

The Bucharest-Ilfov region is one of 283 European Union regions, located in the south-eastern part of Romania, more precisely in the centre of the Romanian Plain, being formed by two entities, respectively Ilfov County and Bucharest municipality. Ilfov County consists of 40 territorial administrative units, of which 8 cities, 32 communes and 91 villages. The city of Bucharest is made up of six sectors, arranged radially around the central area of the city. The region the region is located entirely in the plain area, at altitudes between 48 and 128 m and it has a total area of 1823 square km, of which Ilfov County owns 86.83% (1583 square km), while Bucharest has an area of 240 square km.

The promoting system for the production of electricity from renewable sources

Bucharest, Bucharest - Ilfov, Romania

Creating a functional support mechanism for the production of electricity from renewable sources, by granting green certificates, associated with a functional market for their trading.



Green Certificates

Romania's national policy in the field of renewable energy was elaborated and implemented in the

difficult context of the specific economic transition from centralized market to the economic one. Making the most of the RES has become an important component of the energy policy at the national level at the beginning of the current decade, against the background of Romania's accession to the European Union. In this respect the adoption of the community acquis, by creating a legal framework in the energy field, have had important effects on the use of RES in our country.

Thus, in order to meet the European objectives in the RES sector, in accordance with Directives 2009/28/EC, Romania adopted Law 220 in 2008, completed in 2011, at the request of the Commission, to meet his requirements regarding compatibility of the support measures with the legislation in the field. This represents the primary legislation, the legislative framework being a complex one, meant to give financial support to the investors involved in the production of electricity from renewable sources, by establishing a mechanism for granting green certificates and creating a regulated trading market for them, thus ensuring the increase of electricity production from RES sources.

The legal framework established was considered a signal for all the investors in the field of producing electricity from renewable sources. The support mechanism provided by the Romanian state works according to the following pattern: the electricity producers from renewable sources can sell the quantity of electricity produced to the distributors, under the same conditions as any other energy producer, but, in addition, for covering the costs of production, for each MWh delivered to the network, they receive a certain number of "Green

Certificates", depending on the technology used and the type of energy promoted. The value of the Green Certificates, by trading them on the Green Certificates Market - the market regulated and monitored by the Romanian authorities, represents an additional gain received by the producers for the "clean energy" they delivered in the networks. The trading value of the Green Certificates is established through competitive mechanisms specific to the markets in which the transaction is concluded, the price being fluctuating, between 27 and 55 euros per certificate. At the same time, this support scheme is complemented by a mandatory quotas system through which the Romanian Energy Regulatory Authority obliges the electricity distributors to purchase certain quotas of energy produced from renewable sources.

Romania is concerned, especially in the medium and long term, of the use of renewable energy resources for the production of electricity and thermal energy, thus contributing to encouraging innovative technological development and the use of new technologies in practice. Due to the fact that the energy produced on the basis of renewable energy resources is "clean" energy, their use offers an alternative to the energy produced on the basis of fossil fuels. In this regard, Romania was declared the country with the greatest potential in this sector in south-east Europe, and the use of the available renewable energy resources will contribute to the entry into the economic circuit of isolated areas.

Resources needed

Supporting investors in the production of electricity from renewable sources is a measure taken by the Romanian state, in accordance with the Commission's directives, being a direct intervention mode on the supply side. Romania does not finance this market, all the costs being transferred to the final consumers who, are obliged to pay the value of the green certificates purchased by the electricity suppliers, from the producers using RES.

Evidence of success (results achieved)

According to the annual reports for monitoring this mechanism, prepared by the regulatory authority in this sector, analysing the period between 2013 and 2018, the following conclusions can be issued: Regarding the evolution of the number of energy producers from renewable sources accredited by types of sources, there is an upward trend on all types of sources, both as number of accredited producers and as installed power, as follows:

- Wind power: currently 66 producers with an installed capacity of 2961MW, compared to 60 producers with an installed capacity of 2593 MW in 2013.

- Hydro energy (Installed power of maximum 10 MW): currently 102 producers with an installed capacity of 341MW, compared to 69 producers with an installed power of 263 MW in 2013.
- Energy based on biomass (including those based on waste and sludge fermentation gas): currently 28 producers with an installed capacity of 124 MW, compared with 14 producers with an installed power of 81 MW in 2013.
- Solar energy: currently 576 producers with an installed capacity of 1359MW, compared to 370 producers with an installed capacity of 1217 MW in 2013.

At the end of 2018, the installed capacity accredited in RES type production units was 4785 MW, compared to 2013, when the installed capacity was 4046 MW.

Challenges encountered

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Potential for learning or transfer

Given that this mechanism was established as a result of the transposition of European Union directives into Romanian legislation, directives aimed at increasing the energy use of RES sources to reduce dependence on fossil fuels and thus help reduce gas emissions greenhouse effect in this sector, representing a good practice in terms of promoting the use of renewable energy.

As shown above, this support scheme has produced in Romania an increase in the production and use of electricity from renewable sources, in line with the recommendations of the European Commission and the provisions of the legislative package "Clean Energy for All Europeans".

A support mechanism similar to the one in Romania is used in Italy, the United Kingdom, Poland, Sweden, Belgium, this strengthening the potential of good practices transfer between the European Union regions.

Main institution in charge

Romanian Energy Regulatory Authority

Timescale (start/end date)

2008 - 2021 (ongoing)

Further information:

<http://energie.gov.ro/wp-content/uploads/2016/08/15.OUG-nr.-88-2011-privind-modificarea-si-completarea-Legii-nr.-220-2008-pentru-stabilirea-sistemului-de-promovare-a-productiei-energiei-din-surse-regenerabile-de-energie-MO-736-2011.pdf>

Green House Photovoltaics National Program – Solar energy

Bucharest, Bucharest - Ilfov, Romania

Providing a financing program for the instalment of photovoltaic panels for electricity production, in order to cover the own consumption needs and to deliver the energy surplus to the national network.



Green House Photovoltaics National Program.

Romania's national policy in the field of renewable energy was elaborated and implemented in the difficult context of the specific economic transition from centralized market to the economic one. In this respect the adoption of the community acquis, by creating a legal framework in the energy field, have had important effects on the producing and using of RES in our country.

Thus, in order to meet the European objectives of the RES sector, in accordance with the recommendations of the European Commission and the provisions of the legislative package "Clean energy for all Europeans", to which Romania has aligned, therefore deciding to allocate funds for this sector. In this regard, Romanian authorities have decided to finance, as investment priority, increasing the energy production from renewable sources. This action represents a policy of stimulating the "clean" energy production, to which the Romanian state has decided to assign a financial component, by creating the Green House Photovoltaics National Program, implemented by the Administration of the Environmental Fund (according to the Ministry of the Environment Order 1287/2018). The purpose of the Program is to increase energy efficiency, to improve air quality and the reduction of greenhouse gas emissions through installing photovoltaic panel systems for the production of the own consumption electricity and delivery of the surplus in the national energy system.

Thus, in order to fulfil the objective of the program, that of increasing the capacities of electricity production from renewable sources, the responsible authority has made available to the natural persons a non-reimbursable financing for the purchasing and installation of the photovoltaic panels systems, in order to support their own consumption and, in case of surplus, its delivery to the national energy

system. The financing is granted up to 90% of the total value of the eligible expenses, within the limit of approximately 4200 euro. The registration for financing is done at the installers previously authorized by the authority, based on the participation contract, within the limits of the funds allocated to the region in which the building, for which the project is implemented, is located. In the analysis phase, the registrations from the informatics application are examined and the approved projects are established, based on the eligibility criteria set out. The final settlement is made by subtracting from the final value of the works, the maximum available amount granted by contract, of 4200 euros, following that the difference will be supported by the beneficiary. The budget allocated to this initiative is 16.800.000 euros, calculated only for the Bucharest-Ilfov region, the program being implemented at national level.

Taking into account the eligibility criteria, the main beneficiaries of this measure are the natural persons who choose to submit projects under this program and, of course, the entire community from this region, taking into account the decrease of the consumption of the national energy network, energy created on the basis of fossil fuels. In this regard, Romania was declared the country with the greatest potential in this sector in south-east Europe, and the use of the available renewable energy resources will contribute to the entry into the economic circuit of isolated areas.

Resources needed

As the program is implemented at the national level, the total amount of the financing granted for it amounts to approximately 138 million euros, the Administration of the Environmental Fund providing, from the Environmental Fund, the necessary amounts for the Bucharest - Ilfov region, worth 16.8 million euros. Since the beginning of the registration of projects in the informatics application, the amount is reserved, automatically reducing the budget according to the number of projects uploaded.

Evidence of success (results achieved)

Given that this mechanism was established as a result of the transposition of European Union directives into Romanian legislation, directives aimed at increasing the energy use of RES sources to reduce dependence on fossil fuels and thus help to reduce gas emissions greenhouse effect in this sector, representing a good practice in terms of promoting the use of renewable energy.

Considering that the Program is just launched, November 6th being the first day of the submission of projects, there is currently no information on its success. In any case, given that this financing aims

to install photovoltaic panels for the production of electricity, in order to cover their own consumption needs, by reducing the number of final consumers connected to the national network, a network based on energy from fossils fuels, there is an improvement of the current situation, both in terms of "overloading" the network and from a climatic point of view.

Challenges encountered

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Potential for learning or transfer

Romania has assumed the increase of the production and use of energy from renewable sources in accordance with the recommendations of the legislative package "Clean Energy for All Europeans". In this regard, the Romanian authorities have created a legal framework to encourage the development of the RES sector, ensuring a considerable financial component to offset the high initial costs of implementing this type of projects. By implementing such projects, it will contribute to the development of the entire RES sector, resulting in increasing offers and, consequently, the reduction of the initial acquisition costs. Considering these, we can conclude that given the right support for the development of this sector, it will significantly contribute to the reduction of using energy based on fossils fuels, contributing in this way for better climate conditions.

Main institution in charge

Administration of the Environmental Fund

Timescale (start/end date)

November 2019 - (ongoing, until budget finalization)

Further information:

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Program for the installation of photovoltaic systems for isolated households

Bucharest, Bucharest - Ilfov, Romania

Providing a financing program for the instalment of photovoltaic panels for electricity production in the isolated households from rural area which are not connected to the national electricity grid.



Photovoltaic systems for isolated households

According to data provided by the Ministry of Energy, in Romania there are still over 50 thousand households which are not connected to the national network, most of them being in isolated communities.

At the same time, Romania has aligned itself with the European legislation regarding the reduction of greenhouse gas emissions (Clean energy for all Europeans) by developing financing programs to encourage the increase of the energy production from renewable sources.

This action represents a policy of stimulating the "clean" energy production, to which the Romanian state has decided to assign a financial component, by creating the Program for the installation of photovoltaic systems for isolated households, which are not connected to the grid electricity distribution. The purpose of the program is to improve air quality by reducing greenhouse gases, by using photovoltaic panel systems for the production of electricity that will be used in homes located at least 2 km from the grid distribution of electricity and the abandonment of conventional fuels. The financing represent 100% of the eligible value expenses, but not more than 5000 euros including VAT, for each building and is staggered in close connection with the implementation stage of the project. The applications for financing will be submitted by the municipalities of the localities, for all the households within their territorial range, who wish to install these systems and who have no debts to the local budget. The main beneficiaries of this practice are the inhabitants of the isolated communities, which are not connected to the national electricity network. The practice aim to improve the quality of their life because it will allow them to make their daily household activities easier.

A large part of the households without access to the electricity network are based on practicing subsistence agriculture: they raise animals and cultivate small plots of land. By giving them access to electricity, they can work the land more efficiently, for example using irrigation, various automation methods, which will lead to an improved standard of living.

Resources needed

As the program is implemented at the national level, the total amount of the financing granted for it amounts to approximately 46 mil. euros for entire country. The funds were provided by the Romanian Government from the Environmental Fund.

Evidence of success (results achieved)

Seven files were accepted by the Environmental Fund Administration for the installation of photovoltaic systems in 115 isolated households in Romania

Challenges encountered

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Potential for learning or transfer

Given that this mechanism was established as a result of the transposition of European Union directives into Romanian legislation, directives aimed at increasing the energy use of RES sources to reduce dependence on fossil fuels and thus help to reduce gas emissions greenhouse effect in this sector, representing a good practice in terms of promoting the use of renewable energy.

Main institution in charge

Administration of the Environmental Fund

Timescale (start/end date)

April 2019 – January 2020

Further information:

https://www.afm.ro/main/programe/gospodarii_izolate/2020/comunicat_presa-publicare_liste_dosare_acceptate_gospodarii_izolate-2020_03_24.pdf

<https://e-nergia.ro/afm-a-aprobat-dosare-de-finantare-pentru-115-gospodarii-izolate-in-program-ul-pentru-sisteme-fotovoltaice/>

Prosumers guide – an educational platform for promoting the production and use of energy from RES sources

Bucharest, Bucharest - Ilfov, Romania

Prosumer guide – educational and awareness guide for encouraging development of small electricity producers from renewable sources.



Prosumers guide

Romania is one of the EU countries with the highest natural potential in terms of renewable energy sources, given that the balanced energy mixes of our country. Moreover, Romania is ranking 9th in the EU in terms of the share of renewable energy from the total energy consumed, exceeding the 24% threshold. At the same time, in Romania, the level of bureaucracy is still high, as evidenced by the difficulties encountered by the members of the “energiaTa” team - the community of small energy producers in Romania.

Their project (the guide) came out from the desire to use the energy produced by the solar house EFdeN, a Romanian educational project supported by ENGIE Romania (service utilities provider) who won numerous prizes within the most important competitions of solar houses from world - Solar Decathlon. After the design and construction of 2 of them the most sustainable solar houses in the world, back in Romania they were confronted with the situation of not being able to inject in the grid the energy produced. In this respect, they started to identify problems and reasons for which prosumers did not exist in Romania. 3 years later, with the support of ENGIE Romania – public utilities provider, the prosumer's guide appeared - a measure meant to help small consumers to produce their own energy and deliver the excess amount to the national grid. Moreover, this measure aims to accelerate the transition to an economy based on clean energy, from renewable sources, in accordance with the European community acquis.

The guide has in its structure complete and detailed information on all aspects that characterize photovoltaic energy and presents information of interest to those who want to become energy independent. Practically to ease all potential beneficiaries of

photovoltaic panels, this guide presents all the activities and steps that must be followed to become a prosumer, from elementary notions related to photovoltaic panels, to cost analysis, sources of financing, opinions and authorizations to be obtained, including the method and prices for selling the surplus electricity that is delivered to the network.

Resources needed

This practice was fully supported by private funds.

Evidence of success (results achieved)

First of all, the biggest success is the fact that Romanian citizens who want to become energy independent and, in addition, to deliver the surplus of energy to the national grid, can do so starting with January 1, 2019. At the same time, this information material is intended to promote the production and use of photovoltaic energy, representing a considerable plus in the development of this sector.

Challenges encountered

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Potential for learning or transfer

The transfer potential is an increased one, as this practice can be implemented in any region of Europe.

Main institution in charge

energiaTa - www.energiata.org

Timescale (start/end date)

16th of February 2016 – 1st of January 2019

Further information:

<https://energiata.org/>

https://energiata.org/wp-content/uploads/2019/10/Ghidul_Prosumatorului.pdf

The energy cooperative association – voluntary association of persons for the promotion of RES energy

Bucharest, Bucharest - Ilfov, Romania

The Energy Cooperative is a voluntary association of persons with the only one common objective – to supply and produce only green energy, energy obtained from renewable and non-polluting resources, mainly hydro, solar and wind.



The energy cooperative association

This initiative is based on the concern of the civil society regarding the serious and constant degradation of the environment, generated, among others, by pollution, by the phenomenon of global warming and by the excessive exploitation of fossil resources and, consequently, the need to accelerate the transition to a low carbon economy.

The Energy Cooperative association is the first energy cooperative in Romania, being organized according to the European legislation (Regulation 14535/2003 regarding the status of the European cooperative society), but registered legally and fiscal in Romania. Moreover, it is the first cooperative that will exclusively distribute green energy, considering that this is the future of this industry and the only way in which we can be sure that, in the long term, the production and supply of energy will have an increasingly reduced impact on the environment. Like all other energy providers in Romania, based on the supply license, the Energy Cooperative association will buy green energy from the market managed by OPCOM - the Operator of the Electricity and Natural Gas Market but also directly from other energy suppliers from renewable sources: prosumers, wind farms, photovoltaic parks. The association will supply green energy at the same price as that used by conventional energy suppliers.

Based on the contributions received from the members, the association intends to launch an investment program in the field of renewable energy, especially in the field of solar energy. Thus, with the money collected from the members, either it will be possible to generate new production capacities or to buy existing ones. All costs and returns obtained will be public and transparent. In addition, the Energy Cooperative will launch a system of Collective

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Buying Group Buying that will facilitate the cooperative members the purchase at advantageous prices of various products certified as green / sustainable: solar panels, electric cars / scooters, etc.

Resources needed

Considering that this practice is a private one, the budget allocated to this initiative comes from private funds.

Evidence of success (results achieved)

Since this initiative is just launched, the evidence of success is difficult to follow. However, there is an indicator that can provide an image of its success, namely, the growing number of cooperating members since launch. (from 35 in January to 258 in April)

Challenges encountered

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Potential for learning or transfer

At the European Union level, there are such associations, in countries such as the Netherlands, Spain or France, most of them members in the European Federation of Renewable Energy Cooperatives - REScoop.eu, thus having access to the expertise and good practices of other energy cooperatives from Europe. In this sense the degree of transferability of this measure is a high one.

Main institution in charge

The energy cooperative association

Timescale (start/end date)

January 1st 2020 – Ongoing

Further information:

<https://cooperativadeenergie.ro/>

Use of geothermal water for sustainable heating

Bucharest, Bucharest - Ilfov, Romania

A hospital uses the energy potential of geothermal water to reduce heating costs.



Use of geothermal water for sustainable heating
– Agrippa Ionescu Hospital

In order to reduce the carbon footprint, the Ilfov County Council uses the geothermal energy for the heating of the Emergency Clinical Hospital “Prof. Dr. Agrippa Ionescu” from Balotesti, Bucharest-Ilfov Region.

The general objective of the project is the sustainable use of natural resources and the reduction of greenhouse gas emissions by using renewable energy sources. Before the implementation of this good practice, the medical unit was heated using fossil fuels, more precisely natural gas, which caused the increase of CO2 emissions levels in the area. Therefore, to reduce this level, a geothermal water well was drilled in the hospital yard, which is connected to a 500 cubic meter metal tank that stores water for heating. The geothermal water, with temperatures between 58 and 84 degrees, Celsius comes from the Otopeni-Bucharest North geothermal reservoir, with an area of 300 square km, located at a depth between 1800 and 3200 m. The production of thermal energy based on geothermal power was dimensioned to the current consumption of the hospital, and depending on the growth of its activities, this value will increase and the use of geothermal source will expand to the maximum capacity of 13 MW.

The beneficiaries are the inhabitants of the Ilfov area, as a result of the reductions in greenhouse gas emissions that had been made, thus contributing to a better quality of life and economic benefits for the residents living in the area.

Resources needed

The total funds amount to 2M Euros, 85% from the non-reimbursable funds attracted within the RO06 Renewable Energy Program (RONDINE), through the EEA grants 2009-2014 and operated by the Environmental Fund Administration. The difference of 15% was covered by the state budget.

Evidence of success (results achieved)

The use of energy produced from the geothermal source leads to a substantial reduction in the amount of greenhouse gas emissions, respectively carbon dioxide, with a value of 1,332 tons/year and to the increase of socio-economic benefits. This measure will reduce the operating costs, and the savings thus made, will be reinvested by improving hospitalization conditions, as well as by purchasing new medical equipment.

Challenges encountered

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Potential for learning or transfer

This good practice can be used in many EU regions, where there is the potential of geothermal energy is not sufficiently and properly exploited. In this regard, with the help of European funds, other regional authorities can develop projects which aim to promote the use of this type of resource. In addition, in the same area geothermal water can also be used in agricultural activities, by its utilization to heat flowers and vegetables greenhouses and solariums. The capitalization of this can bring significant benefits, economic profitability and GHG emissions reduction in all sectors.

Main institution in charge

Ilfov County Council

Timescale (start/end date)

April 30th 2014 – April 30th 2017

Further information:

<http://jurnaluldeilfov.ro/potential-urias-de-energie-geotermala-ilfov/>

Rondine - Financing program for investments in the production of hydroelectric and geothermal energy

Bucharest, Bucharest - Ilfov, Romania

The Environmental Fund Administration implemented a program for investments in renewable energy.



Rondine Programme for renewable energy in Romania

The Environmental Fund Administration implements the RO06 Renewable Energy Rondine program through the European Economic Area (EEA) Financial Mechanism.

This program has as general objectives the capitalization of renewable energy sources: hydropower or geothermal for the energy production, rational and efficient use of primary resources to reduce the GHG emissions, which will improve the quality of the environment. More specifically, the program aims to put into operation new capacities to produce energy from renewable sources, improving the economic development of the regions in which investments are made, the production of green ener-

gy and the achievement of environmental standards by reducing pollution. Eligible expenditures for financing include the acquisition and installation of new equipment and machinery, construction costs necessary to set up and install the above-mentioned equipment, drilling and digging costs, promotion and advertising budget.

Both for projects that use hydropower sources and for those that use geothermal sources, the eligible beneficiaries can be private or state economic operators. The financing is granted in a proportion of maximum 50% of the total eligible project value for the private companies from the entire territory of the country, except for the Bucharest-Ilfov region, where the financing can reach a maximum of 40%. For local rural or urban councils in any region, funding can be up to 100% of the project value.

Resources needed

The total budget of the program was 12,65 million Euros, of which the national contribution was 8,38 million Euros to which the 4,27 million Euros funding is added, provided by the Governments of Norway, Liechtenstein and Iceland, through the Financial Mechanism of the European Economic Area (EEA). The total sum is equally divided between the geothermal and hydroelectric components, for each project 85% of the amount is provided through the mentioned financial mechanism, the difference being allocated by the Administration of the Environmental Fund, from national funds.

Evidence of success (results achieved)

The program has certain performance and efficiency indicators: annual reduction of CO2 emissions by 2,957 tons / year, increase in the amount of electricity produced by 4,000 MWh / year, increase in the amount of thermal energy produced by 4,400 MWh / year. Until November 9, 2017, 6 projects with a total value of 7.1 million Euros were financed.

Challenges encountered

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Potential for learning or transfer

This good practice can be implemented by other EU regions, in countries where the potential of these renewable resources is still untapped and central authorities decide to use various European grant funds for financing investments in production capacities of hydroelectric or geothermal energy. Both types of RES can bring significant benefits, economic profitability by successfully using in various agricultural activities, such as: production spaces cooling and heating, powering industrial equipment, raw material storage, processing operations and storing the finished products.

Main institution in charge

Environmental Fund Administration

Timescale (start/end date)

March 20th 2014 – November 9th 2017

Further information:

<https://www.afm.ro/rondine.php>

Financing instrument for the production of energy using renewable sources

Bucharest, Bucharest - Ilfov, Romania

The Romanian Government provides financing for developing of the new electric or thermal energy production capacities from less used renewable energy sources.



Large Infrastructure Operational Program

This support measure has as specific objective the increase of energy production from less exploited renewable resources: biomass, biogas and geothermal sources, through the construction of power plants for the production of thermal or electrical energy and the necessary infrastructure for its transport.

Through this measure, public or private entities can build clean energy production capacities or modernize old power plants that used fossil fuels in the past. Beneficiaries can apply in order to finance the technical project preparation, conducting the feasibility study, obtaining the required approvals and authorizations from the local authorities, the environmental agreement and for the actual construction: the execution of the necessary buildings or constructions, the acquisition and installation of equipment, its assembly and project monitoring activities. The implementation of this support measure aims to increase the production of green energy using biogas, biomass and geothermal energy, thus increasing the share of renewable energy in the total energy consumption and reducing the CO2 and GHG emissions into the atmosphere by replacing part of the amount of fossil fuels previously used: coal and natural gas.

This measure is created in order to help beneficiaries from rural or urban areas, namely local

councils, county councils or intra-community development associations to design and build power plants using biogas, biomass or geothermal sources.

Resources needed

The total budget allocated for this support measure is 126 million Euros. For each applicant, the European Regional Development Fund finances up to 85% of the project value, the State Budget finances up to 13% of the total amount and it is necessary for the beneficiary to contribute at least 2%. For the projects that do not generate income, the limit is 1 million euros, and for those that generate income, the limit reaches to 15 million euros.

Evidence of success (results achieved)

A project to modernize 5 substations for the transport of electricity produced from renewable sources, with an implementation period of 47 months (August 21st 2019 – June 30th 2022) is currently underway. Its total value is 6,45 million Euro; the beneficiary is SC DELGAZ GRID SA, a company owned by private shareholders.

Challenges encountered

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Potential for learning or transfer

Local urban and rural councils, intra-community development associations or private companies in various regions can benefit from such state aid measures offered for investments in renewable energy production using biomass, biogas, and geothermal energy to produce thermal or electrical energy. Similar financing instruments can be extremely useful for areas and communities where agriculture is the main activity, improving thus the local conditions. In this regard, the produced energy can be transferred to agricultural and rural sectors, in this way contributing to reduce GHG emissions.

Main institution in charge

Ministry of European Funds

Timescale (start/end date)

May 16th 2017 – July 1st 2019

Further information:

<https://www.fonduri-ue.ro/apeluri/details/2/91/apeluri-poim-119-6-1-apel-de-proiecte-pentru-sprrijinirea-investi%C5%A3iilor-%C3%AEn-capacit%C4%83%C5%A3i-de-producere-energie-eletric%C4%83-%C5%9Fi-sau-termic%C4%83-din-biomas%C4%83-biogaz-%C5%9Fi-energie-geotermal%C4%83>

Financial support for investments in the processing of agricultural products

Bucharest, Bucharest - Ilfov, Romania

Financial support for agricultural producers granted for the development of the processing units, including production and use of renewable energy.



Agency for Financing Rural Investments

The Agency for Financing Rural Investments implements the National Rural Development Program that aims to improve the economic and social development of the rural area in Romania. It provides non-reimbursable financing to agricultural producers for investments in the development of new processing units or modernization of existing ones, with the obligation to include in the financing project clear measures on energy efficiency and energy consumption, as well as financing and use of energy produced from renewable sources exclusively for carrying out their own activities. The financial support is granted depending on the size of the beneficiary company in the amount of maximum 50% of the value of the eligible expenses, between 1 and 2.5 mil. euros. In this financing session funds are designated to low-capacity mountain slaughterhouses in mountain areas, both for establishment and for modernization, in compliance with the conditions described above.

Among the objectives of this financing measure we mention the introduction of new products and technological processes, including for the decrease of energy consumption and GHG emissions, which will support the profitability of agricultural producers and implicitly the increase of the number of jobs.

The beneficiaries of this measure are the companies operating in the agricultural sector, including the producers associations that can access such financing for the development of their own economic activities.

Resources needed

12.930.334 € – FEADR

Evidence of success (results achieved)

Since the project submission deadline has only

just begun, it is early to discuss the success of this session. Nevertheless, this measure has among its main objectives the reduction of GHG emissions, both by improving energy efficiency and by financing the production and use of energy from RES sources. It aims to reduce greenhouse gas emissions from agricultural activities and provide support for investments that will produce renewable energy to be used in agriculture.

Challenges encountered

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Potential for learning or transfer
Given that this mechanism was established as a result of the transposition of European Union directives into Romanian legislation, directives aimed at increasing the energy use of RES sources to reduce dependence on fossil fuels and thus help to reduce greenhouse gas emissions effect in this sector, caused by the required activities to operate animal slaughterhouses, representing a good practice in terms of promoting the use of renewable energy and can be transferred to another European region.

Main institution in charge

Agency for Financing Rural Investments

Timescale (start/end date)

July 2020 – December 2020

Further information:

<https://www.afir.info/>

RO-Energy Programme - Financing the production of renewable energy

Bucharest, Bucharest - Ilfov, Romania

Financial support for the development of new clean energy production capacities.



RO-Energy Programme

Romanian Ministry of Economy, Energy and Business Environment and Ministry of Environment, Waters and Forests developed a funding program, in cooperation with the Liechtenstein and Iceland governments, operated by Innovation Norway that aims to reduce CO2 emissions and increase energy supply security by financing capabilities of hydro-electric and geothermal energy production.

The RO-Energy program promotes bilateral projects and partnerships in several areas of interest: increasing renewable energy production capacity, research and development in the energy sector and electrification of households, increasing energy efficiency and reducing emissions in all sectors. With focus on renewable energy, each individual project can be financed with 200,000 to 2,000,000 Euros. In the case of the small grant scheme, the financing amount is between 50,000 and 200,000 Euros. For public entities the highest rate of the grant is 85%, NGOs - 90%, and for private companies it can be up to 50%. Eligible costs in this program include: staff salaries, travel expenses, costs for new or second-hand equipment, acquisition of land or buildings and other indirect costs.

The program is addressed to any entity, public or private, commercial or non-commercial and non-governmental organization, established as legal person in Romania for activities that result in increased capacity to supply renewable energy using hydroelectric power and geothermal sources.

Resources needed

The support scheme is provided by EEA and Norway financial mechanism 2014 - 2021 totalling 62, 8 mil. Euros. With focus on these three calls regarding the development of hydro and geothermal potential, the total budget allocated was about 22 mil. Euro.

Evidence of success (results achieved)

Considering the fact that the budget of each call for projects has been totally allocated to a number of 25 approved applications the conclusion of this financial mechanism success can be concluded, as follows:

- Call 1 (hydroelectricity) - 9,673,832 Euros for 6 projects.
- Call 2 (geothermal energy) - 10,755,532 Euros for 7 projects.
- Small grants scheme - 2,023,528 Euros for 12 projects.

Challenges encountered

-

Potential for learning or transfer

This good practice can be successfully implemented in other regions of the European Union where the same difficulties are encountered and also in countries where the potential of these renewable resources is still untapped and central authorities decide to use various European funds for financing investments in production capacities of hydroelectric or geothermal energy. Increasing the production of clean energy is desired, in order to decrease GHG

emissions at global level and by its distribution for the agricultural and rural sectors activities it is expected to bring substantial benefits both, economic and environmental.

Main institution in charge

Innovation Norway, Romanian Ministry of Economy, Energy and Business Environment and Romanian Ministry of Environment, Waters and Forests

Timescale (start/end date)

October 15th 2019 - March 31st 2020

Further information:

<http://cnr-cme.ro/wp-content/uploads/2019/10/Camelia-MANOLIU-Innovation-Norway.pdf>

RO-Energy Programme – Electrification of households

Bucharest, Bucharest - Ilfov, Romania

Financial support provided to develop off-grid households electricity.



RO-Energy Programme

Romanian government authorities developed a program to increase energy supply security in all sectors, funded and implemented in cooperation with Liechtenstein, Iceland and Norway governments, through EEA Grants. The RO-Energy program promotes bilateral projects in several areas of interest: increasing renewable energy production capacity, research and development in the energy sector, electrification of households, increasing energy efficiency and reducing emissions in all fields. With focus on electrification, this scheme provides support for projects that will electrify households and communities where connection to the grid is not technically or economically feasible. The applications that support the economic activity – agricultural or tourist, within the targeted groups of households will have priority for financing. Through this program, each individual project can be financed with 200,000 to 2 Mil Euro with a grant rate of 90% for NGOs and 85% for public authorities. Eligible costs for this program include: salaries for the staff involved, travel expenses, costs for new or second-hand equipment and acquisition of land or buildings.

The program is addressed to any entity, public or private, commercial or non-commercial and NGOs, established as legal person in Romania, which are targeting off-grid solutions in areas with technical constraints that excludes grid connection.

Resources needed

For the sector of electrification, the total budget allocated was 10 mil Euro, with a maximum grant rate of 85%, without exceeding 4 mil Euro per application and the remaining costs - provided by the Project Promoter. The funds are allocated by the donor states, mentioned above.

Evidence of success (results achieved)

Until June 2019, 2 projects with a total value of € 841.000 were funded under this thematic area, out of which € 712.400 represents the requested grants.

Challenges encountered

-

Potential for learning or transfer

This good practice can be successfully implemented in other European Union regions where the same difficulties are encountered – grid connection of isolated households is not feasible. Moreover, projects for the electrification of groups of households carrying out agricultural economic activities are encouraged. In this way they will be able to develop their activities in the sector. Also, it will improve their life quality by reducing pollution caused by agricultural activities.

Main institution in charge

Innovation Norway, Romanian Ministry of Economy, Energy and Business Environment and Romanian Ministry of Environment, Waters and Forests

Timescale (start/end date)

March 2019 - June 2019

Further information:

<https://www.innovasjon Norge.no/en/start-page/eea-norway-grants/Programmes/renewable-energy/romania-energy/>

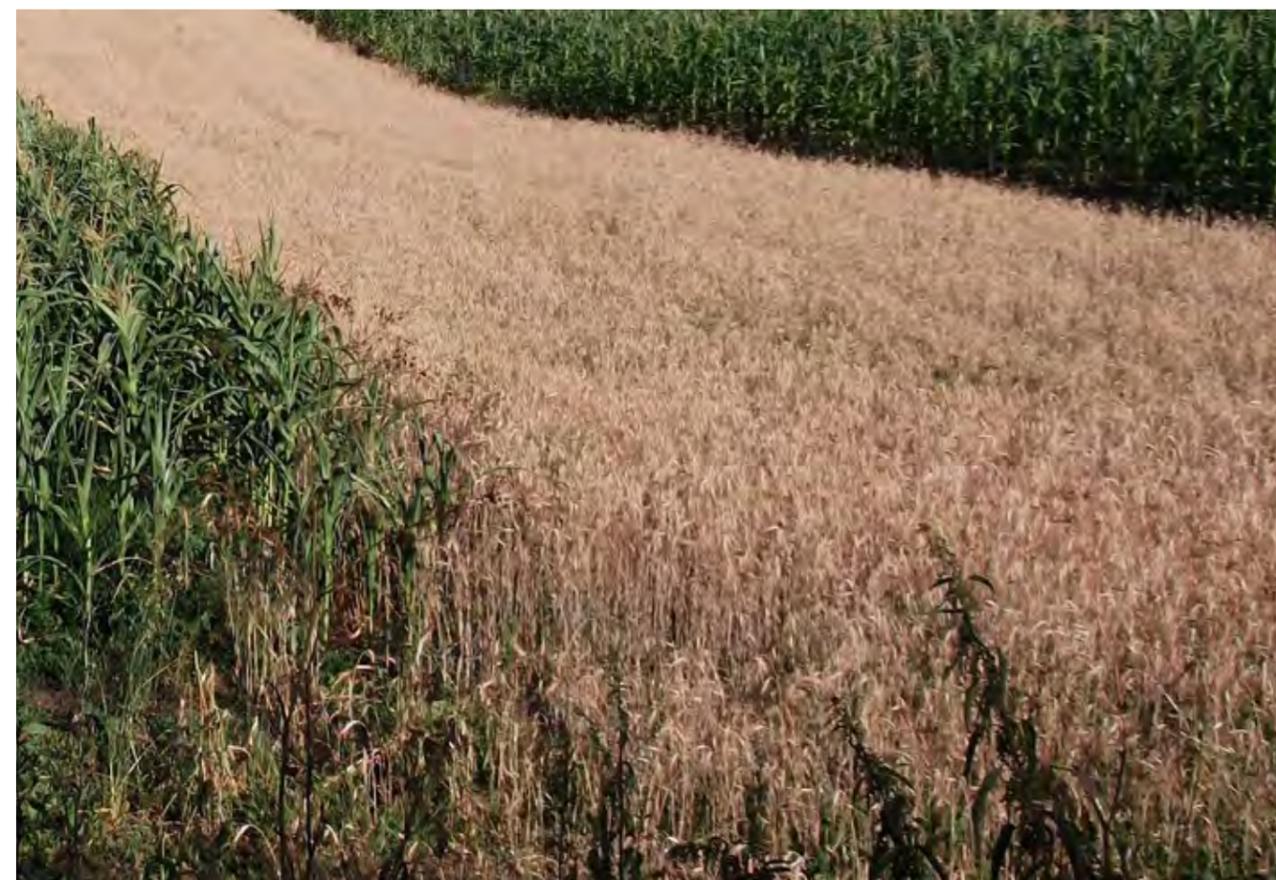
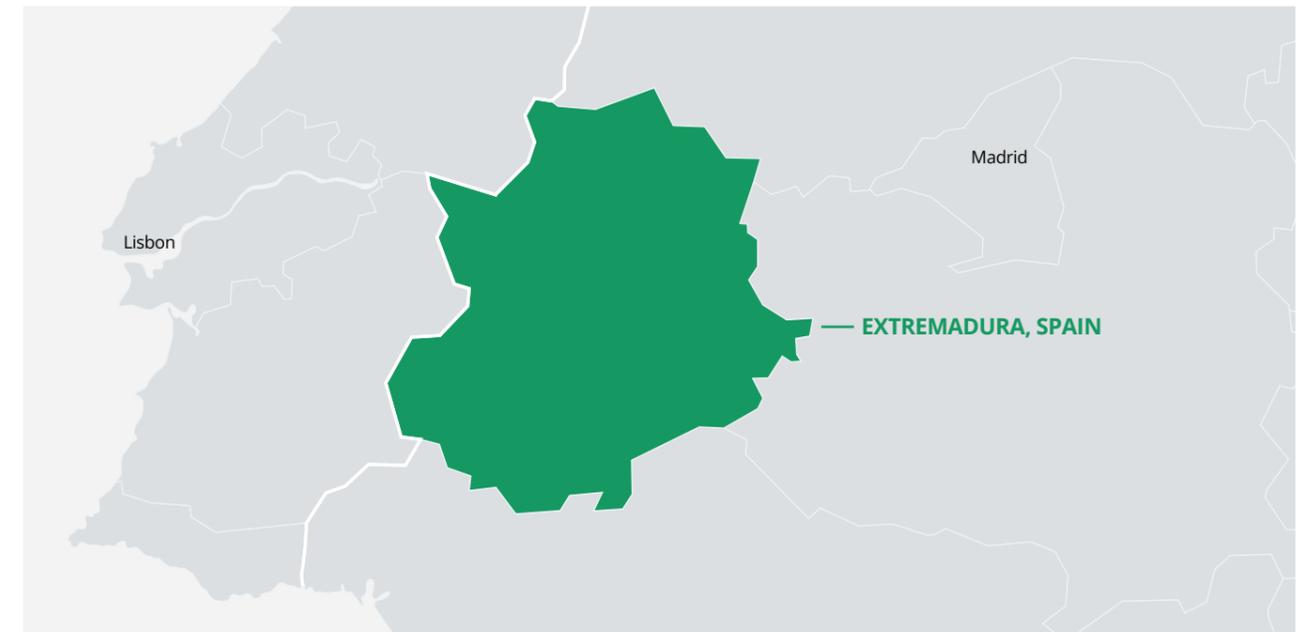




Photo credit Anne and S. Jurnino Miranda, Pixabay

EXTREMADURA, SPAIN



Extremadura is located in southwestern Europe and the Iberian Peninsula. It limits to the north with Castilla-León, to the south with Andalusia, to the east with Castilla-La Mancha and to the west with Portugal. Its capital is the city of Mérida. It has a total area of 41,635 km², which represents 8.2% of the total area of Spain. According to Eurostat, this region has 1,065,424 inhabitants, which results in a population density of 25.6 inhabitants / km². The territory is divided into two provinces: Caceres in the north, with 392,931 inhabitants, and Badajoz in the south, with 672,493. There are 388 municipalities.

The most important economic activity in this region is related to the primary sector, both agriculture and food, due to the industrial characteristics of the region. It represents around 8% of the regional Gross Domestic Product, well above the national average.

Agricultural and agro-industrial industries are key sectors in the Extremadura economy. In 2019, they contributed to the regional economy with 11.7% of the Gross Added Value and 13.3% of the occupation of employed workers. These indexes are much higher than the national average, indicating a high degree of specialization in both sectors. Extremadura is a region especially rich in natural resources with the possibility of exploiting them both for their classic uses: food, agricultural and industrial production, etc.; and for the production and storage of energy from renewable sources. The renewable installed power and production

capacity make the region an energy exporter, thus demonstrating the technical-economic viability of these technical solutions. The adoption of energy efficiency solutions in the production processes of agribusiness in Extremadura will make it possible to enhance competitiveness.

Solar photovoltaic pumping for field irrigation

Don Benito, Extremadura, Spain

Zujar Irrigation Community has become the first in Extremadura to start-up a photovoltaic plant to reduce the electricity bill.



Zujar irrigation Plant.

The main objective is to try to reduce the high costs of electrical energy in the Irrigation Community of Canal del Zújar, the consumption of electrical energy depends on the year, but it is between 20 and 25 Gwh, which has a significant impact on the costs of the Irrigation Community, with a total cost of approximately 5,000,000 €, electric energy accounts for around 55% of these.

The need for electrical energy in this community for irrigation is mainly in the months of June, July and August, which means that they have to pay the maximum power of the year, consuming only 8 months and significantly in the months summer, so the photovoltaic installation was a first step to reduce electric energy costs.

In addition, thanks to the grant established by the Extremadura Regional Government through Decree 133/2017 of August 29, from EAFRD, which made it possible for this type of project to be carried out, otherwise it would have been unfeasible, since the project was 90% subsidized.

Due to this, it was decided to execute 6 99.9 Kwp self-consumption facilities that were located in 6 of the 10 lifting stations in the irrigable area. It was intended to make small plants with what entailed a greater use of the energy produced, since the one that was not consumed was lost, it was about losing as little as possible.

At the same time, as they are small plants, they allowed them to be installed on the land adjacent to the lifting stations, which eliminated the cost of buying or renting land for the plants.

Resources needed

The plan has meant an investment of 764.208,23 €. where 565.450,00 € have been subsidized by the European Agricultural Fund for Rural Development, EAFRD.

Evidence of success (results achieved)

According to the analysis of 2019 with 6 plants operating since the start of the irrigation campaign, the results demonstrate the profitability of the plants based on the grant received and taking into account that the energy produced only represents 2.01% of the total of the energy consumed, which means a saving of approximately 2% of the electricity bill and the non-emission of 527 Tons of CO2 per year.

Challenges encountered

-

Potential for learning or transfer

Thanks to photovoltaic energy and the large amount of solar resources that exist in Extremadura, these can be used to reduce the electricity bill and the emission of CO2 into the atmosphere.

In addition, taking into account that the irrigation communities require irrigation mainly in the dry months, 4 months per year, with self-consumption facilities they avoid having to pay taxes to the electricity company, thus increasing economic savings.

Main institution in charge

Irrigation Community Zujar

Timescale (start/end date)

October 2018 - March 2019

Further information:

-

Olive stone as fuel for energy production in a pig farm

Pealeda del Saucejo, Extremadura, Spain

The objective is to use the local waste for heat production for pigs breeding.



Biomass for floor heating in a pig farm.

Pig farming farms present strong demand of heat during the winter months to maintain a comfortable temperature for piglets.

As a consequence of this need, a biomass installation was built taking advantage of residues from this area, mainly olive stone which is 40% cheaper than traditional fuels such as diesel.

The biomass boiler transfers energy to a series of hot plates that increase the temperature of the piglet. This system is more efficient and economical than heating the entire environment of the farm.

Nurseries free of polluting gases

Los Santos de Maimona, Extremadura, Spain

Reducing energy costs in olive tree nurseries is one of the objectives from Extremadura countryside.



ITB biomass boiler model installed in the nursery.

The superintensive olive plantations was a revolution in Extremadura olive sector, which meant an increase in profitability by shortening the harvesting periods.

From small cuttings, they get rooted in paper pots and grow in nurseries, given to the farmer directly for planting.

All this process needs facilities with an optimal temperature condition during the whole year to make the plant grow in the expected time. Because of that, one of the biggest costs of a nursery is the energy cost.

By an installation of a biomass boiler and the use of the local resources as fuels (chips or olive stones), thermal energy is generated for the maintenance of olive saplings.

Resources needed

The initial budget was more than € 90,000 from which a part was subsidised by public funds.

Evidence of success (results achieved)

The nursery of Los Santos de Maimona was a pioneer at the national level, developing in Extremadura society a process in the farming and improvement of olive tree. All this together, with an energy production by renewable energies achieves an efficient nursery producing almost zero consumption of energy from fossil fuels.

Challenges encountered

-

Supporting this circular economy, the waste coming from the areas is not destined for remote landfills, the wealth of the area is increased and the carbon footprint is reduced, as not only the emissions of polluting gases to the atmosphere for energy production are considerably reduced but also for transportation.

Currently, the farm is waiting to receive a grant to carry out a self-consumption photovoltaic installation, in order to reduce the dependency on fossil fuels.

Resources needed

Through different public grants, several investments have been made to improve and modernize all the facilities in order to achieve a circular economy free of polluting gases.

Two 80kw DO80A boilers are installed and soon a 150kw boiler. The budget for the boiler and installation of the hot plates was more than € 132,000.

Evidence of success (results achieved)

Reduction of the diesel bill.
Reduction of polluting gases.

Challenges encountered

-

Potential for learning or transfer

The Iberian pig market fluctuates greatly depending on the globalized economy. By creating a circular economy and green companies, an added value and a reduction in costs are achieved, which results in a cheaper final product and with it, an increase in sales.

Main institution in charge

Regional Government of Extremadura

Timescale (start/end date)

Ongoing.

Further information:

-

Potential for learning or transfer

Applying this cultivation system and collecting local waste as fuel, we produce a circular economy that is very easily imitable for other types of plantations in any other part of the world.

Main institution in charge

-

Timescale (start/end date)

October 2017 – December 2017

Further information:

-

Tobacco drying by biomass

Losar de la Vera, Extremadura, Spain

Substitution of conventional technology for the tobacco drying and curing process in the cooperatives in the tobacco industry of Extremadura.



Tobacco drying and tobacco industry.

Extremadura cooperatives produces around 85% of Spanish tobacco and one of their highest cost is the thermal energy they need for the tobacco curing and drying process. Solving this problem is one of the first needs of the sector and more so taking into account the removal of grants from European funds for the Spanish tobacco sector in 2013.

Due to this situation, the tobacco Cooperative introduce to all of their partners the way to reduce production costs by changing the technology of the thermal process from diesel to renewable fuel. They had the opportunity to account with public grants and got access to private fund to finance the new renewable installations.

This initiative helped at the tobacco processing cooperatives, workers and their families, as in Extremadura economy there are more than 2000 families depend on this activity.

Resources needed

Support plan for cigar makers from Extremadura. Private Fund.

Evidence of success (results achieved)

Circular economy by using agro-industrial waste (olive pit and pomace) as fuel for thermal production.

Reduction of 0,45 € to dry 1 kg of tobacco with diesel to 0,13 € for the same amount of tobacco with this biomass (saving 7,500-10,000 € / year).

By processing 10,000 tons of tobacco per year, it avoids emitting 24,650 tons of CO₂ into the atmosphere in its useful life.

Challenges encountered

Challenge in the availability of own capital to make the investment profitable in the short term.

Potential for learning or transfer

It can be extrapolated to drying other products such as paprika from La Vera and ultimately to any other drying process (hams too).

Main institution in charge

Tobacco Cooperative and Regional Government of Extremadura.

Timescale (start/end date)

2007-2010 (up to 186 dryers)

Further information:

<http://www.desplazados.org/wp-content/uploads/2012/07/Huesos-de-aceituna-para-secar-el-tobaco-Energ%C3%ADas-Renovables-noviembre-10.pdf>

Biodigester in IDERCEXA project

Guadajira, Extremadura, Spain

The objective of this project was the design of a prototype that allows taking advantage of waste in a technically and economically viable way.



Biogás plant prototype installed in La Finca la Orden (CICYTEX).

One of the three lines of the IDERCEXA project deals with the bioeconomy, specifically, on the development of technologies for the use of biomass residues. Within this framework, a slurry biodigester has been developed for generating electricity, heating and biofertilizer.

The generation of agro-industrial waste (in this case, slurry) invites its recovery and use for energy purposes.

The objective of this project was the design and commissioning of a prototype that makes it possible to take advantage of this waste in a technically and economically viable way.

Among the interested parties are the installation companies of this type of supplies, livestock, engineering and renewable energy companies and, ultimately, society will benefit indirectly.

Resources needed

The IDERCEXA project is co-financed by the European Regional Development Fund (ERDF) through the Interreg V-A Spain-Portugal Program (POCTEP) 2014-2020.

The total cost of the project (indicative) was 2.953.934,19 €.

Evidence of success (results achieved)

The use of waste leads the industry towards a circular economy, which leads to a reduction in production costs. Although investment in equipment is increased, the use of renewable energies leads to a reduction in operating costs and greenhouse gas emissions.

Challenges encountered

The main challenge was technological, in the sense of being able to develop a prototype of a digester that allows the generation of biogas according to certain physical-chemical characteristics that make it suitable for subsequent combustion applications.

Potential for learning or transfer

The characterization process of agro-industrial waste can be extrapolated to other types of biological waste from this type of farms, although the design is specified for pig manure. In this way, a good practice is completely extrapolated to other industries that generate biological waste.

Main institution in charge

CICYTEX and Regional Government of Extremadura

Timescale (start/end date)

2017-2020

Further information:

-

Biomass heating in chicken farm

Extremadura, Spain

The development of new equipment in the industrial heat sector makes it possible to optimize production processes in the regional agribusiness.



Poly-fuel hot air generators.

The project consisted of the installation of three poly-fuel hot air generators, with a power of 150 kW each, for heating in the chicken farm.

The development of new equipment in the industrial heat sector makes it possible to optimize production processes in the regional agribusiness. In this context, the opportunity to improve this chicken farm appear.

The objective of the practice was to obtain a reduction in production costs and an improvement in animal welfare conditions on the farm. The goal was achieved through the implementation of these solutions with industrial multi-use fuel heating solutions.

Resources needed

As it is a private investment project, there is no data on the resources needed.

Evidence of success (results achieved)

The system with no impact on the environment, since biomass combustion, generates a non-polluting CO₂ from plant origin, unlike petroleum-derived fuels that are of fossil origin that were previously used.

Challenges encountered

The main challenge of this project is in access to capital (equipment, civil works and auxiliary facilities). It was necessary to contract a bank loan in order not to compromise the liquidity of the company.

Potential for learning or transfer

The renewal of equipment with other highly efficient and versatile ones in terms of the fuel they consume represents a significant improvement in the profitability of agro-industrial farms at any scale.

Main institution in charge

Private fund.

Timescale (start/end date)

January 2020 – March 2020.

Further information:

-

The largest winery group in Extremadura installs a biomass boiler with olive stones

Fuente del Maestre, Extremadura, Spain.

Replacement of a conventional boiler with a biomass boiler for wine production.



The production system in one of its wineries by a 1.500 kW biomass boiler.

The largest wine producer in Extremadura has implemented a steam production system in one of its wineries using a 1.500 kW biomass boiler.

The new biomass boiler installed in September 2016 allows to cover all the thermal energy demand of the winery, this energy is used in the form of steam in the processes of filtering and pasteurizing wine and juices.

The plant as a whole consists of a 75 ton capacity silo, a multi-fuel steam boiler with a mobile grate system, automatic ash cleaning systems and multi-cyclones.

With the incorporation of the new boiler, it is intended to replace the 2,800 Mwh of thermal energy generated by the old diesel boiler with a renewable fuel produced in the region such as olive pit.

Resources needed

The investment was entirely covered with private funds. The cost of the installation was about 250.000 €.

Evidence of success (results achieved)

The savings achieved are around 80%, to these economic and technological benefits must be added the environmental ones: the facility emitted 735 tons of CO2 per year. The amortization period of the plant will be less than 4 years.

Challenges encountered

-

Potential for learning or transfer

Adapting existing fossil fuel boiler installations by biomass boiler is a relatively simple practise that can be carried out in any territory with access to biomass.

This installation can be carried out in any industry that requires thermal energy for its production, such as wine production in this case.

Main institution in charge

Regional Government of Extremadura.

Timescale (start/end date)

September 2016

Further information:

<https://energiaextremadura.com/2016/04/18/el-mayor-grupo-bodeguero-de-extremadura-lopez-morenas-instala-una-caldera-de-biomasa-con-hueso-de-aceituna/>

Floating Photovoltaic Plant

Merida, Extremadura, Spain

As a consequence of the inability to use the land, the photovoltaic plant was built on the water sheet.



Photovoltaic Plant over accumulation water pool.

One of the biggest solar plant floating in Spain is located in the Irrigation Community of Merida. The main problem for this irrigation community was the energy cost, as electricity bills increase during the strong months of the campaign, having reach until 200.000€.

In order to minimise this cost, the possibility of installing a conventional photovoltaic plant was raised, but, due to the lack of space, it was concluded that the only place to make the installation possible would be on the accumulation water pool.

The solar plant is composed by 1600 PV panels over the water, with an extension of 4 ha.

This irrigation plant is projected in 4 parts, at the moment only the first stage has been done, with an investment cost of 744.695,23€ and with a co-financing of the 75% by EAFRD fund.

Nowadays, the power of this irrigation plant is of 500kW. Nevertheless, in the future, with the other 4 stages created could reach 2,5MW.

This project was born by the hand of the MA of Extremadura, and thanks to this, the regional department of agriculture wrote a decree of energy efficiency.

The goal of this irrigation plant is to minimise costs of the agricultural holding and reducing the carbon emissions.

For the future, the Irrigation community is willing to make a hybridization system. The PV panels will be producing energy pumping water to the top. The water reservoir above would be used as a battery

during the day and in the night or raining seasons will use the hydroelectric power.

Resources needed

The plan has meant an investment of 744,695,23 €. Nearly 600,000 € have been subsidized by the European Agricultural Fund for Rural Development and the Government of Extremadura, under the framework of aid for energy efficiency. (EAFRD 75% - 25 % MA).

Evidence of success (results achieved)

The first evidence of success of the photovoltaic installation was on August 2019, when the Irrigation Community had a saving of 6.000 € on the electricity bill.

- Economic savings: 61.880 €/year
- Energy savings: 640.000 kWh/year
- CO2 emissions savings: 297 Teq(CO2)/year

Challenges encountered

-

Potential for learning or transfer

This is a good example of optimization of land use by using renewable energy production technology. The main advantage for the community is to reduce the bill of the provision of electricity for pressurized irrigation.

Placing the photovoltaic panels on water and thanks to the cooling it suffers, increases energy efficiency by about 10%.

Equally, by covering part of the water sheet, it reduces the evaporation of water by 80% and prevents the proliferation of certain types of algae and microorganisms, which increases water quality and reduces the costs of hydraulic maintenance.

Main institution in charge

Regional Government of Extremadura

Timescale (start/end date)

May 2019 – July 2019

Further information:

<https://esenergia.es/energia-fotovoltaica-flotante-espana/>

Production of electrical energy, cold and heat through the use of forest and agricultural wastes

Gévora, Extremadura, Spain

A consortium of companies and the University of Extremadura develop a prototype that uses biomass from pruning and agro-industrial waste as the main fuel.



Tribar Project "Biomass-solar microgenerator of residual use".

The main objective of the Tribar Project "Biomass-solar microgenerator of residual use" is to obtain electricity, industrial cold and heat through a compact, modular, scalable and portable system that hybridizes solar energy and takes advantage of agricultural or forestry wastes and thus allows reduce the power energy contracted by farmers.

The heat provided by this prototype can be the only energy source in the system or combined with generated by a biomass boiler, which in turn may also be the only energy source in the plant. Part of this heat can be used in generating electricity. Another part can be dedicated to the generation of industrial cold, through an absorption machine and the rest of the heat can be used for heating or industrial processes.

This prototype is located in the facilities of the solid biofuel factory from forest and agricultural wastes. This plant is designed to meet the specific needs of the company and is made up of a boiler, Fresnel solar field, turbine, absorption chiller, heat dissipation system and a control system.

The main consumers of this system will be agro-food industries located in remote places with difficult access to electricity (which makes their products more expensive). The waste from these industries will be the raw materials that will be used for energy generation.

Resources needed

TRIBAR is a project financed by the Centre for Industrial Technological Development, co-financed by the European Regional Development Fund (ERDF) and supported by the Ministry of Economy and Competitiveness.

Total execution budget: 1.961.074,00 €

Evidence of success (results achieved)

In this plant, the micro-trigeneration process produces around 400 kW of thermal energy, 50 kW of electricity and 35 kW of cold thanks to a hybridization process between biomass and solar energy.

Challenges encountered

The agri-food activity is organized in campaigns seasons to recollect their raw materials, moments in which the need for energy to process them increases significantly. This forces companies to hire a very high power, unnecessary during the rest of the year, with the consequent economic expense.

Potential for learning or transfer

This project can be implemented anywhere in the world with access to agricultural biomass wastes, being especially interesting in situations of intensive seasonal energy demand and in isolated locations where transport networks are deficient and the transport of fuels such as gas or diesel is a big logistical problem, since this is where distributed generation reaches its maximum efficiency.

Main institution in charge

Regional Government of Extremadura

Timescale (start/end date)

2016 -2019

Further information:

<https://www.unex.es/organizacion/servicios-universitarios/servicios/comunicacion/archivo/2019/abril-de-2019/26-de-abril-de-2019/la-universidad-de-extremadura-contribuye-a-la-obtencion-de-electricidad-frio-industrial-y-calor-mediante-el-aprovechamiento-de-residuos-de-biomasa#.YaCtA71ByWZ>



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