GREEN TECH
Sustainable Heat & Power

Green Tech International

Key Project Information

Project Description

Green Tech International S.A. is developing **a first of its kind CO2 emissions reductions project by enhancing the efficiency of the use of geothermal waters.**

Under its title - "Reducing 3,000,000 tons of CO2 emissions over a span of 15 years by increasing the efficiency of the exploitation and use of geothermal waters in Călimănești - Căciulata, Vâlcea county, Romania" - the proposed activity is a greenfield project for the utilization of Călimănești - Căciulata geothermal water resources to produce heat and electricity through a high efficiency cogeneration system. The aim of this investment is to ensure green energy development while protecting the environment and fostering sustainable agriculture and tourism in the region.

The development of the project relies on the following fundamentals:

- favorable geological structure, characterized by high heat gradient and flow;
- significant geothermal water flow rates (over 250 cubic meter per hour of hot water springing from 4 deep geothermal wells drilled at 3000 m depth) in eruptive system, with water temperature between 91 ÷ 97 degrees C.

The geothermal water, which is a renewable natural resource, will be mainly used for the preparation of heating and clean hot water for consumption in greenhouses, cold storage facilities, food processing plants and supplying heating and hot water to residential buildings, blocks of flats and houses, tourist and leisure facilities (hotels and guesthouses), military facilities, religious facilities, industrial annexes, service facilities (offices, commercial and social premises, hospitals, schools, etc.) or catering establishments, etc. The use of geothermal water extends to balneotherapy and leisure purposes with the aim to foster local development in this region rich in renewable resources.

When extracted, the geothermal water comes from the ground associated with a small fraction of natural gases and, through the proposed investment, these gases will be 100% captured and used to produce electricity and heat through a high efficiency cogeneration system.

Furthermore, the project captures also 95% of the CO2 from the burning process of these associated natural gases and the generated CO2 will be consumed by the plants in the greenhouses located near the project, which are aimed to develop sustainable agriculture too, thus securing minimum gas discharged in the atmosphere and a maximum utilization of the renewable resources.

What is the aim of Gold Standard certification?

The project is currently going through a Carbon Credit certification process to adhere to the international 'Gold Standard' accreditation, which utilizes innovative approaches to quantify, certify and maximize impacts towards climate security and sustainable development under Gold Standard for the Global Goals, and it is aligned with the United Nations Sustainable Development Goals.

Upon successfully finalizing its Gold Standard certification, Green Tech International is aiming to receive carbon credits in an equal amount with the certified CO2 emissions reductions achieved by the project activities. The total GHG emission reductions for the 15 years crediting period (2024-2039) are estimated at 3,000,000 tCO2e, and the annual average GHG emission estimation is above 200,000 tCO2e.

Gold Standard Certification Timeline

The project is expected to pass the Gold Standard preliminary review by the fall of 2023 and continue the certification process during 2024 with the aim to receive carbon credits at the end of 2024. After that date, the project will receive CO2 credits for a 5-year cycle, renewable 3 times, upon passing all verification process.

Project Location

The project activity is located in Romania, Valcea county in Călimănești – Căciulata perimeter. The GPS coordinates for the wells of geothermal plant in Calimanesti are:

Well	East	North	Elevation over see level
1006	24.3242	45.2596	277.44
1008	24.3186	45.2683	288.20
1009	24.3379	45.2500	278.43
1010	24.3414	45.2325	270.00

and the land where the main technology will be installed has the following coordinates: 45○ 13 '59.22" N and 24○ 21' 07.49" E with 273m elevation over sea level.

Project Timeline Implementation

The Project's first tender for the acquisition of the major equipment shall be in autumn 2023, which is considered the start date of the project, according to Gold Standard rules and requirements. Then, the final commissioning of the integrated geothermal facility is estimated to be on fall 2024, starting its commercial operation in the fall/winter of 2024.

Baseline Scenario

According to the UN CDM methodology used to calculate the emissions savings of the project, for renewable energy technologies that displace technologies using fossil fuels, the simplified baseline is the fossil fuel consumption of the technologies that would have

been used in the absence of the project activity, times an emission factor for the fossil fuel displaced.

In our specific case, the baseline scenario for thermal and electrical energy production in the absence of the project activity represents the thermal energy produced using fossil fuel and electricity imported from the grid.

Major Project Benefits

The participants of the Project recognize that this project activity is a model for other projects, aiming at delivering sustainable development through the efficient use of renewable geothermal water. Furthermore, the project is in line with specific UN requirements because it contributes not only to environmental protection sustainable, but also to sustainable agriculture and local community development.

The efficient use of geothermal energy resources in areas that are or can be supplied with heat and domestic hot water through centralised or non-centralised systems has the following benefits:

- decreases the consumption of fossil fuels needed to meet heating demand;
- decreases the environmental impact of burning fossil fuels,
- minimizing pollutant emissions by capturing most of the associated gases including CO2 and utilizing it in greenhouse applications;

Overall, the geothermal energy has a number of clear advantages:

- it is a nature-based solution project from renewable water resources;
- it has a positive impact on the environment by replacing highly polluting fossil fuels;
- it is a reliable primary energy source that does not require storage facilities for a certain period of the day or year;
- it is sustainable, because the geothermal resources provide a steady flow of water and implicit clean energy throught the year as compared to other renewable resources such as wind and solar power. This is because the resource is always available to be tapped into, unlike the wind or solar energy.

  The opportunity and the need to expand and modernize the exploitation system of the Călimănești - Căciulata geothermal perimeter, takes into account the following aspects:

- the existence of new beneficiaries in the area, notably in the food, food processing and cold storage fields;
- providing thermal energy for Călimănești district heating at an appropriate flow rate and temperature;
- supplying the beneficiaries with heat on a regular basis at the level required, by creating an automatic system for the exploitation and delivery of geothermal water and thermal agent;
- the agreement and support of local authorities;
- creating a high-efficiency cogeneration system that uses only the gases associated with the geothermal renewable water sources;

- easy access to constant heat will support new investments that make efficient use of the energy stored in geothermal water;
- the new investment will create new jobs;
- the development of the area, supported by the high tourist potential and the reputation created over time;
- fostering sustainable agriculture through constant delivery of heat and CO2 from carbon capture

Therefore, the project contributes to the following United Nations Sustainable Development Goals:

SDG 4 – Quality education
SDG 5 – Gender equality
SDG 7 – Affordable and clean energy
SDG 8 – Decent work and economic growth
SDG 9 – Industry, innovation and infrastructure
SDG 13 – Climate action

Additional Information

For further information, please contact us at casiana@carbonexpert.ro, hpitulea@green-tech.energy and office@green-tech.energy or visit our webpage https://www.green-tech.energy/projects/development-projects

For information about Gold Standard, please visit www.goldstandard.org .