Name of the project:

IRN AP19679083 «Development of prototypes of alternative energy sources of cogeneration type to improve the efficiency of energy supply to autonomous consumers».

Relevance:

The idea of the project is to develop two of new operation principle cogeneration-type alternative energy sources prototypes, which are based on an engine with an external heat supply, capable of working on almost any type of combustible fuel or waste subject to utilize the loss of thermal energy production cycles or to use solar energy. As result, the efficiency of energy supply to autonomous consumers with a capacity from 1 to 100 kW will be increased, greenhouse gas emissions into the atmosphere will be reduced and decentralized energy supply systems for remote rural areas will be developed and energy losses during its transportation will be eliminated. The source allows to produce thermal and electrical energy at the place of its consumption, regardless of the time of day.

Aim:

Conducting comprehensive scientific research to develop a new design of alternative cogeneration-type energy sources using low-potential energy of heated up to 100 °C water to increase the efficiency of energy supply to autonomous consumers.

Expected and achieved results:

1) Selection and justification of thermal energy sources capable of operating on any type of combustible fuel or waste subject, to utilize the loss of production cycles thermal energy or to use solar energy for heating the water to a temperature of less than 100 °C;

2) Conducting comprehensive theoretical research and developing a mathematical apparatus describing the processes of energy conversion in low-temperature EEHS and TAE, taking into account their operation in cogeneration mode;

3) Computer modeling of low-temperature EEHS and TAE for the formation of technical specifications for the manufacture of laboratory samples of cogeneration alternative energy source.

4) Conducting a study of laboratory samples of low-temperature EEHS and TAE and making the necessary adjustments to their design;

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Information for potential users:

As a result of solving the problems, two types of cogeneration alternative sources operating samples based on a low-temperature engine with external heat supply (EEHS) and a thermoacoustic engine (TAE) operating on the Stirling thermal cycle will be developed and tested. The prototypes will be adapted to the climatic conditions of Kazakhstan and various sources of thermal energy (hot water boiler, pyrolysis boiler, solar collector, heat exchanger, etc.). The expected service life of EEHS is up to 80,000 hours and TAE up to 120,000 hours without major repairs.