

## Research team specializing in bioenergetics, biogas technologies, and the energy potential of organic-containing waste



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## **Mikhail P. Fedorov, DEng, member of Russian Academy of Science**

### **Group Description:**

The engineering center of production and consumption waste specializes in innovative technologies and focuses on the energy potential of organic-containing waste, including producing hydrogen from less valuable landfill methane.

The team has been executing various Russian and international projects for many years, including IncoCOPERNICUS, LIFE, NISMIST, BLESK, Federal Special Purpose Program “Innovative Energy Technologies Development in Recycling and Disposal of TMO and Waste” etc.

The team is going to develop a technical plan for high-quality fuel production.

The center has designed an experimental unit for producing hydrogen from organic-containing waste to be used in fuel cells. The team has conducted some research that confirms the possibility of putting the reformat produced from biogas and containing high hydrogen percentage (volume 98%) directly into fuel cells. It helps to reduce energy costs avoiding expensive clean-up systems, which eliminate residual methane.

The new and promising line of our research includes developing biogas processing units to be used as auxiliary batteries of unstable energy produced by wind, solar, and other power units using renewable energy sources. Energy surplus is used to produce electrolytic hydrogen that later goes directly to bioreactors, which can increase the methane part of the biogas up to 95% instead of usual 40-50%. Biogas sources are widely available, so if there is an effective technology of biomethane and hydrogen-containing fuel producing, there will be some opportunities for the development of stand-alone hydrogen power generation using local fuel resources. This is one of the most promising researching trends in modern energetics.

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