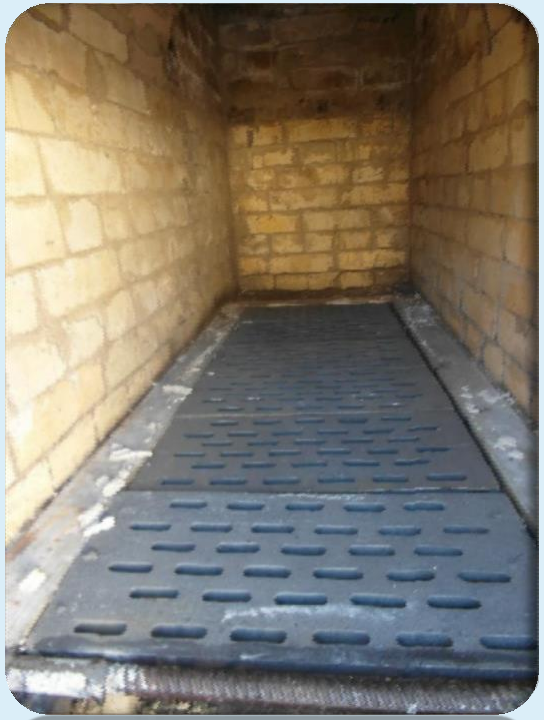
NEW ENERGY TECHNOLOGIES ON THE BASIS OF FUNDAMENTAL RESEARCH

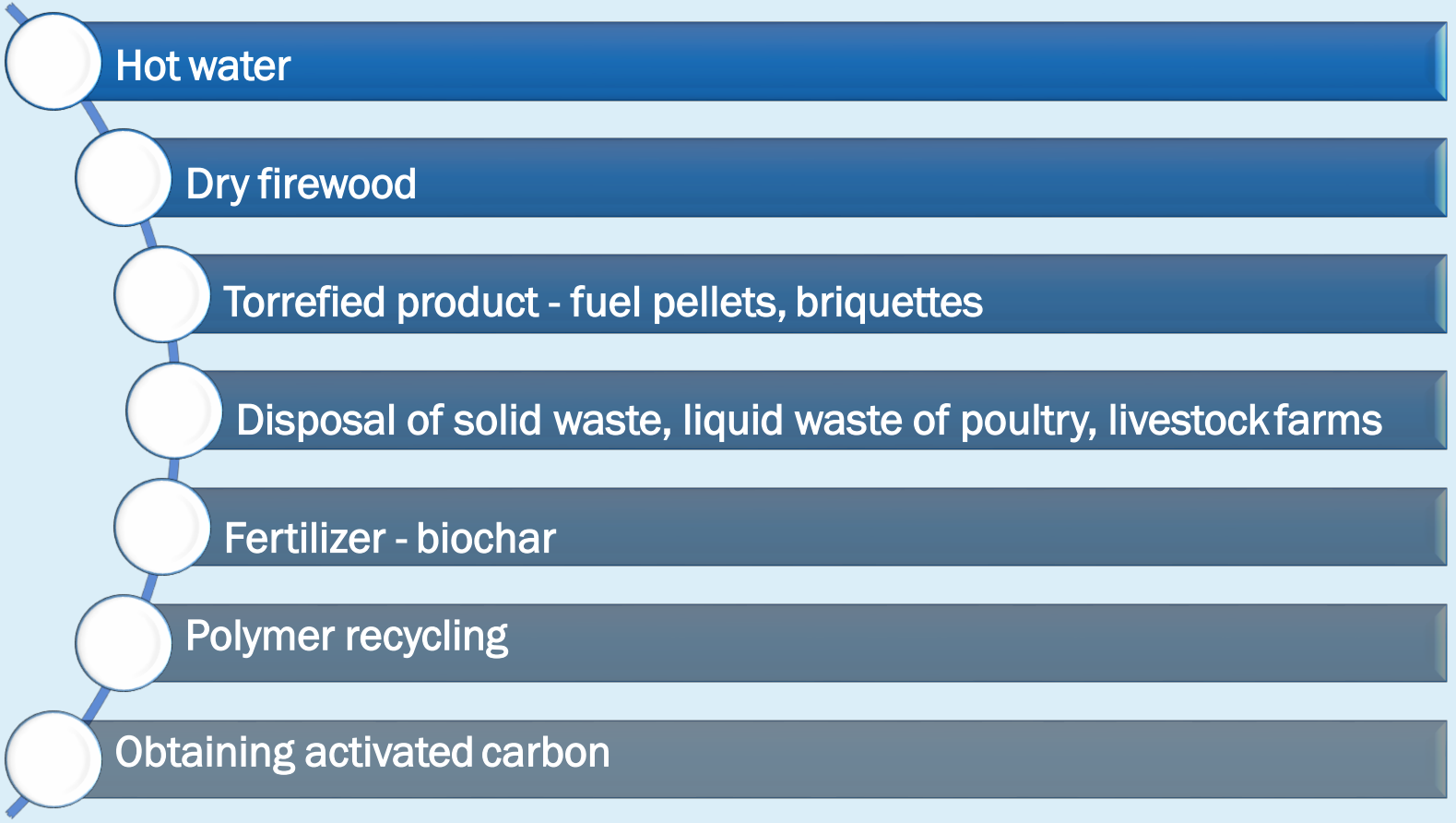
Author: Vasilii Azarenkov
Olesia Azarenkova



PYROLYSIS FURNACE

Pyrolysis Furnace

- I have developed pyrolysis furnace using raw wood with up to 70% moisture content, which contributed to the emergence of a number of technical devices, namely:



The heating device

- Range from 20 kW to 12 MW. Cost of producing 1 kcal of heat is 5-10 times lower than that of all types of solid fuel and pyrolysis boilers.
- The device works on the wood of any moisture. For work that requires electricity, fans blowing, very tall pipe for exhaust gases.
- Service - 1 time in the offseason.
- Clearing ash - 1 time per week.
- Loading wood 1-2 times a day, depending on the temperature outside. The flue gas temperature in the tube does not exceed 80 °C.
- No analogues of this invention exist.

Heating Device
1,2 MW

Heating Device
1 MW

Speed firewood drying 900/1800 RM per month, hot water

- The temperature in the chamber is 130-150°C.
- Wood is dried in its own juice, washed from dust and dirt. Drying is up to 20 hours. During this time, 30/60 RM (1 or 2 chambers) of dry finished products are produced. Product humidity is less than 18%.
- Low operating cost, no analogues of the product.




Key Benefits

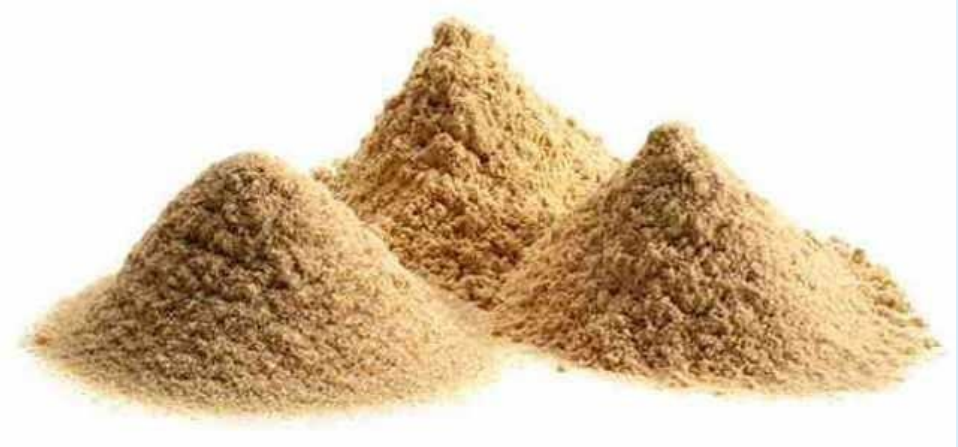
- LOW ENERGY CONSUMPTION
- HIGH ECONOMIC EFFICIENCY
- SHORT CYCLE TIME (18 TO 20 HOURS)
- DRYING ALL TYPES OF WOOD
- HIGH EFFICIENCY (UP TO 21 600 RM)
- HIGH QUALITY (HUMIDITY <18%)

Getting torrefied wood 100/200/300 tons per month of product; getting hot water.

- The temperature in the chamber is 220-250°C.
- Torrefied wood is obtained from timber waste - sawdust, wood chips, chopped branches, leaves, grass, reeds, straw, chaff - any organic matter. Briquettes and pellets are produced from organics. Calorie content of such briquettes and pellets is more than 8000 kcal / kg, that is 50% more than the briquettes and pellets obtained in conventional manner.
- 3 tons per day or more of the final product. The product does not absorb moisture. It can be stored in the open air.
- Great fuel for heat and power plants. A mixture of 1/3 torrefied wood powder and 2/3 of lignite is not inferior to the caloric content of black coal. The perfect alternative to gas. Environmentally friendly process.

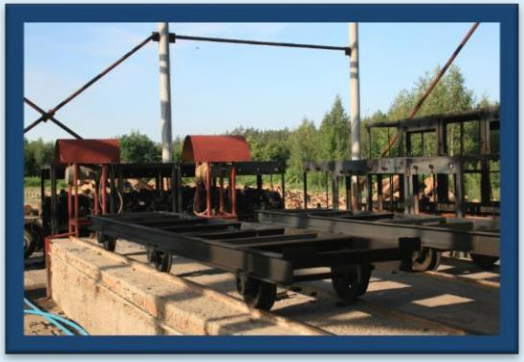
Getting biochar - a fertilizer for the soil, fertilizer of the future, which will solve the food problem on a global scale; obtaining hot water.

- The temperature in the chamber is 380°C. The fertilizer is prepared from any organics. In our conditions the best raw materials are wood waste. The resulting product can be directly applied to the soil.
- Productivity - from 10 tons / day.
- Environmentally friendly process.



Production of charcoal - up to 300 tones per month, getting hot water.

- The temperature in the chamber is 550°C.
- The raw material for charcoal is hardwood. The resulting product contains a non-volatile carbon (86% and greater). Volatiles are less than 12%. 5m^3 of dense hardwood per one ton of product. Charcoal is an excellent raw material for production of activated carbon.
- Capacity is up to 10 tons per day.
- Environmentally friendly process.

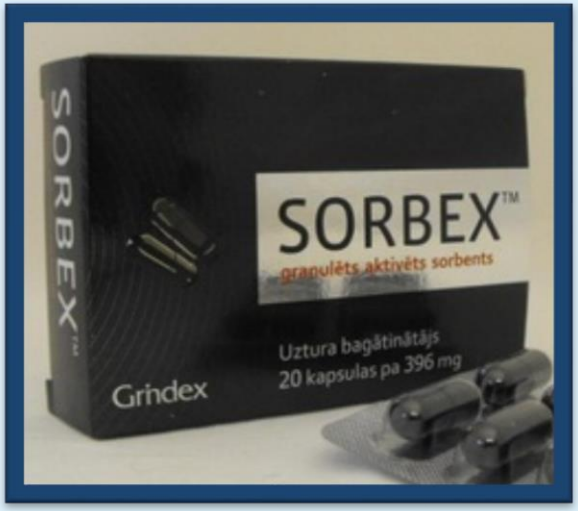



Recycling (destruction) of polymer waste. Firing defective paint coatings. Getting hot water.

- The temperature in the chamber is 700°C.
- There is heating and degradation of polymers without oxygen. Combustion of products after the decomposition occurs at temperatures over 1200°C in an oxygen atmosphere.
- 100% environmentally-friendly process.

Production of activated carbon. 100 tons of activated carbon per month. Getting hot water.

- The temperature in the chamber is 850°C. Process of producing activated carbon is followed by feeding superheated vapor in the chamber.
- Environmentally friendly process.



Recycling municipal solid waste - garbage dumps. Recycling manure, poultry and cattle farms manure . Recycling waste remaining after cutting the birds and animals.

- Equipment for the processing of municipal solid waste, liquid waste from poultry and livestock farms on the basis of energy received from the pyrolysis furnace with capacity of 140 tons per day has been developed. The waste is recycled into torrefied organics with further converting it into fuel pellets, briquettes.
- Smelly gases decompose during processing, there is a degradation of the compounds and their combustion.
- The temperature is above 1200°C.

- Operation of pyrolysis furnace is characterized by low operating costs, durability - it simply never breaks. Many samples has been operating for 10-15 years without repair. The resulting temperature in the furnace is not inferior to gas. But we get this temperature from the waste. The furnace produces heat energy of high power. With this power you can get many kinds of products:
    - Hot water
    - Dry firewood
    - Torrefied product - fuel pellets, briquettes
    - Disposal of solid waste, liquid waste of poultry, livestock farms
    - Fertilizer - biochar
    - Polymer recycling
    - Obtaining activated carbon
    - etc., that is not included in this article.
- All production sites constructed based on my pyrolysis furnace, are low in cost.