

Sustainable use of biomass waste for energy in Romania

Project Description

The GEF SGP project “Sustainable use of biomass for energy purposes” promoted the production of thermal energy from biomass using locally produced raw materials in Romania. The results are income generation from agricultural waste, pollution reduction from preventing the burning of the straw on the fields. Heat generation from cereal straw instead of fuel wood, could significantly reduce deforestation, while reducing emissions from fuel wood transport at the same time.

Capitalizing on biomass derived from agricultural waste, the project developed a sustainable solution for heating generation. In a pilot location and involving community-based organizations, civil society, the local government and the private sector, this initiative also aimed to raise awareness and interest in using renewable energy as a way to mitigate climate change. As a result, the demand for energy produced from agricultural biomass waste is increased and the community is involved in decision-making to increase the significance of renewable energy use at local level.



Background

The project idea was inspired by Romania’s National Climate Change Strategy, and as a member of the EU, Romania supports the EU’s 20-20-20 Agenda, which aims to reduce greenhouse gas emissions by 20% and increase the production of renewable energy resources to a share of 20% at EU level by 2020. Reducing the negative effects of energy production processes on the climate requires concrete and rigorous initiatives. These include promoting the use of biomass waste for heating purposes, and preserving and strengthening the natural sinks of greenhouse gases such as forests, among numerous others.

This initiative started in Calarasi county, in the Vlad Tepes community composed of the two villages Vlad Tepes and Mihai Viteazu, which are located 100 km from Bucharest. The area covers 7442 hectares, is home to 2418 inhabitants, and demonstrates a poverty rate of 47%, which is significantly higher than the average rural poverty rate of Calarasi County (40%). With a large agricultural sector in this region, agricultural waste is abundant in tremendous quantities.



Implementing organization: Terra Mileniul III Foundation

Location: Vlad Tepes village, Romania

Duration: January 2010 - March 2011

Number of beneficiaries: 6 public buildings and 100 households heated with briquettes

GEF SGP Contribution: US\$ 48,400

Cash co-financing: US\$ 20,920

In-kind co-financing: US\$ 14,310

Award and recognition:

Energy Globe National Award of Romania, 2012

Due to the physical conditions and geographical location of Vlad Tepes, agriculture accounts for the largest share in the local economy (80% of the working population is involved in subsistence farms and specialized companies). Cereals like wheat, barley and corn are the primary crops produced on 4067 hectares (ha) of land, utilizing seasonal work. Local farming practices are weakly mechanized and the straw is left on the fields. With wheat production yield of 4,000 kg/ha, a 1:1 ratio of grains to straw for the current varieties of wheat, and wheat fields of about 1704 ha, it can be estimated a quantity of 6816 tons of straw go to waste annually.

Heating in Vlad Tepes community is generated with individual wood stoves, since the community does not have access to the natural gas grid, like all villages in the area.

Thus the 1142 households, 2 schools, 2 kindergartens, City Hall, and the community centre use about 3500 tons of acacia wood for heating annually. Despite the vast potential that this community has in terms of waste to energy, the use of alternative energy sources within the community was practically nonexistent.

Local stakeholders recently realized the value of the agriculture waste as an energy source and promoted the dialogue with the local government from Vlad Tepes community regarding the use of straw for heating.

Implementation

For this project, a multi-stakeholder group collaboratively determined the following activities:

- Acquisition of briquetting machinery and establishment of a workshop for making briquettes from agricultural waste
- Training of beneficiaries who will operate the installation
- Development of knowledge products on climate change and the use of renewables as a solution to reduce greenhouse gases emissions for the local community
- Survey on the use of straw briquettes
- Organizing 2 local public debates about the use agricultural biomass to assure the demand for heating of the village
- Organizing a training for local community leaders, aiming to increase the use of renewable energy sources

A public-private partnership was established between the local government and the private local company, driven by a local NGO and the local community. All stakeholders divided roles and shared responsibilities in the process such as the NGO managing the project, the company providing the bulk of the raw material (straws) for briquetting as well as the space for the workshop (including storage space for the raw material and working space for the equipment), and the community providing additional straw from their private lots.

As a result, the communities received free briquettes for heating the local schools, benefitting the community by reducing their energy expenditures. Furthermore, the community can buy briquettes for residential heating at a discounted price and the company sells the remainder of the briquettes to cover their costs and even generate profits.

A major challenge was the acquisition of the equipment, as the fiscal legislation changed in Romania during the implementation period and the VAT increased from 19% to 24%, reducing the project budget. Under these conditions, the project was not able to obtain the entire machinery necessary, which includes the press and a mechanized device to supply the press with straw.



Only the press could be purchased, which has to be loaded manually. Consequently, an additional worker is needed to manually feed the press. This solution, even if only a temporary one, demonstrated the community's commitment to the project's success and also motivated the people to think about possibilities to improve the equipment's productivity.



Environmental Impact

The use of briquettes from agricultural waste can be a potential alternative to address climate change and deforestation.

Farmers no longer burn their fields in order to get rid of the old straw and roots. This significantly reduces greenhouse gas emissions and prevents uncontrolled fires. In addition, the use of briquettes for household heating reduces the use of fire wood. Through the project, an average of 200 tonnes of briquettes are produced annually. With the distribution of 10 tonnes of briquettes for the heating of public schools, 16 tonnes of fuel wood can be saved annually.

The use of renewable energy resources has increased in 6 public buildings and 100 households, which are now heating with these briquettes. The heating source is now carbon neutral, being produced locally, and it substantially contributes to reducing the need of logging in the area. Furthermore, it also avoids carbon emissions through reduced fuel wood transportation from other areas.

Socio-Economic Impact

During project implementation, six people were trained and then hired to operate the briquette manufacturing line. The company hired seasonal workers (locals who only find jobs in the spring and summer) to employ them all year round. Business development will help increase employment both directly and indirectly in construction and agriculture. Farmers are now more interested to sell their straw to the local company.

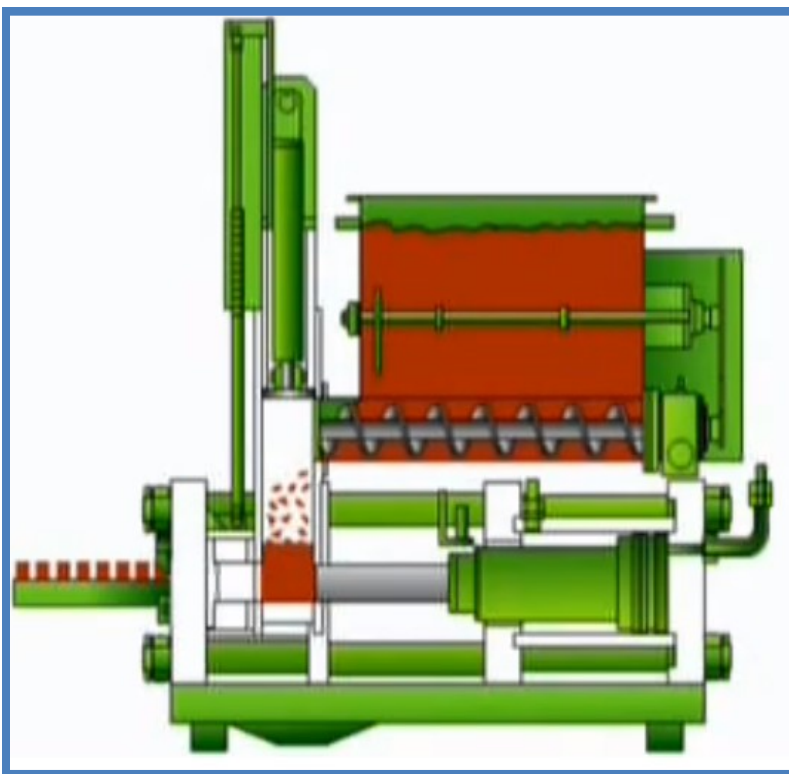
Secondary benefits included higher awareness among the local population regarding renewable energy sources and climate change, as well as environmental education. The project further supported the Public Local Authority to implement its local sustainable development strategy.

An innovative mechanism was the involvement of the private sector in the project activities, benefitting the local community in multiple ways. The private partner provided co-financing during project implementation, the space for installing the equipment as well as 10 tons of free briquettes to be used for heating in public buildings and in the lowest income households. Furthermore, after project completion, the private company continues to operate the equipment and provides the necessary briquettes to heat schools without charge, hence significantly contributing to project sustainability.

Briquettes Press System

The utilized press system creates solid briquettes without the use of any glues or adhesives. Technical specifications include:

- Briquettes diameter: 6 cm;
- Briquettes length: 30—90 cm (depending on the adjustments and the kind/size of the materials used);
- Requirements for the material: a residual moisture content of less than 15%, and chips lengths of less than 50 mm;
- Press capacity: up to 240 briquettes per hour;
- Equipment weight: 1300 Kg.



Sustainability

The partnership with the private sector ensured a mechanism that can guarantee project sustainability in the future. While the private partner provides free briquettes for the heating of schools in the community from the straw supplied by farmers' private plots, the company can recover their operational costs by selling additionally produced briquettes. This mutually beneficial arrangement creates incentives for all stakeholders to maintain the facility's operations.

Furthermore, higher awareness among the local population regarding renewable energy sources and climate change strengthened the interest in renewable energy development by local communities, which may likely attract further partners. By supporting the Public Local Authority to implement its local sustainable development strategy, the project further promoted biomass use for energy in Romania.

Replication and Upscaling

Considering the great potential of the vegetal biomass as a renewable energy source, another NGO (Amoeba Eco Center - located in a forestry area) already investigated the possibility of capitalizing on forest biomass by producing briquettes, while conserving biodiversity through sustainable harvesting methods. Based on the model partnership established by Terra Milenium III, they identified potential partners in their area, discussed the project idea and applied for a GEF SGP grant in 2011. The application was successful and the NGO in partnership with two local public administrations, one association of forest owners and one private company are implementing a project to establish a workshop for briquettes production from forest biomass. The innovative aspect of this project is the use of mobile equipment to mince the biomass on site in the forest, thus reducing the volume of material to be transported to the workshop. The project is currently under implementation.

In 2012, the "Leader +" programme was initiated under the EU structural funds available for sustainable development of rural communities, which may be useful for upscaling efforts using non-GEF funds. Based on GEF SGP's project experience, many communities and associations are now planning to submit similar project proposals in Romania. Five organisations already contacted Terra Milenium III for their support.



The project is easily replicable in any rural agricultural areas in Romania as well as in other countries. The GEF SGP Romania team already shared their experiences with the GEF SGP Uzbekistan and Mongolia National Coordinators, who inquired about the technical characteristics of the equipment and about the possibility to involve the private sector in such a project in these countries.

The organisation's website, the dedicated communication network (GEF SGP grantees) and the network of environmental NGOs were the primary vehicles for knowledge exchange. Meetings with local communities and interested stakeholders from other regions added to further knowledge sharing and information dissemination.

Lessons Learned

This initiative involving the partnership among multi-stakeholders in heating generation from agricultural waste has demonstrated that socio-economic benefits are key to project sustainability.



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