GREAT STONE
индустриальный парк

MANUFACTURING OF ECOBIO MICROALGAE-RUN MINI HEAT POWER PLANTS

PROJECT

For implementation there is provided a project on launching **manufacturing of ecobio biomass-run (microalgae) mini heat power plants.**

The project is worth of implementation due to the following factors:

- Biomass fuel conversion technology is energy efficient, resource saving and environmentally-friendly.
- Growing popularity of renewable energy sources all over the globe (in the EU countries, poorly provided with own energy sources, alternative energy sources account for **8%** of the power balance).
- One of the main reasons of locating the production in Belarus is availability of highly skilled scientific and engineering personnel.
- Capital expenditures for the project are estimated at **USD 25-30 mn**, payback period – **4-5 years**, IRR – **18-22%**.

MARKETS

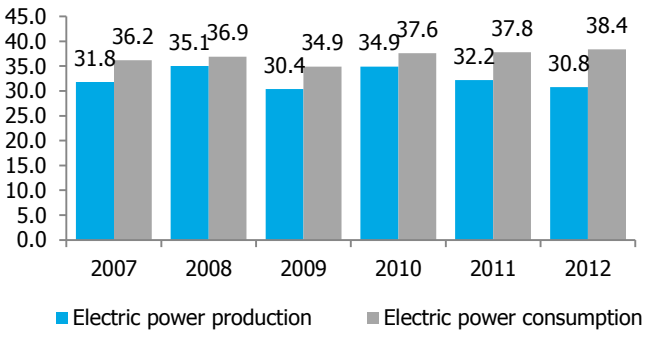
Customs Union and European Union markets:

- Usage of alternative energy sources by companies in the Customs Union is an incentive for maintaining cost of production and being independent from volatility in global oil prices.
- In Russia in order to reduce energy intensity of the national economy and save raw hydrocarbon deposits, the Government set as a strategic task to increase share of alternative energy sources in the country's power balance **from current 1% to 4,5%** by 2020.
- The EU is increasing usage of alternative energy sources (**8%** in the power balance).

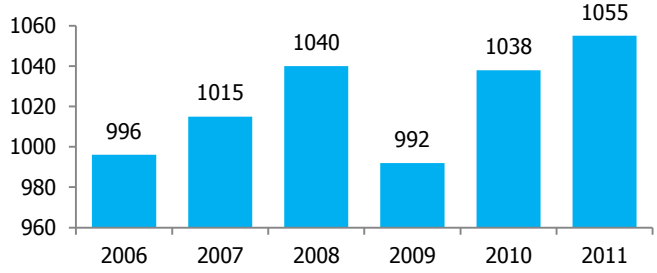
Internal market of Belarus:

- In 2012 Belarus imported **7,9 bn kWh** of electric power, over 2007-2011 import of electric power in Belarus totaled on average **4 bn kWh**.

Production and consumption of electric power in Belarus, bn kWh



Electric power production in Russia, bn kWh



MARKET OPPORTUNITIES

Global opportunities:

- In 2011 alternative energy sources accounted for **4%** in the world's electric power generation structure by fuel types, in 1973 – less than **1%.**
- In spite of relatively low share of alternative energy sources nowadays, it is projected to increase to **1/3** by 2050.

Local opportunities:

- There is a cross-subsidization of electricity in Belarus and Russia. Tariff for legal entities was 2,7 times higher than for population in Belarus in 2013. The government is planning to eliminate a cross-subsidization, but this process will be gradual.
- Despite the cross-subsidization, price for a kWh of energy in Belarus is one of the highest in Eastern Europe.
- Every year new production facilities are commissioned which are future electricity consumers and potential CHP plant buyers. By 2013 production facilities have increased by almost **2,4 times** compared to 2005.
- In Belarus there is a multiplying ratio in respect of the owners of alternative energy sources – **1,3** for biomass.

The approximate calculation of the effect from the construction of CHP plant compared to buying given the cross-subsidization:

- Electric power consumption – 1 MWh
- Working hours per year – 8000 hours
- Tariff when buying electric power –0,15 USD/kWh
- Approximate electricity cost at own CHP plant – around 0,06 USD/kWh

Saving=(0,15-0,06)x1000x8000=720 000 USD/year*

*cost of heat which gives an additional effect is not included

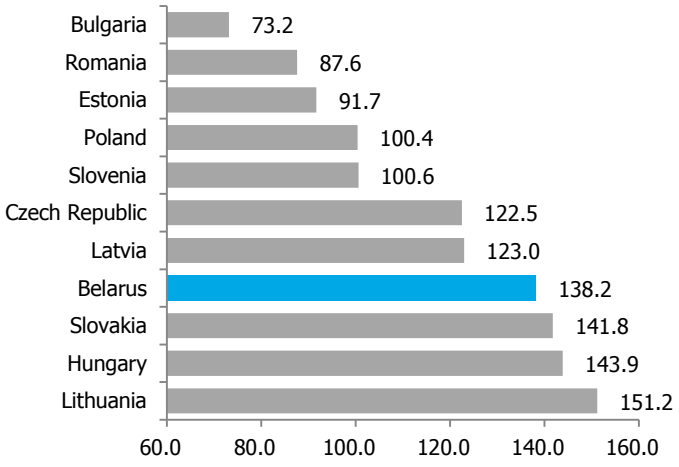
INVESTMENT OPPORTUNITIES

- Capex for the project is estimated at **USD 25-30 mn**.
- Payback period is **4-5 years**.
- IRR varies between**18-22%**.

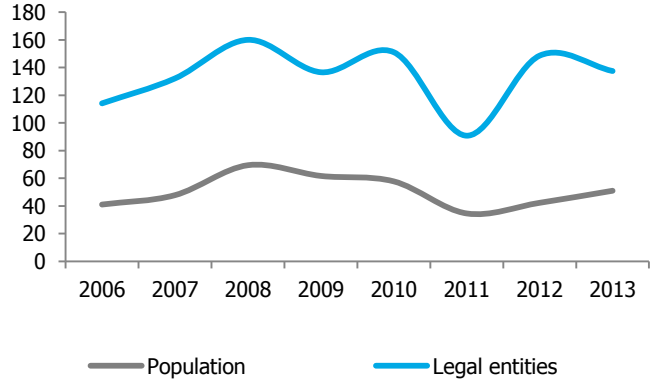
POTENTIAL INVESTORS

- **Strategic investors** – companies with appropriate technologies and experience in manufacturing of alternative energy sources.
- **Forward integration –** companies-energy consumers interested in getting independent of centralized energy sources.

Electricity tariffs in Eastern European countries, USD per kWh



Electricity tariffs in Belarus, USD per 1000 kWh



Global electricity production in2000-2011 , tln kWh