

SMALL-SCALE ENERGY INDUSTRY BASED ON LOCAL FUEL RESOURCES – A WAY OF INTENSIVE DEVELOPMENT OF THE SMALL AND AVERAGE BUSINESS ENTERPRISES IN THE REPUBLIC OF BYELORUSSIA

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Considerable price fluctuations on the Belarus fuel and energy market, world tendencies of the further price increase for primary power resources and, consequently, electric and thermal energy, as well as toughening of requirements on the environmental issue, give the reason for scale application of local fuels and processing of a combustible waste into energy carriers.

The solution allows to decrease the negative effect of human waste products on the environment, let alone a sufficient saving of expenses on imported energy resources.

Foreign technologies on combustible waste processing and the necessary equipment are offered to the Republic of Byelorussia, but the prices are rather high, and the requirements for the delivery and application are rather rigid. As a rule, the payback period for similar technologies, e.g. biogas facilities, is rather long taking into account the cold climatic conditions of the Republic. Moreover they are based on obsolete engineering solutions which are much less effective in comparison to newer, highly-efficient technologies applied in the area of small-scale energy.

The Scientific production Russian-German association – the Group of companies "NIKKOM-PERMANENT" incorporate: scientific, project, industrial, financial as well as organizational resources and resources of the partner organizations which are successful in implementing projects for autonomous object construction of alternative energy facilities designed for local fuel application made of organic waste and low-grade fuel resources of the region.

The main goals of the Association "NIKKOM-PERMANENT" are focused on setting up production sites for deep ecologically safe processing of an organic waste with 5 types of commercial production:

1. Combustible gas (power gas), applied to boiler-house any kind in any combination with regular fuel, with a possibility of its full replacement.
2. The electric energy
3. Warmth (cold)
4. Fuel briquettes (granules) of wide application, with customized properties (form, humidity, density, thermal stability, caloric content);
5. The granulated, certified fertilizer (from produced ashes for all-weather field application, as a coproduct of waste gasification).

The suggested technology is implemented as a technological complex with a continuous automated operation including the full cycle of deep waste recycling with useful production output (mini thermal power plant operating from wastes).

The technology basis is an up-to-date environmentally friendly method of thermal gasification of organic products, which is cost and power efficient.

All non-standard equipment of our complex has been patented in EU and meets the international requirements.

Our technological solutions are competitive with similar purpose technologies (fermentation, pyrolysis technology) in following aspects: cost efficiency, performance index for solid waste energy transfer into combustible gas energy, output production types (5 products), maintainability of the complex and realization of coproducts (dry ashes) in the agriculture area.

Nowadays the developed technology for production of energy carriers from various origin wastes on industrial scale is a continuous automated production process which includes following technological stages:

- integrated waste preparation for thermal gasification;
- production of qualified fuel in briquettes and granules (if a production of high-quality fuel for independent fire chambers is needed);
- gasification process with production of power gas;
- clearing, cooling and stabilization of power gas;
- application of power gas in gas-piston power stations or in the fire chambers working from various fuel.

Implementation of all the technological stages is based on the advanced technical solutions and in-house design which meet ecological safety requirements under EU specifications and are not expensive.

Today technical solutions developed and proved on a number of objects allow to carry out construction of independent mini-thermal energy plants with a capacity from 200 kW to 6 MW and with passing heat of 0,5 to 16 MW operating on local organic waste fuel.

The return on investment for the mini-thermal energy plant, operating in a production cycle according to the «НИККОМ» technology, considerably exceeds the existing foreign analogs operating only on expensive agglomerated wood processing waste and dry loose biomass.

The developed technology allows to successfully utilize an organic waste with high viscosity and humidity, such as manure and dung, silt deposits from waste disposal facilities, organic part of the technical and domestic waste etc.

The estimated cost price of the produced heat, will make 12-16 Euro cents for 1 Gcal, the electric energy – 0,03-0,07 Euro for 1 kW/hour that provides 2-to-3 times costs decrease in comparison with regional tariffs in the Republic.

Construction of a technological complex in the region based on technology «НИККОМ» will allow to utilize simultaneously a renewable local waste and to create alternative inexpensive energy sources (the combustible gas, the granulated high-quality fuel, the electric power, warmth) for needs of manufacture and social sphere.

Economic feasibility of installing a system of independent power generating production is mainly defined by given regional conditions: cumulative volumes of renewable organic waste, their physical, chemical and energy properties, degree of environmental contamination by this waste, deficiency and cost of imported and produced energy carriers (solid and liquid fuel, gas, an electricity, heat).

Depending upon the main goals of the project customer, the association "НИККОМ-PERMANENT" is ready to construct a technological complex on a turn-key basis (mini-thermal electric plant, operating from wastes) in the modification which allows to provide for the highest efficiency and profitability taking into account conditions of considered object and area.

The investments amount into one power technological complex depends upon the type and volume of processed waste and makes ca. 2500 Euro for 1 kW of installed capacity.

Preliminary technical and economic analyses show that the payback period for investments into the energy technological area on recycling of a municipal waste (silt deposit of city treatment facilities, organic part of technical and domestic waste), stock farm waste (manure and dung) with production of qualified energy carriers will be 2,5 to 3 years.