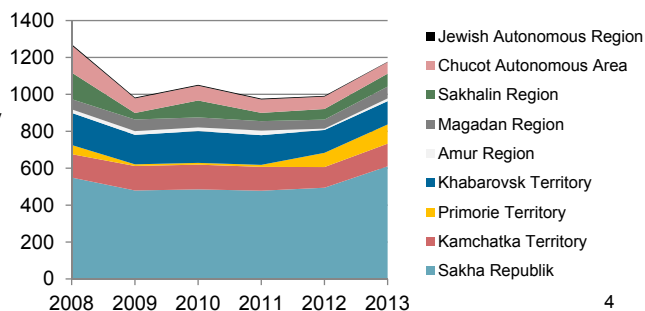
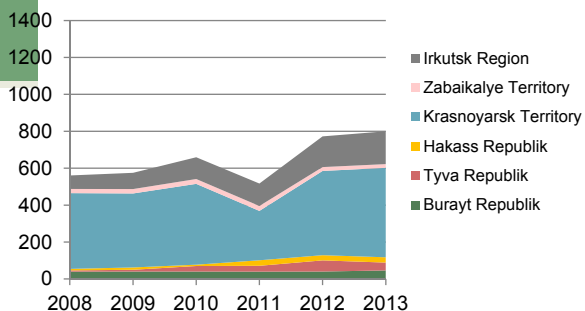
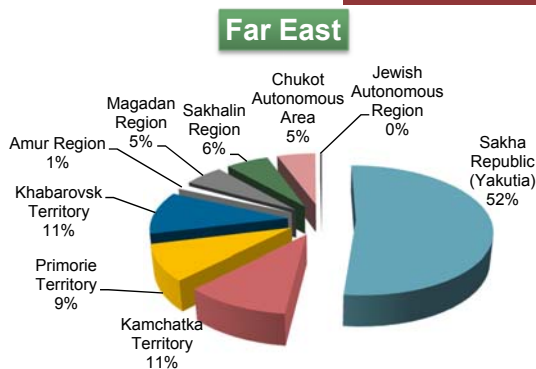
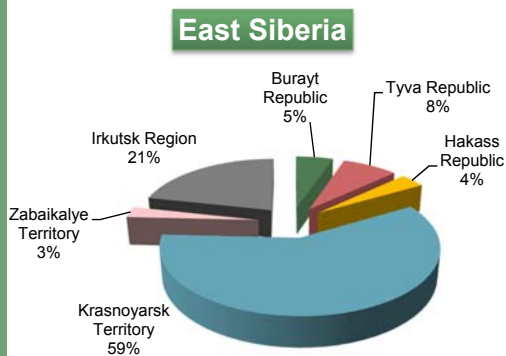


Region	Number, Pcs	Total capacity, MW	Electricity production, mln kWh
Russia, total	>20000	6337	8700
East Siberia	1433	800	1924
Far East	3016	1176	1296

Share of the eastern regions in the installed capacity structure of small-scale power plants - **31%**



DISTRIBUTION OF SMALL-SCALE STATIONARY POWER PLANT CAPACITIES IN THE EASTERN REGIONS OF RUSSIA





Resolution of the Government of RF No 449 of May 28, 2013 «A mechanism to stimulate the use of renewable energy sources in the wholesale electricity and capacity market»

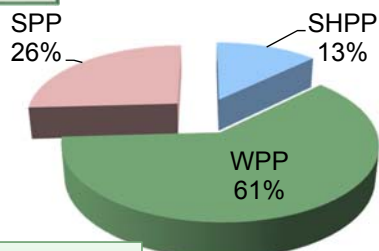
Resolution of the Government of RF № 861-P of May 28, 2013 “About introduction of some changes in the Resolution of the Government 1-P of January 8, 2009 “

Total RES capacities to be commissioned **by 2020** in the zone of electricity wholesale market – **5871 MW**

Small-scale HPPs < 25 MW

Wind power plants > 5 MW

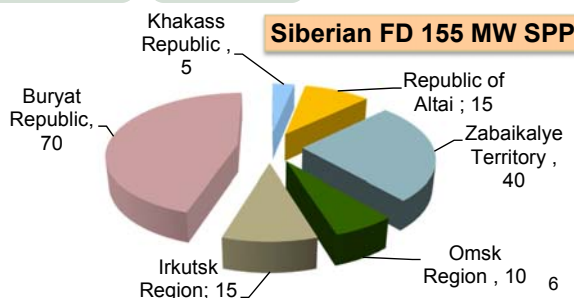
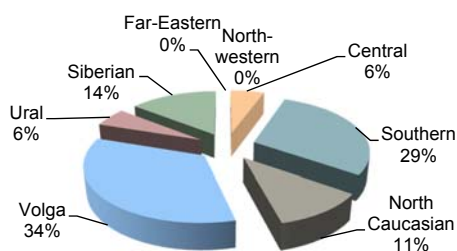
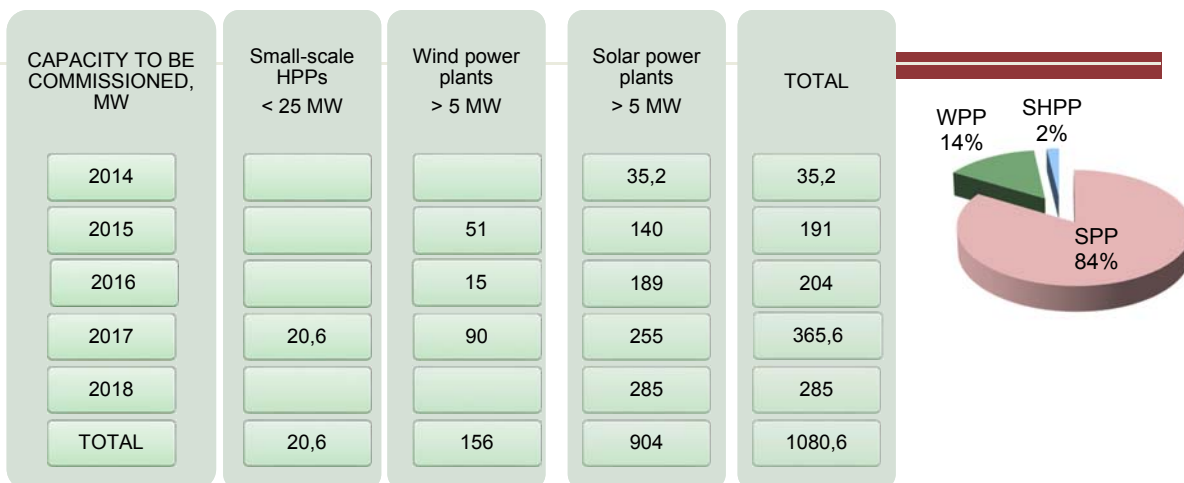
Solar power plants > 5MW



- Capacity to be commissioned by 2020
- Capacity factor
- Share of equipment production in the Russian Federation
- Marginal capital costs



Investment projects for RES construction that won the tender held by the JSC “Trading System Administrator of Wholesale Electricity Market” in 2013-2014, in pursuance of the Resolution No 449 of the RF Government





Resolution of the Government of RF No 47 of January 23, 2015 “About introduction of changes in some acts of the Government of RF on the promotion of RES utilization in retail electricity markets”

- Facilities using wind, solar, hydro energy, biogas, biomass and landfill gas;
- Main criterion in the tenders is a reduction in the electricity cost;
- Payback period of the project is 15 years;
- Electricity is sold to a last resort supplier;
- Long-term electricity tariff established by the regional executive body for this period with a fixed rate of return ;
- Mandatory share of equipment production in the Russian Federation is set from 01.01.2017 ;
- No standards on limits of capital costs;
- No methodology is defined to determine a long-term tariff.

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COMPARISON OF RESOLUTIONS OF THE GOVERNMENT OF RF ON THE PROMOTION OF RES UTILIZATION IN THE WHOLESALE AND RETAIL MARKETS

Index	Wholesale market	Retail market
Tender	Non-commercial partnership “Council of the Market” through JSC “Trading System Administrator of Wholesale Electricity Market”	RF entity
Mandatory introduction of RES utilization in the scheme and program of prospective regional power industry development	When developing	Based on tender
Project payback period	15 years, but there are distinctions in calculation of the rate of return	
Limitation of the volume of RES-based electricity production	< 5% of electricity losses in networks	No
Mandatory share of equipment production in the Russian Federation	Is operating	Since 2017
Certification	The object is controlled by the system operator	It is necessary to collect, recognize and cancel certificates of RES-based electricity production

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FORECAST OF RENEWABLE ENERGY DEVELOPMENT IN THE PROJECT OF ENERGY PROGRAM - 2035

The main target index by 2035:

the share of renewable energy in the total capacities to be commissioned – 3,7%
in electricity production – 2,2%

Total RES capacities to be commissioned – 18 thousand MW

Electricity production from RES – 34-35 billion kWh

Increase of capacity factor for WPP up to 25%, SHPP – 50%,
GeoPP – 75%, CP on biomass – 50%

The main lines of innovative energy development:

- Development of units and equipment for low-head small-scale hydropower plants;
- Creation of technologies for construction and operation of large on-grid wind power plants;
- Adoption of technologies for construction and operation of wind-diesel systems;
- Creation of an industry for production of large- and medium-capacity wind power plants;
- Modernization of the existing industrial facilities for production of geothermal power plants;
- Development of an industry for production of equipment for photovoltaic plants;
- Development of technologies for binary cycle units, thermal pumps, etc.
- Development and implementation of technologies for electricity production on the basis of wood waste gasification;
- Improvement in the equipment for biogas plants.

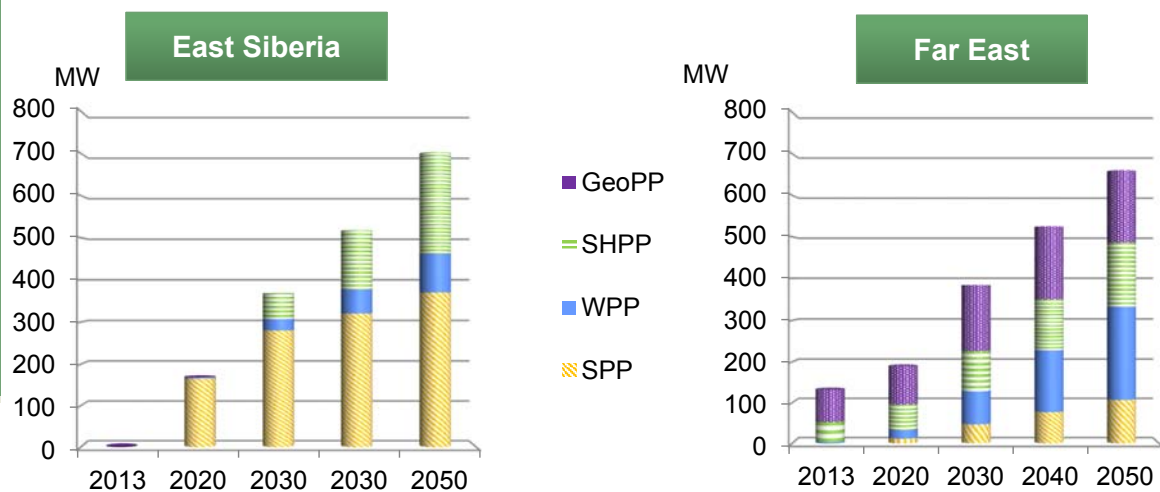
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WITHIN THE PROGRAM OF HYDROPOWER INDUSTRY DEVELOPMENT IN THE EASTERN REGIONS OF SIBERIA AND THE FAR EAST FOR THE FEDERAL HYDROGENERATION COMPANY «RUSGIDRO»

ESI FORECAST FOR EASTERN REGIONS



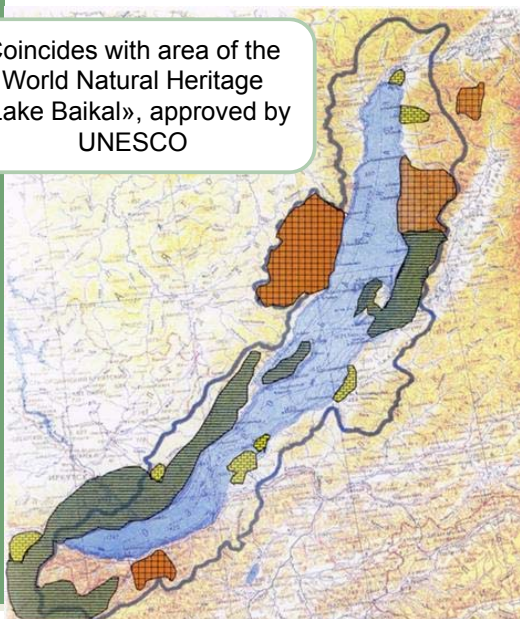
TOTAL CAPACITY TO BE COMMISSIONED – 900-1200 MW

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THE CENTRAL ENVIRONMENTAL ZONE OF BAIKAL NATURAL TERRITORY (ENACTED IN THE FEDERAL LAW "ABOUT PROTECTION OF THE LAKE BAIKAL")

Coincides with area of the World Natural Heritage «Lake Baikal», approved by UNESCO



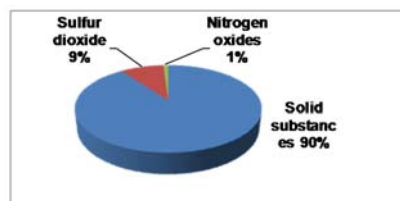
Total area of specially protected natural territories is **1/3** of the Central environmental zone

23 specially protected natural areas	
	Preserves
	National parks
	Wildlife sanctuaries and reserves

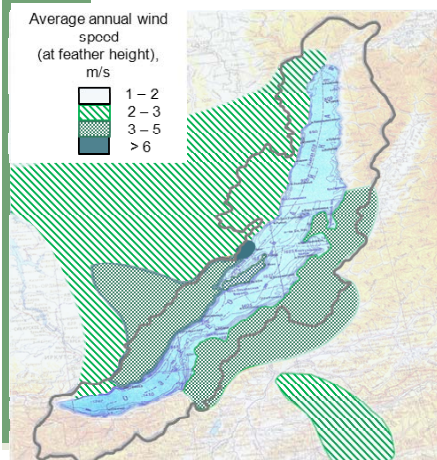
The law regulates special anthropogenic activities

Entities of RF	Number of coal-fired boiler plants, pcs.	Coal consumption, thous. t/yr	Rated emission, thous. t/yr
Irkutsk Region	28	87	9,0
Buryat Republic	54	109	11,6
TOTAL	82	196	20,6

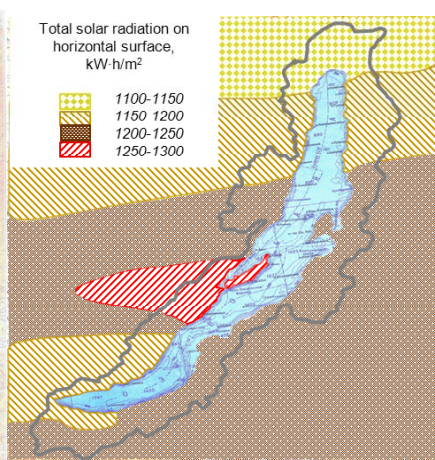
Emission composition



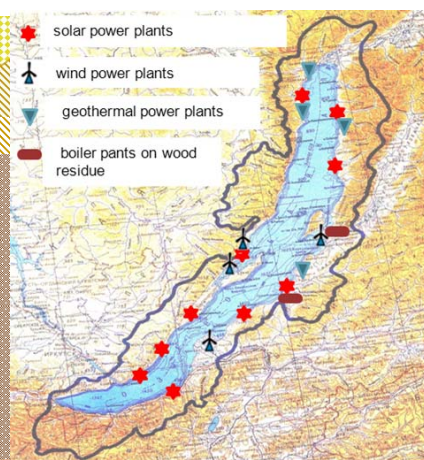
DIVISION OF THE CENTRAL ENVIRONMENTAL ZONE INTO SUBZONES IN TERMS OF INDICES OF RENEWABLE NATURAL ENERGY RESOURCES



Wind energy potential



Heliopotential



Potential location of renewable energy sources



Thank you for your attention

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