International Gas Union Research Conference
IGRC OPENHAGEN 2014
September 17-19

Gas Innovations Inspiring Clean Energy

Prospects for Green Gas Production in the Russian Federation and its Potential Export to the European Union

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Potential of Biogas Production (plant growing, waste water, solid domestic waste (SDW))

	Organic substances (mln t)*	Biogas Billion cubic m	Total (GW)
Plant growing	147	94.8	84.4
Agro-industrial complex waste processing	14	12.8	11,4
Waste water	4.9	2.6	2.3
SDW (municipal)	16	20.8	18.5
Total		131.0	117.7

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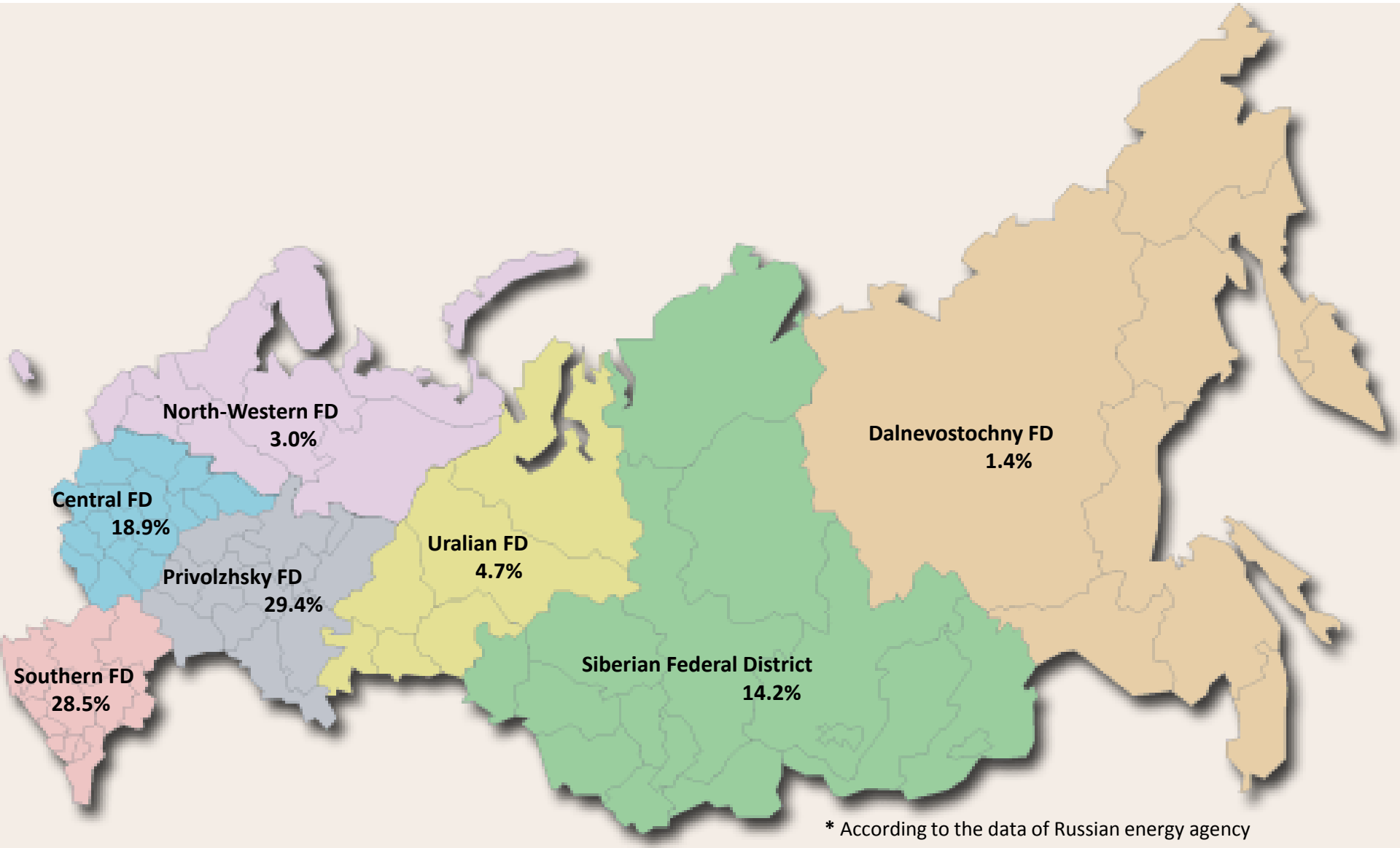
Data of the Institute of energy strategy of Ministry of Energy of the RF

The Distribution of Biogas Potential over Federal Districts (without lumber industry waste and peat)*



* According to the data of Russian energy agency

Basic Trends in Green Gas Development in the Russian Federation

- Anaerobic fermentation at:
  - Livestock units and agro-industrial complex enterprises
  - Water and drainage facilities and waste water treatment systems
  - Food industry enterprises
  - SDW
- Pyrolysis technologies for:
  - SDW
  - Wood waste

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Agro-industrial Complex: Problems

- Nowadays a volume of waste of agro-industrial complex in Russia totals 600 mln t/year (225 mln t of dry matter), the major portion of this waste is not utilized.
- Generation of a large quantity of waste in agriculture results in the soil oxidation problems, condemnation of agricultural lands (over 2 mln ha of agricultural lands are used for manure storage).
- 37% of large- and medium-size agricultural producers only have an access to the gas distribution networks and 20% of them have an access to the heat supply systems.

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Pre-requisites for Biogas Production at the Water and Drainage Facilities and Water Disposal Systems in the Russian Federation

- The necessity for water cleaning from organic wastes and their further utilization or burial;
- Popularity of the anaerobic fermentation technology for organic waste processing at the aeration stations of EC and US water and drainage systems;
- The necessity to provide steady electric power supply of auxiliaries of water and drainage facilities and high requirements for reservation of capacities;

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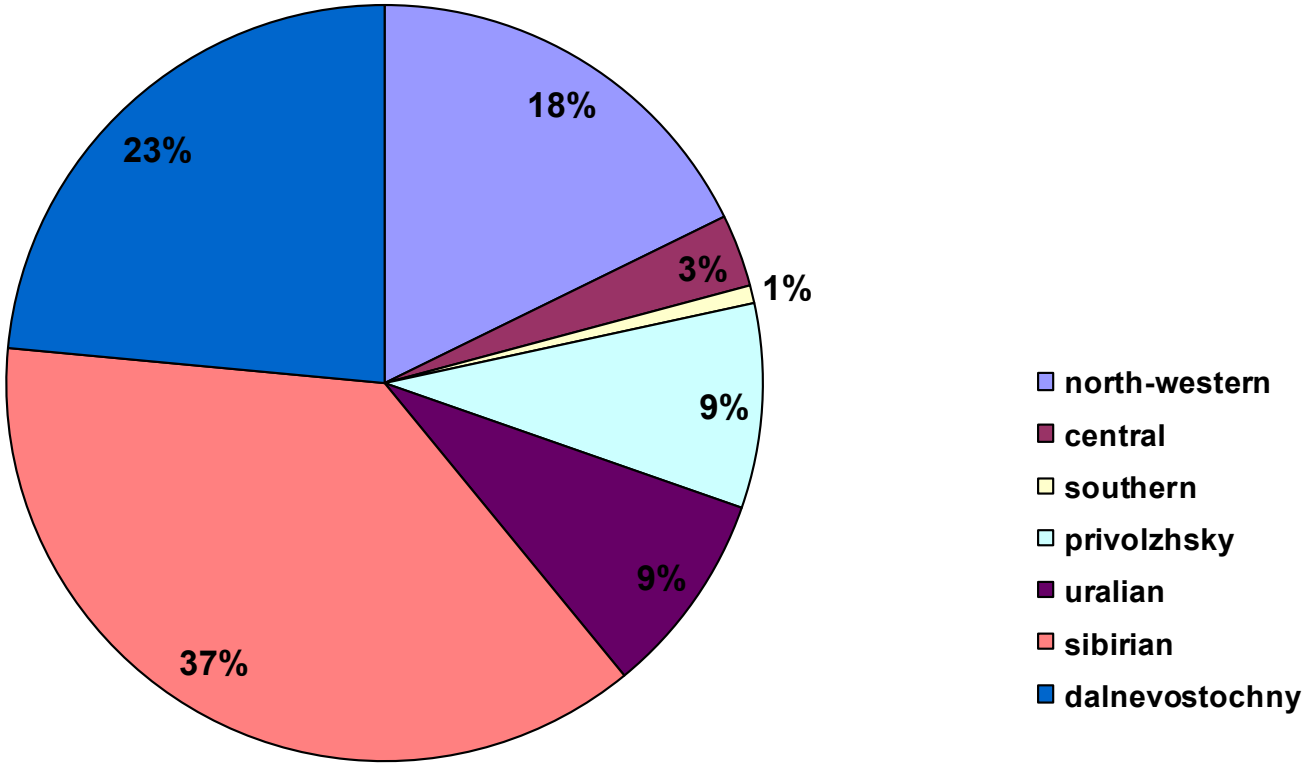
Distribution of Biogas Production Potential at Lumber Industry Enterprises over the RF districts



Biogas production potential – 59 billion cubic m (in biogas equivalent)

Biogas Production Facilities in the Belgorod Region

Governor of the Belgorod region Yevgeny Savchenko approved the Concept of bioenergetics and biotechnology development in the Belgorod region for the period of 2009 - 2012.

Basic objectives:

- ensuring environmental safety of Belgorod region territories (the atmosphere and land) upon intensified development of livestock and poultry production units;
- creation and development of innovative technologies for biowaste utilization based on bioenergetics with harnessing of alternative renewable resources, with use of biotechnologies and production of electric power and heat energy;
- creating a market of their own highly-effective organic fertilizers with complete replacement of mineral fertilizers acquired outside of the region

The following projects are being implemented within the framework of the Concept:

- construction of a 500 kW biogas unit at OOO “Strigunovsky pig production unit” v. Baytsury, Borisov district;
- construction of biogas units at the treatment facilities on the sites of OOO “Severnaya” poultry plant” in the Belgorod district and of “Investments Finance Management” managing company “Mayachki-1” in v. Mayachki, Prokhorov district.

Project of Biogas Production at the Kuryanovsky and Lyuberetsky Treatment Facilities of Mosvodokanal (Moscow Water and Drain System)

- Presently at the treatment facilities of MGUP “Mosvodokanal” (Moscow water and drainage system) there are 44 methane tanks with a total volume of 280 thousand cubic meters, including 24 methane tanks at the Kuryanovsky treatment facilities and 20 methane tanks at the Lyuberetsky treatment facilities;
- Biogas production at the Kuryanovsky treatment facilities is 28 mln cubic meters/year
- Mini-thermal power plant (TPP) is operated by WTE Wassertechnik (Austria) and runs in parallel with a network of OAO “MOESK”, covering 50% of thermal power requirements of the plant.
- Basic specifications of mini-TPP:
  - Electric output of mini-TPP - 10 MW;
  - Thermal power of mini-TPP – 6.9 Gcal/h;
  - Efficiency (total) – 84.6 %.
- Basic technical and economic indices
  - investment value – 29.6 mln EUR;
  - biogas cost – 286 rub/1000 cubic m.
  - electric power cost at mini-TPP -2.13 rub/kW h;
  - thermal power cost - 755 rub./Gcal,
  - electric power cost exclusive of investment component – 1.80 rub/kW h;

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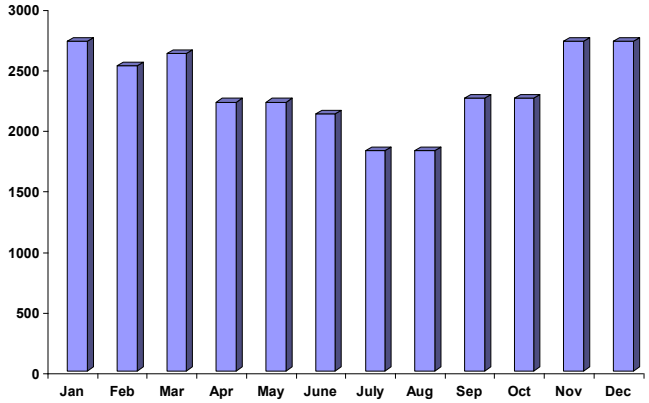

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Landfill gas system in Adler city waste plant

gas drainage well

gas collection unit

gas manifold

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Possible Ways of Biogas Use in the Russian Federation

- Production of heat and power, including that in combination with natural gas;
- Biogas treatment to generate methane for its further application:
  - For coproduction of heat and electric power
  - In road and water transport
- Biogas export in the form of LNG or over transmission pipelines

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Some tricky questions for my colleagues

- Does it have sense to import organic waste from non-EU countries?
- Do we need feeding tariffs?
- Why technologies become more expensive instead of became cheaper?
- Why customer pays double price for his waste?

Don’t clean black stripes on zebra.
It’s not a dust it’s zebra itself

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Thank you for your attention!

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