

Photo credit Fabio Grandis, Pixabay

LAZIO, ITALY



Lazio is one of the main production engines of the country, with a GDP of € 198 billion. Overall, Lazio shows good performance for most of the indicators compared to the national objectives of the Europe 2020 strategy. Public spending has already reached and exceeded the national target. On the national scene, the agricultural sector accounts for 6.7% of greenhouse gas emissions and is responsible for 40% of methane emissions and 49% of nitrous oxide (Ispra, 2012).

In line with "Europe 2020" - the strategy for the economic and social growth of EU countries launched by the European Commission (2010) - and with the provisions of the National Bioenergy Sector Plan, the development of the agro-energy supply chain is fundamental.

The agricultural sector remains one of the fundamental sectors for the Lazio economy too. The sector is characterized by a strong push towards the implementation of new agricultural and rural development models based on safeguarding the balance of the natural environment, on the development of typical agricultural productions, on the recovery of internal and residual areas and on the enhancement of territories to tourist purposes. Renewables are constantly growing: photovoltaics went from 150 to 1,750 Gwh, wind from 15 went up to over 110 GWh, bioenergy from 100 to 700 Gwh but total production still comes from fossil sources for 84.7 %, due to the presence of mega plants starting from the coal-fired one in Civitavecchia. The production of energy from renewable sources

is only 15.3% (national average over 35%) and the presence of mega-plants, starting from the Civitavecchia plant, weighs heavily on this figure. There is a need for an energy revolution in Lazio, with wind and photovoltaics on the roofs, low enthalpy geothermal energy, self-consumption, distributed production, efficiency, green mobility. If you want to know more about the potential of this region, read the Regional Self-Assessment from Regione Lazio.

An Organic and Multifunctional Closed Cycle Farm: Energy, Food and Culture

Cittaducale, Lazio, Italy

Organic and multifunctional closed cycle farm, with energy supply through photovoltaic and biomass.



Photovoltaic plant

Tularù is an organic and multi-purpose closed-cycle farm located 850 meters above sea level, in a mountain area 15 km from Rieti in north part of Lazio Region, between the valleys of the Salto and Velino rivers.

The property is 60 Ha, 30 of which are woodland, 30 of which are directly managed by the farm. The company activity is based on the primary production of ancient cereals, vegetables, fruit and wild fruit and on breeding of cattle and chickens grown in a natural way exclusively with grass and hay.

In order to achieve significant savings in terms of expenses incurred, the farm Tularù has implemented the following closed-loop system:

- Production of photovoltaic energy
 - Photovoltaic panels on a roof (6 kw) in energy exchange
- Production of thermal energy
 - Thermal storage: with 800 liter boiler without coil in series and with 600 liter boiler with coil for the production of domestic hot water, powered by solar panels mounted on the roof with east-west exposure;
 - Inverted flame wood stove (gasification) of 35 kw;
 - Thermal composting: system of about 30 cubic meters, from branches wood chips, pruning waste and forest cleaning.
 - Pyrolysis: a wood-fired oven, which produces "biochar" as a byproduct, which, enriched with biofertilizer, guarantees excellent health for farm crops.

The main direct beneficiary of the practice is the farm itself, which has created a chain of ancient Rieti grains involving 9 other farms, 1 local pasta factory and 2 ovens (stakeholders).

Resources needed

- Own resources
- Thermal system € 6,000
- Public funds
- Photovoltaic € 10,000 - Measure 6.1 of the Rural Development Programme of the Lazio Region 2014-2020
 - Thermal system € 18,000 - "Conto Energia" (Energy account) 2.0 - introduced with EU Directive 2001/77/EC

Evidence of success (results achieved)

The practice has developed a renewable energy supply mainly for self-consumption. The activity of this organic farm is significantly oriented towards multifunctionality. By the discovering of the supply

chain of ancient local grains Tularù has been able to involve part of the local community to the objectives of sustainable agriculture. Moreover, through the restaurant and agritourism activity, this farm could also promote a sustainable tourism with a socio-economic impact on the rural community.

Building thermos compost, Tularù has added to the wood produced within the farm also that of the pruning companies of the nearby cities (Rieti, Cittaducale) forming a circular economy chain.

Challenges encountered

For the composting system to work properly, the humidity of the compost pile must be between 60% and 75%. Excessive humidity in case of constant rain, in fact, risks suffocating the bacteria, compromising the composting process for a long period. The construction of a good draining base (a layer of stones or a spiral of corrugated pipe), the insertion of aerating elements and access to a water source, preferably rainwater, are essential.

Potential for learning or transfer

Thermal composting is built with pruning waste and forest cleaning, which are composted and the heat produced by micro-organisms is used. This method guarantees a constant production of heat and the waste material the end of the cycle constitutes an excellent soil improver for horticulture, with excellent water savings and better plant health. When the camping service was active, this thermal composting produced enough hot water to ensure the proper functioning of the outdoor showers used by about 750 campers. It was surprising both the continuity of hot water production at 55 degrees and the ability to retain water once the compost material was transferred into the ground.

Main institution in charge

Tularù

Timescale (start/end date)

Year of implementation 2018

Further information:

<http://www.tularu.it>
info@tularu.it
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Maccarese Agricultural Company: from animal farming to energy production

Maccarese – Fiumicino – Roma, Lazio, Italy

Production of electricity from two biogas plants fed by by-products derived from animal farm, such as effluents and feed waste, and from dedicated biomass.



Biogas plants. Photo credit Maccarese S.p.A.



Biogas plant 999 kW plan detail. Photo credit Maccarese S.p.A.



300 kW Photovoltaic plant on stable roof. Photo credit Maccarese S.p.A.

20 km North of Rome, the Maccarese farm, founded in 1930 and privatised in 1998, is the largest in Italy with its 3240 hectares of flat land. The farm's prevalent productive address is fodder-zootechnic with production of cereals and fruit. Inside the farm, in an area of 16 hectares, there is the largest dairy cow breeding in Italy: 3,600 selected cows of the Friesian breed, with 1250 lactating cows, for the daily production of 48,000 litres of milk. Adhering to the plan promoted by the Government in favour of RE, the farm realized two plants for the production of electricity from biogas: 1) Built in 2010; with a power of 625 Kw, it is able to produce 4.500.000 Kw net/year. It uses cattle slurry (mc 130/day) and silage (22 tons/day). Articulated on two circular digesters with a diameter of 24 m. by 9 m. of height, it is equipped with a preloading tank, a torch, a feeding system for the loading of silage and uses a Jenbacher j312 engine; 2) Built in 2012, it has a power of 999 Kw. It is fed exclusively with cereal silage, and is able to produce 8,750,000 Kw net/year. Articulated on three digesters, it is equipped with an overloading tank, a torch, a feeding system for loading silage and uses a Jenbacher j416 engine.

The liquid digestate,, deprived of any odor, is spread on the fields as a soil improver, while the solid part is used as litter for adult cattle and then as a soil improver.

The main beneficiary is the farm itself but also the whole community.

Resources needed

These plants were built with the company's own funds (€ 6 mil) and benefit from national incentive policies pursuant to Article 2 par 145 of Law 244/2007. This law allows companies to benefit from a fixed all-inclusive tariff for the electricity produced with RE and fed into the operator's network (0.28 €/kw).

Evidence of success (results achieved)

In 2019, the first plant produced 4,732,667 gross kw per year with an engine efficiency of 97.80 % or 8573 hours of operation per year with a 6 % self-consumption of energy for the operation of the plant.

In 2019 the second plant produced 8,203,909 gross kw per year with an engine efficiency of 99.18% equal to 8688 hours of operation per year with a percentage of 7% self-consumption of energy for the operation of the plant itself.

Challenges encountered

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Potential for learning or transfer

Biogas plants, besides being a model of circular economy, bring to the environment important advantages such as the reduction of the diffusion in the atmosphere of methane naturally produced by cattle droppings and help to support the development of sustainable agriculture as using digestate for the improvement of soil fertility reduces the use of chemical products.

The attention to the environment on the part of the company is then confirmed by the attention to biodiversity in the conservation of 200 hectares of Mediterranean maquis constituting a naturalistic oasis.

Finally, the company preserves important historical buildings (Castle of San Giorgio and the Spring Tower of 16th century) and in its spaces there is also the headquarters of Biodiversity International, the FAO research institute

Main institution in charge

MACCARESE spa

Timescale (start/end date)

Gennaio 2010 Biodigestor plant- Agosto 2012 Photovoltaic plant/ongoing

Further information:

<http://www.maccarese.com>

The development of renewable energies in the Rural Development Program 2014-2020 of the Lazio Region

Rome, Lazio, Italy

The Rural Development Programme, or RDP, is the main operational programming and financing instrument for agricultural, forestry and rural interventions in the region.



Regione Lazio

The RDP defines at regional level the strategic priorities deriving from the national and Union (CAP) priorities and defines them according to the needs of its territory.

The RDP strategy for the development of renewable energy in agriculture is:

- Promote the improvement of the competitiveness of agriculture through the adoption of processes and / or systems of energy efficiency and production of renewable energy for self-consumption and / or marketing incentivized to the network manager and enhancement of products, by-products and company residues.
- Contribute to the sustainable management of natural resources and mitigate the action of fossil fuels on the climate.
- Promote the diversification of primary activities towards complementary activities in order to increase the income of agricultural entrepreneurs (Multifunctional Agriculture).

The energy consumption of agriculture and the forestry sector of the Lazio Region is higher than the national and European average. Although energy consumption accounts for only 3% of total regional final one, it is considered particularly susceptible to development initiatives for both renewables and energy efficiency as opportunities for technological progress, sustainable exploitation of local resources and relaunching the economy of companies in the sector to encourage restructuring and modernisation.

The RDP main actions for the efficiency and use of renewable energy in agriculture are as follows:

- 4.1.3 - Investments in individual farms to improve the energy efficiency of production processes.
- 4.1.4 - Investments in individual farms for the supply/use of renewable energy sources, by-products, waste and residues and non-food raw materials.
- 4.2.2 - Investments in agri-food enterprises, aimed at improving energy efficiency.
- 4.2.3 - Investments in agri-food enterprises for the production and supply of energy from renewable sources.
- 6.4.2 - Production of energy from alternative sources.

Among these, we would like to highlight measure 4.1.4, which supports tangible and/or intangible investments aimed at building plants for the production and distribution of energy from renewable sources using biomass and other renewable energy sources, intended for the production of electricity and/or heat, mainly using photovoltaic solar energy; Action 7.2.2 Investments in public body to promote the supply and use of energy from renewable

sources for self-consumption, suitable for the public bodies in Lazio, has also received many requests for financing (178).

Resources needed

Actions 4 and 6 : Applications submitted 232 intervention amount € 42,691,324.26.

Details:

Actions	Applications	Intervention
4.1.3	4	€ 322.967,34
4.1.4	128	€ 15.769.307,35
4.2.2	26	€ 12.160.740,97
4.2.3	3	€ 2.262.034,31
6.4.2	71	€ 12.176.274,29

Actions 7.2.2: Applications submitted 178 - intervention amount € 29,129,678.11

Evidence of success (results achieved)

The success of the 4.1.4. action is highlighted by the numbers: with a total investment of € 15,769,307.35 and 128 applications submitted, it represents a success in terms of participation and investments made.

Out of 39 applications submitted for the first tender almost completed, 29 have already had access to funding. 74%, therefore.

In the second call for proposals, 88 applications were received, which are still under investigation and if the same trend continues at the end of the second call for proposals, it is expected that 65 other companies will receive the funds, bringing the total to more than 100 funded applications.

Challenges encountered

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Photo credit anto-dc, Pixabay

Potential for learning or transfer

The regional network, with all the actors involved between authorities and companies, has worked very well.

The regional administration has allowed with a great deal of staff work the correct execution of the call for proposals, which has guaranteed amounts for almost all the funding. It has arrived with good publicity to a large number of companies that have been put in a position to access the funds that will allow them to build plants for the production and distribution of energy from renewable sources using biomass and other renewable energy sources, intended for the production of electricity and/or heat, mainly using measure 4.1.4. on photovoltaic solar energy.

The applications found to be inadmissible are a minority part of the totality.

Main institution in charge

Regione Lazio

Timescale (start/end date)

2015- ongoing

Further information:

<http://www.lazioeuropa.it/psrfeasr>

Energy efficiency in Rome agrifood market (CAR)

Guidonia Montecelio (Roma), Lazio, Italy

CAR is a complex structure with different structures, facilities and services that has managed to apply energy efficiency measures savings both in economic and environmental terms.



CAR - Centro Agroalimentare Roma

CAR, a consortium company (private and public capital), is one of the most important fruit, vegetables and fish market in Europe. Covering a total area of 140 hectares, it has about 270,000 square meters of covered areas. CAR needs a large amount of electricity (about 22 GWh/year) and of Natural Gas (about 200,000 Sm³ /year), for lighting, heating, water pumping and refrigeration products. That is why it has planned to develop an energy strategy, through an Energy Management System (EMS), aimed at ISO 50001 certification.

The Campus has several photovoltaic plants producing about 4.5 MW. This allows Car to be as SEU. SEU acronym for Efficient User System a system in which one or more plants of production of electricity (with a total capacity not exceeding 20 MW are directly connected to a consumption unit and aimed at energy supply of the consumer himself.

A complete monitoring system (Building Management System) of all energy vectors, necessary for measurement and control, has been implemented.

A series of energy efficiency activities have been undertaken related to some utilities offered (insulation, cooling, air conditioning and lighting) that have gradually reduced electricity consumption from 23.4 GWh in 2016 to 20 GWh in 2019, despite the expansion of the facilities (new warehouses).

The two largest GAS heat generators have been replaced for heat production and heat pump machines of equal power have been installed.

Efficiency policies have also been used for the use of drinking water as well as for industrial water, allowing here too a decisive containment of costs and waste.

The principle stakeholder the 400 companies that have their operational headquarter in the structure.

Resources needed

No costs have been incurred for photovoltaic systems that are not owned but which have allowed significant savings (Legislative Decree no. 102/2014 of 4 July 2014, which implements the Directive 2012/27/EU).

Evidence of success (results achieved)

The recognition as SEU, obtained in 2017, allows CAR to reduce electric network charges to 5% instead of the 55% due. The economic advantage obtained from this is around 100,000 €/year. Thanks to the policy of raising the awareness of its users and the energy efficiency activities carried out on buildings, large reductions in the consumption of drinking and industrial water have been achieved.

CAR is now working to be able to implement, maintain and improve an SGE in accordance with the requirements of ISO 50001.

Challenges encountered

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Potential for learning or transfer

The special vocation of the CAR with regard to the management of precious and sensitive assets, such as fruit, vegetables and fish, commits it to promoting its own sustainable development strategy.

The CAR, as a reference agro-food centre on the national and European territory, has decided to undertake a path to improve its environmental impact and energy efficiency. This path, which is still in progress, can be an example for similar realities in Europe.

Main institution in charge

CAR - Centro Agroalimentare Roma

Timescale (start/end date)

2015 - ongoing

Further information:

<https://www.agroalimroma.it/>

AGROENER - Energy from agriculture: sustainable innovations for the bioeconomy

Rome, Lazio, Italy

Agroener is an applied research project that studies the efficiency of agricultural machinery and the development of biomass and biogas supply chain, disseminating the results achieved.



Uniconfort Global 30 biomass boiler 350 kWth.



Control system and combustion chamber with moving grate.



Detail of combustion chamber with mobile grill. Photo credits Gallucci Francesca.

CREA (Council for Research in Agriculture and Analysis of Agricultural Economics) is the main Italian research body dedicated to agri-food chains with legal personality under public law, supervised by the Ministry of Agricultural, Food and Forestry Policies (Mipaaf). It enjoys full scientific, statutory, organizational, administrative and financial autonomy. It has 12 research centers, 6 of supply chain and 6 transversal, present in a capillary way on the national territory. CREA is implementing the Agroener project. The project consists of 5 work packages in addition to the coordination activity: 1) Improvement, development and promotion of energy efficiency of

machinery, agricultural equipment and mechanization; 2) Development of solid agroforestry biomass supply chain; 3) Development of the biogas supply chain; 4) Biorefineries integrated in agri-food production cycles; 5) Implementation of experimental plants, demonstrations and dissemination. The research done is detailed on the project website (<http://agroener.crea.gov.it/avanzamento.html>) as well as the transfer, training and communication activities.

The project makes use of 25 external collaborations that also include companies as well as research institutes. Both of them fall into the category of project stakeholders together with farmers and the community as a whole.

Resources needed

The project is funded by the Ministry of Agriculture, Food and Forestry with a contribution of € 4,344,813.00 (Decree n. 26329 of April 1st 2106). There are 55 researchers, 14 operational units, 25 collaborators and external bodies working on the project.

Evidence of success (results achieved)

The project fully addresses the main aspects of the use of renewable energy in agriculture from the perspective of a science closely related to the operational aspects of the agricultural sector. It is interesting to note that Agroener has also focused its research on the reduction of absolute levels of consumption without which every effort seems, in the long term, destined not to produce the expected results.

Challenges encountered

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Potential for learning or transfer

The results of the research lines and the consequent transfer and dissemination activity foreseen in the project may be of interest for the whole Europe especially where the concept of "producing more with less" can be proven in the identification of new agronomic techniques related to the hypothesis of sustainable intensification.

Main institution in charge

CREA - Consiglio per la ricerca in agricoltura e l'analisi dell'economia agraria

Timescale (start/end date)

09/06/2016 - ongoing

Further information:

<http://agroener.crea.gov.it>

Cogeneration from biogas of an agrozootechnical company

Sutri (Viterbo), Lazio, Italy

Cogeneration plant for the production of electrical and thermal energy, with an electrical power of 750 kW, fueled by biogas obtained largely with the company's livestock waste.



BRUNI ENRICO E ALDO SOC. AGR. S.S.

The company covers an area of 200 hectares used for corn, sorghum and ryegrass production for feeding cattle and partly for silage for energy use. The farm is made up of 600 cattle.

The biogas plant is composed by two anaerobic digesters, fed with a mix of organic matrices, mostly from the farm, and from a short supply chain for the rest. Anaerobic digestion takes place in two reactors, of 1,100 m³ each, and their feeding changes according to the matrices: mechanical (loading shovel) for the solid ones, hydraulic with pumping systems for the liquid ones (vegetation waters) and semi-liquid ones (sewage). The feeding is managed by a computerized system that regulates the flow of matter to the digesters on a daily basis. The biomass remains in the reactors for about 50 days. The biogas is produced in a mesophilic regime (about 40°C), the heating of the digesters is obtained thanks to the recovery of the electricity generators' cooling heat and maintained by an efficient insulation system of the reactors. After undergoing a chemical-physical-biological cleaning, the biogas, with a methane content of 55-60%, feeds three generators with internal combustion engines of 250 kW each, to produce electrical and thermal energy.

Most of the electricity is sold to the national transmission network, about 3% of the electricity produced is self-consumed in the company for the handling of the organic matrices and the hydraulic loading. The thermal energy, in the form of hot water at 85°C, is produced by recovering the cooling heat of the generators and the exhaust fumes; it's totally consumed in the company.

The solid and liquid digestate produced is used in the company to restore the organic substance in the soil. About 50% of the thermal energy produced

during the winter is destined to the digesters' thermoregulation.

The biogas production process is wet and uses part of the generation heat produced by the prime movers of the generators. The practice is of absolute benefit because it can be easily inserted in the process of managing and disposing of wastewater and nitrogen in medium and large livestock farms, allowing them to transform into great advantages what represents only disadvantages and costs to them. The practice in question was implemented to produce electricity using largely the company's livestock manure. In addition to the electricity production, the biogas plant allows a strong reduction in the volume of livestock waste to be disposed of, its odorous power and nitrogen emissions into the atmosphere.

The process of generating electricity is enhanced by the simultaneous production of heat which, a part is used in the anaerobic digestion process in digesters, and the rest is made available for company use. The amount of electricity produced by the biogas plant is usually higher than the average business needs of the average and large typical livestock farm, and therefore allows an important portion of it to be fed into the national grid.

The beneficiaries of the practice are, first of all, the company, but also the environment and the entire community.

Resources needed

The initial investment cost of € 600,000 for the construction of the plant, was supported for a share of € 200,000 from regional funding (PSR 2007-2013 AXIS 3, MEASURE 311 "Diversification into non-agricultural activities"). For the second cogeneration group's purchase the Company participated in the ENAMA-Mi-PAAF tender.

The Company benefits from the All-inclusive Rate (0.28 € / kWh) reserved for plants fuelled by biogas with a power of less than 1 MW (Article 2 paragraph 145 Finance Law No. 244/2007).

Plant costs: € 2,400,000
Operating costs: € 60,000 / year
Raw material costs: € 300,000 / year (agro-industrial residues, transport and diesel)
Digestate disposal costs: none

Evidence of success (results achieved)

The practice can be considered excellent because it has brought immediate benefits, evincible from the energy fed into the national grid and the resulting revenues.

On average, every year the biogas plant in question is able to feed over 4,000,000 kWh of electricity into the national grid, almost uniformly in the various periods of the day and week.

Challenges encountered

The challenge faced and the lesson learned is represented by the need to always keep the plant and the cycle of biogas production and waste management efficient.

The other aspect is the improving in the company's workers' skills, dedicated to operating the plants: they have had the opportunity to grow because they have learned to manage more technologically advanced systems than those usually found in livestock farms.

Potential for learning or transfer

The implemented practice is potentially advantageous because it optimizes the cycle and the management costs of wastewater of the medium and large livestock farm and allows generating profits thanks to the introduction into the national grid of the electricity produced with the biogas plant.

It increases its technological level, it improves its economic stability on the market and its competitiveness, especially towards European Union companies, while respecting and protecting the environment.

What's more, the necessary investments affect important and fundamental national sectors for innovation, growth and technological evolution of the Lazio Region and the Nation.

Another extremely important aspect is the reduction in the use of fossil fuels to produce electricity, to the benefit of reducing CO₂ emissions and environmental pollution.

Main institution in charge

BRUNI ENRICO E ALDO SOC. AGR. S.S.

Timescale (start/end date)

START DATE 2009

Further information:

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A cow's milk processing company in 2020: quality, territoriality, sustainability, short supply chain

Nepi (VT), Lazio, Italy

IPA's sustainable "zero emissions" policy has led to the construction of a photovoltaic plant and above all a 0,25 MW biogas plant that contributes to minimising CO₂ emissions into the atmosphere by producing electricity and thermal energy through the exploitation of waste from agricultural and agro-industrial activity.



I.P.A. S.r.l. Industria Prodotti Agroalimentari

I.P.A. s.r.l. is a cow's milk processing company that processes on average 100,000 litres of milk per day. The plant has 6000 square meters of covered structures set in 170 hectares of farm, an internal dairy of 2000 square meters, fresh lines, UHT lines with sterilizer, loading platforms, offices, laboratories.

In its path of sustainability, the company has replaced the heat generators of the heating plant with high efficiency and heat recovery models, 2 x 450 kWt, together with the use of photovoltaic systems installed in a coplanar way on the roofs of the company's buildings (300 kWp).

Ipa uses a fully eco-sustainable integrated production method, thanks to the adoption of a modern biogas plant (250 kW of electricity) currently under construction, fed largely with by-products and waste from processing and transformation of the company's production activity: an expression of care for the environment and attention to preserving precious natural resources.

The practice in question has been implemented to improve the aspects related to the energy costs of production, the company's competitiveness on the market, the company's energy efficiency and CO₂ emissions, and achieves the objectives by reducing the energy needs of production and consequently the energy costs.

Biogas plant also allows you to produce energy using the company's processing waste, bringing the double benefit of generating energy and reducing

costs and consumption for the disposal of waste. In conclusion, this whole process has the company as its primary beneficiaries, but also the environment and the entire community.

The electricity that biogas plant can produce, when fully operational, can be estimated at approximately 1.000.000 kWh per year.

Resources needed

The financial resources used amount to about € 800,000.00, part of which (43,12%) was financed by FEASR - PSR Lazio 2014-2020.

Evidence of success (results achieved)

Together with the immediate benefits for the company, which are demonstrable from the reduction of energy costs, concrete proof is provided:

- from the measurement of fossil fuels used for the production of thermal energy, which was lower than the previous periods due to the improved efficiency of the installed systems;
- from the measurement of electricity withdrawn from the national grid, which was also lower thanks to the use of that self-produced in the company with the photovoltaic system (with the next activation of the biogas system the situation will further improve).

With the activation of the plants described in this practice the advantages for the environment and for the community of Nepi, deriving from the use of biogas, are significant:

- equality between CO₂ emitted and absorbed: the carbon dioxide emitted by the combustion of biogas is the same as that taken by animals indirectly through plants;
- methane (the main component of biogas and naturally produced by the decomposition of plants and sewage) is physically trapped, preventing its diffusion in the troposphere: methane is one of the most powerful and dangerous greenhouse gases;
- renewable electricity production: 1000 kw/h per year will be used entirely in the company for self-consumption;
- production of renewable thermal energy thanks to the cogeneration process of generating electricity from the biogas plant: about 100 kW;
- possibility to use a natural fertilizer purified from polluting components.

Challenges encountered

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Potential for learning or transfer

The lesson learned is the need to measure and store the consumption of energy carriers and the energy needs of the various production phases in order to demonstrate any targets achieved and/or distance from them.

Another important aspect concerns the improvement of the skills of the company's workers, who have had the opportunity to grow as they have learned to manage plants that are technologically more advanced than the previous ones.

The project implemented not only reduces the energy cost and therefore the production cost incurred by the company, but also increases its technological level, improves its economic stability on the market and its competitiveness while respecting and protecting the environment.

It is important to combine words such as environment, localisation, competitiveness, permanent training and quality in the perspective of the European Green New Deal and that is what this project has succeeded in.

Main institution in charge

I.P.A. S.r.l. Industria Prodotti Agroalimentari

Timescale (start/end date)

2019/Ongoing

Further information:

<http://www.ipa-alimenti.it/>

From the ancient waters of the Latin lands to a modern 400 Kwp photovoltaic plant

Sezze (LT), Lazio, Italy

Installation of 1539 solar panels and 20 inverters on the roof of the warehouse of the San Lidano cooperative.



San Lidano soc coop agricola arl

Founded on 1997 in the heart of "Agro Pontino" (the fruitful lowland Southern of Rome saved from the waters by centuries of land reclamation), San Lidano is today a Producers Organization with more than 60 member farmers specialized in the production of pretailed vegetables of IV range ready to use and /or to eat.

Exponential growth required a more energetic consumption, when it was necessary to increase storage cells with temperatures constantly lower than 8°C on any day and with new machinery for washing and drying vegetables.

Kw/h consumptions in 2019 were 5,497,729 KW/h.

The photovoltaic plant for the year 2019 has produced 468,510 kw/h including about 10% of the energy requirements.

the installation has a power of 400.14 kwp, partly covering the shed surface with 260 Wp Benq solar panels with Solaredge inverter model SE17000-EUR three-phase including P600-MC4-RM optimisers.

Resources needed

The plant had a total cost of € 507,232.91, of which € 177,531.51 was financed by the European Agricultural Fund for Rural Development and the Lazio Region, within the scope of the energy efficiency aid from Renewable sources - Action 4 (35% public contribution 65% cooperative investments).



Photo credit Bruno / Germany, Pixabay

Evidence of success (results achieved)

In 2015 Sanlidano save 60,000 kw/h for a bill saving of € 11,500.

So far the plant has produced 2,170,000 kW/h per year with an estimated energy saving of 370,000 € while the environmental benefits correspond to 805.869,88 avoided CO₂ emissions and 24,052.75 trees planted.

Challenges encountered

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Potential for learning or transfer

The investment has already been amortized in the first four years with a significant environmental benefit, while recognizing that it covers only 10% of energy requirement. It has strongly demonstrated how cost-effective energy efficiency measures are from both an economic and environmental point of view.

Main institution in charge

San Lidano soc coop agricola arl

Timescale (start/end date)

04/10/2013-24/08/2015

Further information:

<https://www.sanlidano.it/>

From the sustainability of renewable energy to the quality of the wine produced

Cori (Latina), Lazio, Italy

The Cincinnato wanted to realize an important photovoltaic system integrated in the landscape for the improvement of the quality of the wine produced.



800 photovoltaic panels covering the roof of the Cori winery. Photo credit Temistocle Lucarelli.

In 1947 some farmers founded the Cooperativa Cincinnato in Cori, Latina, south part of Lazio Region, with the aim of transforming and marketing their members' products and promoting the progress of local agriculture and the well-being of the community itself. At the end of the Sixties, the Cooperative intervened to support the typicality of the local viticultural production, obtaining in 1971 the recognition of the Cori Rosso and Cori Bianco DOC. In 1979, an innovative winery with a high technological content was created. Today the Cincinnato represents 62 years of history, 400 hectares of land, 189 members.

For many years, Cincinnato has implemented a policy of respect for the environment. Many members voluntarily adhere to the organic method.

More and more electricity has become necessary for the refrigeration of the products being processed for the continuous improvement of the wines. At the same time, however, with this project the environmental impact has been reduced. For this reason, a photovoltaic system was designed, with a power of 200 Kw, to be positioned on the oenopole covering on the south-facing slopes, essentially maintaining the same inclination of the slopes in order to reduce the visual impact, reducing it to zero, to make the system itself "integrated" to the landscape.

The surface area involved is about 1,500 square metres and the energy produced will be used mainly for the refrigeration of the products, greatly improving their quality.

The grid connection system is characterised by the following components:

- n° 928 SANYO HIP214 modules, with a total power of 198,590 Wp. These modules will be connected to form strings. A string of modules consists of modules connected in series. Several strings will be connected in parallel. The series and parallel connection of the modules depends on the voltage to be brought to the inverter input.
- No. 16 POWER ONE PVI 12.5 string inverters, capable of covering a DC power range up to 14,300 Wp, complete with the necessary interface devices, integrated and certified, which guarantee the safety of the system and compliance with the characteristics required by the electricity companies.
- Supporting structure, consisting of a frame formed by a warp of metal profiles fixed to the supporting structure.
- Three-phase parallel panel: electrical panel containing network-inverter interface device to meet CEI 11-20 and DK5940, protection and disconnection devices.

Resources needed

The cost of the project was about 900.000,00 partially financed by the European Agricultural Fund For Rural Development Lazio 2007-2013 Misura 311 Azione 4

Evidence of success (results achieved)

The investment has on the one hand allowed a return in economic and environmental terms but has also had an important impact on the quality of the wine produced thanks to the reduction in refrigeration costs necessary to guarantee a better quality of wine.

Challenges encountered

-

Potential for learning or transfer

-

Main institution in charge

CINCINNATO COOP AGRICOLA ARL

Timescale (start/end date)

2010 - 2013

Further information:

<https://cincinnato.it/>

A photovoltaic plant in roman countryside - Agrinova

Campagnano di Roma (Roma) Lazio, Italy

Integrated GSE STORAGE system to store all the electricity produced from renewable energy.



Photovoltaic plant 2 17kW
AGRINOVA SRL

Photovoltaic plant 1 63kW.
Photo credits Nazario Nazzarri.

The production consists of organic hay that is sold to organic livestock farms in the province of Rome and breeding of horses. The agricultural area is totally flat and about 25 hectares are irrigated by a reservoir (12,000mc) and underground lines that feed 2 self-propelled rollers.

On the roof of an old stable for dairy ovines a new fv plant has been installed producing up to 63 kwh peak using the benefits arriving from the 4th conto energia more the additional premium for asbestos removal. A photovoltaic plant composed by three sections with the capacity production of 18 kwh peak each (total peak production 63 kwh) on the roof of an old rural stable has been realized using the benefit arriving from the 4th conto energia (0,20 € / kwh produced) in addition to the energy market price.

The old roof cover in asbestos plates has been removed and disposed and replaced by a new insulated metal panel roof; thank to this ecologic operation an further benefit for 0,05 € /kwh produced was obtained. All energy produced is sold to the national gse granting an important pillar to the farm income balance. This first fv plant has been realised during 2012. In addition in 2018 a second smaller photovoltaic plant has been realised without the benefits of the expired gse conto energia. The second plant has a peak capacity of 17 kwh ,is on the top of a rural roof and the production is not totally sold to the national gse but it is mainly self-consumed in the farm activities. Only the surplus continues to be sold

to the gse. The economic goal of this investment is to maximise the self-consumption percentage, in fact the price difference between the sold and bought energy is considerable - 0,21/5 € /kwh in case of buying and 0,05/7 € /kwh in case of selling. It is crystal clear as the economic breakeven point is much closer as the percentage of self-consumption increases.

Resources needed

€ 120.000,00 for the first plant + € 15.000,00 the second smaller plant. There are no other benefits or electricity sales.

Evidence of success (results achieved)

In the first case the initial investment € 120.000,00 generates a positive gross cash flow for approx. € 25.000 /year, deducted the expenses for insurance maintenance etc the result has been a net income for over € 20.000/year. The initial investment has been paid back in 6 year and starting from 2019 the plant continues to generate an increasing of the yearly farm income for approx. € 20.000,00. The situation is different in the case of the second plant.

Without the fv plant the yearly cost of the energy consumed in the farm was approx. € 7/8.000,00 now the cost of the energy bought from the national suppliers don't reach € 4.000,00 /year. also in this case the payback period is approx. 5/6 years.

Challenges encountered

-

Potential for learning or transfer

The still high cost of the batteries for the energy storage limits the diffusion of this technology in the domestic use reducing the positive impact of the technology in the field of sustainability.

Main institution in charge

Società Agrinova srl

Timescale (start/end date)

1st plant- january 2012 - july 2012 / august 2012 connected to the grid - ongoing.
2nd plant - march 2018 - june 2018 connected to the grid - ongoing.

Further information:

-



Photo credit sylen, Pixabay

LUBELSKIE VOIVODESHIP, POLAND



The Lubelskie Voivodeship is located in the south-eastern part of Poland. The eastern border of the voivodeship is also the border of Poland and EU. It is the fourth largest province in the country with an area of 25 thousand square km and a population of over 2 million. The capital of the region is the city of Lublin, a large administrative, academic and cultural center. The Lubelskie Voivodeship is a typically agricultural region. The agri-food industry, including agriculture and agri-food processing, forms one of the largest, dynamically developing segments of the economy of the Lubelskie Voivodeship. Agricultural land in the region constitutes 68% of the total area (first place in Poland), and is one of the largest domestic producers of cereals, ground vegetables, fruit and herbs. The region also has very favorable conditions for the development of renewable energy production from sun, wind and biomass.

The project "A nationwide system of advisory support for the public & housing sector and enterprises in the field of energy efficiency and RES"

Lubelskie Voivodeship, Poland

The advisory project is designed to eliminate the identified barriers to the development of a low-carbon economy, support the preparation and implementation of SEAPs, monitor best practices and identify projects in the field of energy efficiency and RES.



The project is implemented by the National Fund for Environmental Protection and Water Management in cooperation with Partners throughout the country in 15 Regional Funds for Environmental Protection and Water Management and by the Lubelskie Voivodeship.

There are 6 energy advisors working in the Lubelskie Voivodeship. Advisors operate in a territorial and expert system, i.e.:

- advisers specialize in specific areas related to the subject of the support provided,
- the priority of the advisors' work distribution system is an appropriately high level of services provided,
- each adviser was assigned a group of municipalities covered by advisory support.

The aim of the project is to support investment projects contributing to the reduction of the emission intensity of the economy through:

1. Support in the preparation and implementation of investments in the field of energy efficiency and RES.
2. Raising awareness of the development of a low-carbon economy.
3. Support for municipalities in the preparation and implementation of Low-Emission Economy Plans.

Activity of energy advisers:

- Assistance in the preparation of documents:
 - Low -Emission Economy Plans,
 - Energy audits (of buildings, street lighting),
 - Assumptions for the heat, electricity and gaseous fuels supply plan for the commune,
 - TOR for investments related to energy and energy efficiency,
 - Thermographic reports.
- Education and promotion activities:
 - seminars,
 - training cycles,
 - conferences.
- Assistance in applying for external funds.
- Assistance in the implementation of projects under the OPI & E, ROP LV.

Resources needed

The project is financed under the Operational Programme Infrastructure and Environment for 2014 -2020 under Priority Axis I "Reducing the emissions of the economy". The amount of the co-financing: EUR 1,813,232.

Evidence of success (results achieved)

Tasks carried out by the 6 energy advisors in the Lubelskie Voivodeship:

1. Verification of Low -Emission Economy Plans in 2015 -2018 - 170 in number,
2. LCEP update in 2019 -2020 (e.g. for the purposes of measure 5.5) - 62 no.,
3. Energy audits - 52 no.,
4. Certificates of energy performance of buildings in the resources of the Provincial Property Management Board – 4 no. (Biała Podlaska, Chełm, Zamość, Lublin),
5. "White Certificates" - applications to the Energy Regulatory Office in the Łaszczów, Poniatowa, Sławatycze communes - 3 no.,
6. Thermographic measurements made and reports prepared - 27 no.,
7. Education and promotion activities:
 - A series of trainings for candidates for municipal energy specialists. A total of 90 people were trained, creating three training groups of two training days. One training group participated in 6 training days. There were 18 training days in total;
 - A series of trainings for employees of Social Welfare Centers. The total number of people trained – 319;
 - Training workshops for the employees of local government units on the "Clean Air" programme, organized in 20 Poviats Authorities. A total of 312 people participated in the workshops;
 - Information and promotion meetings entitled "Meetings with new energy" organized in 70 municipalities;

- Training workshops in 124 communes under the Priority Programs: "My Electricity", "Clean Air" and "Agroenergy". The total number of participants - 2010 people.

Energy consulting project in Poland:

1. Number of consultations provided - 57 604,
2. Number of advice provided - 91 267,
3. Number of educational and training activities carried out - 2,247.

Challenges encountered

-

Potential for learning or transfer

The implementation of such projects will contribute to increasing knowledge in the field of low-emission economy development and to increasing knowledge in the preparation and implementation of investments in the field of energy efficiency and RES.

Main institution in charge

National Fund for Environmental Protection and Water Management

Timescale (start/end date)

2015-2023

Further information:

-

My Electricity Priority Program

Lubelskie Voivodeship, Poland

The program aims to increase electricity production from photovoltaic micro-installations.



Photovoltaic installation on the roof. Photo credit Adam Głęb.

The My Electricity priority program is an instrument, unique on the scale to date in Poland, dedicated to

Installation of a photovoltaic panels on the Pstrąg Pustelnia fish farm buildings and the fish sale building in Wola Rudzka

Wola Rudzka, Lubelskie Voivodeship, Poland

The idea behind making a photovoltaic installation on the buildings of fish farm Pstrąg Pustelnia was to reduce its operating costs thanks to the self-produced electricity from photovoltaic cells.

The Pstrąg Pustelnia fish farm is located in the Lubelskie Voivodeship in the village of Wola Rudzka. The fish farm deals with the breeding and sale of fish, i.e. trout and carp, on an area of 400 ha. In order to increase the management efficiency and to increase the competitiveness of the farm, photovoltaic installations have been made. The installations enabled the production of electricity for self-consumption, i.e. mainly for electricity supply in buildings:

- Photovoltaic installation on the fish farm buildings with a capacity of 30 kWp,
- Photovoltaic installation on the fish sale building with a capacity of 35 kWp.

Resources needed

The implementation of photovoltaic installations by the Pstrąg Pustelnia fish farm was financed under the Operational Program "Fisheries and Sea" for the years 2014 - 2020, sub-measure 1.1.2. Supporting activities aimed at reducing emissions of substances causing climate change:

- Photovoltaic installation on the Pstrąg Pustelnia fish farm buildings"
 - Total value of the operation: Euro 39 600
 - The funding value: Euro 16 100
- Photovoltaic installation on the fish sale building in Wola Rudzka"
 - Total value of the operation: Euro 42 600
 - The funding value: Euro 17 300

Evidence of success (results achieved)

Two photovoltaic installations with a total capacity of 65 kWp were installed.

Challenges encountered

-

Potential for learning or transfer

Projects of similar type should find wide application in agricultural areas among farmers engaged in agriculture or agricultural activities.

Benefits of implementing such projects:

1. Increasing the efficiency of management and

supporting the development of prosumer energy, and specifically supporting the segment of photovoltaic (PV) micro-installations.

The implementation of the program will contribute to the development of prosumer energy and will significantly contribute to the fulfillment of Poland's international obligations in the field of renewable energy development.

The beneficiaries of the project are natural persons generating electricity for their own needs, who have concluded a comprehensive agreement regulating the issues related to the introduction of electricity generated in micro-installations to the grid.

Under the program, projects involving the purchase and installation of photovoltaic micro-installations with an installed electrical power of 2 kW to 10 kW, used for the needs of existing buildings, especially in rural and less industrialized areas, can be implemented.

Co-financing under the My Electricity program is in the form of a subsidy up to 50% of eligible costs of the micro-installation included in the project, not more than EUR 1100 per one project.

Resources needed

The budget for the implementation of the program objective is Euro 217 million, including Euro 217 million for non-returnable forms of funding.

Evidence of success (results achieved)

Currently, under the My Electricity program, 73,000 applications have been submitted, and the capacity of already installed PV installations is 408 MW.

Challenges encountered

-

Potential for learning or transfer

The implementation of the "My Electricity" program will significantly increase the public's interest in photovoltaics in agricultural and urban areas. The development of prosumer energy will contribute to reducing CO2 emissions.

Main institution in charge

National Fund for Environmental Protection and Water Management

Timescale (start/end date)

2019 - 2025

Further information:

-

savings on operating costs thanks to the production of own electricity.

2. Increasing the profitability of running a farm through savings, that is lower costs and increasing farm income.
3. Perception of the farm as modern, innovative, ecological and environmentally friendly.
4. Increase of the farm competitiveness.

Main institution in charge

"Pustelnia" Ltd fish farm from Opole Lubelskie

Timescale (start/end date)

2017

Further information:

-

Agroenergy Priority Program

Lubelskie Voivodeship, Poland

The program aims to increase the production of energy from renewable sources in the agricultural sector.



A rural view in the Lubelskie Voivodeship. Photo credit Adam Głab.

The first call for applications under the Agroenergy program was addressed to individual farmers who had lived for at least 5 years in the commune in which one of the agricultural real estates is located and the total area of agricultural land on the farm does not exceed 300 ha.

Types of co-financed projects:

- Projects relating to the construction of new generating units, including the possibility of connecting them to the distribution / transmission network, in which energy production uses:
 - a) renewable sources,
 - b) cogeneration sources,
 - c) waste heat utilization technologies.

- Projects involving, et. al., construction, expansion or modernization of production installations or equipment, leading to a reduction in the consumption of primary raw materials (as part of own production lines), including by replacing them with recyclable materials, waste or leading to a reduction in the amount of waste generated, including:
 - a) Non-waste technologies (NWT) and low-waste production technologies ensuring the most comprehensive use of the raw materials used;
 - b) Technologies limiting the unit water consumption in production processes or closed water circulation systems;
 - c) Material production technologies using combustion by-products / production processes or waste generated by the applicant;
 - d) Technologies for the production of alternative fuels and substrates for their production from the waste generated by the applicant, including sludge;
 - e) Modernization of the water demineralization and decarbonisation station (if necessary for the implementation of the investment generating the environmental effect).

- Projects in line with the "Announcement of the Minister of Energy of 23 November 2016 on the detailed list of projects to improve energy efficiency" aimed at improving energy efficiency, as well as technological changes in existing facilities, installations and technical devices aimed at this, including in:
 - a) Technologies for rationalizing electricity consumption,
 - b) Technologies for rationalizing heat consumption,
 - c) Modernization of production and processing methods in the field of energy efficiency,
 - d) Implementation of energy and quality management systems and implementation of power grid management systems at farm facilities.

Under the first call for proposals, funding was in the form of a loan up to 100% of eligible costs, and a subsidy of up to 40% of eligible costs, not more than EUR 174,000.

The new call for the updated Agroenergy 2020 program assumes that other entities running agricultural activity in the same area or economic activity in the field of agricultural services may also benefit from co-financing for renewable energy sources. Types of co-financed measures to be implemented in the updated Agroenergy 2020 program:

- Photovoltaic installations, wind farms and heat pumps for the Applicant's own energy needs with an installed capacity of more than 10 kW and not more than 50 kW.

- Energy storage facilities for photovoltaic installations or for wind farms.
- Hybrid installations, i.e.: photovoltaics with a heat pump or a wind farm with a heat pump, combined into one system, the submission of the application is conditioned by the prior carrying out of an energy audit, which recommends the use of a heat pump.

As part of the update of the Agroenergy program, co-financing will be in the form of subsidies up to 20% of eligible costs for energy generating installations.

Resources needed

The budget for the implementation of the program objective under the first call for proposals was Euro 43.5 million, including:

- 1) for non-returnable forms of financing - Euro 17.4 million
- 2) for returnable forms of co-financing - Euro 26.1 million

The budget for achieving the program objective in the Agroenergy 2020 update is Euro 43.5 million, including:

- 1) for non-returnable forms of financing - Euro 37 million
- 2) for returnable forms of co-financing - Euro 6.5 million.

Evidence of success (results achieved)

As part of the first edition of the program, for which the call for applications ended in December 2019, a total of Euro 43.5 million was granted: Euro 17.4 million in the form of subsidies and Euro 26.1 million in the form of loans.

In the period from July to December 2019, NFEP&WM accepted 449 grant applications and 89 loan applications.

Finally, as many as 53 contracts were signed for installations with a total capacity of 1,819 MWp.

Challenges encountered

-

Potential for learning or transfer

In the ecological context, the most important objective of the Agroenergy program is to reduce the emission of environmentally harmful carbon dioxide, which is generated as a result of burning hard coal in power plants. The program plan assumes that CO₂ emissions after the implementation of RES installations will drop to 170,000 Mg per year. Implementation of the program will increase the use of energy from renewable sources in the agricultural sector.

Main institution in charge

National Fund for Environmental Protection and Water Management

Timescale (start/end date)

2019 – 2025

Further information:

-

Construction of the agricultural biogas plant and distillery in Łany Wielkie

Łany Wielkie, Silesian Voivodeship, Poland

The purpose of this project was to use waste from distilleries by processing them into biogas for use in the production of electricity and heat.

In November 2011, the biogas plant and distillery were launched. This investment is a unique combination of two separate technological processes.

Producing 0.5 MW of electricity, the biogas plant consumes distillery waste, mainly decoction, manure and other organic residues from farms. In addition to electricity, the product derived from biogas is an excellent (ecological and odorless) organic fertilizer used in its own farming fields. Most of the energy produced is used for the company's own needs.

The distillery has an annual production capacity of 1,600,000 liters of agricultural distillate from cereals with an average content of 94% alcohol, which can be directly used for the production of vodka and contaminated alcohol.

The scientific employees of the University of Life Sciences in Lublin had substantive participation in the development and during the implementation of the project. Their participation in the development of this project gives the opportunity to apply similar solutions in the Lubelskie Voivodeship.

Resources needed

Built with nearly 16 million PLN in Łany Wielkie, the biogas plant and distillery installation was implemented with the investor's own funds, bank loans and 50% of subsidies under the Rural Development Program, measure 123 "Increasing the added value of basic agricultural and forestry production".

Evidence of success (results achieved)

The newly created installation is a modernized distillery with a capacity of 1.6 million liters per year and a biogas plant with a 526 KWe cogenerator. The raw material for this installation is mainly maize cultivated by a group of agricultural producers on almost 2,000 ha, used for the production of spirit and stillage. Additives are also dosed in the amount necessary for the proper process of anaerobic digestion (cattle slurry and manure from own dairy farming).

The liquid part of digestate produced during anaerobic digestion is exported to arable fields as fertilizer. The dry part, in turn, returns as litter to the barns.

The heat obtained during the fermentation process in the biogas plant is completely utilized in the distillation process, and the resulting electricity covers the needs of the entire biogas and distillation installation - any surpluses will be sold to the power grids.

Challenges encountered

-

Potential for learning or transfer

Unfortunately, the Polish food processing industry is still using renewable energy sources insufficiently. Initially, the investments included modern process systems, packaging machines and logistics, now the time has come for energy efficiency. There is a significant potential in biogas installations for the management of processing residues and sewage sludge. In an increasingly competitive market, in addition to raw material costs, energy costs have a huge share in the unit cost of production. Depending on the type of food processing, energy costs can be reduced to around 30% in the brewing industry, 15-25% in the spirits industry and several percent in the meat and dairy industries.

Main institution in charge

BIO-BUT Sp. z o.o

Timescale (start/end date)

2009-2011

Further information:

-

Construction of a biogas power plant for electricity production in combination with heat in Siedliszczki

Siedliszczki, Lubelskie Voivodeship, Poland

The aim of the project was to build a biogas power plant for the production of electricity in combination with heat in Siedliszczki in the Piaski Municipality.



Biogas power plant. Wikana Bioenergia Sp z o.o.

The biogas plant in the Piaski Municipality is located near the dairy cooperative, from which it will collect the substrate needed for biogas production, and in return will provide heat energy to OSM Piaski. The power plant uses methane, which is the main component of biogas formed in the methane fermentation process, to drive the power block. Installed capacity of electricity in cogeneration not less than 998 kWe, installed capacity of heat energy in cogeneration not less than 850 kWt, annual production of electricity 6,200 MWh, annual heat production in the amount of 16000 GJ.

As a substrate for biogas production, it uses soft biomass obtained either from plantations of special purpose plants such as corn, sugar beet, sunflower, various types of grass or grain, or from post-production waste from the food industry (e.g. from dairies, breweries, breeding farms and other organic waste).

Resources needed

The investment was co-financed with the support of the Operational Program Infrastructure and Environment

Action IX.1. High efficiency energy production
Total cost of the Project: 20 081 980,52 PLN
The amount of co-financing by the European Union from the Cohesion Fund:
7 877 044,96 PLN

Evidence of success (results achieved)

In the case of investments in the construction of biogas plants using plant substrates and industrial waste for methane production, there is a positive

impact on the state of the natural environment by stopping the emission of harmful compounds into the atmosphere. First of all, it is about abandoning the emission of gases and dusts (mainly nitrogen oxides) and carbon dioxide that would take place if conventional energy sources were used.

The average volume of energy produced in this installation is 6200 MWh per year. Assuming that 950 kg of CO₂ is needed to generate 1 MWh of energy, annual discontinued carbon dioxide emissions will reach almost 5,938 tons. However, over the entire lifetime of the biogas plant, which is estimated at an average of 15 years (assumed infrastructure depreciation), abandoned emissions will be close to 89,063 tonnes of CO₂. This is a direct ecological effect of the planned undertaking.

Challenges encountered

-

Potential for learning or transfer

Biogas plants are one of the most important goals set by "Poland's energy policy until 2030". The development of biogas installations will improve energy security, enable the creation of so-called local value chains, activating the villages economically and increasing employment in small local markets. An extensive information and education campaign should be prepared for farmers and agricultural producers, local governments and entrepreneurs, disseminating knowledge about the production of energy from renewable sources and the use of locally available sources.

Main institution in charge

Wikana Bioenergia Sp. z o.o.

Timescale (start/end date)

2009-2011

Further information:

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Photovoltaics farm in Bordziłówka (Lubelskie)

Bordziłówka, Lubelskie Voivodeship, Poland

The aim of the project was to build a biogas power plant for the production of electricity in combination with heat in Siedliszczki in the Piaski Municipality.



Photovoltaics farm in Bordziłówka. Photo credit Adam Głąb.

The Lubelskie Voivodeship is low industrialized. One of the sources of income for municipal local governments is agricultural tax. The influence is not high and does not offer many development opportunities. That is why the authorities often have to look for other solutions. The area of the Lubelskie region is characterized by the highest sunshine in Poland. In 2012, five municipalities: Wisznice, Rossosz, Sosnówka, Jabłoń and Podedwórze formed a self-government company Energia Dolina Zielawy in order to provide energy security for its members and to cut pollution by increasing the share of renewable energy used in electricity production. It was a joint operation, because they are very small municipalities and they knew from previous experience that they could not individually manage large renewable energy projects.

Aware of the need to make heating systems less reliant on traditional energy sources, the partners identified solar power as an alternative. In 2014 they started the construction of a photovoltaic farm with the capacity to generate 1.4 megawatts of power. The photovoltaic farm uses solar power to produce electricity which is fed into the grid. In all, 5 560 polycrystalline silicon modules were installed to convert sunlight into electricity. The size and power of farm should meet the current needs of five municipalities and local schools, libraries and offices. It is possible to supply electricity to a maximum of 500 households, depending on the current capacity of the power plant.

The farm also has an important research function. In addition to the polycrystalline panels, thin-film modules with a total power of 10 kW were installed there. The purpose of the installation is to compare the work of thin-film panels in different weather conditions, with different insolation and a reference to polycrystalline panels. The research should show how to use photovoltaic panels in an efficient and economically justified way.

Resources needed

Total investment for the project is EUR 1 829 761, with the EU's European Regional Development Fund contributing EUR 619 516 Regional Operational Programme of Lubelskie for the 2007-2013. The remaining amount comes from the loan granted by the bank in Wisznice.

Evidence of success (results achieved)

The production of electricity as part of the photovoltaic plant operation ensures energy security not only for five municipalities of the partnership, but also improves the security of electricity supply in the neighbourhood. And it should be remembered that this is a completely agricultural area, devoid of industry and conventional sources of electricity production.

In the long term, a solar farm and the production of energy from renewable sources affect the growth of economic competitiveness: investors are interested in this area taking into account a high potential for the development of renewable energy sources in this agricultural region. In turn, this affects positively the local labour market and reduces the unemployment.

Challenges encountered

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Potential for learning or transfer

This is the first association of several municipalities signed in order to support the development of renewable energy sources. With partners it was easier to apply for financial support to build a photovoltaic farm. The farm ensures local energy security, guarantees additional income and also help to create an environmental friendly image of municipalities.

Main institution in charge

Energia Doliny Zielawy Sp. z o.o.

Timescale (start/end date)

2014 - 2015

Further information:

-

"Dolina Zielawy" – a partnership for joint development

Wisznice, Lubelskie Voivodeship, Poland

The mission of the partner operation of local governments in the cluster is to create conditions for economic development of the Dolina Zielawy and to achieve economic specialization while ensuring a high quality of life for the residents.



Local self-governments have difficulty in financing new infrastructure using only their own budget. It is also a challenge for them to compete with bigger municipalities to gain EU funding. That is why, in 2007 local municipalities from Lubelskie: Wisznice, Sosnówka, Rossosz, Jabłoń and Podedwórze decided to form a partnership called Association of Dolina Zielawy (Zielawa Valley). Thanks to this cooperation it was possible to implement two big projects using good local conditions for investments in solar energy.

In 2010 municipalities started a new project called Clean Energy in Dolina Zielawy" which was co-financed from Regional Operational Programme of Lubelskie for 2007-2013. Within this project households and public buildings have been equipped in 925 solar sets converting solar energy into thermal energy.

In 2012 the partnership formed a company Energia Dolina Zielawy in order to gain funding for the construction of a photovoltaic farm (in Bordziłówka) 1.4 megawatts of power. This investment was successfully realized in 2014 with the combination of funding from ROP of Lubelskie and bank.

In 2018 Energy Cluster Dolina Zielawy gained a Certificate of Pilot Energy Cluster awarded by the Polish Ministry of Energy.

In this case, it is necessary to appreciate and emphasize the innovative idea of willingness to cooperate with several neighbouring local governments on the principles of long-term planning, without guarantee of quick success. Many years ago it was a rare and unusual phenomenon among competing entities.

Resources needed

Both the costs and benefits of partnership are measured individually for each unit, and the reference point is in each implemented activity. Although the financial benefits are measurable, it is difficult to quantify and it is impossible to present even an indicative amount.

Evidence of success (results achieved)

Thanks to the cooperation of local municipalities it was possible to get funding for two big projects in solar energy. Future investments are also planned. This kind of initiative was awarded the President of the Republic of Poland in 2013, also gaining a Certificate of Pilot Energy Cluster. Having the status of a certified cluster may bring many benefits in the future when applying for external financing in connection with the regulations being developed on cluster support.

Challenges encountered

-

Potential for learning or transfer

The case of the "Dolina Zielawy" partnership shows that an innovative approach to challenges allows finding interesting solutions. The idea of joint operation of several local governments, which have similar challenges and similar possibilities, enabled the implementation of projects on a larger scale, often unattainable for individual entities.

Main institution in charge

Dolina Zielawy

Timescale (start/end date)

2007 - ongoing

Further information:

-

Construction of a straw boiler house in Grabowiec

Grabowiec, Lubelskie Voivodeship, Poland

The idea of creating a straw boiler house in Grabowiec was to use local surpluses of agricultural biomass and reduce the cost of maintaining public buildings.

Grabowiec is located in the Lubelskie Voivodeship. About 956 people live in the village. The main profile of activity is agriculture. The most important institutions in this area are the Commune Office,

Cooperative Bank, elementary school, high school and Commune Culture Center.

On the initiative of the representatives of the Grabowiec Commune Office and the ATEX company (contractor), a large straw-fired boiler house was established in 1996. Today, the boiler house provides heat to several public facilities in Grabowiec: a complex of school buildings, the Bank, the Commune Office, a hydrophore plant, a health center and the building of the boiler house itself. The implementation of the investment, from raising funds to starting operation, lasted about 9 months.

Resources needed

At that time, the cost of the project amounted to PLN 2 150 297.00.

The project was financed in 43.9% from subsidies from the National Fund for Environmental Protection and Water Management, in 14% from subsidies from the Ekofundusz Foundation, in 13.3% from own funds of the Commune Office in Grabowiec, in 1.9% from subsidies of the Zamość Voivode and in 26.9% from a loan from the Provincial Fund for Environmental Protection and Water Management.

Evidence of success (results achieved)

There were installed two boilers with 400kW of thermal power each, which produce annually about 1300 MWh by heating an area of about 5,000. m². This installation reduces annual emissions by 448 tons of CO₂.

Challenges encountered

-

Potential for learning or transfer

Projects of this type should be widely used in typically agricultural areas where there is unlimited access to biomass resources. This installation uses fuel in the form of straw bales, prepared using straw harvesting presses common on farms. There is no need to build processing lines that would require additional expenses and consume energy. However, to disseminate such activities, information campaigns and appropriate financial and expert support are needed.

Main institution in charge

Grabowiec Municipality

Timescale (start/end date)

1996

Further information:

-

Boiler house using biomass for the School Complex in Ostrów Lubelski

Ostrów Lubelski, Lubelskie Voivodeship, Poland

The aim of the project is to replace the heating source of the School Complex in Ostrów Lubelski. The biomass-fired boiler house will increase the energy security of the inhabitants of the Lubartów powiat by using renewable energy sources.



Boiler house in Ostrów Lubelski, ZS Ostrów Lubelski.

Statistical data shows that as a result of agricultural production, there is a surplus of biomass each year, which after processing can be used to produce solid biofuels for combustion in properly prepared boilers. Burning such material guarantees reduction of carbon dioxide emissions into the atmosphere. In addition, biomass does not produce harmful chemicals, as is the case with the burning of fossil fuels. During the biomass combustion cycle, plants absorb carbon dioxide from the atmosphere through photosynthesis. Burning biomass does not cause a greenhouse effect, and the resulting ash can be used as a mineral fertilizer. According to experts, the construction of a biomass boiler house was economical and ecological. The investment may also improve the financial situation of local farmers interested in growing energy crops and developing other biomass surpluses. It is also a plus for the powiat itself, because it is local governments that have the task of reducing emissions and promoting energy from renewable sources.

Resources needed

The project "Boiler house using biomass for the School Complex in Ostrów Lubelski" received funding from the European Regional Development Fund under the Regional Operational Program of the Lubelskie Voivodeship for the years 2007 - 2013, Priority Axis VI Environment and clean energy, Actions 6.2 Environmentally friendly energy.

The total value of the project is: 3 182 370, 00 PLN. The amount of funding from the ERDF: 2 705 014, 50 PLN.

Evidence of success (results achieved)

The objectives of the action are:

- protecting the natural environment by increasing the use of energy from renewable energy sources (RES),
- reducing the amount of greenhouse gases and other harmful substances emitted to the atmosphere (dust, sulfur dioxide (SO₂), nitrogen dioxide (NO₂), carbon monoxide (CO) and carbon dioxide (CO₂)),
- minimizing the costs of heat energy production,
- reducing the dependence of heating systems on conventional energy resources through the use of biomass,
- reducing the amount of waste generated in the process of burning traditional energy raw materials,
- increasing the tourist attractiveness and natural values of the commune by limiting the emission of pollutants and shaping its modern and environmentally friendly image.

Challenges encountered

-

Potential for learning or transfer

On a regional scale, many such facilities can be created thanks to EU subsidies, especially in the Lubelskie region. Such solutions are very desirable in agricultural areas where it is possible to easily obtain the raw material and do not need high expenditure on its transport.

Main institution in charge

Lubartowski Powiat

Timescale (start/end date)

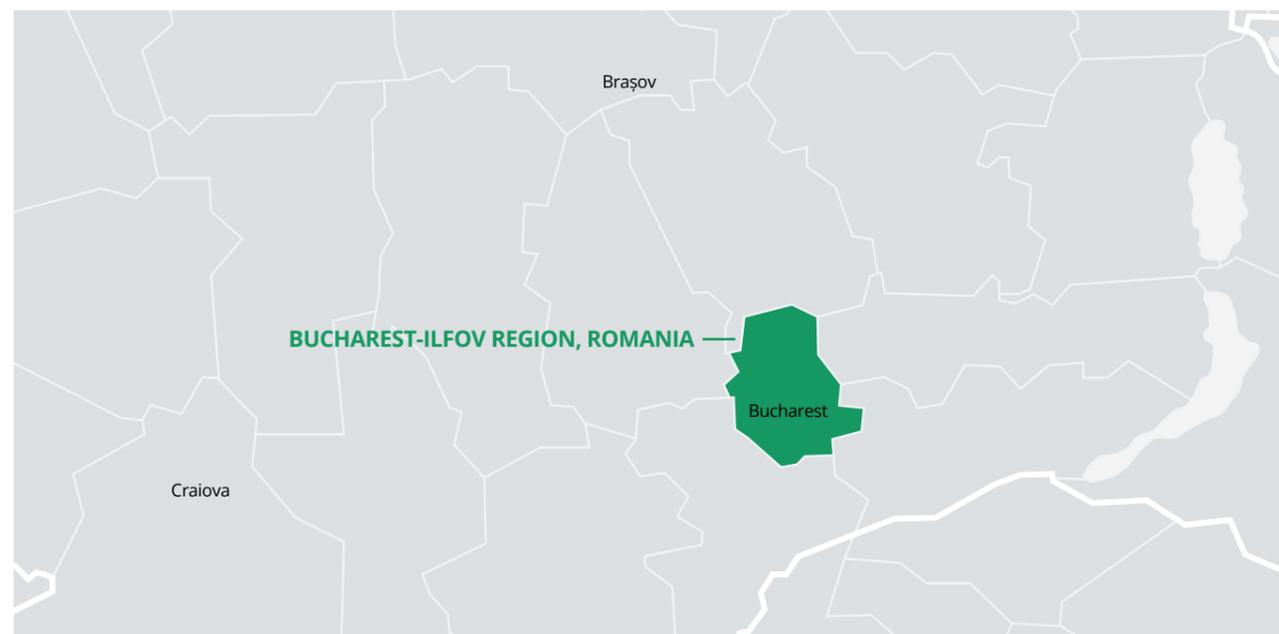
2011

Further information:

-



Photo credit David Mark, Pixabay



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

-

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-programul-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

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

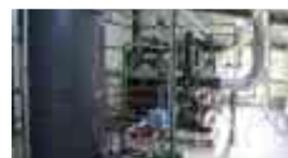
Further information:

<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-electric%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

-

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:

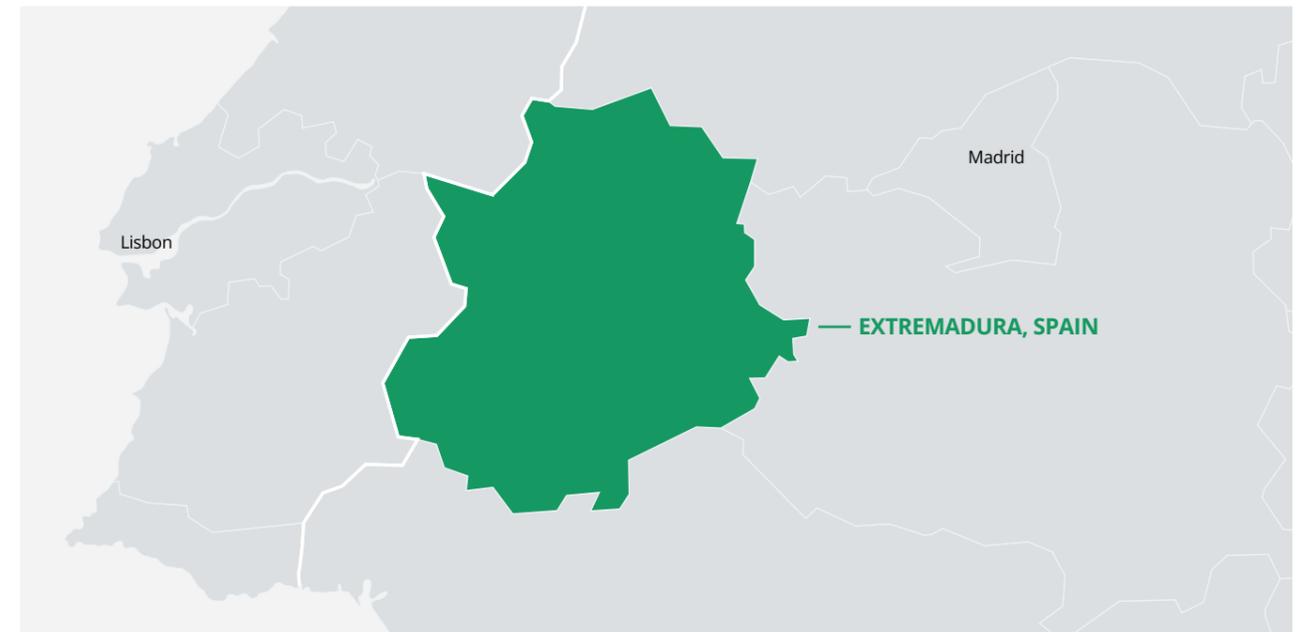
<https://www.innovasjon Norge.no/en/start-page/eea-norway-grants/Programmes/renewable-energy/romania-energy/>





Photo credit Anne and Saturnino 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.

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:

-

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

-

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.



Bio gas 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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