



Subject: AP13068541 «Development of an experimental energy complex based on a modernized boiler plant using biofuels».

Goal of the project: Develop a project for an operating experimental energy complex that will produce heat energy from biomass or animal waste, composed of from a biogas production site, an installation for the synthesis of biogas - gaseous fuel from livestock products, a heat generator - boiler for generating heat energy up.

The idea of the project: the development of domestic technology for the use of waste and the production of biogas based on a new controlled water boiler; improving energy and food security of the Republic of Kazakhstan.

Short description: In developing and implementing of biogas tech can be achieved those purposes: A low cost production of a thermal and an electrical energy, an improvement of the quality of the agricultural products. For instance the manufacture of an environmentally safe production, the improvements of social conditions of the rural population, etc. Therefore the introduction of biogas plants is the most important thing in this process. This project aims to develop and implement the experimental results of an energy set. And it will produces an the thermal energy from the biomass or from the waste materials of livestock.

Resulting from the project would be develop and manufacture of experimental and functional sample of generation in the form of biogas.

Relevance

The novelty of the project is that for the first time in Kazakhstan, a plant will be developed that allows you to efficiently process waste through the development of a new type of boiler operating on biogas.

The results of the project to create a prototype plant for the processing of livestock products (waste) for the industrial production of biogas, complete with new hot water boilers in Kazakhstan, may become a real impetus for creating a new industry in the agro-industrial sector with new jobs.

The implementation of the project for the development and manufacture of an experimental active sample of a biogas generator from livestock waste with auxiliary equipment will solve the theoretical and experimental problem of optimizing a wide range of plants for the production of biogas from livestock waste with hot water boilers and smoothly adjustable burners.

Achieved results:

2022 year:

1. The research show the fundamental difference between project ideas and existing analogues, as well as a scientific justification of the relevance, significance of the project on a national scale for ensuring independence, energy and food security. Completion form: A report written based on the research carried out. The report will provide recommendations for using the installation.

2. A patent analysis of similar technologies carried out in patent databases of the EU, the USA and China, as well as in top-rated foreign journals. Completion form: Patent search and collection of information. Technical report on the work done. Review publication.

3. Design documents for the new installation developed, taking into account the shortcomings of similar models. Completion form: Development of technical documentation, design documentation for a plant for processing livestock products, 1 article in the publication recommended by Committee for Control in the Sphere of Education and Science.

2023 year:

4. On the basis of already existing studies, as well as taking into account the shortcomings of analogues, the design documentation of the new boiler developed. Completion form: design documentation for a 0.43 MW biogas boiler. Filing a patent for an invention. Development of technical documentation.

5. Manufacturing of new parts start on the basis of design documentation. Completion form: Manufacturing of new parts.

6. The installation assembled with auxiliary tanks and a boiler. Completion form: technical documentation of the pilot unit.

Application areas:

- environmental departments of the Republic of Kazakhstan;
- enterprises of the energy sector, farms;
- Universities in the training of specialists in the specialty "Heat Engineering";
- design bureaus of enterprises of the Ministry of Energy of the Republic of Kazakhstan and scientific organizations.

Implementation: Is implemented within grant financing of young scientists on scientific and (or) scientific and technical projects for 2022-2024 (36 months).

Publications:

2022 year:

1. Г.У.Турсунбаева, Б.Т.Бахтияр, М.С.Коробков, А.К.Мергалимова «СОВРЕМЕННОЕ СОСТОЯНИЕ ПРОБЛЕМЫ ПРОИЗВОДСТВА БИОГАЗА» Вестник КазАТК, 121(2), 478–485. DOI: <https://doi.org/10.52167/1609-1817-2022-121-2-478-485>.

2. Г.У.Турсунбаева, Б.Т.Бахтияр, Байжан Г.Ә., А.К.Мергалимова «ПРОИЗВОДСТВО БИОГАЗА ИЗ БИОМАССЫ ЖИВОТНОВОДСТВА» Вестник КазАТК, 122(3), 171-181. DOI: <https://doi.org/10.52167/1609-1817-2022-122-3-171-181>.

3. Г.У.Турсунбаева, Б.Т.Бахтияр, Г.К. Балбаев «ПОСТРОЕНИЕ ИМИТАЦИОННОЙ КОМПЬЮТЕРНОЙ МОДЕЛИ ВЕТРО ЭНЕРГЕТИЧЕСКОЙ УСТАНОВКИ В СРЕДЕ» Вестник КазАТК, 122(3), 171-181. DOI: <https://doi.org/10.52167/1609-1817-2022-122-3-246-254>.

4. Б.К.Алияров, Г.К. Балбаев, Б.Т.Бахтияр, М.Б. Бейсенбаев «РАЗВИТИЕ ГИБРИДНОГО ОБЩЕСТВЕННОГО ТРАНСПОРТА ПУТЬ СНИЖЕНИЯ КАРБОННОГО ЗАГРЯЗНЕНИЯ АТМОСФЕРЫ ГОРОДА» Вестник КазАТК, 122(3), 171-181. DOI: <https://doi.org/10.52167/1609-1817-2022-122-3-246-254>.

5. В. В. Torepashovna, M. A. Kairbergenovna, K. M. Sergeyevich, T. G. Uyezbekovna and Z. A. Kairbekovna, "AP13068541 Development of an Experimental Energy Complex Based on an Upgraded Boiler Plant Using Biofuels," *2022 International Conference on Communications, Information, Electronic and Energy Systems (CIEES)*, Veliko Tarnovo, Bulgaria, 2022, pp. 1-6, doi: 10.1109/CIEES55704.2022.9990656.

2023 year:

1. A.K.Zhumaliyeva, B.T.Bakhtiyar, M.S. Korobkov, A. Zhaut, G. U. Tursynbaeva «CLEANING OF WATER SUPPLIED TO THERMAL POWER PLANTS AND BOILERS», Вестник КазАТК № 1 (124), 2023, 397-403 стр., DOI 10.52167/1609-1817-2023-124-1-397-403, <https://vestnik.alt.edu.kz/index.php/journal/article/view/713/811>

2. B.T.Bakhtiyar, M.Beisenbaev, G.U.Tursynbaeva, N. Karabekova « BIOTECHNOLOGY: TECHNOLOGY FOR PRODUCTION OF BIOGAS FROM ORGANIC PRODUCTS AND ITS APPLICATION» Вестник КазАТК № 1 (124), 2023, 404-409 стр., DOI 10.52167/1609-1817-2023-124-1-404-409 <https://vestnik.alt.edu.kz/index.php/journal/article/view/735>

3. G.A. Manapova, B.V. Bakhtiyar, Zh. Seitova, M. Makhanova «APPLICATION OF A LOW-PRESSURE MIXING TYPE HEATER IN SCHEMES OF STEAM TURBINE INSTALLATIONS OF THERMAL POWER PLANTS», Вестник КазАТК № 3 (126), 2023, 435-442 стр., DOI 10.52167/1609-1817-2023-126-3-435-442 <https://vestnik.alt.edu.kz/index.php/journal/article/view/1103>

4. Г.А.Манапова, Б.Т.Бахтияр «ВЗАИМОСВЯЗЬ ВРЕДНЫХ ВЕЩЕСТВ И ЭКОЛОГИЧЕСКОГО УЩЕРБА В ТЕПЛОЭНЕРГЕТИЧЕСКИХ ЦЕНТРАЛЯХ» Вестник КазАТК № 2 (125), 2023, 437-443 стр. DOI 10.52167/1609-1817-2023-124-1-437-443 <https://vestnik.alt.edu.kz/index.php/journal/article/view/870>

5. Г.А.Манапова, Б.Т.Бахтияр, А.К.Мергалимова, Ж.А.Сеитова, Г.У. Турсунбаева «БИОГАЗ ҚОНДЫРҒЫЛАРЫНЫҢ ЖҰМЫС ІСТЕУ ҚАҒИДАЛАРЫ», Вестник КазАТК № 5 (128), 2023, 410-423 стр. DOI 10.52167/1609-1817-2023-128-5-410-423 <https://vestnik.alt.edu.kz/index.php/journal/article/view/1504>

6. Б.Т. Бахтияр, Г.А.Манапова, А.К. Мергалимова, М.А. Маханова, Г.У. Турсунбаева «АУЫЛ ШАРУЫШЫЛЫҒЫНЫҢ ҚАЛДЫҚТАРЫНАН БИОГАЗ АЛУ» Вестник КазАТК № 5 (128), 2023, 399-409 стр. DOI 10.52167/1609-1817-2023-128-5-399-409 <https://vestnik.alt.edu.kz/index.php/journal/article/view/1476>

7. Otyunchiyeva, M. T., Bakhtyar V.T., Korobkov M.S., Tursunbayeva G.U. «Experimental studies of a model of a dusted flow air heater for the development of a new hot-water boiler», International Conference on Electrical Facilities and information technologies 2023 «New Intelligence Technology: Past, Present and Future», 322-334 p. https://www.icef2023.org/pages/about/icef_2023.vm

8. Бахтияр Б.Т., Коробков М.С., Турсунбаева Г.У. подана заявка на патент на изобретение «ТЕПЛО-БИОЭНЕРГЕТИЧЕСКИЙ КОМПЛЕКС» от 27.04.2023 г. № 2023/0295.1., «Национальный институт интеллектуальной собственности» (на этапе прохождения экспертизы, по существу)

Partners (domestic and foreign):

- Moscow Power Engineering Institute (Russian Federation, Moscow)
- Almaty University of Energy and Communications named after Gumarbek Daukeev (Almaty)
- Angel Kynchev Rusen University (Ruse, Bulgaria)
- Kazkotloservice LLP