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COMPARATIVE ANALYSIS OF THERMOCHEMICAL PROCESSING TECHNOLOGIES FOR WASTE REMAINING AFTER MUNICIPAL SOLID WASTE SORTING

Nechepurenko A.I. (ITMO University)
Scientific Supervisor – associate professor, PhD, Sergienko O.I. (ITMO University)

Introduction. Within the framework of circular economy implementation, the issue of waste sorting and segregation is becoming urgent. On the territory of the Leningrad Region, the strategic priority of the development of the waste management industry is aimed at increasing the proportion of the selection of useful fractions for their subsequent involvement in secondary economic turnover. The territorial waste management scheme of the Leningrad Region includes developing a set of measures for phasing out the practice of placing waste at landfills in the Leningrad region that has not passed the production cycle of pre-treatment (sorting) and extraction of useful fractions (secondary material resources) and switching to the principles of circular economy. The priorities of the state policy of the Leningrad Region, as a subject, in the field of waste management is the creation of a sustainable system of solid municipal waste management, ensuring the sorting of waste in the amount of 100%, increasing the proportion of the selection of useful fractions from the total mass of solid municipal waste for their subsequent involvement in secondary economic turnover and in twice reducing the volume of waste sent to landfills [1].

Main part. As thermochemical technologies as the part of a waste sorting complex for processing waste remaining from MSW sorting incineration, gasification and pyrolysis are proposed. Comparative analysis of technologies is conducted, economic efficiency and environmental impact for the same scope of waste processing is assessed. As economic efficiency of the technologies indicators as investment and operational costs, taxes and secondary resources selling is assessed. As environmental impact the prevented volume of waste from landfilling and emissions are considered. For final project evaluation, payback period and net present value (NPV) of the project is used. NPV as economic efficiency of the project is calculated for the prospect of 10 years with discount rate of 20%. Calculation methodology is based on the scientific and educational publication «New energy- and resource-saving processes in a circular economy» [2].

Conclusions. As the most efficient technology pyrolysis is suggested as the technology that have best balance between economic efficiency and environmental impact. The installation unit of thermal destruction UTD-2-800 has been selected as one of the most effective pyrolysis devices from a Russian supplier [3].

List of sources used:

1. Leningrad Region Waste Management Committee. Territorial waste management scheme of the Leningrad region. URL: https://waste.lenobl.ru/ru/deiatelnost/tershema/ (date: 15.02.2023)
2. Sergienko O.I., Rakhmanov Yu.A., Kuznetsova K.G., Kournikova N.V. New energy- and resource-saving processes in the circular economy: Scientific and educational publication. – St. Petersburg: ITMO University, 2023. – 129 p.
3. IPEC. International power ecology company. Installation of thermal destruction UTD-2-800. URL: https://i-pec.ru/equipments/ustanovka-termicheskoj-destrukcii-utd-2 (date: 15.02.2023)