THE GREEN TECHNOLOGY PARK FOR RENEWABLE ENERGY

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INTRODUCTION

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North of Albania is increasingly lagging behind national average according to a range of macroeconomic and human development indicators. In Kukes Region, for example, the average GDP per capita is USD $1,564, approximately one third of Albanian national average of $4,830 as noted in 2004 Global Human Development Report. Average unemployment rate across northern Albania is just under 30%, compared to national average of 14.6% recorded in 2001. With regards to women, the Institute for Gender Applied Policies notes that 67% of women are unemployed in Kukes town, and this figure is likely much higher in rural areas. 56% of the population receives social aid, compared with a national average of 22%.

The large majority of rural population is engaged in subsistence farming. Although agricultural and forestry products from the area have a good reputation and enjoy potential comparative advantages, production remains at, or just above, subsistence level and agro processing is almost non-existent. Less than 32% of dwellings have internal water access. Electricity connections are unavailable in many rural Communes; electricity supply is rationed in several rural areas to evenings and early mornings. Rural roads, irrigation systems, educational and health facilities are in state of disrepair.

Environment has been degraded through deforestation for heating and cooking and through toxic waste from an industrial past, without any implementation of policies for environment rehabilitation and protection in the most polluted areas.

Regarding RE sector, due to lack of incentive policies on use of renewable energies and lack or weak implementation of legislation regarding protection of environment against pollution through agriculture production, farmers are not investing in proper manure management.

The promoter of the Green Energy Park (GEP) is the Qendra e Transferimit te Teknologjive Bujqesore – Shkoder - QTTB *(*Center for Technology Transfer in Agriculture - Shkoder - CTTA). GEP creation started in 2012 and it is still in its initial stage, it is implementing now the feasibility study, installation of first pilot facilities and selection of operator for Renewable Energy Desk at the CTTA - Shkoder.

The idea of Technology Park for Renewable Energy throughout the territory (GEP), designed and developed by Center for Technology Transfer (CTTA) - Shkoder, consists in creating a network of institutions and private entities that promote and enhance the use of renewable energy sources in agriculture, agri-food and tourist centers in Northern Albania.

There are many innovative components in this project, starting with those directly linked with the exploitation of renewable energy. Social awareness and understanding of environmental and economic issues related to renewable energy use that Albanian population and institutions will gain thanks to this project, will represent a huge step forward for the whole country. Thus, the major stakeholders will share the idea, currently present only in an embryonic stage, of the importance of the respect for the environment and its preservation through the use of renewable energy, and will be aware that every action aimed at environment protection will surely have positive effects on the country economy in terms of costs and savings.

Moreover, the various training programs for the personnel who will be working at various levels within the GEP, will contribute to the creation of new professional figures, that is, a group of experts in the field of renewable energy, a completely new figure in the Albanian job landscape.

In addition to the possibilities and advantages directly linked to GEP project, there are numerous positive effects that arise as consequences: cooperation between public and private Albanians, and collaboration with organizations and Italian experts, in addition of being a highly innovative element for the Albanian context (traditionally closed and characterized by a high respect for hierarchies and roles, resulting in almost a total absence of communication between different economic, political and social partners), forms the basis, on one hand, for a profitable exchange of knowledge, and on the other hand, paves the way for future collaborations, outside of this project. In fact, in addition to being necessary for the success of the project, the creation and development of these partnerships is an opportunity for stakeholders to create a network of relationships and contacts.

In this way the ties among the Albanian institutions and private individuals are then strengthened - or even new ones are created - an element that represents an important step for the future development of the region and the country; furthermore, thanks to the collaboration with Italian experts and organizations, a rapid adaptation to European standards is possible for Albanians, on the road to a greater inclusion of Albania in the European context. There are no similar projects in other parts of the world; in fact, this particular combination of partners and activities represents a total worldwide innovation in the field of renewable energy.

WHAT PROBLEM DOES IT SOLVE

The lack of additional income for farmers and tourist initiatives in rural areas and the need for energy supply in the most remote areas in Northern Albania that people face nowadays is going to be addressed by the creation of the Green Energy Park, providing concrete examples and information about available technologies.

The dependence of power production of Albania from traditional fossil resources, tradition biomass non-renewable sources (as forest wood) and hydro-power, very dependant from the climate situation (with variation of 50% of electricity production from year to year, due to rain fall variations) makes the life of farmers and small entrepreneurs in rural areas quite difficult.

The tables below show the relevance of hydro-energy and wood in the energy production of Albania. The climate change puts a serious question about the reliability of this source for the future, and the continuous impoverishment of local forest creates a risk for the environmental equilibrium of the entire Northern Albania.

Table 4: Production and share of renewable energy in total energy demand (TJ: Tera Joule)

	2000	2001	2002	2003	2004	2005*	2006	2007
Total energy demand	76379	80957	77914	86068	94550		90253	89217
Supply by RE								
- biofuel, annual								
- biofuel, wood	12740	12435	12435	9588	11242		9630	9002
- wind								
- solar		150	150	150	150		96	264
- hydroenergy	19335	15437	15282	20390	22634		19887	10718
Share (%)								
- biofuel, annual								
- biofuel, wood	16.68	15.36	15.96	11.14	11.89		10.67	10.09
- wind								
- solar		0.19	0.19	0.17	0.16		0.11	0.30
hydro energy (as percentage on the total energy supply)	25.32	19.06	19.61	23.70	23.94		22.03	12.02

Source: www.data.un.org
*Note: Data for 2005 are not available

Table 5: Production and share of renewable energy in total electricity demand (TJ)

	2000	2001	2002	2003	2004	2005	2006	2007
Total electricity demand	19336	15437	15282	20390	22633	0	22064	20545
Absolute supply of RE for electricity	14940	8885	7495	15919	20916	18259	19886	10717
Share (%)	77.3%	57.6%	49.0%	78.1%	92.4%		90.1%	52.2%

Source: National Agency of Natural Resources

The diffusion of micro and small energy generations plants and installations in the rural areas through an innovative approach, mixing information awareness, training and education and the realization of demonstrative installations will have positive effects both on differentiation of energy production, the possibility for farmers and small business to get additional income and to provide solid and continuative energy supply with no additional costs.

Republic of Albania allocated a specific budget in order to implement some policy measures in the agro-food sector just in the two last years (2008-2009). Unfortunately none of these measures is directly or indirectly linked to renewable energy production and environment protection.

In addition, Albanian farmers are not aware of using renewable energy production as a means to increase farm income since they are facing big challenges in the transition period and they are mainly focused on corps production for food, often for self-consumption.

There is a lack of tradition and know-how by farmers and government institutions in Albania which should advise farmers with regard to introduction and utilization of agriculture products and the biomass for gaining energy and other relevant technologies based on RE to be applied in the agro-food sector. Unfortunately use of agriculture output as renewable energy recourse has not yet a good understanding and prioritisation by government institutions and the result is a lack of policies, expertise and investments in that field.

In addition, legal framework is not yet properly developed and approximated to the EU legislation in order to support the private initiative in producing those kinds of energies. Social and economic conditions of a large portion of inhabitants of the northern part of Albania (Regions of Lezhe, Shkoder and Kukes) remain difficult, due to lack of investments in rural areas, hard geographical conditions, underdevelopment of transport network.

The impact of the Green Energy Park

Production of energy from agriculture is not developed yet in Albania. Though agriculture production is one of the most important income sources for almost 50 % of the population, the present income from agriculture is constantly reducing and the market situation is not stable, due to saturation from imported goods. Therefore more and more farmers are seeking new income sources from the agriculture sector. Unfortunately, development activities directed to energy production from renewable resources directly or indirectly are still limited due to lack of know-how and scepticism.

In addition, for the first time private subjects, which have adopted these technologies and public bodies working in the field of education and technology transfer, join together with the aim of promoting and spreading the awareness about renewable energy resources (RES). The network established thus, which will have in the future the possibility to include universities and research centres working on RE, has a positive impact on development of the area where it is active (Northern Albania).

In particular the network will help systematize the available information related to technologies in RES, with the creation of different database for companies selling RES technologies, universities, research centres, experts, Incubators and Technology Parks and the establishment of a library on RES

This measure, which is going to be realized by the desk office for renewable energies within the CTTA, aims at solving the problem of availability of information about technologies related to RES and will foster the circulation of information in the area of intervention, spreading the awareness about the RE among farmers, companies and the general public, thus having a positive impact on circulation of ideas and providing the interested stakeholders with potential solution to the problem of energy production in rural and marginalized area.

The CTTA will form specialized human resources as installers, RE systems designers, through courses and seminars organized by Vocational Training Centre of Shkodra (VTC). Technicians trained in VTC will then be connected by the desk office for RE to interested individuals, farmers and companies, who would like to install RE technologies.

The CTTA will supply the market with highly specialized human resources and will allow a correct and efficient design and installation of selected technologies. The work of the desk office as mediator will also improve the possibilities of employment and self-employment for the people trained by VTC of Shkoder.

The installation of pilot RE production facilities in farms, greenhouses, agri-tourism and households will encourage common people to adopt new solutions for energy production from renewable sources, fostering environment protection, with a direct impact on farmers and common people living in the area of intervention and in particular:

- Creation of new jobs in rural areas;
- Use of local resources;
- Increase of supply provision for rural areas;
- Improving living conditions and environment for the economic development of the rural areas.

Sustainability of this innovative project is guaranteed in all fronts through the creation of a network involving several actors such as public institutions (CTTA and VTC of Shkoder) and private companies, promoting the use of renewable energy, guaranting a decrease of production costs, and promotion and dissemination of knowledge related to new technologies in the market among the people involved in the project.

An analysis about the problems that could undermine the project success both for the Albanian context and for any scenario outside Albania is necessary to be made each time: for example, in order to increase project effectiveness, it is necessary that legislation in the implementation country promotes the use of renewable energy sources strongly, thus facilitating the realization of a project such as the Technological Park GEP.

In addition, there must be a great involvement of all stakeholders whose participation is required in the project: local institutions, regional and national institutions, Universities and research centers, local businesses operating in the agro-food and tourism, all of them should be able and willing to cooperate in the project implementation. The actual involvement of these actors is a condition that, even if not necessary, of course it is highly desirable to ensure a positive impact of the project.

Thanks to these demonstration facilities constituting GEP, the environmental benefits arising from the use of renewable energies and the equally important economic benefits will be properly explained and promoted: from the environmental point of view it the use of non-renewable energy will be limited (particularly important especially for countries seeking rapid industrialization and economic growth, being generally linked to an increase in the consumption of fossil fuels), and from the economic point of view it will reach lower energy costs and a greater energy independence (particularly significant in the light of high fuel prices variation that affects the market).

TECHNOLOGY PARK IN PRACTICE

The implementation of the GEP is primarily based on an integrated approach that will enable the promotion and dissemination of renewable energy in agriculture, and tourism sectors, acting on:

- Training, by strengthening the CFP Shkoder.
- Information, by creating a desk dedicated to renewable energies that would allow the meeting between energy resources supply (represented by companies, research centers, universities, etc. ...) and the demand (farmers, businesses, local communities) and the creation of a network of facilities allowing interested people to get directly in touch with different types of available technologies.
- Billboard indicating each subject and each application in GEP.

GEP is also based on the network concept, that is, the capacity of institutions, small business and tourism sector to cooperate and collaborate with the aim to promote the use of renewable energy, both at a nationwide entrepreneurial and agricultural level, and at a local level.

GEP implementation, still in its initial phase, occurs through several steps, which take place simultaneously for reasons related to timing of various projects that support its implementation:

- Feasibility Study, which is necessary for a scientific validation of the approach and the adopted methodology and to promote the dissemination and application of the model in other areas of Albania and abroad.
- Opening of a renewable energy desk at the Centre for Transfer of Technology CTTA of Shkoder, capable of providing information to farmers, agribusiness and tourism sector operators and a wider generic audience on the main technologies available in the market, and at the same time to maintain updated the database of main actors (universities, research centers, companies, etc.) active in this field;
- Organizing courses on renewable energy (particularly solar thermal and photovoltaic) at the Professional Training Centre (CFP) - Shkoder, along with the supply of equipment for solar water heater (SWH) and photovoltaic's (PV) educational workshops;
- Installation of renewable energy demonstrative facilities at several small agribusiness and tourism facilities, located in North Albania, covering a wider possible range of technologies available in the market at present.

Demonstration centers

Demonstration centers, linked to the Renewable Energy Desk at the CTTA of Shkodër, will achieve these goals:

- Raising the awareness of the general public, businesses, farmers, and other specific categories with regard to renewable energy applications in various sectors, among which particular attention will be reserved for the applications in agricultural and touristic sectors;
- Providing information on existing installation in the area (functioning, benefits, costs, etc.) and on the companies that produce them;
- Creation of a network of contacts with companies, universities, research centers, institutions and other relevant stakeholders to enable the diffusion and the improvement of the network on the territory;
- Promotion of demonstrative initiative in the Northern Albania area and potentially in other areas of Albania.

Permanent desk

Permanent Desk plays a vital role inside Technology Park project for transfer of technology and skills, diffusion and promotion of renewable energy use in agriculture, agri-food and rural tourism sectors in Northern Albania and in a national level. The Desk has the following tasks:

- To inform stakeholders about renewable energies and technologies available in the market and the present realized installation. This activity is supported by a collection of documents presenting national and international applications in agricultural and tourist sectors;
- To help stakeholders get in contact with companies and other entities that develop and market equipment and systems powered by renewable energy. This activity is supported by a database, accessible, in the first stage, only by the Desk operator and, in a later stage, through the web.
- To create a network of relationships and contacts with universities, research centers, companies, Italian and Albanian institutions involved in the development, design, marketing and promotion of systems and equipment powered by renewable energy.

This network should include people who share knowledge and interests and who agree to work in a logic cluster.

- To organize training courses and informational and awareness-raising events regarding the use of renewable energy sources, organized both by Desk staff and by GEP members.
- To define Technology Park functioning and to manage its formalization; to create management and coordination bodies.

RESULTS

With regard to demonstrative installations, a brief description is given below of some facilities partially identified according to the local needs and context:

Installation at the Center for Technology Transfer in Agriculture of Shkoder

The Center for Technology Transfer of Shkoder is developing, with the support of the Dutch NGO, SNV, a greenhouse of 2,000 square meters, for cultivation of a variety of native sage. The Center for Technology Transfer of Shkodra has proposed installation in the greenhouse of:

- photovoltaic panel for the water pump energy supply for the irrigation system of the greenhouse;
- Solar Panels for Greenhouse Lighting.

Installation at the Professional Training Center of Laboratories

Activities related to professional training for the SWH and PV are already realized in the Professional Training Centre (PTC). These activities are essential for ensuring the maintenance of equipment installed in any facility included in the Technology Park. Currently, CFP has incomplete equipment in its laboratory (especially the laboratory on SWH) and needs to create the PV laboratory from scratch. Therefore, installation of the following equipment is expected: Missing equipment for SWH and Photovoltaic Laboratory PV.

Installation at Mrizi i Zanave agritourism

The restaurant-agritourism Mrizi i Zanave represents an excellent sounding board for Technology Park activities and therefore constitutes a point where to display some applications, and where to promote the other demonstrative centers of the Park.

Since the project implementation is still in its early stages, it is impossible at this time to carry out an impact assessment for the project. However, it is possible to evaluate the impact of the project idea, of its aims and its methodologies: these have indeed received many praises, by all stakeholders at all levels: institutional representatives, partners and companies have all expressed great interest in this project. This makes it possible to envisage a further development and extension of Technology Park, with the involvement of other companies to be employed as demonstration centers, and the increase in number – and type – of installed facilities (e.g. exploiting wind and waterstream).

Planned activities

Therefore, a SWH solar water heating system-guided through the rooms of the bed & breakfast currently under construction, a SWH guided system for the restaurant, and a composite photovoltaic and micro-wind device to power the exterior lighting system will be installed. The planned intervention foresaw also the implemention of micro-biogas facilities and photovoltaic systems.

- **Installation at the AMT Laboratory of Agribusiness Center of Puke.** AMT Agribusiness Center will be equipped with a SWH system to supply the room for drying herbs and mushrooms and a photovoltaic system energy supply to the equipment for production of traditional products. A micro-biogas device for pig shed heating will also be designed and implemented.
- **Installation in Agro-Zadrima Cooperative, Cellar and Crusher Krajen.** An intervention of an application to biomass will be made in this company, which has large amounts of waste production from agricultural production. Keeping in mind that Zadrima Cooperative operates within the grounds of Krajen Mission where there is also a technical agriculture school, the system educational value, the possibility of access for the concerned would be assured.
- **Installation in Vivaldi Restaurant.** A heating system powered by a high efficiency stove (pellet stoves or similar) will be designed

- **Installation of micro-water system in Vermosh.** A micro-water plant for electricity production for business has already been created in B & B Vermosh.

- **Educational interventions.** Educational interventions will be carried out along with the installation through the creation of a specific course about technology in use, with the representatives of institutional and private actors involved in the GEP, which will allow the strengthening of the network and the capacity of various stakeholders to disseminate correct information with respect to the installed devices.

- **Informational interventions.** Activities will be promoted which will seek on the one hand to disseminate information about applications of Technology Park and on the other hand to promote the various subjects that are part of the network. In particular, the following activities will be carried out: National or Regional Conference on "Renewable and agriculture", with the participation of national, regional and local associations, agricultural and agro-food, tourism companies; Publication / brochure of the most important applications of renewable energy in agriculture and tourism sectors in GEP; Leaflet presenting GEP and Map of parties to GEP.

INTERNATIONAL INTERESTS

The initiative is promoted by Technology Transfer in Agriculture (CTTA) of Shkoder) – Ministry of Agriculture Vocational Training Centre (VTC) of Shkoder and supported by NGO Centro Laici Italiani per le Missioni-CeLIM, which activities were coordinated by Filippo Unterhofer.

The supporting activities offered by CeLIM NGO were focused on providing concrete example of different technologies for energy production from renewable sources in agricultural and tourist sector as biomass, photovoltaic, solar water heating, micro-hydro and micro-wind, giving farmers, companies and the general public, the possibility to watch directly how these technologies operate. A feasibility study of GEP that allows the transferability of this experience to other areas of the country and outside it was supported by NGO Ingegnaria per lo Sviluppo-ISF Milano. The design and creation of Technology Park on the gound is achieved by the expertise of CTTA of Shkoder in the food and agriculture sector with the support of Ingegneria Senza Frontiere Milano (ISF).

For the analysis of future perspectives, CeLIM NGO under the coordination of Filippo Unterhofer is working closely with Engineers Without Borders (EWB) for the identification of possible demonstration centers and the most appropriate technologies to be used.

In particular, the following Albanian parties involved in GEP are:

- Center for Technology Transfer in Agriculture of Shkoder
- Albanian private companies with a social and/or economic impact on local communities (Agrofood center AMT in Puke, Cooperative Agro-Zadrima and Agriturism Mrizi i Zanave in Zadrima area, Restaurant Vivaldi in Shkoder, etc…)
- Professional Training Centre of Scutari (CFP)

CONTACTS

The author is available to provide technical support and innovation transfer to the interested countries. In order to establish collaborations, contact:

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