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WASTE RECYCLING AND USING IN ENERGY PURPOSES

The consumption habits of modern consumer lifestyles are causing a huge worldwide waste problem. Having overfilled local landfill capacities, many first world nations are now exporting their refuse to third world countries. This is having a devastating impact on ecosystems and cultures throughout the world. Some alternative energy companies are developing new ways to recycle waste by generating electricity from landfill waste and pollution.

Belarus generates around 30 million tonnes of waste annually, out of which household waste makes up 3 million tonnes. Each year, the volume grows by 20%. Existing waste recycling stations have the capacity to recycle only 12% of household waste, while in the EU the rate of waste recycling is around 60%.

The rest is dumped into landfills and/or buried. The existing landfills in Belarus often do not satisfy the basic standards in their way they carry out their operations or with regards to their location or their usage. These landfills pose a major threat to the environment in Belarus.

Although the government states that 85% of urban housing has access to separate waste systems, the population does not yet actively use it. As a result, the waste suitable for recycling makes up half of the total waste and ends up in landfills.

The absence of equipment for recycling various post-consumer waste constitutes another problem, as the state has no resources to invest in this area.

Several foreign investors have already established their business in this area in Belarus, such as the Swiss company TDF Ecotech AG, the Swedish company Vireo Energy, Austria's Strabag and the German company Remondis. However, they work only in several urban centres, while most towns, the those that are small or medium-sized, have no prospects for developing a sustainable waste management system.

This year was put into operation a factory near Grodno, which is the third such facility in our country. This factory will dispose of 100% waste generated in Grodno and in part in the regional center of the area. Investment in this project is approximately $ 28 million, the power is about 120 thousand tons of waste per year.

In Belarus in 2020 is scheduled to begin construction of 14 waste sorting factories. The rest of the waste sorting factories will be built in major cities across the country. Also Belarus actively searches for investors for the construction of enterprises for sorting waste in Vitebsk, Minsk, Borisov, Orsha, Bobruisk.

The cost of construction enterprises for the processing of waste depends on the technology. Creating a simple sorting worth 10 million euros to 100 thousand tonnes, and burning of waste – 100 million euros. This is due to the cost of equipment, the cost of cleaning system from waste incineration. Good example of such factory is the Spittelau waste incineration plant, which located in Vienna, Austria.

It processes around 250,000 tonnes of household waste every year. The plant in the 9th district produces approximately: 40,000 MWh of electricity; 470,000 MWh of district heating; 6,000 tonnes of scrap iron; 60,000 tonnes of clinker, ash and filter cake. The environmentally friendly heating produced at Spittelau is enough to heat more than 60,000 households in Vienna in a year.

In Belarus this direction of waste utilization is not used, because it is very expensive in terms of construction and operation. One way to involve this very promising for energy sector and environment technology – looking for external investment with state supporting of it.

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NEUTRON CAPTURE GAMMA RAY FIELD WITH ENERGY TO 10 MEV FROM RADIONUCLIDE FAST NEUTRON SOURCE

Wide spread and use of technogenic sources of ionizing radiation such as particle accelerators and nuclear reactors leads to appearance of a number of applied metrological tasks aimed at providing spectrometric and dosimetry ionization measurement instruments, located for photon radiation fields with energy to 10 MeV.

Gamma rays with energy higher 3 MeV may be acquired using radiative thermal neutron capture on target, i.e. (n, γ) – nuclear reaction. In range of energies to 7 MeV Titanium is used; to 10 MeV – Nickel. Simplest source of instantaneous Neutron Capture Gamma-Ray should consist of fast neutron source, neutron moderator and target irradiated with thermal neutrons. As a source of gamma-ray with energy to 10 MeV thermal neutron collimator of AT140 Neutron Calibration Facility with ^{238}Pu-Be fast neutron source, may be used (IBN-8-6).

Were built Monte-Carlo models of thermal neutrons collimator, facility and ^{238}Pu-Be fast neutron source using MCNP-4b code. Defined energy distribution of flux density of Neutron Capture Gamma-Ray for Titanium and Nickel targets.

For instrumental support of the experiment at SPE "ATOMTEX" was specifically manufactured Spectrometric Detector BDKG-19M NaI (T1) 63×160mm with nonlinear channel-energy conversion characteristic in range to 10 MeV. Were acquired results for Ti, Ni, and Fe targets, and without a target for open ^{238}Pu-Be neutron source.

During the experiment possibility to use Neutron Capture Gamma-Ray field formed by thermal neutron collimator of AT140 Neutron Calibration Facility with ^{238}Pu-Be fastneutron source with Ti and Ni targets for calibration NaI (Tl) spectrometers for energy to 10 MeV was confirmed. Closely stationing polyethylene plate in the