

# The Prospects of Biogas Production and Use in the Russian Federation

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Date: 4-8 June 2012  
Venue: Kuala Lumpur



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# Presentation Structure

- Conditions of biogas production development in the Russian Federation
- Legal framework
- Potential for biogas production in the Russian Federation
- Examples of the existing projects
- Gazprom and biogas (agreements, prospects)
- Conclusions

**The Prospects of Biogas Production and Use in the Russian Federation**

Region	Percentage
Центральный ФО	16.9%
Дальний Восток	1.4%
Южный федеральный округ	14.3%
Северо-Кавказский ФО	9.7%
Волжский ФО	26.4%

- Стратегия развития газовой и энергетической промышленности России до 2020 года, утвержденная распоряжением Правительства Российской Федерации от 17 апреля 2012 г. № 399-р предусматривает значительные инвестиции в развитие отрасли.
- Необходимость очистки сточных вод, градирней и высоком экологических требования к качеству очисток.
- Наличие значительного объема органических отходов, необходимость их утилизации.
- Необходимость обеспечения высококачественного теплоснабжения и электроэнергоснабжения сельскохозяйственного производства.

Спасибо за внимание!

# Conditions of Biogas Production Development in the Russian Federation

- Energy strategy of Russia till 2030 envisages power production based on renewable energy sources by 2030 – 80-100 billion kW h/year
- Support of biogas development on the federal and regional levels
- 51% of the Russian Federation territory have no centralized energy supply
- Unreliable power supply, steady-rising cost of gas, heat and power
- Substantial consumer demand for biogas in developed countries
- The necessity to utilize manure



# Potential of Biogas Production in the Livestock Sector (March 2012)

	Total * (mln head)	volume of manure (th. tonnes)	Biogas (billion cubic m/year)	Biogas (GW)
Cattle	20.9 (+1.1)	606	10.1	8.8
Pigs	18.1 (+1.3)	106.8	2.0	1.6
Sheep and goats	24.5 (+7.1)	58.8	1.8	1.6
Poultry	498.1 (+8.5)	0.2	1.8	1.6
Total	-	-	15.7	13.6

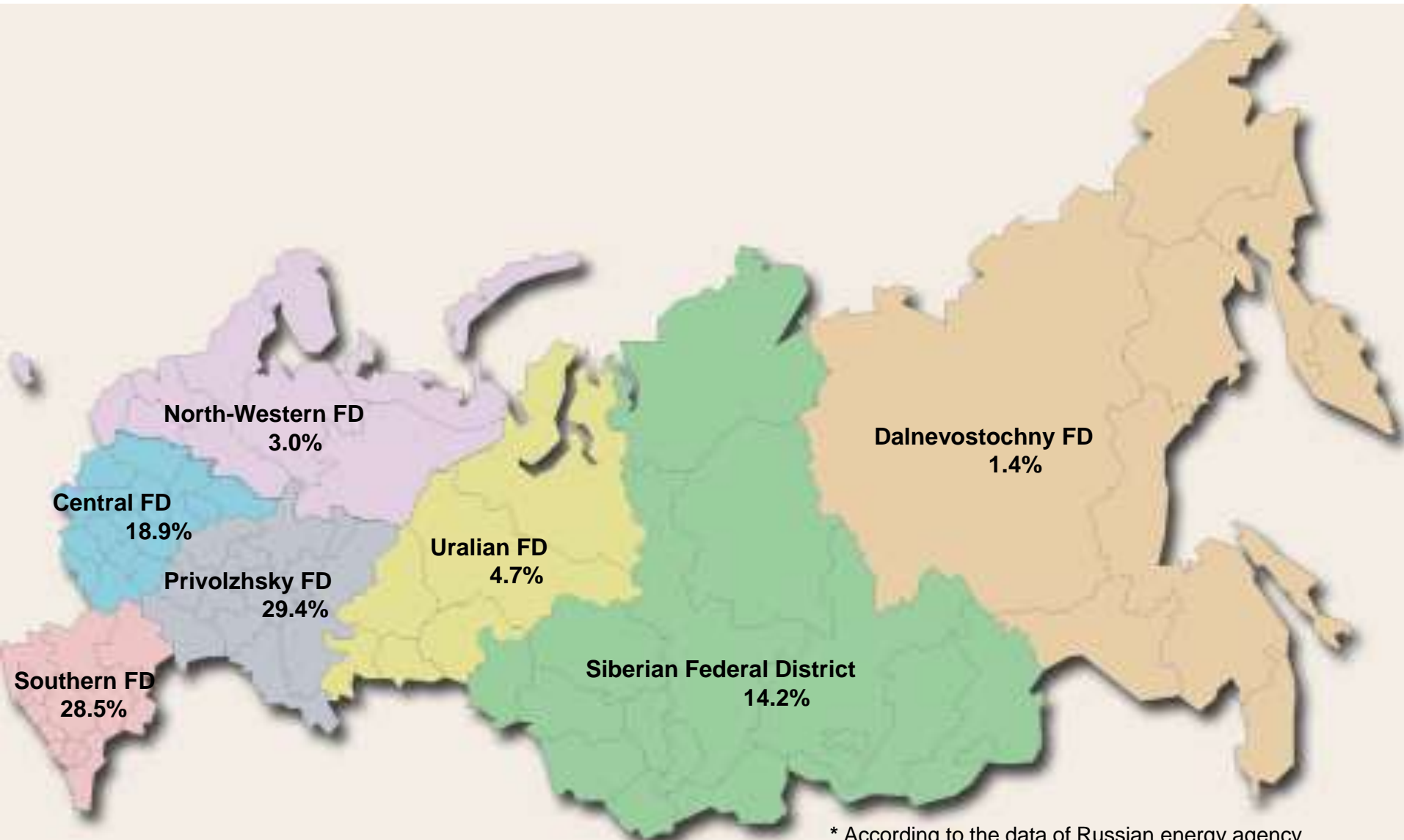
*\*Data of Ministry of Agriculture of the RF*

# 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

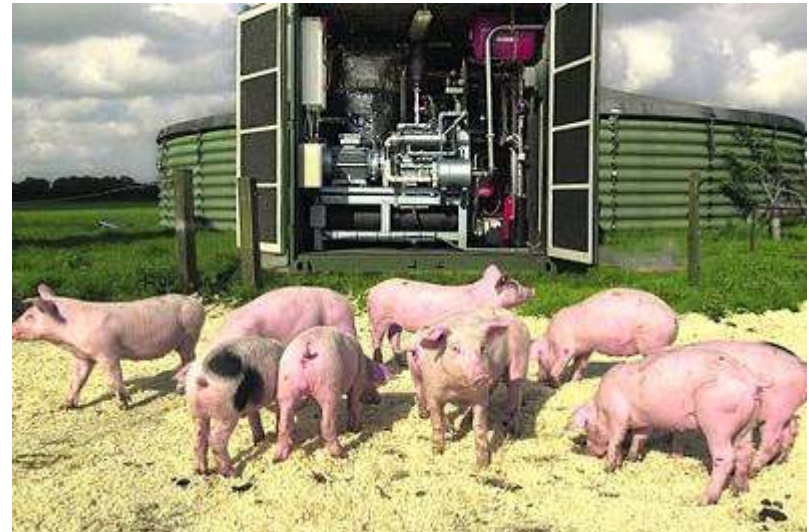
*\*Data of the Institute of energy strategy of Ministry of Energy of the RF*

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



\* According to the data of Russian energy agency

- 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



[www.oilngases.ru](http://www.oilngases.ru)

# Agro-industrial Complex: Problems

- Waste of agro-industrial complex in Russia exceeds 150 mln. t/year, most of this is not utilized.
- Much waste in agriculture leads to soil oxidation and other problems.
- Only 37% of large- and medium-size agricultural producers have an access to the gas and 20% of them have an access to the heat.
- Government plan to increase a share of electric power produced from renewables by 2020 up to 4.5%.
- Russian Government Decree sets Rules for allocating and granting federal subsidies to support regional agriculture development programmes





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

- In the Russian Federation there are 454 waste water treatment facilities, serving 100 th. and more people each;
- The necessity of treated water organic waste further utilization or burial;
- The necessity to ensure reliable electric power supply of auxiliaries of water and drainage facilities and high requirements for reservation of capacities;
- Availability of state financial support in the frames of private public partnership.
- Long-term Concept of Russian Federation development until 2020 sets as major priority enhancement of potable water production technology, sewage treatment, water production industry development.



[www.mosvodokanal.ru](http://www.mosvodokanal.ru)

# Problems and Prospects of Solid Domestic Waste Processing

- Volume of accumulated waste in Russia exceeds 94 bln t; over 50 thousand hectares are under disposal sites (March 2012);
- About 35-40 million tons of SDW are formed annually in Russia. Only 4-5% of total amount of waste formed annually are processed;
- Ensuring the environmentally safe waste management is one of the priority objectives of «Fundamentals of the state policy in the area of environmental development of the Russian Federation for the period till 2030»;



[www.rpn.gov.ru](http://www.rpn.gov.ru)



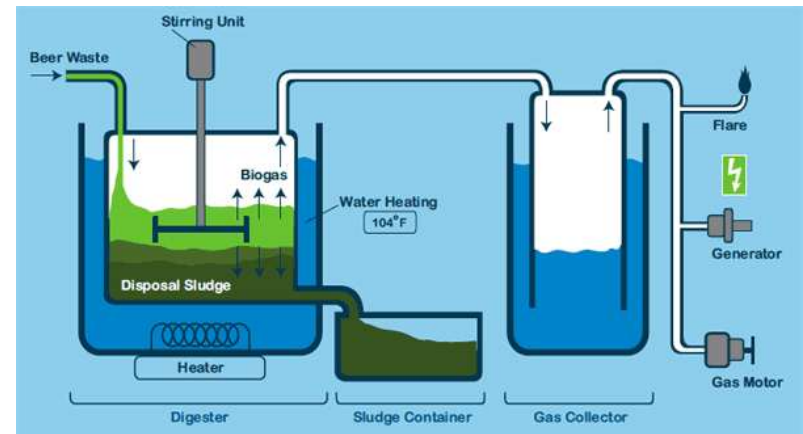
[www.dae.gov.in](http://www.dae.gov.in)

# Prospects of Biogas Production at Food Industry Enterprises

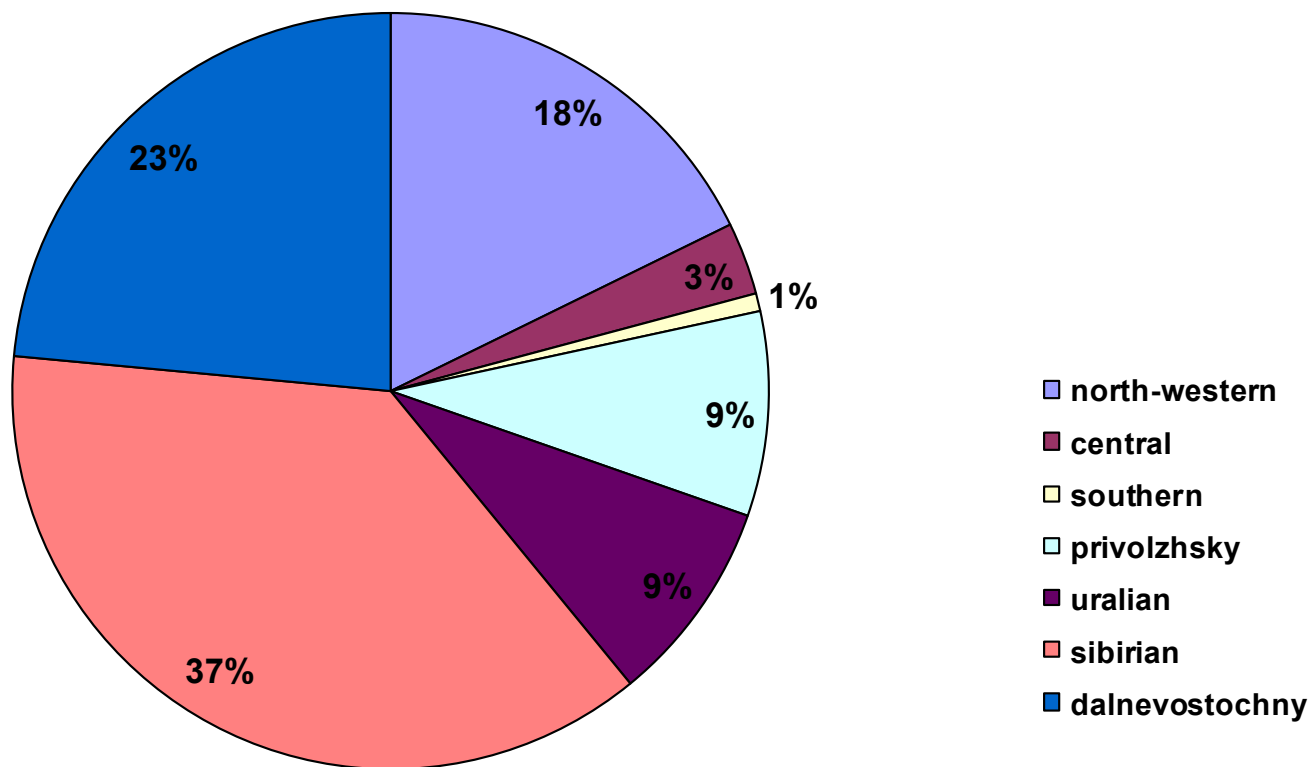
- Presently there are over 25 thousand food industry enterprises in the Russian Federation;
- The necessity for treatment of waste water from the enterprises and high environmental requirements to the quality of treatment;
- Availability of a considerable volume of organic waste and necessity of its utilization;
- Necessity to provide high-quality heat and electric power supply for the operating process at the enterprises.



[www.4turista.ru](http://www.4turista.ru)



# 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 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;
- creating a market of their own highly-effective organic fertilizers with complete replacement of mineral fertilizers

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

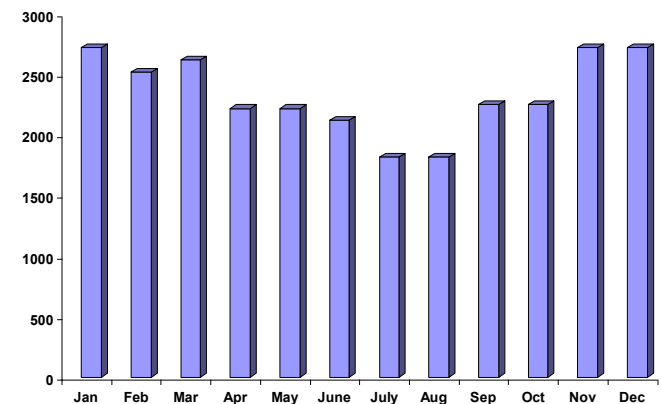
- construction of a 500 kW biogas unit at a livestock farm;
- construction of biogas units at the treatment facilities on the sites of one poultry plant in the Belgorod district.

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

- Presently at the treatment facilities of “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), covering 50% of thermal power requirements of the facilities.
- Basic specifications of mini-TPP:
  - Electric power of mini-TPP - 10 MW;
  - Thermal output 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.



[www.mosvodokanal.ru](http://www.mosvodokanal.ru)



# OAO «Gazprom» and Biogas Production:

- On April 25, 2012 Board of Directors of OAO “Gazprom” **adopted a decision on the development of scientific and technological potential of the Company in the area of production of non-conventional types of gas**
- Memorandum of Understanding on joint implementation of the project for “green” gas production in Russia between OAO “Gazprom”, Gasunie and local biogas consultancy company;
- Prefeasibility study of biomethane production at the treatment facilities of the Saint-Petersburg water and drainage system followed by its supply to EC in the form of LNG together with Gasum (Finland);
- Capabilities study of livestock waste utilization in the Tambov, Kaluga regions carried out by OAO “Gazprom”;
- International conference of OAO “Gazprom” on renewable energy sources (end of September, 2012) – section on biogas production in the regions of the Russian Federation.



# 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 combine heat and power generation
    - For vehicles In road and water
- Biogas export in the form of LNG or over transmission pipelines



[www.gasum.fi](http://www.gasum.fi)



# Conclusions

- ✓ Production of “green” gas (biogas) is an efficient method for utilization of renewable biomass.
- ✓ Russian Federation has significant potential for production of biogas. In case of its implementation together with the existing gas infrastructure in Russia it will strengthen a core role of methane in the stable power balance in future.
- ✓ There are condition for growth of demand for biogas in Russia and good opportunities of Russian green gas in the European market.
- ✓ Development of bioenergetics in Russia is a topical state objective for reducing the farming industry volatility, decreasing the greenhouse gas emissions and diversification of fuel balance of the country in the direction of environmentally cleaner power industry development.



Thank you for your attention!