Market Study:
Bio-energy in Belgorod and Voronezh regions of Russia

Opportunities for Dutch companies

October, 2013
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Last but not least, the authors would like to thank all the interviewed representatives of the bioenergy sector, representatives of the scientific organizations and public officials for sharing their experiences and contributions to this study.

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1. Executive Summary

Belgorod and Voronezh regions are both located in the Central Black Earth Region of Russia. The fertile grounds are ideal for agricultural production.

In the investigated regions a large number of mega farms are operating in the field of poultry, swine and cattle. The abundant agricultural produce is partly used as animal feed. These mega farms supply not only the region but to the whole of Russia. Due to its sheer production size and expected growth, agricultural waste disposal is a priority. Anticipating the environmental challenges, the regional government of Belgorod has approved a program called “Development of renewable energy sources for 2013-2015 and the period until 2020”. The main source is for the bio energy projects will be agricultural waste. Also the regional government of Voronesh expects bio energy project to start in the coming years and eventually more than 10% of the agricultural waste is expected to be processed and used for bio energy generation.

Some progress in legislation promoting the energy generation out of renewables (RES-energy) has been achieved, however the acting legislation does consist of defined supporting measures to promote bio-energy plants as RES-generating facilities. This means that bio-energy plants are treated just as power plants by the Government; complicating the construction and approval process. Legislative changes are expected by the end of 2013 – beginning 2014.

While the green tariff is not officially implemented yet in Russia, another model of indirect subsidy of electricity generated out of RES (including bio-energy plants) is successfully piloted at Belgorod region. The network and distribution companies have to buy electricity for covering transmission losses from certified companies involved in electricity generation from RES at a higher tariff, which is approved by the regional tariff authorities.

There is no large market for bio-energy solutions in Russia yet at this moment, however Belgorod and Voronesh regions are in Russia amongst the most interesting ones for the Dutch suppliers for the following reasons:

- The high concentration of mega farms and the growth in agricultural production, which is still expected, especially in the Voronesh region.
- The regional Government is well aware that it needs to deal with agricultural waste (for environmental reasons).
- In the region already 3 digesters and biogas installations are in operation and the regional Government has taken measures to have these installations running profitable.
- The regional Government has allowed private companies to operate the biogas installations and has recently outsourced municipal waste collection and processing, facilitated by the change in legislation in the beginning of this year.
When the legislation for bio energy plants is changed and they will be treated like RES generating power plants the number of projects is expected to take off. The following equipment and technologies in the area of bio-energy are considered very potential:

**Municipal waste processing:**
- Bio-gas cleaning and purification technologies;
- Equipment for automatic sorting of municipal waste and producing energy briquettes.
- High-efficient CHP units;
- Landfill gas collection systems feasible at low-scale landfills.

**Bio-gas installations:**
- Bio-additives for increasing the efficiency of fermentation at bio-gas plants;
- Bio-gas cleaning and purification technologies;
- Digesters and biogas installations
- Equipment for utilizing exhaust heat produced by gas motors at bio-gas plants;
- Equipment for producing granulated organic fertilizers out of the bio-reactor substrate;
- Technologies for biological processing of poultry litter.

Dutch companies who decide to enter the Russian market have to deal with the low awareness in Russia about the available Dutch technology in the field of bio-energy. They should be prepared to adapt their sales strategy to the realities of the Russian market. A successful entry will be difficult to achieve without co-operation with a Russian partner.

Special attention should be paid to the financing of bio energy projects. With lengthy approval procedures before bio-energy plants can be put in operation, finding financing to bridge the initial period is key. Russian banks are at this moment reluctant to finance these projects and the regional governments are not yet allocating sufficient subsidy money. This means that at this moment the complete project has to be financed by the private Russian investor. Only, for the Voronezh region the IFC has a credit facility available. Dutch companies, who are considering to deliver on credit terms should consider contacting credit insurance companies, who are active on the Russian market (Atradius, Hermes etc)

Most of the Dutch suppliers of equipment and technologies in the field of bio energy are SME companies. In order to be successful a long term approach is needed: creating awareness, showing your capabilities and mostly turnkey implementing the projects. Most of the Dutch technology suppliers are too small to do this independently. Cooperation and joint promotion are necessary. The Dutch government could play an important role in forming and facilitating a cluster of bio energy suppliers. The cluster should have a horizon of cooperation of at least 2 to 3 years.
2. Introduction

On behalf of the Ministry of Economic Affairs of the Netherlands, represented by Agentschap NL (hereinafter referred to as “NL Agency”), Larive International has executed this market study.

The market study is seen as the concretisation of the previously executed market survey on bio-energy in Russia (2012), with the focus on the more detailed scanning of the situation with the bio-energy in Belgorod and Voronezh regions.

Goal of the survey was to develop a short description of the Belgorod and Voronezh regions with regard to bio-energy as well as to provide an advice, based on this description, on how to stimulate cooperation between Dutch and Russian companies and/or institutes.

The survey maps the opportunities for Dutch companies to export their technology and knowledge in the field of bio-energy to Russian companies in the selected regions. The survey is based on desk and field research and comprises the following:

1. An overview of Belgorod and Voronezh bio-energy potential.
2. An overview of the federal and regional legislation with regard to bio-energy.
3. An analysis of stakeholders involved into realisation of bio-energy projects.
4. An overview of the technologies applied in the area of bio-energy.
5. An analysis of the opportunities to export Dutch technology and knowledge in the field of bio-energy to the respective regions of Russia.
6. Advice on how to improve the Dutch commercial involvement in the respective regions.
7. Practical information on the best ways to enter this market segment by Dutch companies.

Both the desk and field research have been conducted in Belgorod and Voronezh regions of Russia. Interviews have been conducted with representatives of companies, research institutions and governmental officials.
3. Potential of Belgorod and Voronezh regions with regard to bio-energy

This chapter provides an overview of the bio-energy potential of Belgorod and Voronezh regions with regard to bio-energy and its development trends.

Belgorod and Voronezh regions are located in the Central Black Earth Region or Central Chernozem Region of Russia. Its a segment of the Eurasian black earth belt that lies within Central Russia and comprises Voronezh Oblast, Lipetsk Oblast, Belgorod Oblast, Tambov Oblast, Oryol Oblast and Kursk Oblast. Between 1928 and 1934, these regions were united into Central Black Earth Oblast, with the centre in Voronezh.

The Black Earth Region is famous for its very good soil, called Chernozem (Black Earth), hence the name. Its importance is primarily agricultural.

The area contains a biosphere nature reserve called Central Chernozem Reserve. It was created in 1935 within the Kursk and Belgorod oblasts. A prime specimen of forest steppe in Europe, the nature reserve consists of typical virgin land steppes (tselina) and deciduous forests.

3.1. Overview of Belgorod region

![Belgorod Region Map]

**Population:** 1,532,526 (2010 census)
**Area:** 27,100 square km
**Capital:** Belgorod (362,832 inhabitants), 695 km from Moscow
**Other major cities:** Stary Oskol (216,000)
**Federal district:** Central
**Geography:** Located in the western part of European Russia, Belgorod borders Ukraine and the Kursk and Voronezh regions.

**Population spread:** urban - 65%, rural - 35%.

Belgorod is best situated in the Black Earth Region, full of mineral reserves and rich farmland. The region is one of Russia’s largest agricultural districts, producing sunflowers, sugar, grain, meat and milk.

Mining and metallurgy are important industries, focused around the Kursk magnetic anomaly.

Belgorod Oblast is administratively divided into twenty-one districts, which are further divided into 335 rural okrugs. There are ten cities/towns in the oblast, as well as twenty urban-type settlements and 1,592 rural-type settlements.
3.1.1. Main energy sources applied

Belgorod region is supplied by electricity from outside the region. Its own electricity production is only 7,97 % from the consumption of electricity in the region (see Table 1). The generation of electrical energy is done by 2 Combined Heat & Power (CHP) plants:

- Belgorodskaya CHP (25,6 MW electric capacity);
- Gubkinskaya CHP (46 MW electric capacity).

Table 1. Energy balance of Belgorod region.

<table>
<thead>
<tr>
<th>Region</th>
<th>Production 2012, million kWh</th>
<th>In % to 2011</th>
<th>Consumption 2012, million kWh</th>
<th>In % to 2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>Belgorod region</td>
<td>816.0</td>
<td>97.1</td>
<td>10234.8</td>
<td>104.8</td>
</tr>
</tbody>
</table>

Source: RIA Rating, 2013.

Both Belgorodskaya CHP and Gubkinskaya CHP plants use natural gas as fuel.

3.1.2. Bio-energy sources and potential

Belgorod region has a high concentration of agro-industrial enterprises on its territory, which provide the region with plenty of bio-energy potential. This potential is mainly in the form of agricultural waste. The quantities are estimated as follows (in the main sectors):

Table 2. Main sources and volumes of agricultural waste in Belgorod region.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Sugar beet cultivation</td>
<td>1.145 thousand tons</td>
<td>1.716 thousand tons</td>
<td>2...5 % growth compared to 2012</td>
</tr>
<tr>
<td>2.</td>
<td>Poultry</td>
<td>48.545 thousand heads</td>
<td>1.136 thousand tons</td>
<td>4...6 % growth compared to 2012</td>
</tr>
<tr>
<td>3.</td>
<td>Cattle</td>
<td>235 thousand heads</td>
<td>3.636 thousand tons</td>
<td>No growth is foreseen</td>
</tr>
<tr>
<td>4.</td>
<td>Pigs</td>
<td>3.406 thousand heads</td>
<td>7.795 thousand tons</td>
<td>5...10 % growth compared to 2012</td>
</tr>
</tbody>
</table>

Market study: Bio-energy in Belgorod and Voronezh

The existing volume of agricultural waste constitutes an environmental issue (smell and land pollution), thus creating an urgent need for its processing. So far, practically all agricultural waste remains unprocessed.

3.1.3. Energy/environmental issues which can be solved with application of bio-energy

In the Belgorod region due to implementation of regional target programs of pig breeding, poultry farming and dairy farming the environmental problem of agricultural sector waste disposal today has a priority.

Considering the increasing concentration of agro-industrial enterprises the task to minimize damage to the environment is especially relevant. Shift of livestock and poultry production to industrial scale makes it necessary to organize on each farm a complex system of processing of the large waste volumes. At this moment the manure removal is by water wash, where a runoff pipeline system brings the manure to a lagoon, where it is kept for sometime and then spread over the land. Long-term storage of manure runoff is linked with the negative impact on the environment.

3.1.4. Energy applications which are most interesting for bio-energy

The bio-energy potential of the Belgorod region is primarily agricultural. With the help of biomass processing technologies it will be possible not only to solve the environmental issues in Belgorod region, but also to reduce the regional dependency from the federal electrical grid system.

3.2. Overview of Voronezh region

Population: 2,335,380 (2010 census)
Area: 52,400 square km
Capital: Voronezh (847,620 inhabitants), 587 km from Moscow
Federal district: Central
Geography: Voronezh is located in the south central part of European Russia, on the upper reaches of the Don river basin. The region is divided into forest and steppe lands. The Voronezh river, a tributary of the Don, flows through the region.

Population spread: urban - 62%, rural - 38%.

Voronezh region's leading economic sectors: aircraft construction, compression-type machines, excavating machines, mining equipment, machines and equipment for food manufacturing industry, agricultural machine building, radio engineering products, synthetic rubber, tyres, mineral fertilizers, as well as production of food, building materials and agricultural products. The region's soil is well suited for growing sunflowers, grains, hemp and millet. The area also produces oils, alcohol and tobacco.
The administrative and territorial division of the Region comprises of the city of Voronezh and 32 districts in the Region.

### 3.2.1. Main energy sources applied

The electricity produced reaches 97.54% of the electricity consumed in the region.

The Novovoronezh nuclear power station (capacity – 2,449 MW) is a main source of electrical energy, providing 85% of the Voronezh region needs. The other 15% is generated by CHP-1 (Combined Heat and Power 1: capacity - 168 MW) and CHP-2 (12 MW) of the "Voronezh regional generation" company, and units 3 and 4 of the Novovoronesh CHP.

The first unit of Novovoronezh nuclear power station was commissioned in 2012, the second unit (NPS-2) is expected to be commissioned in 2015. Launching the second unit of the new plant will fully provide the region with electric power and offset the decline in production of electric energy that is a result of the planned decommissioning of Units NN 3, 4 of Novovoronesh CHP.

#### Table 3. Energy balance of Voronezh region.

<table>
<thead>
<tr>
<th>Region</th>
<th>Production</th>
<th>Consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2012, million kWh</td>
<td>In % to 2011</td>
</tr>
<tr>
<td>Voronezh region</td>
<td>14528.8</td>
<td>151.5</td>
</tr>
</tbody>
</table>

*Source: RIA Rating, 2013.*

### 3.2.2. Bio-energy sources and potential

Voronezh Oblast is one of the country's food donors. Advanced agriculture is formed here thanks to the fertile black soil that is one of the main natural resources of the region. The main areas of agricultural production are cereals, sugar beet, sunflower seeds, milk, eggs, meat, cattle and pigs. The quantities of waste generated in the agriculture are estimated as follows (for the main sectors):

#### Table 4. Main sources and volumes of agricultural waste in Voronezh region.

<table>
<thead>
<tr>
<th>No.</th>
<th>Source</th>
<th>Volume of agricultural production 2012</th>
<th>Calculated volume of waste 2012</th>
<th>Expected development until 2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Sugar beet</td>
<td>3.923 thousand tons</td>
<td>2.900 thousand tons</td>
<td>15% growth comparing to 2012</td>
</tr>
<tr>
<td>2.</td>
<td>Poultry</td>
<td>8.436 thousand heads</td>
<td>191 thousand tons</td>
<td>15...20% growth comparing to 2012</td>
</tr>
</tbody>
</table>
3. Cattle 428 thousand heads 6.250 thousand tons 10...15% growth comparing to 2012

4. Pigs 512 thousand heads 1.500 thousand tons 25...30% growth comparing to 2012


3.2.3. Energy/environmental issues which can be solved with application of bio-energy

According to the Program “The development of agriculture in the Voronezh region for the years 2013 - 2020” a considerable increase in agricultural and livestock production is expected. The regional Government expects that treatment of agricultural waste with the help of biotechnology will start in 2015. By 2020 the share of waste, processed by biotechnology, is expected to reach 11,5 %.

As agriculture and livestock development are closely linked to environmental pollution issues, the task to minimize damage to the environment with the help of technology will become especially relevant in the next years.

3.2.4. Energy applications which are most interesting for bio-energy

Due to the nature of the bio-energy potential which is primarily agricultural, biogas related technologies seem to be the most appropriate solution to address the environmental issues related to the forecasted development of agricultural sector in Voronezh region.
4. Federal and regional energy policies with regard to bio-energy

4.1. Current policy developments at federal level

There is no separately formulated bio-energy policy in Russia. The developments in this sector are mainly regulated/influenced by the legislation in the fields of energy market, renewable energy sources and environment protection. There were no major initiatives at the federal level enforced since the beginning of 2013 which might be influencing the development bio-energy project in Russia. At the same time, some progress in the direction of promoting the energy generation out of renewables (RES-energy) has been achieved.

Policy changes regarding the use of renewable energy sources

The Russian Government 28 May 2013 has issued Regulation No. 449 “On the mechanism for promotion of renewable energy for the wholesale electricity market”. This document sets up the methodology to define the level of subsidies from a federal budget depending on kinds of renewables used and the percentage of locally manufactured components used (local content requirement). This subsidy is capacity-based and applied for the power plants using the following renewable sources:
- Solar energy;
- Wind power;
- Hydropower (with a capacity less that 25 MW electric).

Bio-energy plants are not specified in the above mentioned decree. As a consequence, the same requirements are applied now for bio-energy installations as for large-scale generation facilities operating at the wholesale electricity market. In particular, this concerns the procedure of connection to the grid, which requires amongst others a link to an automated system of control of quality and volume of electricity generated (ASCQE) and installing the controlling equipment of A+ class. This requirement is obligatory to be qualified as RES - generation facility. The procedure of qualification itself is complicated and time-consuming (appr. 1 year) and could be started only after the plant is put into the operation, what makes selling electricity to the grid impossible during the initial period of operation.

To overcome this, the government has developed a draft decree, describing the measures to promote the use of renewable energy sources at retail electricity market. It’s expected that bio-energy plants will be classified by this decree as RES-generating facilities and support measures are defined. The text of this document is not publically available, and it’s not clear which subsidy scheme will be used: green tariff or capacity-based subsidy. The experts expect that the decree will be passed for adoption to related Ministries and finally by Duma by the end of 2013 – beginning 2014 year after passing an internal approval procedure at the Ministry of Energy of the Russian Federation. The process has been postponed due to the current internal restructuring at the Ministry of Energy.
Policy changes regarding the environmental protection

The amendment to the Federal Law No. 89-FZ setting the norms for processing industrial and agricultural waste and defining the minimum required recycled/processed percentages of all materials and goods, or the level of obligatory processing fee, is still expected. The draft amendment of the Law, specifying these changes, has passed the 2-nd processing in Duma, but was not finally adopted. The draft Law will be put to the 3rd processing by the end of the year.

4.2. Specific regional energy policies

Belgorod region

As a response to the considerable challenge with respect to management of agricultural waste, Belgorod Government by its Decree No. 427-pp of 29 October 2012 has approved the regional program “Development of renewable energy sources for 2013-2015 and the period until 2020”.

The main goal of the program is to develop energy from biomass in the Belgorod region.

Objectives of the program are:
- increasing ecological security of the Belgorod region by processing organic waste with use of biochemical and bio-thermal methods;
- putting the Belgorod region in a leading position in the Russian Federation in terms of development of renewable energy;
- increasing the energy security of the Belgorod region; increase the share of renewable energy in the fuel and energy balance; reducing the power shortage in the region;
- attracting investment into the construction of objects for processing agriculture and municipal waste, which can be used as renewable energy sources;
- implementing bio-fertilizing of soil at Belgorod region through the use of organic fertilizers derived from the processing of waste;
- creating of a technological, experimental-industrial, scientific and legal framework for the production of materials and components for biochemical and bio-thermal plants;
- creating a trained human resource base for the renewable energy sector.

The program aims to build by 2020 a number of power plants with a total installed capacity of 223,3 MW electric.
The main sources of financing of this programs are in the table below:

<table>
<thead>
<tr>
<th>Years</th>
<th>Regional budget</th>
<th>Other sources (private investments etc)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>2,0</td>
<td>2 798,0</td>
<td>2 800,0</td>
</tr>
<tr>
<td>2014</td>
<td>2,0</td>
<td>9 898,0</td>
<td>9 900,0</td>
</tr>
<tr>
<td>2015</td>
<td>2,0</td>
<td>14 998,0</td>
<td>15 000,0</td>
</tr>
<tr>
<td>2016</td>
<td></td>
<td>13 000,0</td>
<td>13 000,0</td>
</tr>
<tr>
<td>2017</td>
<td></td>
<td>9 200,0</td>
<td>9 200,0</td>
</tr>
<tr>
<td>2018</td>
<td></td>
<td>7 800,0</td>
<td>7 800,0</td>
</tr>
<tr>
<td>2019</td>
<td></td>
<td>3 000,0</td>
<td>3 000,0</td>
</tr>
<tr>
<td>2020</td>
<td></td>
<td>1 500,0</td>
<td>1 500,0</td>
</tr>
<tr>
<td>Total</td>
<td>6,0</td>
<td>62 294,0</td>
<td>62 300,0</td>
</tr>
</tbody>
</table>


*) The exchange rate as per 01/10/13 is: 1 Euro = 43,81 RUB.

The main financing sources are expected to come from private investors. The regional government financial support is limited to subsidising a part of the interest rate for loans obtained for the RES projects (RUB 6 million in total). Besides, a reduction in property tax is applied as incentive.

While the green tariff is not officially implemented yet in the Russian Federation, another model of indirect subsidy of electricity generated out of RES (including bio-gas plants) is successfully piloted at Belgorod oblast. According to the acting legislation, the network and distribution companies are obliged to buy electricity for covering transmission losses, preferably from certified companies involved in electricity generation from RES. The price level is defined by the regional government tariff bodies according to the confirmed cost structure of each power plant individually and is fixed for 1 year period. The power supply and network companies are including the higher RES electricity prices into their own costs structure which results in a higher tariff for the final users. However, the changes are not noticeable due to the low share of renewable energy in the total electricity supply.

Example: Bio-gas plant “Luchky” with an installed capacity of 2,4 MW sells electricity to the grid at Euro 0,22 per kWh (current averaged price for the industrial users is Euro 0,10 per kWh).

**Voronezh region**

There are no specific stimulating programs developed by Voronezh government targeted to bio-energy projects. Some legislative documents however might be applied for projects in bio-energy.

In line with the “Regional program of increasing energy efficiency in Voronezh oblast”, the regional government issued the decree No. 635 on 22nd of July 2011, which defines the subsidies for investment into energy efficiency by companies. The use of renewable energy course (incl. biomass) is qualified for this subsidy as well. The level of the subsidy is 20% of the total investment costs with a maximum of RUB 3 Million (appr. Euro 70,000).
4.3. Energy prices development in the regions

The price of electricity for industrial users in Russia is higher than for households. In fact, the industrial users are subsidizing part of the energy price supplied to the residential consumers. Also, prices vary from region to region considerably due to the different sources of energy used and transmission distances from the power generating stations. Both Belgorod and Voronezh region belong to the Central region of the Russian Federation, so the difference in prices for the electricity is not considerable. In the table below the average prices for the electricity applied for industrial users are shown.

Table 6. The development of electricity prices for the industrial users in Central Federal Region.

<table>
<thead>
<tr>
<th>Average price for the electricity (Euro/1 kWh)</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014-2015 est.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.05</td>
<td>0.06</td>
<td>0.07</td>
<td>0.09</td>
<td>0.11</td>
<td>0.11</td>
</tr>
</tbody>
</table>

Source: Ministry of energy of Russian Federation, industry experts.

According to the recent federal government decision, the prices are fixed at the current level and will not be changed until July 2015.
5. Stakeholders involved into the realisation of the bio-energy projects

5.1. Agricultural sector

Belgorod and Voronezh regions are among leaders in the production volumes of poultry and pig meat. On the territory of these regions a number of big agriculture and meat industries are located. Those entities supply its production not only to the region but to the whole Russia. The specific feature of those companies is that they are often vertically integrated, combining different business units into large conglomerates, with the centralized decision making bodies. These companies in most cases have an access to the resources of financing, at the same time prefer to invest primarily into projects with guaranteed financial return. After joining WTO, Russian agricultural producers expect to face an increasing of the foreign competition thus the chances for the developing privately financed projects in bio-energy is limited unless the government will introduce financial incentives for making the projects profitable already in mid-term (5..7 years pay-back period).

Among the leading agricultural companies which are located in Belgorod and Voronezh regions the main ones are:
- “Prioskolie”;
- “BEZRK-Belgrankorm”;
- “Agro-Belogorie”;
- “Belgorod Bacon”;
- “Cherkizovo Group”;
- “Miratorg”;
- “Logus-Agro”;
- “Ryaba”; 
- “Prodo” etc.

«Prioskolie» (http://www.prioskol.ru/) is the leader of the domestic poultry market (according to the data of Rospititsesouz for 2010 year). ZAO «Prioskolie» led the list of three hundred most effective and successful Russian companies, members of the «Agro — 300» club.

Agricultural holding "BEZRK-Belgrankorm" (http://www.jasnzori.ru/) - one of the largest diversified, vertically integrated structures of the agricultural sector of the Russian Federation. The main activities are the production of poultry, pork, beef, sausage and deli products, milk, grain and feed.


The “Belgorod Bacon” (http://www.belbecon.ru/) company is the youngest branch of the Russian agribusiness group RusAgro and specializes in the production of pork. The sharp growth of Belgorod
Bacon required the construction of its own feed factory. A short time after going into service, its production capacity had to be more than doubled.

Cherkizovo Group (http://www.cherkizovo-group.ru/) is meat manufacturer in Russia and one of the top three companies serving Russia’s poultry, pork and meat processing markets. The company is also Russia’s largest producer of fodder.

Miratorg Agribusiness Holding (http://www.miratorg.ru/sites/en/default.aspx) is one of the largest meat producers and suppliers in the Russian market. Miratorg was established in 1995 and it managed to create, from scratch, a technologically advanced high performing vertically-integrated agribusiness holding that took the leading positions in production, processing, logistic supplies and sales of agricultural products.

“Logus-Agro” (http://logus-agro.all.biz/) leads the Potato growers Association of Voronezh and the Voronezh region. The main strategic culture sector is the potato - 13 000.0 tons / year, and also such vegetables as onions, cabbage, beetroot.

“Ryaba” (website n.a.) – egg poultry farm.

Prodo (http://www.prodo.ru/) - one of fastest growing players in the market scale of the federal meat processing, poultry and pork. Enterprises PRODO produce all kinds of sausage, semi-products from poultry meat. Range of companies currently has more than 2,300 items.

5.2. Energy sector

The energy sector in Russian Federation consists of the following main groups of organizations:
- Governmental regulatory bodies;
- Infrastructural organizations;
- Energy generating companies;
- Energy network and distribution companies;
- Other energy companies.

The main influence of the stakeholders in the energy sector to bio-energy projects regard tariff regulations and requirements related to connecting to the grid.

Tariff regulation is the shared competence between the federal and regional government. The limits for retail tariffs and network tariffs are set at the federal government level. The regional governments have the authority to set up the prices for renewable energy generated by certified RES-plants for compensating network losses. This is done by the tariff regulation bodies of the regional governments:
- Committee on State Regulation of Prices and Tariffs in Belgorod oblast (http://kgrct.ru/tarify/);
- Directorate on State Regulation of Tariffs in Voronezh oblast (http://gut.vrn.ru/rek/index.php/).
Although the electricity prices for industrial users are partly market driven, the federal government recently has fixed the prices of electricity for industrial users at the current level until July 2015 (they will be adjusted according to the official inflation level). This is a measure to provide support to domestic producers after joining WTO. This regulation applies for both investigated regions.

The organization which is in charge of qualification procedure of renewable energy projects is the wholesale market regulator – the Non-commercial partnership body Market Council (http://www.np-src.ru/). This organization has regulatory authority over the wholesale electricity market on the territory of the Russian Federation.

Energy companies of Voronezh and Belgorod regions are incorporated into United Energy System (OES) “Center” with the total capacity of energy plants of 37 924 MW. The supply of energy to the industrial users and individual consumers are made by network and distribution companies, the main ones in the region are:

- Belgorod Supply company (http://www.belsbyt.ru/);
- Voronezh Energy Supply company (http://www.vesc.ru/).

According to the acting legislation, the network companies are obliged to compensate network losses preferably with electricity produced from qualified renewable energy plants. However, the procedure of setting the tariffs for RES-energy is not exactly defined, thus this mechanism can not be “automatically” applied and is subject to negotiations between the generation and supply companies.

5.3. Waste processing sector

Waste management in Russia was historically state-dominated. Today approximately 40% of the waste volumes are processed by private companies. It concerns the collection, transportation and disposal of solid municipal waste into landfills. At this moment, the volume of recycled waste in Russia is only 11 percent. The Ministry of Environment hopes that in seven years it will reach the 80 percent mark. A draft law prepared by the Ministry of Environment encouraging maximum involvement of recycled waste into a closed loop may be adopted in the spring of 2014.

At the same time, these initiatives remain mainly at the federal level, the regional environmental strategies and programs still have to be formulated. Even existing legislation related to the environmental protection is not always enforced, the sector itself needs considerable institutional restructuring.

Municipal waste processing

Belgorod region

Belgorod region generates annually 3,6 million cubic meters of municipal waste, 2,7 million cubic meters of it is generated by Belgorod city itself. Approximately 20% of the municipal waste is been recycled, the remaining volume goes to 29 operating dumps. The largest 3 dumps are serving
Belgorod city, and have a storage area of 4 - 10 hectares with the average depth of 40 meters. These dumps are built according to the federal environmental protection standards which require a ground layer protection against leakages. The municipal waste consist of 25...30% of bio-waste on average, which might be used for generating bio-energy. This can be done in the form of capturing and burning landfill gas and use waste for producing energy pellets.

The largest operator of the municipal waste collection and processing in Belgorod region is Ekotrans company (www.ekotrans.ru). It’s a privately-owned company serving Belgorod city and major districts of the Belgorod region and is involved in:

- Waste collection;
- Waste sorting at the sorting plant (manual);
- Waste deposit (operates 3 own landfills in Belgorod oblast).

At this moment, there is no separation of waste implemented, the landfill gas is also not captured and utilized. Ekotrans has developed a concept of “Waste-to-energy”, which comprises of the introduction of a separated waste collection system in selected parts of Belgorod, installation of equipment to make energy pellets from solid waste and using this for fueling power generating plants. The planned electrical capacity of the project is 30 MW. The project has been labeled by Belgorod government as priority project, however the realization has been postponed due to lack of financing.

Voronezh region

Voronezh city is the main source of municipal waste in the region. The volume of generated waste is more than 3,3 million of cubic meters per year. The volume of waste generated in the rural areas is not included. There is no waste separation implemented, practically all municipal waste goes to the landfills. The collection and transportation of waste is organized by the following companies:

- Municipal company MUC “Industrial association for waste treatment” (http://www.mkp-po.ru/index.html);
- Privately-owned “Clean planet” (http://чистая-планета-воронеж.рф/);
- Privately-owned “POETRO-landfill” (http://www.poetro.ru/).

The major player in the segment of waste management is the “Industrial association for waste treatment” company, which collects approximately 80% of the waste in Voronezh and the major districts of Voronezh oblast. The company was operating in the past a landfill with a capacity of 22 million cubic meters of waste, which has been closed in 2012.

Now the waste is transported and stored at 3 privately managed landfills nearby Voronezh, the largest one has a capacity of 15 million of cubic meters of waste and a lifetime of 7 years. This landfill was built by “Kaskad”, a private company, and commissioned in 2011. The system of landfill gas extraction is not foreseen. “Kaskad” announced the plan to increase the volume of the landfill up to 50 million cubic meters and build a waste-separation plant with a capacity of 400,000 tons of separated waste p.a. When realized, this landfill will secure the needs of Voronezh for waste collection for the coming 20 years.
Waste water treatment

Belgorod region
The largest waste water treatment company in Belgorod region is State Unitary Enterprise “Belvodokanal” (http://www.belwater.ru/). This is an utilities company providing water purification and waste water treatment services for the both industrial users and individual consumers at the territory of Belgorod and Belgorod region. The volume of waste water processed is 38,6 million cubic meters p.a. (2012).

The technology of water treatment foresees pumping the sludge to open fields. The company announced plans to install a system of mechanical de-watering of sludge and building a plant for high-temperature sludge gasification and burning. The financial resources however are not defined.

Voronezh region
Waste water treatment plant of Voronezh city is operated by RVK-Voronezh Ltd. RVK-Voronezh belongs to a Rosvodokanal Group (www.rosvodokanal.ru), the largest private operator in the area of water purification and supply, as well as waste water treatment in Russia. The Group is managing municipal water supply and treatment companies in 7 regions of Russia and one in Ukraine. Rosvodokanal is servicing about 7 mln inhabitants, their annual supply of purified water is 562 million cubic meters. Annual turnover (2011) is Euro 325 million. The Group has received a long-term loan from EBRD amounting to Euro 75 million for reconstruction of existing systems in cities where they operate. Voronezh water treatment networks have been given for concession to RVK-Voronezh in June 2012.

The waste water treatment in Voronezh has an installed capacity of 400,000 cubic meters of waste water per day and was engineered in 1964 and constructed in early seventies for servicing both inhabitants and industrial sector. Since that time many industrial companies were either closed or reduced their production. Now the actual load is approximately 200,000 cubic meters per day. The sludge after treatment is pumped to open sludge fields with a total area of 112 hectares. There is no mechanical de-watering of the sludge however it might be installed in the future.

For the period up to 2016 the following improvement measures are planned:
- reconstruction of aerotanks with implementing nitro-denitrification technology
- construction of tertiary treatment module with reagent phosphate elimination.

The overall budget for implementing these measures is not considerable (Euro 150,000).

5.4. Foreign companies/institutions

The activities of foreign companies/institutions in the area of bio-energy in Belgorod and Voronezh regions are fragmented. Currently, only IFC executes a project called “Russia Renewable Energy Program”, where activities are focused at the following regions:
- Belgorod region;
- Fas East Federal region;
- Kaluga region;
- Nizhny Novgorod region;
- Tomsk region.
In the framework of this project the creation of RES-map of Belgorod region is foreseen, where the main sources of bio-energy will be assessed and the most appropriate locations for placing bio-energy plants are identified.

Foreign technology suppliers which are currently offering their bio-energy solutions in the regions are listed in the table below:

<table>
<thead>
<tr>
<th>No.</th>
<th>Name</th>
<th>Web page</th>
<th>Technology offered</th>
<th>Presence in Russia</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Biogas NORD AG</td>
<td><a href="http://www.biogas.de">www.biogas.de</a></td>
<td>Biogas plants starting from small plants of 75kW, up to large parks of several MW</td>
<td>Russian speaking representative</td>
</tr>
<tr>
<td>2.</td>
<td>EnviTec Biogas GmbH</td>
<td><a href="http://www.envitec-biogas.com">www.envitec-biogas.com</a></td>
<td>Biogas plants</td>
<td>Representative in Ukraine</td>
</tr>
<tr>
<td>3.</td>
<td>Host</td>
<td><a href="http://www.host.nl">www.host.nl</a></td>
<td>Bioenergy systems and complete systems, from anaerobic digesters for agriculture and industry, wood-fired boilers and combined heat and power plants to fluidized-bed gasifiers</td>
<td>Russian representative</td>
</tr>
<tr>
<td>4.</td>
<td>MT-Energie GmbH</td>
<td><a href="http://www.mt-energie.com">www.mt-energie.com</a></td>
<td>Design, planning and construction of biogas plants and specialty biogas components</td>
<td>Through partnership with Big Dutchman</td>
</tr>
<tr>
<td>5.</td>
<td>Rota Guido</td>
<td><a href="http://www.rotaguido.it">www.rotaguido.it</a></td>
<td>Technologies for the microclimatic control, the vehiculation and the treatment of organic manure and nitrogen reduction and also for biogas processing system, gasification, vegetable oil engines and photovoltaic plants</td>
<td>Through partnership with Agrotecnica (<a href="http://www.agrotecnica.ru">www.agrotecnica.ru</a>)</td>
</tr>
<tr>
<td>6.</td>
<td>Watrec</td>
<td><a href="http://www.watrec.com">www.watrec.com</a></td>
<td>Biogas plant solutions in large-scale facilities</td>
<td>Considering market entry</td>
</tr>
</tbody>
</table>

Source: Industry interviews.
6. Technologies applied in the area of bio-energy applications

6.1. Foreign technologies and reference projects

By now, the foreign technologies in the area of bio-energy applications are mainly bio-gas installations:

- **BigDutchman Renewables** (Germany) has built and commissioned biogas plant for AltEnergo (Agro-Belogorje Group) at Luchky, Belgorod region with the capacity of 2,4 MW. The plant is using the waste from the pig farm, slaughter house and cereal waste from Agro-Belogorje group of companies. The electricity is sold to the grid, the heat is not fully utilized.

- Regional Center of Biotechnology has installed equipment of **Farmatic** (Germany), and **Eurotank** (Germany) at their own bio-gas plant at Baitsury, Belgorod region with the capacity of 0,5 MW. The plant is using the pig manure and sugar beat press for producing biogas, the plant is connected to the grid, heat is not fully utilized.

- Belgorod citric acid plant “Citrobel” has installed a waste water treatment facility engineered by **Voith GmbH** (Germany). This installation is producing biogas out of industrial waste water which will be used to cover the heating needs of the production. The processing capacity of the installation is 16 tons of waste water per day.

- Kashyrsky oil extraction plant (part of **BUNGE** group), Voronezh region has installed a pelletizing line for making energy pellets out of sunflower husk. The pellets are used to produce heat for the production needs. The supplier of the technology was not announced.

6.2. Russian technologies

At present there are a number of small Russian manufacturers offering the bio-gas installations targeted to the small farmers (Individual Biogas Equipment Sets) those able to process a couple of tons of organic waste per day, the installations can be equipped by small electricity generators. The number of actually sold units is negligible however.

The only Russian OEM company, certified for manufacturing bio-gas installations, is **BioGasEnergoStroi** ([http://www.bioges.ru/](http://www.bioges.ru/)). This company was established in 2008 by GasEnergoStroi corporation (a company belonging to Gazprom and involved in the construction of electricity and heating plants). BioGasEnergoStroi manufacturers bio-gas plants with a capacity of 100 kW and more. It exports to the Ukraine, Belorussia and Baltic states. In Russia they have installed only one biogas power plant so far (Doshino, Kaluga region).

6.3. Innovations in the sector

**Belgorod State University**

Belgorod State University, department of biotechnology has completed a research program aimed to improve a technology for bio-tech production of lysine amino-acid from cereals. The research was
financed from the federal state budget. The technology was successfully piloted at the Prioskolje holding (Belgorod region). The launch of industrial production is planned at the premises of Premix Plant No1 of Prioskolje group in 2014. Another research topic, aimed to improve the efficiency of fermentation processes in bio-gas installations was initiated at bio-technology department, but has been stopped due to the lack of financing.

Apart from research activities, Belgorod State University has started a program to educate students to become specialists in the area of bio-technology. The first of these specialists will graduate in 2015.

**Voronezh State Technical University**

The specialists of the department of renewable energy sources have been involved in preliminary research activities for analyzing the feasibility of installing bio-gas plants for processing poultry litter at the farms in the Voronezh region. The research was not finalized due to lack of financing from private companies. The intended bio-gas projects were not realized so far.

Generally, due to the lack of state financing and low level of co-operation between commercial and research organizations, the R&D activities in the area of bio-energy in Belgorod and Voronezh regions are at a low level. The business entities are not prepared to finance R&D activities and prefer to use proven (“western”) technologies.
7. Co-operation opportunities for the Dutch companies in the area of bio-energy

7.1. Areas of potential co-operation

While there is no structured market demand for bio-energy solutions in the regions at this moment, there are several niche opportunities, where the Dutch companies can already offer their equipment/technologies in the area of bio-energy. These solutions should be commercially proven and able to provide a return on investment in a mid-term. Some examples are listed below:

Municipal waste processing:
- Bio-gas cleaning and purification technologies;
- Equipment for automatic sorting of municipal waste and producing energy briquettes.
- High-efficient CHP units;
- Landfill gas collection systems feasible at low-scale landfills.

Bio-gas installations:
- Bio-additives for increasing the efficiency of fermentation at bio-gas plants;
- Bio-gas cleaning and purification technologies;
- Digesters and biogas installations
- Equipment for utilizing exhaust heat produced by gas motors at bio-gas plants;
- Equipment for producing granulated organic fertilizers out of the bio-reactor substrate;
- Technologies for biological processing of poultry litter.

7.2. Potential projects

The following potential projects in the field of bio-energy were identified in the market study:

<table>
<thead>
<tr>
<th>No.</th>
<th>Description of the project</th>
<th>Location</th>
<th>Ranking</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Solid municipal waste processing plant with use of high-temperature gasification of waste technology</td>
<td>Waste landfill at Stroitel, Yakovlevsky district, Belgorod region</td>
<td>Middle</td>
</tr>
<tr>
<td>2.</td>
<td>Sludge processing plant with use of the high-temperature gasification technology</td>
<td>SUC “Gorvodocanal”, Belgorod city</td>
<td>Low</td>
</tr>
</tbody>
</table>
3. Poultry waste processing plant  
Veydelevsky district, Belgorod region  
Low

4. Biogas station for processing the poultry slaughter waste  
Slaughter house No.3 of Prioskolje holding, Valuyki, Prioskolje Valuysky district, Belgorod region  
Middle

5. Biogas stations for processing of agricultural waste of Prioskolje holding  
Belgorod region  
Middle

6. Sludge burning installation at the waste water treatment plant  
RVK-Voronezh, Voronezh city  
Low

7. Bio-waste utilization plants for processing culled animals  
Voronezh region  
Low

8. Sunflower husk processing installations  
Bogucharskiy district, Voronezh region  
Low

9. Biogas station for processing cattle manure and the waste from sugar beat refinery  
Novousmansky district, Voronezh region  
High

Source: Belgorod government, Voronezh government, industry interviews.

7.3. Chances and threats for the Dutch companies

Biogas technology for processing agricultural waste and municipal waste processing is an area where Dutch companies have a lot to offer. It concerns a variety of equipment and related technologies: digesters, biogas capturing installations (landfill), waste water treatment installations, biogas burners, electricity generating equipment and ORC (Organic Rankine Capture) machines to optimize the performance. A number of Dutch suppliers are able to offer turn-key solutions.

The Belgorod Voronezh regions are in Russia amongst the most interesting regions for the Dutch suppliers for the following reasons:

- The high concentration of mega farms and the growth in agricultural production, which is still expected, especially in the Voronezh region.
- The regional Government is well aware that it needs to deal with agricultural waste (for environmental reasons).
- In the region already 3 digesters and biogas installations are in operation and the regional Government has taken measures to have these installation running profitable.
- The regional Government has allowed private companies to operate the biogas installations and has recently outsourced municipal waste collection and processing, facilitated by the change in legislation in the beginning of this year.
However, the Dutch companies considering to enter the Russian market for bio-energy projects should be prepared to adapt their sales strategy to the realities of the Russian market. Their Russian clients face arduous procedures for electricity generating equipment and lengthy approval procedures. After initial financial support of the regional Government for the first biogas projects, at this moment financing is an issue. Under pressure of the tightening of the federal government support, the support from the regional Government becomes questionable. Those suppliers who are able to provide either flexible financing schemes or access to the affordable financing, will have a preference.

Another important factor is that bio-energy projects are rather new and Russian managers/owners of the companies are hesitant to invest in technologies which do not have a proven commercial and technical track record. Technologies which have been successfully implemented in Russia have a clear preference. German-made biogas installations and equipment which are already in operation in the region have an advantage in this regard. Given the exiting business habits to learn the related experience in the sector first prior to making a decision about the equipment supplier (this practice comes from the times of Soviet Union where the systems of know-how exchange in industries was widely applied) it’s important to show a reference project, preferably in the Belgorod Voronesh region or somewhere else in Russia.

Specific attention has to be given to the issue of certification of the equipment. The current regulations require the local certificates to be obtained for specific parts/technology while importing. The absence of the certificate for a certain part might be an obstacle for custom clearance of the whole set of equipment, thus prior consultation with the customs brokers is recommended.

The Dutch companies which decide to enter the Russian market have to know that the awareness about the capabilities of the Dutch technology in bio-energy segment is still relatively low in regions. The usual questions raised will be:
- can the installation work in cold climate;
- will a local biomass quality be suitable for the technology applied;
- how does the technology work and what is the difference/advantage over technologies already in use;
- how is maintenance and spare parts delivery arranged;
- who takes care of service.

The assurance of reliable service is needed, which most probably will be difficult to reach without co-operation with a Russian partner.
8. How to improve the Dutch commercial involvement in the area of bio-energy

The industry experts expect that the changes into the federal legislation creating the legislative background for bio-energy projects will be implemented in the nearest future (end of 2013 – beginning of 2014). The main ruling will be to classify bio-energy projects as RES generation and implement simplified procedures for both connecting to the grid and setting up the tariff for electricity out of bio-energy generation. Upon implementing these changes the market will be ready for “take-off”.

The following recommendations are given to companies interested to enter the regional market related to bio-energy projects:

a) Information sources; project opportunities in bio-energy are mostly known by regional government officials. None of the regional governments has a department specialized in bio-energy, thus such information should be found at other departments: agriculture, economic development, communal and housing. Regional governments might be supportive in arranging contacts with potential interested parties, although contacting them might take some time as well. The language barrier is an important issue while contacting local authorities. Using a Russian translator or involving Russian-speaking colleagues is recommended.

b) Finding a reliable partner is a must; due to the complexity of the construction regulations and the need to get a number of approvals for commissioning of the installation, a close co-operation with local agents/engineers is recommended. A Russian speaking representative is necessary to manage the process of project development and implementation.

c) In the field of municipal waste processing, where good opportunities are, the potential customers are mostly public companies. Therefore, cooperation with Russian firms is needed.

d) In the case of turn key projects, civil works and assembly should be preferably done by Russian companies in order to be price competitive.

e) Financing opportunities; Russian banks are not always positive to finance bio-energy projects without state back-up, thus support in contacting international financial institutions, such as IFC, to provide finance for bio-energy project concerned will be appreciated by the Russian clients.

f) If delivery on credit terms is required, credit insurance can be obtained from a number of reputable credit insurance companies (f.e. Atradius and Hermes).

g) Good personal contacts; building up mutual trust is essential for any business transaction to succeed. Regular visits to potential clients and inviting them to the Netherlands to visit reference projects are successful selling strategies.

The recommendations to the Dutch Government:

a) To realize a bio-energy project in Russia a long term approach is needed. Whereas, most of the Dutch suppliers are SME companies. To create awareness about the capabilities of the Dutch technology suppliers joint promotional efforts are necessary. This could be achieved by creating a platform for joint promotion of a cluster of companies, all providers of bio-energy solutions.
The Dutch government could play a role in initially supporting such a cluster for a period of 2 to 3 years. This concept is already implemented with success for the food sector in a number of countries; see www.foodtechholland.nl.

b) Pilot (demonstration) projects are great tools to create awareness of the Dutch technology solutions and their advantages. By showing a bio-energy installation in operation under local conditions, the sales barriers related to the technology risks (non-performance risks) are overcome. Pilot (demonstration) projects could be realized in the frames of Public Private Partnership construction with the support of the Dutch government.

c) The co-operation between the Dutch manufacturers and export financing organization could be further improved, to be able to offer tailor-made financing instruments. The Dutch Government could play a role here with the instrument of Finance for International Business (FIB).
References


6. International Finance Corporation, 2013 “Possibilities to support renewable energy in the regions of Russia”.


11. Voronezh oblast Government Resolution October 2, 2012 N 874 "On approval of the regional program" Development of Agriculture of the Voronezh region in 2013 - 2020 years ".


Appendices

I. Overview interviews

The table below gives an overview of interviews executed in Russia on behalf of this market study.

<table>
<thead>
<tr>
<th>#</th>
<th>Company name</th>
<th>Name</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Belgorod institute of the alternative energy</td>
<td>Maksym Cherednichenko</td>
<td>Deputy Director in strategic planning</td>
</tr>
<tr>
<td>2</td>
<td>Belgorod National Research University</td>
<td>Irina Batlutskaya</td>
<td>Head of biotechnology department</td>
</tr>
<tr>
<td>3</td>
<td>Centre of energy saving in Voronezh region</td>
<td>Alexey Suhorukov</td>
<td>Director</td>
</tr>
<tr>
<td>4</td>
<td>Department for Economic Development of the Government of the Voronesh Region</td>
<td>Vadim Dmitriev</td>
<td>Deputy Head</td>
</tr>
<tr>
<td>5</td>
<td>Department of the agro-industrial complex of the Belgorod regional government</td>
<td>Alexey Sevalnev</td>
<td>The first deputy head of Belgorod Oblast agricultural sector department</td>
</tr>
<tr>
<td>6</td>
<td>Department of the agro-industrial complex of the Belgorod regional government</td>
<td>Alexey Hmyrov</td>
<td>The deputy head of Belgorod Oblast agricultural sector department, head of the programs in livestock sector</td>
</tr>
<tr>
<td>8</td>
<td>Logus-Agro</td>
<td>Igor Alymenko</td>
<td>General Director</td>
</tr>
<tr>
<td>9</td>
<td>Logus-Agro</td>
<td>Sergey Eskov</td>
<td>Commercial Director</td>
</tr>
<tr>
<td>10</td>
<td>Regional Center of Biotechnology</td>
<td>Alexey Orehov</td>
<td>CEO</td>
</tr>
<tr>
<td>11</td>
<td>Regional Center of Biotechnology</td>
<td>Anna Ryzhova</td>
<td>Chief Technologist</td>
</tr>
<tr>
<td>12</td>
<td>Ecotrans</td>
<td>Nicolay Shein</td>
<td>Director</td>
</tr>
<tr>
<td>7</td>
<td>Ecotrans</td>
<td>Oleg Verevkin</td>
<td>Manager of strategic development</td>
</tr>
<tr>
<td>13</td>
<td>Voronesh State Technical University</td>
<td>Pavel Beliakov</td>
<td>Associate Professor, Scientific director of the laboratory of alternative energy technologies and installations</td>
</tr>
</tbody>
</table>
## II. Events scheduled for 2013

<table>
<thead>
<tr>
<th>Event</th>
<th>Description</th>
<th>Date</th>
<th>Place</th>
<th>Organizer</th>
<th>Site</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. 12-th International Specialized Exhibition “Energy Supply”</td>
<td>12-th International Specialized Exhibition &quot;Energy Supply&quot; is focused on industry professionals: a demonstration of developments in the field of energy efficiency and energy saving, communication and exchange of scientific and technological achievements and practical results on the transition to the Energy Saving mode of development, the use of the capacity of regional enterprises producing modern energy-saving equipment, developing new technologies and materials, and mechanisms to attract investors for financing energy efficiency projects.</td>
<td>October 2-4, 2013</td>
<td>Voronezh</td>
<td>The Chamber of Commerce of the Voronezh region</td>
<td></td>
</tr>
<tr>
<td>2. “Golden Autumn-2013”</td>
<td>The exhibition &quot;Golden Autumn&quot; is the main Agricultural Forum of Russia for over 15 years, keeping the best traditions of agricultural exhibitions and shows that develop the main directions of modern agriculture. Each year, the exhibition gathers more than 2,000 enterprises from 70 regions of Russia and 30 countries. The total exhibition area is over 70 000 square meters. Last exhibition was visited by about 100 000 people, 90% of them are agriculture specialists from more than 60 countries.</td>
<td>October 9-12, 2013</td>
<td>Moscow</td>
<td>Ministry of Agriculture of the Russian Federation, Moscow Government, Russian Agricultural Academy, All-Russia Exhibition Centre.</td>
<td><a href="http://www.goldenautumn.ru">http://www.goldenautumn.ru</a></td>
</tr>
<tr>
<td>3. Wasma 2013</td>
<td>Wasma is an effective platform for producers and buyers of environmental equipment to hold business discussions and exchange their experience.</td>
<td>October 29 -31, 2013</td>
<td>Moscow</td>
<td>MVK, part of ITE Group</td>
<td><a href="http://www.wasma.ru">http://www.wasma.ru</a></td>
</tr>
</tbody>
</table>

Wasma allow participants to show the innovative equipment for recycling, nature protection and resource-saving technologies, development in the field of technology of processing of waste, rubber and plastic, water purification.