

**“Integrating and strengthening the European Research Area,
Specific Measures in support of International Cooperation (INCO)”**



**“Rural Sustainable Development through Integration of
Renewable Energy Technologies in Poor European Regions”**



RES INTEGRATION



**Work Package 4:
SOCIO-ECONOMIC IMPACT
ASSESSMENT**





FP6-509204

RES - INTEGRATION

Work Package 4:

SOCIO-ECONOMIC IMPACT ASSESSMENT

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Skopje, August 2007

INTRODUCTION

There have been many approaches to community development programs applied by governments and companies in the energy sectors, with results ranging from outstanding successes to prominent failures. Community development itself reflects a focus on an improved quality of life, including cultural and social economic conditions, social welfare, sustainable social transformation, and human life competency.

Work in social responsibility issues represents a new area of human development, beyond what is normally considered as essential obligation of any development activity. Because the system only works if most people in a community, region or country are imbued in the philosophy, and empowered to take action, much of the success depends on the results of debate and discussion - internally among peers and with outsiders - to build a consensus around the actions to be taken. Positive results can be expected only if having precise and detailed answers to the locally conditioned questions.

There is a growing global tendency to apply policies of corporate responsibility emanating from the boardrooms, with an emphasis that it is not possible to have long-term success of large development actions if a country (region, municipality) abdicates its social responsibility. In short words said: To have success in a long term development strategy for development implementation, it is imperative that the one who is responsible for it hold their products and processes to ethical standards that integrate its procedures, and that he tries to respond to the demands of the social agents that they affect, or that affect them.

Social responsibility can be interpreted as an ethical-social imperative present in each and every one of the developer's transactions with the different social agents it comes in contact with. It is in these interrelations that a series of moral rights and duties exist, that define the scope of the social responsibility.

Certainly working within an ethical framework will reduce conflict with and among the stakeholders, and thus will reduce tensions and time delays which impact RES projects, especially in regions where RES developments are much needed. However, it should not be misconstrued that having a social responsibility policy and working consciously to implement it will eliminate all inconveniences, as much opposition to project composition or practices come from external interests, entirely out of the reach of the performer(s).

Beside all above said, however, it can be followed that in the RES literature not so much has been mentioned about this topic, aside from certain "enthusiasts and commercials", trying to propagate positive aspects of one or more RES implementation in concrete environment. Much has been mentioned by them about the fact that RES project produce few greenhouse gas emissions, in comparison to fossil fuels, and that it is a versatile renewable energy source that is among the cleanest of the commercially viable technologies available today. If one add to this the fact that RES developers complies with legal requirements, provides employment, one may even have the idea that just about any RES development can and will surpass ethical standards for social and environmental responsibility. In reality, however, many RES projects face strong opposition from politicians, neighbouring communities or environmental pressure groups, which would indicate that either the social and environmental impacts are more significant than is generally accepted, or some concerns of stakeholders have not been properly addressed, or both.

Taking into account that social aspects, and between them the positive economy, of proposed project implies different dimensions of life in a community, a trial is made to identify and systemize them, to evaluate influence of proposed projects and IRES schemes to their present balance, to underline the positive effects but also the (eventual) negative ones. Having this "tool" in hands, future developers can easier face appearance of eventual opposition and reaching the necessary positive consensus.

Results of the working package are particularly interesting because studying communities with completely different cultural and economic background and at very different level of development.

1. LOCATIONS



Fig.1. Location of RES INTEGRATION regions in Europe

Location of the RES INTEGRATION regions is in 6 European countries, with completely different geographical, social and economic surrounding, level of development and living standard conditions. Common for all of them is that being less developed in comparison with the other regions in own country, that having on disposal good pre-conditions for wider introduction of RES in different life sectors and local political consensus for support of it.

During the RES INTEGRATION project realization series of activities have been performed in order to collect all relevant data and information for composition of most adequate strategies for local RES development, with a full support of the local municipalities. Social aspect have been particularly carefully investigated in order to ensure full support also of the majority of inhabitants, future benefitors of the strategy realization.

1.1. ALBANIA

Project location is in the “Bregu” region or “Riviera” region. Bregu region is situated in south – western of Albania at a hilly and mountainous surface and it is a coastal land washed by the Ionian Sea. Area of the region is about 345 km².



Fig.1.1.1. Location of the region in Albania.



Fig.1.1.2. Map of the region

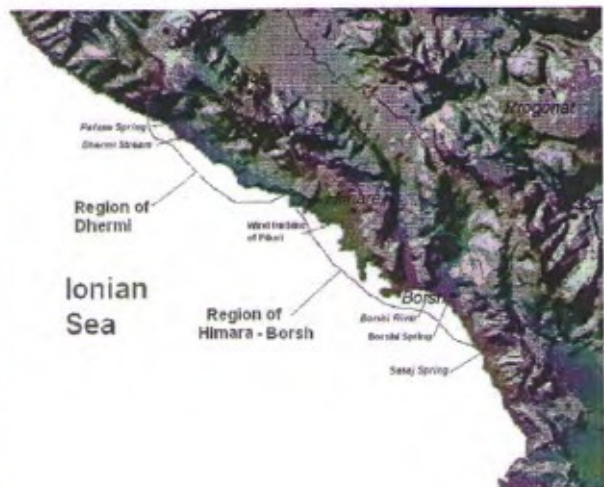
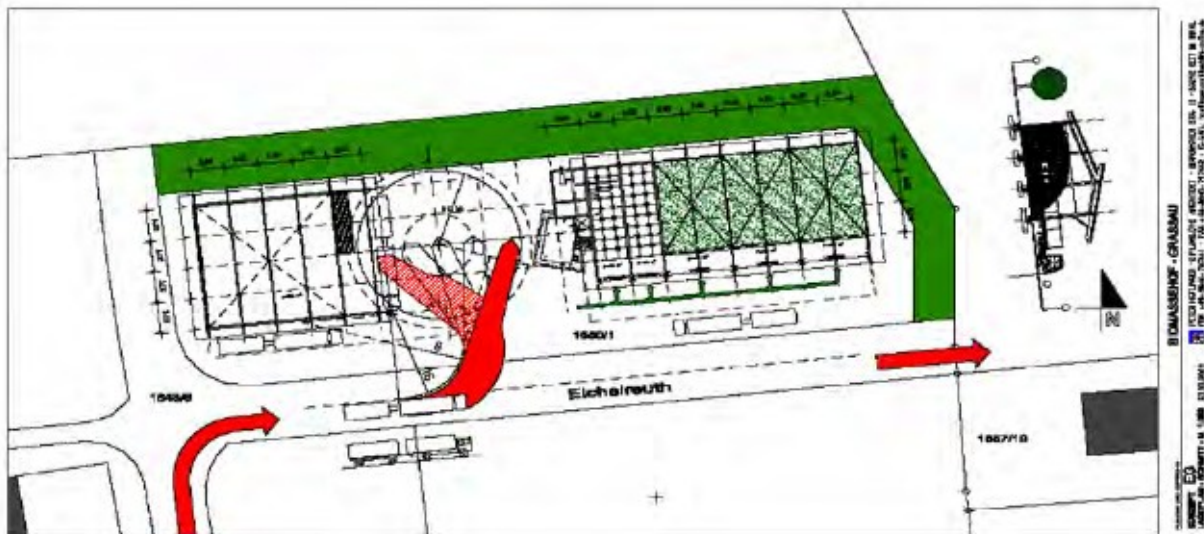


Fig.1.1.3. Locations of planned projects

1.2. GERMANY



Fig.1.2.1. Location of the region in Germany and view of the area of Achenal valley



Fif.1.2.2. Architectural plan of the plant

The BM Centre Achenal will be established in the Industrial Park of Markt Grassau in the Achenal valley in Chiemgau, Germany. Markt Grassau is the biggest and most centrally located municipality in the region. 4.500m² of land will be leased for the BM Centre. The site will also enable future extension of the project to a wood chips district heating plant. The figure above shows the architectural plan of the site.

The region already has positive experiences with RES introduction in different life sectors. A small district heating system based on the use of wood chips increased a lot the positive public acceptance. It already reached the state that municipality intent to make the region fully energetically selfsufficient in order to enable further development of the already developed tourism economy sector, based on clean and healthy environment.

1.3. GREECE



The project is located in Milos one of the Cyclades complex islands, in the middle of Aegean Sea. The surface of Milos island is 151 km², with a coastal area of 126 km. Milos is a hilly – mountainous island, with highest altitude at 751m.

The economy of the island is based both on the fossil wealth and on tourism. Agriculture is stably diminishing because of the lack of water and the abandonment by the farmers.

The history of Milos is very rich. The first village was founded in 2300 BC and from that period Milos had shown a growing activity and a civilization development up to the Roman and Byzantine period and finally the Venetian and Turkish occupation.

Climatic conditions are characterized by mild winter and moderate temperatures during the summer. Precipitation in the island is limited to 300 mm/year. Permanent inhabitants are 4771, but during the summer population is 4 times higher.

1.4. ITALY

Mountain Community of Lamina, Italy



Figure 1: Italy, Calabria region and the selected area in the red circle.



Figure 2: the selected area in the red circle.

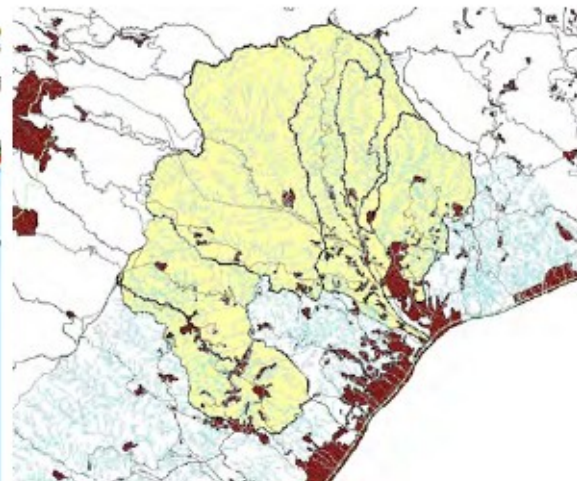


Figure 3: the municipalities of the selected area in yellow (urban areas in red)

Mountain community of Lamina, located in the South part of Calabria, can be a model for wider introduction of RES for the needs of animal husbandry, milk production and processing, different uses for tourism purposes and for increasing the local life conditions.

1.5. FYROM

Project location is in the part of Strumica valley, at the South/East part of the Republic of FYROM. The Podbelasica region is composed of the ex-municipalities of Murtino and Kuklish, presently part of the new Strumica municipality. Project consists of 5 sub-projects with different locations at the territory of the region.



Fig.1.5.1. Location of the region in the Republic of FYROM

1.5.1. 2 new geothermal boreholes completion, reconstruction and modernization of Bansko geothermal district heating system

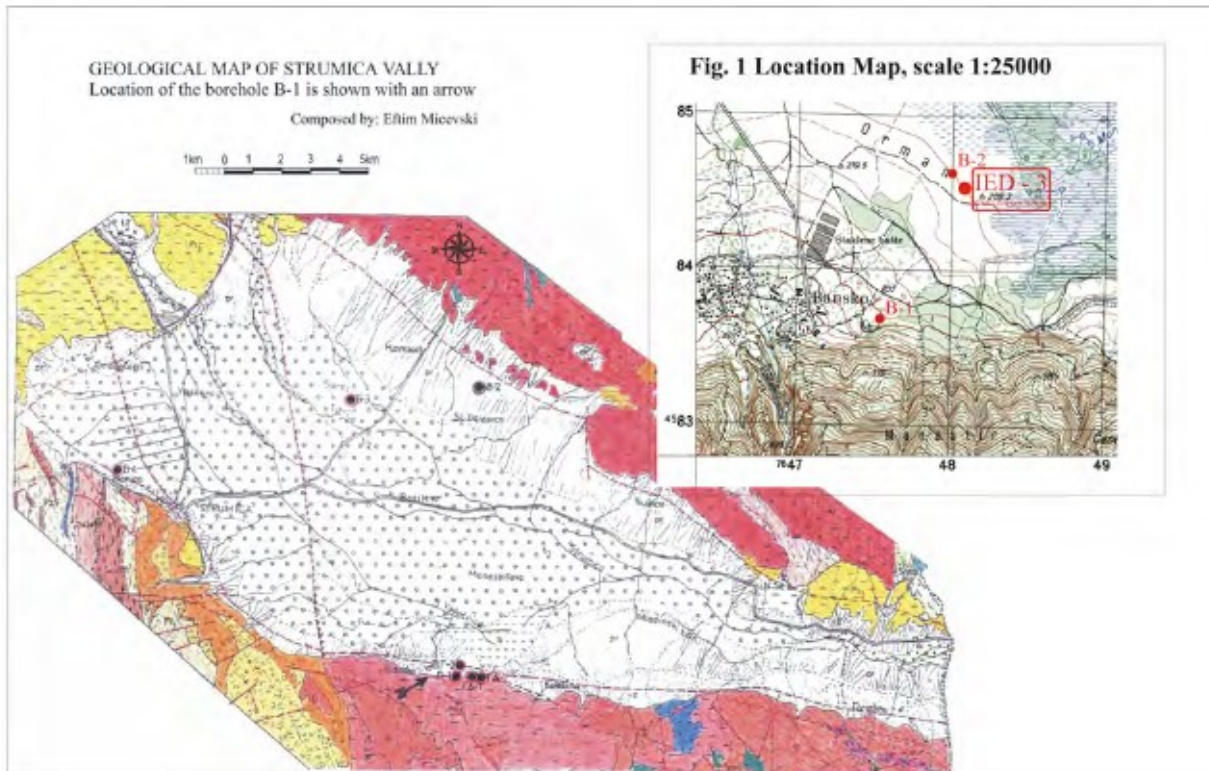


Fig.1.5.2. Geological map of Strumica valley, location of Bansko and 2 new geothermal boreholes

1.5.2. 2 plants for briquetting the wood residues

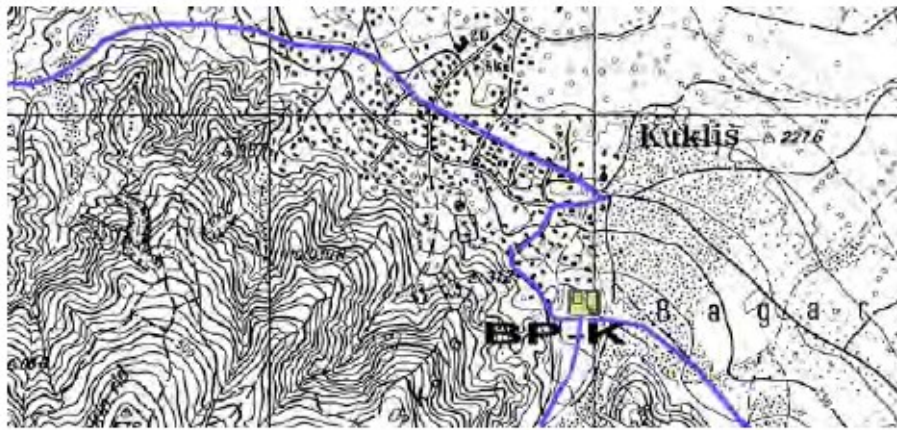


Fig.1.5.3. Location of the Kuklish briquetting plant



Fig.1.5.4. Location of the Murtino briquetting plant

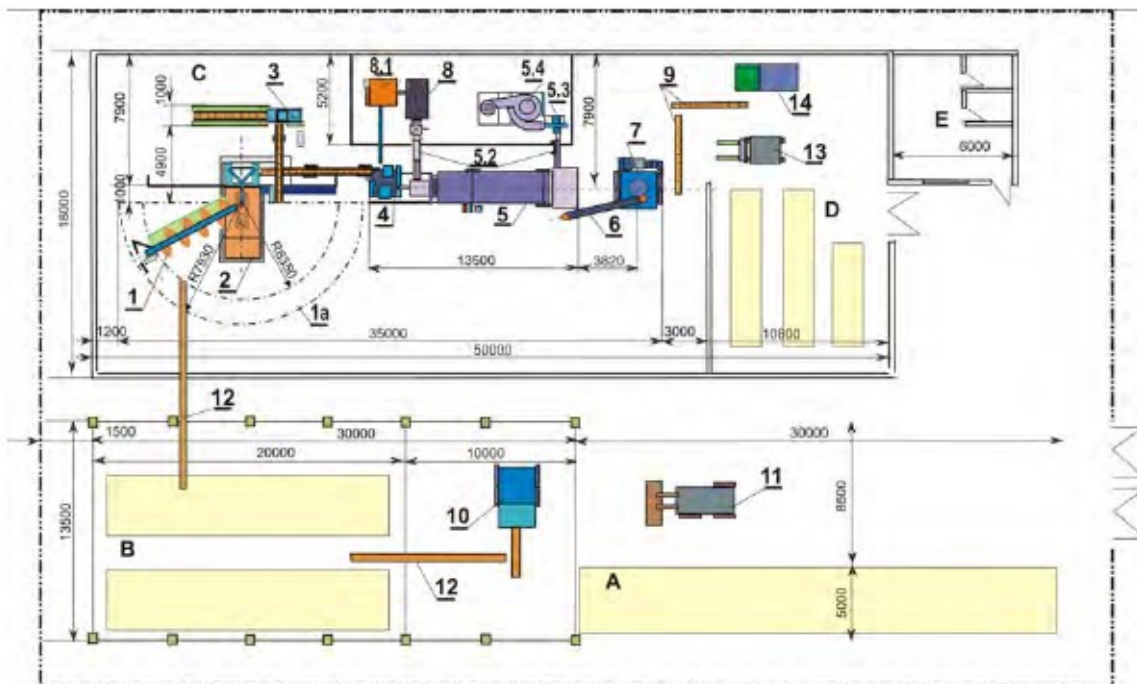


Fig.1.5.5. Architectural view on the Kuklish and Murtino briquetting plants

1.5.3. Biodiesel production plant



Fig.1.5.6. Location of biodiesel plant in Murtino

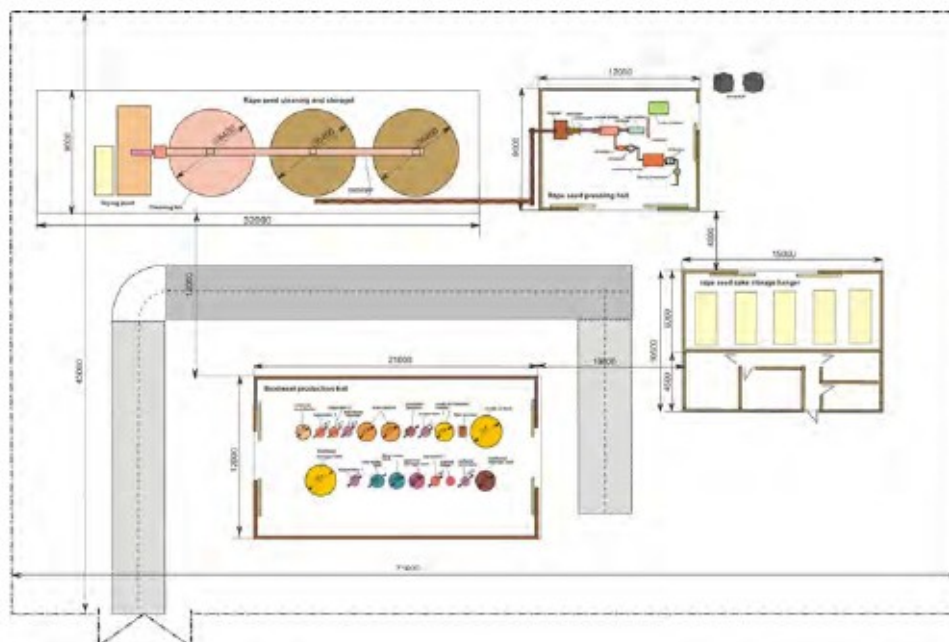


Fig.1.5.7. Architectural view of the biodiesel plant in Murtino

1.5.4. Development of a water supply system for 1.320 ha of land in the lower part of the region for production of oil plants



Fig.1.5.8. Location of the area for production of oil plants

1.6. SERBIA

Village region of Kragujevac is located in the central Serbia. The region is approximately around 120 km south of Belgrade. This is part of border region called Sumadija or in English "Forest region", because in the past the region was almost 100% under forest of oak. Then, the region was largely inhabited during independent Serbian state in 15 century and after Turk occupation it was unpopulated. In 17-19 century, the region lost lot of forest due to new habitation in an effort to obtain cultivable areas and settlements. So today, the region has small amount of forest and high amount of cultivable land.

- size (ha) 77067ha
- max altitude = 1132m; min altitude = 166m
- With its fertile lowland, low hills, cultivated orchards.
- Village region is an ideal oasis for holiday and recreation, fishery and hunting
- There are numerous cultural and historical monuments.



Fig.1.6.1. Location of the region in the Republic of Serbia

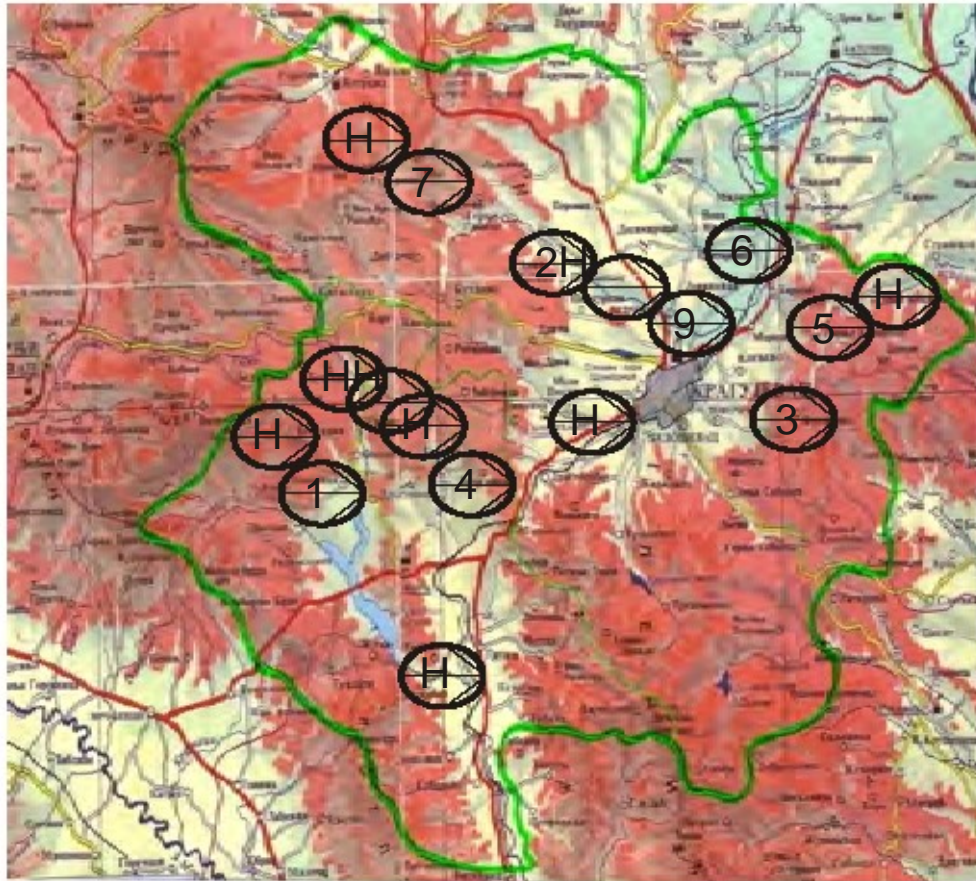


Fig. 1.6.2. Region of Kragujevac and Knin in Serbia with location of projects inside the regions: 1. Production of rapeseed, 2 Production of energy-for-combustion crops, 3 Collection of forest residues, 4 Production of biodiesel, 5 Production of wood chips and pellets, 6. Production of electricity by biogas, 7. Production of electricity by biomass, H. Production of electricity by hydro 9. Production of heat by co-combustion of biomass and coal

2. PROJECTS

2.1. ALBANIA

2.1.1. 3 small hydro power plants.

2.1.2. Installation of wind turbines.

2.1.3. Installation of solar collectors for warm tap water preparation.

2.2. GERMANY

Establishment of the municipal biomass centre Biomassehof Achental / Biomass Centre Achental, as service provider for energy woods, will fulfil the following functions:

- Purchase of biomass and production of wood chips and wood pellets,
- Drying, logistic and storage of delivered biomass material,
- Collection and utilization of municipal and private waste wood (including landscape preservation waste wood),
- Long-term supply of private and municipal biomass boilers in the region,
- Distribution of special biomass segments like 'Scheitholz IL',
- Setup of a common distribution line for premium – biomass products,
- Public relations and information.

2.3. GREECE

The projects are separated in 1st scenario of prompt application and 2nd scenario of long term potential application. Socio-economic impact assessment will be implemented for only prompt application. The projects are listed in the following table :

RES	1st scenario of prompt application	2nd scenario of long term potential application
Geothermal Energy	Hotels climatization (Heating cooling) and hot water procurement	1) Climatization of Hotels, public buildings and residences of the two main villages 2) Desalination with R.O Rankine Cycle for places outside the two main villages 3) Heating of fish framings
Wind Energy	Production of electricity for PPC: 4 wing turbines x 600 kW=2400 kW and Desalination sea water in a capaciting 2000 m ³ /h)	1) Electricity production for PPC 2400 KW 2) R.O. Desalination Capacity 4000 m ³ /day 3) Electricity production for the local industry own needs 1x600 kW 4) Hydrogen production' 5) Water Pumping – storing – electricity production connection
Solar Energy	1) Expansion of the already installed units for sanitary hot water 2) P.V. for stand alone settlements, residences, cafes etc. Lighting and cooling 3) Thermal desalination with R.O Rankine cycle for stand alone applications in distance from the 2 main villages	Same as 1st scenario
Biomass	1) Recycling of municipal solid wastes and compost production 2) Used- oil collection and treatment for use into municipal diesel vehicles 3) Liquid wastes aerobical treatment and water recycling for irrigation	1) Recycling + compost 2) Reuse of oil for transport 3) PPO production for vehicles 4) Agricultural residues for Pellets and compost

Development and completion of 5 projets is planned in Milos – the already installed plants will not be evaluated. For the socio-economic impact assessment the following has been selected:

- 2.1. 2 new geothermal boreholes completion for Hotel cooling in Adamas, port of Milos
- 2.2. P.V. for stand alone settlements, residences, cafes etc. Lighting and cooling. Western part of Milos
- 2.3. Thermal desalination with R.O Rankine cycle for stand alone applications.

2.4. ITALY

The implementation of several renewable energy technologies in the community.

2.5. FYROM

Development and completion of 5 projects is planned in Fyrom:

- 2.5.1. 2 new geothermal boreholes completion, reconstruction and modernization of the Banskó geothermal district heating system
- 2.5.2. 2 plants for briquetting the wood residues
- 2.5.3. Plant for biodiesel production
- 2.5.4. Development of a water supply system for 1.320 ha of land in the lower part of the region
- 2.5.5. Installation of 650 solar completes for warm tap water preparation

2.6. SERBIA

Development and completion of 10 projects is planned in Serbia:

- 2.6.1 Production of rapeseed (region Toponice in Knic)
- 2.6.2 Production of energy-for-combustion crops (region Luznica-Uglesnice in Kragujevac)
- 2.6.3 Collection of forest residues (region Bukurovca i Crnog Vrha-Kragujevac)
- 2.6.4 Production of biodiesel (Region Vuckovice- Knic)
- 2.6.5 Production of wood chips and pellets (Komarica –nord-east part of Kragujevac region),
- 2.6.6 Production of electricity by biogas (region of Cvetojevac-north part of Kragujevac region),
- 2.6.7 Production of electricity by biomass (Stragari-north west part of Kragujevac region),
- 2.6.8 Production of electricity by hydro (different spots in Kragujevac and Knic regions)
- 2.6.9 Production of heat by co-combustion of biomass and coal (near City of Kragujevac),
- 2.6.10 Demonstration of advantages of solar energy in the village municipalities

2.7. COMMON ELEMENTS

It's evident that the approach to definition of an IRES for concrete region has been absolutely influenced by the locally influencing factors.

In Albania, that's the present very bad situation with energy supply in all the country and particularly in the rural regions. Proposed IRES should improve the local situations with electricity supply and conditions for tourism development by improving the quality of like conditions with wide introduction of sanitary warm water preparation by use of independent solar water collectors completes.

In Greece, that's the problem of opening new better conditions for tourism development by secure energy supply for improving the quality of offer of the existing and new tourist projects, desalinization of sea water and protected crop cultivation of vegetables and flowers. Introduction of geothermal energy should enable also opening of a new all year around offer, i.e. balneology.

In Germany, already established wide participation of RES in covering the local energy balance. An IRES scheme enabling future energy supply independence of the municipality should be a good demonstration example not only for Germany but for whole Europe.

In Italy, proposed scheme should support the implementation of a wider strategy of development for the isolated poorer region of Italy, with good chances for agricultural and tourist development.

In Fyrom, unemployment is the main economy problem of the country, resulting with high rate of emigration, particularly from the Eastern poor rural communities. Chosen IRES offer important increase of employment in the community and export of energy materials (wooden briquettes and pellets and bio-diesel).

In Serbia, similar problems like in Fyrom influenced composition of an IRES offering better employment possibilities for the rural region in question and significant improving the life conditions and possibilities for several economy sectors development.

Evidently, social aspects of all the proposed IRES schemes are paramount importance and should strongly support their implementation.

3. PRODUCTS

3.1. ALBANIA

3.1.1. Small Hydro Energy.

3 new Small Hydro Power Plants with the total capacity of 1 MW.

3.1.2. Wind energy

There will be installed the wind turbines with the total capacity of 1 MW.

3.1.3. Solar Thermal Energy.

There will be installed the solar thermal completes with the total capacity of 0.9 MW

3.2. GERMANY

3.2.1. A wood chips production centre of 8.000 t/yr

3.3. GREECE

3.3.1. Geothermal Energy

3 new geothermal boreholes of a total capacity of 1,800.00 Mwh/year to cover the energy requirements for the climatization of 25 Small Hotels in Adamas village and Hot water procurement

3.3.2. Wind Energy

Installation of a 4th wind turbine of 850 kW to cover the electricity needs for the R.O desalination unit of a capacity of 2000 m³/day. The 4 wind turbines of a total capacity of 2400 kW will continue to feed the P.P.C network with 8650 MWh/year electricity for general purposes of the island and the desalination of 2,000 m³/day

3.3.3. Solar Energy

a) Solar thermal

a1) Expansion of the 1100 units by 20% to cover all the sanitary water requirements of the houses in the island.

a2) Rankine cycle R.O units for desalination of water in places out of the water network of the 2 main settlements (Adamas and Plaka)

That kind of desalination water will be used also for irrigation in small farms (vegetables arboriculture and animal units)

b) P.V. Units for electricity for stand alone places, Cafes-bars, restaurants, residences and public lighting in small settlements, out of the P.P.C. networks for lighting, and cooling of water and other products.

3.3.4. Biomass

1) Collection and in the source separation of solids to be used for recycling (metals, glasses etc.), for compost preparation and R.D.F. for direct combustion

2) Collection and mechanical treatment of used plant oils for the municipal diesel cars (in mixture with diesel from 0% to 20%)

3) Aerobical treatment of liquid municipal wastes (under installation) and reuse of effluents for irrigation and the Sludges will be mixed with the compost from the Municipal Solid Wastes.

3.4. ITALY

3.4.1. Three centralized PV power plants

3.4.2. Decentralized PV network over roof-tops

3.4.3. Solar thermal hot water heater roof-top installations

3.5. FYROM

3.5.1. Geothermal energy

2 new geothermal boreholes, one with capacity of 60 l/s and temperature of 70-80 °C, and one of 70 l/s and temperature of 80-120°C is planned. That is more than tripling the existing borehole capacity of 55 l/s and temperature of 70 °C. Also reconstruction and modernization of the existing geothermal district heating Bansko is planned.

3.5.2. Briquettes and pellets of wood residues

Based on the local wood economy from forests on the belasics mountain, collection of the waste wood is planned and then its briquetting for local and foreign market supply. Capacity of the briquetting unit in Murtino is 786,7 t/yr and in Kuklish 2.290 t/yr as raw material and 685 t/yr and 1.955 t/yr as final product.

3.5.3. Biodiesel production

Based on the planned production of 663.300 kg/yr soybean and 858.000 kg/yr oil beet, completion of a biodiesel production plant with capacity of 485.000 kg/yr biodiesel is planned.

3.5.4. Organization of production of oil plants

Completion of 56 boreholes is planned, enabling to cover the area with a regular network for water supply. Initially, pumping by diesel or electricity driven pumps is planned. After the completion of the biodiesel production plant, all the pumps shall be driven by biodiesel mixture. Project should enable organization of production of oil plants for production of biodiesel.

3.5.5. Wider introduction of solar heaters

Organized installation of 650 completes should enable a significant increase of the living facilities standard in the region and should open the door for further development, either in public buildings or residences.

3.6. SERBIA

3.6.1. Organization of production of oil rapeseed with crop rotation on 3000 ha;

Organization of collection and processing the oil rapeseed;

3.6.2. Organization of production of giant reed on 5000 ha;

Organization of collection and processing the giant reed for energy;

3.6.3. Organization of collection of forest's residues;

3.6.4. Completion of a biodiesel production plant for 450-500 t/yr with possibilities to increase the production to 1.000 t/yr with minimal additional financial investments.

3.6.5. Completion of two plants for production of wood chips and pellets

3.6.6. Reconstruction of existing 200 kW power plant to work with biogas.

3.6.7. Construction of one biomass power plant of 1 MW.

3.6.8. Construction of 10 small hydro plants with 3 MW of power.

3.6.9. Construction of one boiler for combustion of the mixture of 90% of coal and 10 % of biomass. Power of boiler is 300 kW

3.6.10. Completion of 2000 solar water heaters in order to demonstrate the economy advantages in comparison with the present use of electricity for sanitary warm water preparation.

3.7. COMMON ELEMENTS

Depending on the local conditions, a variety of RES projects is planned, consisting:

- Wider introduction of solar energy heaters for sanitary warm water preparation (Italy, Albania, Greece, Fyrom);
- Production of wooden chips, briquettes and pellets (Italy, Germany, Fyrom, Serbia);
- Production of biodiesel (Fyrom, Serbia);
- Small hydropower plants (Albania);
- Development of a geothermal district heating scheme (Fyrom);
- PV electricity production (Italy);
- Biogas production and use (Serbia).

Obviously, not only the energy reasons have been taken into account for the choice of local IRES. Job creation and improving the life conditions have been probably the most important element in all the West Balkan countries. In Greece it was the improvement of conditions for tourist sector development, in Italy intention to support the general strategy of the region development, and in Germany contribution to implementation of already accepted strategy to enable energy supply independent community. Also, careful approach to improving environmental life conditions can be noticed.

4. CAPACITIES

4.1. ALBANIA

- a) 4000 MWh/yr. from Small Hydro Power Plants.
- b) 350 MWh/yr. from Wind Turbines.
- c) 1100 MWh/yr. from Solar Thermal Completes.

4.2. GERMANY

The estimated yearly production capacity of the wood fuel products of the Biomass Centre are shown in the tables below and on next page. The production capacities are quoted in the following units:

Wood fuel	Unit
Wood pellets	tons (t)
Wood chips	tons of absolute dry substance (atro)
Split logs	solid cubic metre (sm ³)

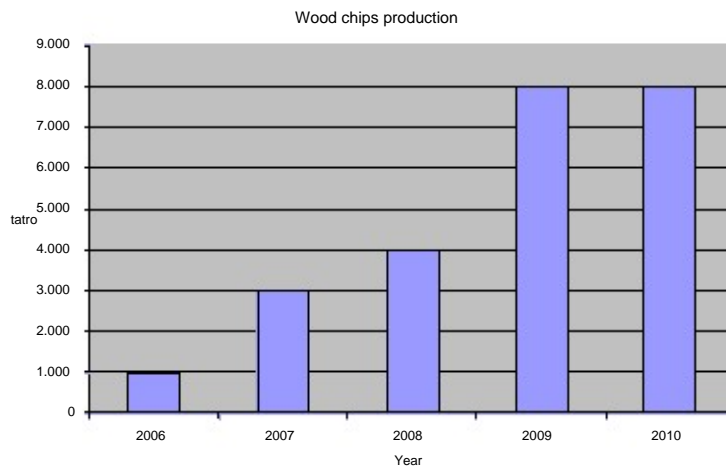


Figure 4.2.1. Yearly wood chips production capacity of the Biomass Centre Achental in tons

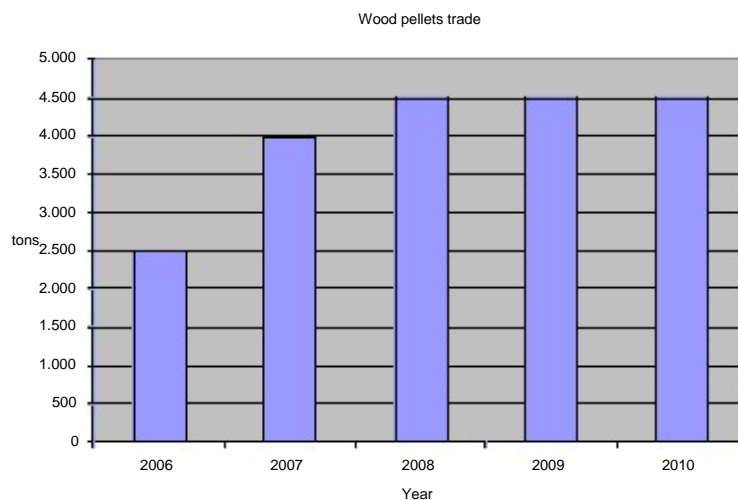


Figure 4.2.2. Yearly wood pellets trading capacity of the Biomass Centre Achental in tons

4.3. GREECE

4.1 Geothermal energy

Climatisation during 200 days/year of 25 hotels
 Hot water procurement to the hotels
 Total energy production: 1,800.00Mwh/year

4.2. Wind energy

Electricity production for the PPC network 4 wind turbines x 600kW = 2,400 Kw

Electricity consumption for desalination of sea water 6 kWh/m³ 2000 m³ fresh water / day

Total Electricity to the P.P.C grid = 4,540.00 MWh/year

4.3 Solar Energy

Expansion of the 1100 units by 20% to cover all the sanitary water requirements of the houses in the island.

R.O. Rankine cycle for desalination 100 units of 5 m³ fresh water / day

PV for electricity 20 stand alone units of 3kW peak each. Production of 4200 kWh electricity each.

4.4 Biomass

Compost 900 t/year

R.D.F 500 t/year

Used oil recycling 5 t/year

4.4. ITALY

- a) 3x1MW plants @ 1.488 MWh/year → 4.464 MWh/year
- b) 2.000 kW of distributed plants (500 kW of less than 3kWp, 200 kW of between 3 and 20 kWp, and 1.300 kW of between 50 and 200 kWp) → 2.976 MWh/year
- c) 1.000 roof-top installations (approx. 700 7m² systems for 9 person multi-home, and 300 3m² systems for 4 person single home)

4.5. FYROM

- a) 15.000 MWh/yr (32.000 MWh/yr)
- b) 2.600 t/yr briquettes and pellets
- c) 500 t/yr biodiesel
- d) 6500 solar water heaters introduction

4.6. SERBIA

- 3.6.1. 3000 t of oil;
- 3.6.2. 125000 t of giant reed;
- 4.6.4. 450-500 t/yr of a biodiesel
- 4.6.5. 4800 t of wood chips
- 4.6.6. 0.4 MW of electricity
- 4.6.7. 0.6 MW of electricity
- 4.6.8. 0.4 MW of electricity
- 4.6.9. 6 MW of heat
- 4.6.10. 2000 solar water heaters

4.7. COMMON ELEMENTS

Two different approaches can be noticed, when capacities of the planned plants are in question:

- Intention to generally improve the situation with energy supply of the community (Albania, Germany, Greece, Italy);
- Intention to improve the poor energy consumption of the rural region by introduction of local renewable energies production for local supply and for export (Fyrom, Serbia).

In general, capacities are quite small, which is understandable when taking into account that small communities (except in Serbia) are in question.

5. SUMMARY OF ECONOMIC BENEFITS

5.1. ALBANIA

- CONCESSION RIGHTS : none
- TAXES :none
- POSSIBILITIES FOR NEW INVESTMENTS:
 - a) Significant investments in tourist sector, connected to sea side (new hotels, recreation centre, re-habilitation centre, projects of tercial sector connected to tourism development)
 - b) Investments in agricultural and agroindustrial users of RES (new greenhouses, vegetable drying, etc.)
 - b) TERCIARY SECTOR (increased income): Renewal and further development of tourism, appearance of new jobs, presence of new investments, etc. shall stimulate development of tercial sector in the municipality (shops, restaurants, tourist agencies, local sea port, etc. There will be organized the cultural events for tourists.).
- ESTIMATION OF INFLUENCE TO THE TOTAL ECONOMY OF THE MUNICIPALITY :
Present employment structure in the BREGU REGION is very bad. Only less than 10% have permanent job, the others live from emigration, agriculture or temporal engagements. Realization of the planed strategy for development should dramatically change the situation, i.e.:
 - Tourism Development
 - Number of permanent jobs shall be increased
 - Agricultural producers shall have production of a product with guaranteed market, which means stabile income

5.2. GREECE

- CONCESSION RIGHTS: Future investors will be obliged to pay for concession rights for exploitation of geothermal energy.
- TAXES: none
- POSSIBILITIES FOR NEW INVESTMENTS:
 - a) Investments for RES
 - a1 Climatisation of Hotels, based on geothermal energy (total energy production ~ 1800 MWh/year)
 - a2. Investment for the installation of a new desalination unit of a capacity of 2000 m³/day fresh water, based on geothermal or wind energy. A desalination unit is already in operation of 2000 m³ fresh water/day capacity
 - b) Significant investments in tourist sector
 - b1. Tourism of all seasons
 - Thermalism (SPA)
 - Sea sport – Training center- Diving
 - Unprofessional fishing
 - Tourism of geological interest
 - b2. Increase of peak period tourism and qualitative enhancement of accommodations (~+50%)
 - c) Agricultural primary production
 - c1. Production of forages in two phases: 1st/2nd 250/750 ha
 - c2. Vineyards in two phases: 1st/2nd 100/200 ha
 - c3. Vegetables – Fruits in two phases: 1st/2nd 150/350 ha
(asparagus, melon, watermelon, strawberry etc.)
 - d) Husbandry production and Agr. Industries
 - d1 Productive livestock (improved tribes) goats and sheep
 - 1st phase 2.000 units 2nd phase 7.000 units
 - d2 Expected production of milk and meat
 - 1st phase milk > 800 t/year, meat > 10 t/year
 - 2nd phase milk > 28.000 t/year, meat > 35 t/year
 - d3 Spaces for cheese production, Abattoirs, Livestock-feed production, Packing rooms of Fruits and Vegetables

e Enhancement of Fishing potential + aquaculture

e1. Production of shrimp, crayfish with geothermal use and thermal waste of PPC

e2. Hatchery fish enrichment of Milos gulf

e3. Heated spaces (with geothermal use) for hibernating of certain fish.

f) Municipal Solid Waste treatment and Aerobical treatment of liquid municipal wastes (under installation)

g) TERTIARY SECTOR (increased income): Renewal and further development of tourism, appearance of new jobs, presence of new investments, etc. shall stimulate development of tertian sector in the municipality (shops, restaurants, tourist agencies, local sea port, new hotels, recreation centre, re-habilitation centre, projects of tertian sector connected to tourism development etc.)

- ESTIMATION OF INFLUENCE TO THE TOTAL ECONOMY OF THE MUNICIPALITY :
The influence of proposed development plan to the local economy can be summarised

as:

- Development of local production plants, producing energy or energy materials;
- Development of tourist sector and, connected to that the tertiary economy sector;
- Opening possibilities for new local investments like new installed desalination unit;
- Increasing the income of inhabitants and, in that way, enriching generally the market;

and

- Enhancing the agricultural sector and farmers that have abandoned agricultural land through high quality products and guaranteed new markets.

5.3. GERMANY

- CONCESSION RIGHTS: none

- TAXES: none

- POSSIBILITIES FOR NEW INVESTMENTS: With the implementation of the Biomass Centre, the following investments had to be undertaken:

Building construction for hacking hall, pellets storage hall, office

Technical Equipment

Vehicles

Others

Due to the well-situated site of the Biomass Centre, near to populated areas and infra-structural facilities, there is the opportunity for future extension of the facilities by the implementation of a district heating scheme. On the leased ground, a district heating plant can be installed in order to supply the nearby communities with heat from a district heating network. The implementation of the district heating plant offer mutual benefits. The existing facilities such as the office building, the storage facilities and the vehicles can be used. Moreover, the existing partnerships with biomass suppliers and other companies and entities can also be used.

- TERTIARY SECTOR (increased income): Besides the processing and trading activities of wooden biomass products, the Biomass Centre offers bio-energy related services; e.g. marketing of regional products, information and consultation services and public relations.

- ESTIMATION OF INFLUENCE TO THE TOTAL ECONOMY OF THE MUNICIPALITY:

The employment structure of the Achental and Leukental shows a distribution of tourism, building industry, manufacturing industry and other services. The share of employees in agriculture in the Leukental and Achental is 5%, and 50% thereof are working half-time. Furthermore, a small percentage is employed in forestry. Additional income is expected for forestry farmers through increasing demand for biomass products; which is caused by the growing market for pellets and wood chip heating systems in the region, and the biomass trading activities of the Biomass Centre. The implementation of the Biomass Centre Achental influences the total economy of the municipality in the following way:

- New jobs and additional income for farmers and foresters are created by the development of new markets for biomass products,

- Reduction of the dependence of energy imports and consequently reduced spending for imported fossil fuels increases economic stability, and income in forestry and agricultural sector,
- Possible regional income generation through emission trading,
- Tourism employs ~17% of the population in the region, with winter tourism taking the biggest share. Reduced snow fall quantities caused by climate change will undoubtedly have a negative impact on winter tourism. The implementation of bio-energy offers the chance to alleviate this negative effect on the economy of the region.

The bio-energy sector in the region is developing constantly. There are already some farmers trading with wood chips, and there are approximately two dozens of crafts enterprises offering installations and products in the field of RE-technologies. However, the growth potential for RE-infrastructure is still considerably high, be it for the area-wide delivery of wood chips, pellets and plant oil, or the production and processing of bio-fuels. The exploitation of the potential should not only be considered as 'development-opportunity', much more it is a must, in case added value shall be kept in the region.

5.4. ITALY

The current balance of RES in the municipalities is almost zero, and so this represents a very large increase. In addition to the above developments, an 12 MW wind park is also being planned by another developer, which would give a very large "green" boost to the region.

- CONCESSION RIGHTS : For PV installations on commune land, there may be an issue, but the majority would be on private land in any case.
- TAXES : For each solar thermal installation, the owner can claim 1/3 of the capital cost in a tax refund. This makes the installations even more economically beneficial.
- POSSIBILITIES FOR NEW INVESTMENTS :
 - a) The installation of distributed PV would not only spur interest in the technology, but also show the potential for other regions. In addition, 3 large PV generation plants would immediately show their profitability due to the Italian feed-in tariff, which would attract other land owners in the community, and also surrounding areas, to consider constructing new plants which would boost the local economy.
 - b) Solar Thermal domestic hot water heaters (DHW) are still very rare in the region, but the success of them in other rural Mediterranean markets (such as Greece) points to the potential. The installation of such systems, especially if incentivized more by the local government, would spur the creation of a local solar service centre.
 - c) Furthermore, the RES installations would increase the "green" image of the region, which would appeal to tourists, especially foreign ones. The tourism region in the industry is still not highly developed, and this could become a selling point, adding to the growth of the sector.
- TERTIARY SECTOR (increased income):
The increased demand from new jobs as well as spill over green-tourism effects would increase the need for tertiary jobs
- ESTIMATION OF INFLUENCE TO THE TOTAL ECONOMY OF THE MUNICIPALITY :
The installation of so many PV and solar thermal systems would create a positive-feedback effect into the economy, encouraging further investment into the region. This would continue to create job opportunities. Initially, several construction job opportunities would become available, but even continued job opportunities in the skilled trades would be required for service. Service companies could be established for this purpose. Considering that the region suffers from high unemployment on the order of 30%, this would create a positive stimulus.

5.5. FYROM

- CONCESSION RIGHTS : Future users shall be obliged to pay for concession rights for

- exploitation of geothermal energy. Part of the funds shall be returned to the users for financing new development.
- TAXES : According to the present legislative, selling the briquettes, pellets and biodiesel consists payment of VAT.
 - POSSIBILITIES FOR NEW INVESTMENTS :
 - a) Significant investments in tourist sector, connected to geothermal energy use (new hotels, recreation centre, spas, rehabilitation centre, projects of tercial sector connected to tourism development)
 - b) Investments in agricultural and agroindustrial uses of geothermal energy (new greenhouses, vegetable drying, etc.)
 - c) Investments in further increase of biodiesel production (new irrigation systems, new plant)
 - TERCIARY SECTOR (increased income): Renewal and further development of tourism, appearance of new jobs, presence of new investments, etc. shall stimulate development of tercial sector in the municipality (shops, restaurants, tourist agencies, local handcraft, etc. Organization of cultural events for tourists.).
 - ESTIMATION OF INFLUENCE TO THE TOTAL ECONOMY OF THE MUNICIPALITY : Present employment structure in the Podbelasica region is very bad. Only less than 5% have permanent job, the others live from agriculture or temporal engagements. Realization of the planed strategy for development should dramatically change the situation, i.e. :
 - Number of permanent jobs shall be increased
 - Agricultural producers shall have production of a product with guarantied market, which means stabile income
 - Significant increase of temporal engagements, which means income for unemployed and additional income for the ones with low regular income.
 Above listed shall improve significantly the local economy and shall generate a wider development process of the region.

5.6. SERBIA

- TAXES : According to the present legislative, selling the wood chips, biodiesel, electricity and heat consists payment of VAT.
- POSSIBILITIES FOR NEW INVESTMENTS :
 - a) Significant investment in energy biomass sector: Production of oil rapeseed, giant reed on 5000 ha; and collection of forest's residues;
 - b) Investment in plants for fuel production: biodiesel production plant and two plants for production of wood chips
 - c) Investment in electricity production (power plants): biogas, wood chips, and small hydro plants.
 - d) Investment in boiler for co-combustion
 - e) Investment in use of solar energy for sanitary warm water preparation.
- TERCIARY SECTOR (increased income): Renewal and further development of tourism, appearance of new jobs, presence of new investments, etc. shall stimulate development of tercial sector in the municipality (shops, restaurants, tourist agencies, local handcraft, etc. Organization of cultural events for tourists.).
- ESTIMATION OF INFLUENCE TO THE TOTAL ECONOMY OF THE MUNICIPALITY : Present employment structure in Kragujevac and Knic region is very bad. Only less than 5% have permanent job, the others live from agriculture or temporal engagements. Realization of the planed strategy for development should dramatically change the situation, i.e. :
 - Number of permanent jobs shall be increased
 - Agricultural producers shall have production of a product with guarantied market, which means stabile income

- Significant increase of temporal engagements, which means income for unemployed and additional income for the ones with low regular income.
Above listed shall improve significantly the local economy and shall generate a wider development process of the region.

5.7. COMMON ELEMENTS

In general, economic benefits are foreseen in:

- Development of local production plants, producing energy or energy materials;
- Development of tourist sector and, connected to that the tertiary economy sector;
- Opening possibilities for new local investments; and
- Increasing the income of inhabitants and, in that way, enriching generally the market.

6. JOB CREATION

6.1. ALBANIA

- NUMBER OF NEW JOBS:

Development of tourist sector will create the new job offer. The presence of new investments, etc. shall stimulate development of tertiary sector in the municipality (shops, restaurants, tourist agencies, local sea port, etc. As a result:

a) 130 new permanent jobs

b) About 250 new jobs in tertiary sectors

- ESTIMATION OF INFLUENCE TO THE TOTAL NUMBER OF JOBS IN THE MUNICIPALITY:

a) About 40% increase of permanent jobs

b) About 30% increase of temporal jobs

- INCREASED QUALITY OF LIFE : Introduction of central heating in residencies in Bregu Region, shops and public buildings in all the villages, regular supply of warm water in the villages from solar energy, organization of recreational centres, etc. Together with the tourism development, better supply with food and other products and also better road connections.

Appearance of new regular jobs shall by itself increase the quality of life of inhabitants.

6.2. GREECE

- POSSIBILITIES FOR NEW INVESTMENTS:

a) Investments for RES

a1 Climatisation of Hotels, based on geothermal energy (total energy production ~ 1800 MWh/year)

a2. Investment for the installation of a new desalination unit of a capacity of 2000 m³/day fresh water, based on geothermal or wind energy. A desalination unit is already in operation of 2000 m³ fresh water/day capacity

b) Significant investments in tourist sector

b1. Tourism of all seasons

Thermalism (SPA)

Sea sport – Training center- Diving

Unprofessional fishing

Tourism of geological interest

b2. Increase of peak period tourism and qualitative enhancement of accommodations (~+50%)

c) Agricultural primary production

c1. Production of forages in two phases: 1st/2nd 250/750 ha

c2. Vineyards in two phases: 1st/2nd 100/200 ha

c3. Vegetables – Fruits in two phases: 1st/2nd 150/350 ha
(asparagus, melon, watermelon, strawberry etc.)

d) Husbandry production and Agr. Industries

d1 Productive livestock (improved tribes) goats and sheep

1st phase 2.000 units 2nd phase 7.000 units

d2 Expected production of milk and meat

1st phase milk > 800 t/year, meat > 10 t/year

2nd phase milk > 28.000 t/year, meat > 35 t/year

d3 Spaces for cheese production, Abattoirs, Livestock-feed production, Packing rooms of Fruits and Vegetables

e Enhancement of Fishing potential + aquaculture

e1. Production of shrimp, crayfish with geothermal use and thermal waste of PPC

e2. Hatchery fish enrichment of Milos gulf

e3. Heated spaces (with geothermal use) for hibernating of certain fish.

f) Municipal Solid Waste treatment and Aerobical treatment of liquid municipal wastes (under installation)

g) TERTIARY SECTOR (increased income): Renewal and further development of tourism, appearance of new jobs, presence of new investments, etc. shall stimulate development of tertian sector in the municipality (shops, restaurants, tourist agencies, local sea port, new hotels, recreation centre, re-habilitation centre, projects of tertian sector connected to tourism development etc.)

- ESTIMATION OF INFLUENCE TO THE TOTAL ECONOMY OF THE MUNICIPALITY :

The influence of proposed development plan to the local economy can be summarised as:

- Development of local production plants, producing energy or energy materials;
 - Development of tourist sector and, connected to that the tertiary economy sector;
 - Opening possibilities for new local investments like new installed desalination unit;
 - Increasing the income of inhabitants and, in that way, enriching generally the market;
- and
- Enhancing the agricultural sector and farmers that have abandoned agricultural land through high quality products and guaranteed new markets.

6.3. GERMANY

- NUMBER OF NEW JOBS :Generally, numerous business opportunities arise from a distinctive approach to renewable energies, with economic and rural regeneration benefits. The activities related to the project development and business operation of the Biomass Centre create direct and indirect employment. The direct jobs created in the project development phase are:

- a) Chief executive of the corporation (1 job part-time)
- b) Divisional management purchase (1 job part-time)
- c) Divisional management distribution (1 job part-time)
- d) Other positions in the corporation (8 jobs part-time)

The direct jobs created by the business operation of the Biomass Centre are:

- a) Controlling and new business segments (1 job part-time)
- b) Commercial project lead (1 job part-time)
- c) Annual financial statement (1 job part-time)
- d) Truck driver (1 job full-time)

6.4. ITALY

- NUMBER OF NEW JOBS :

- a) For the construction of the a 1MW PV plants, about 12.000 person-hours are required, leading to at least 10 jobs for the 6-7 month construction, i.e. 30 jobs for the 3 plants. About 3 permanent jobs could be anticipated as needed for the operation and maintenance.

- b) For the construction of the 2.000 kW of distributed PV, about 15 jobs could be considered during the installation phase depending on how quickly this will be accomplished, with the addition of 5 permanent jobs to run the business overseeing the installation and operation, which may grow in order to install more systems in other areas in the future.
- c) For the construction of the solar thermal systems, another 8 jobs may be created. The spillover effect of increased demand for solar thermal systems and PV installations could lead to a further increase in employment, perhaps 3 to 4 permanent jobs to run a solar thermal service/installation business. As well, increased tourism may add many jobs, although this spillover effect is difficult to quantify.
- ESTIMATION OF INFLUENCE TO THE TOTAL NUMBER OF JOBS IN THE MUNICIPALITY :
 - a) About 1-2 % increase in permanent jobs
 - b) About 4-5 % increase in temporary jobs

6.5. FYROM

- NUMBER OF NEW JOBS :
 - a) 110 new permanent jobs
 - b) About 7.000 manmonths/year temporal engagements
 - c) About 200 new jobs in tertiary sectors
- ESTIMATION OF INFLUENCE TO THE TOTAL NUMBER OF JOBS IN THE MUNICIPALITY :
 - a) About 50% increase of permanent jobs
 - b) About 30% increase of temporal jobs

6.6. SERBIA

- NUMBER OF NEW JOBS :
 - a) 200 new permanent jobs
 - b) About 11.000 manmonths/year temporal engagements
 - c) About 300 new jobs in tertiary sectors
- ESTIMATION OF INFLUENCE TO THE TOTAL NUMBER OF JOBS IN THE MUNICIPALITY :
 - a) About 30% increase of permanent jobs
 - b) About 20% increase of temporal jobs

6.7. COMMON ELEMENTS

For some of the communities (Albania, Fyrom, Serbia), this is the most important part of the economy benefits of chosen IRES completion. The importance of this segment can be estimated through the decrease of present high emigration of younger inhabitants. Chosen RES offer possibilities for their employment. In the other communities (Italy, Grece), employment is foreseen also as an important benefit through the open possibilities of the tourist sector development.

7. INCREASED QUALITY OF LIFE

7.1. ALBANIA

There will be the regular supply of warm water in the villages from solar energy, organization of recreational centers, etc. Together with the tourism development, better supply with food and other products and also better road connections.

Appearance of new regular jobs shall by itself increase the quality of life of inhabitants.

7.2. GREECE

- Supply with potable water of good quality and low cost

- Better energy supply of the region
- Increased income of inhabitants followed with development of shops, restaurants, and other content of tertiary economy sector, i.e. better supply and commodities
- Drainage of liquid waste and Ecological treatment of Sludge and wrought Liquids.
- Ecological treatment of Solid Wastes with Recycling and Sanitary landfill for not
- recyclables (production of compote and RDF)
- Supply with heated water for domestic use and district heating-cooling
- Development of the tourist economy sector, enabling contacts with people from other cultural surroundings and organization of local and international cultural events
- Cooperation of Public Services with Local Organisations, Schools, Police:
- Landscape gardening – Embellishment of buildings, streets, squares and details per neighborhood
- Specifications for residential constructions under the frame of code planning
- Enhancement of ministration to citizens and tourists
- Ecological alertness and procurement, specification of responsible persons by
- neighborhood
- Better care for aesthetics of the environment

7.3. GERMANY

Biomass fuels in the region are mainly used for domestic heating. The introduction of such heating systems increase the quality of life of the end-user, if there is reliable delivery of biomass products in the region. This will be achieved through the implementation of the Biomass Centre, which will guarantee for:

- Linking demand and potential of bio-energy,
- Long term and reliable supply with biomass-fuels for communities, private consumers and district heating systems.

Provided that reliable supply is given, biomass heating systems imply the following benefits for the end-users:

- Economic fuel supply,
- Comfortable system giving regular and flexible heating flexible heating,
- Heating supply during work time,
- Good comfort of use: low handling and cleaning tasks,
- Warm ambiance and aesthetics in the living space,
- Limited space consumed by the appliance and the storage appliance.

Apart from increasing the quality of life of the end-user through comfortable heating devices, what is also important is to sustain quality of life through active preservation of nature. The substitution of conventional fuel heating systems through biomass heating systems is an important contribution to this aim. The awareness among the population in the region about environmental and sustainability issues is already quite high. This is proven through the successful establishment of the 'Ökomodell Achenal'¹, which is an INTERREG II founded umbrella association comprising eight municipalities. The overall objective is to sustain the quality of the living space of the regions. This shall be achieved through networked thinking and common actions. The key note 'healthy living space of our Achenal' is based on the three pillars agriculture, tourism, environmental protection. Quality of life shall be sustained through networking of the three pillars. The respective priorities are:

- Agriculture: Agricultural enterprises serve for cultural landscape preservation,
- Tourism: Promotion and development of eco-friendly tourism and industry,
- Environmental protection: Conservation of nature and cultural landscape.

7.4. ITALY

Residents will benefit in a number of ways. The use of solar hot water heaters will decrease

¹ <http://www.oekomodell-achental.de>. The Ökomodell Achenal is involved in a range of international projects, i.a. the FP6 RES-Integration project.

the need for natural gas and/or electricity for residents, which will lead to a greater independence after the system has paid for itself. Residents in other regions of the Mediterranean that have the systems are generally very satisfied and the systems may also be seen as somewhat of a "status symbol". The same would be true for PV. The increase in employment opportunities would also lead to a general increase in the sentiment of the population which is used to employment opportunities decreasing in most sectors.

7.5. FYROM

Introduction of central heating in residencies in Bansko, shops and public buildings in all the villages, regular supply of warm tap water in Bansko from geothermal origin and in the other villages from solar energy, organization of recreational centres, etc. Together with the tourism development, better supply with food and other products. Also better road connections.

Appearance of new regular jobs shall by itself increase the quality of life of inhabitants.

7.6. SERBIA

Appearance of new regular and temporal jobs will increase the excellence of life of population.

7.7. COMMON ELEMENTS

In all the regions in question an increase of life conditions is expected. Elements of that are:

- Better energy supply of the region;
- Introduction of central heating and sanitary warm water preparation, which was minimally present before (Albania, Fyrom, Serbia);
- Increased income of inhabitants followed with development of shops, restaurants, and other content of tertiary economy sector, i.e. better supply and commodities;
- Development of the tourist economy sector, enabling contacts with people from other cultural surroundings and organization of local and international cultural events;
- Better care for aesthetics of the environment;
- Introduction of tap water supply and waste water collection systems;
- Introduction of better urban infrastructure;, etc.

In general, chosen IRES should improve the quality of life in all the regions in question with a particularly recognizable difference in most poor ones (Albania, Fyrom, Serbia).

8. INCREASED ENVIRONMENTAL PROTECTION

8.1. ALBANIA

Realization of the strategy results with significant improving of the environmental protection of the region, i.e.:

Air pollution: Due to the absence of industry in the region, quality of air is quite high. However, it can be expected significant positive influence by wider introduction of RES in tourist sector and residencies. The same is with introduction of solar water heaters.

Preservation of forests: Introduction of controlled collection of wood residues and programmed growing of new woods shall improve the state of existing and development of new forests.

8.2. GERMANY

The most significant environmental benefits of the implementation of biomass energy systems are the protection of air and water quality, and the preservation of forests and cultural landscape.

Air protection: The Achenal and Leukental are characterized by low industry density, thus the air quality in the region is relatively high. However, during the heating season smog caused by domestic fuel causes air pollution. This problem is worsened through traffic peaks (leisure traffic), especially during the winter season.

Replacing conventional oil, gas or electric heating systems with carbon-neutral biomass fuelled heating systems leads to reduced carbon dioxide emissions, since biomass materials are carbon neutral - any CO₂ released in the combustion process is assimilated by growing trees. In this way, climate protection goals are achieved. However, the environmental issue smog caused by domestic fuel can not be solved this way. The example of the Eastern Tyrol city Lienz in Austria has shown, that this problem can be successfully mastered by the erection of combined heat and power plant (CHP) fuelled by biomass [3]. The Biomass Centre Achenal will deliver wood chips also to the district heating plant Reit im Winkel, and is in this way contributing to the protection of air quality. Additionally, there are plans for future extension of the Biomass Centre to the district heating grid.

With the promotion of biomass energy systems, air pollution caused by leisure traffic can not be reduced. Yet it contributes to the reduction of trans-national traffic, since the energy raw materials are produced locally and thus the need for trans-national transportation is reduced.

Groundwater protection: Fossil fuels cause air pollution when they are burned. They also present environmental problems during their extraction and transportation, so as surface and ground water pollution: Oil, coal, and gas are typically found underground below groundwater levels. During extraction, drilling can break the barrier between fossil fuel and groundwater reserves. Later during storage and transportation, broken pipes or storage tanks can also contaminate water supplies. Possibly the most visible impact of fossil fuel production is the potential for environmental disaster during transportation. A number of high-profile oil spills have illustrated the extent of environmental damage possible. On a smaller scale, storage tank leakage and other accidents can directly damage local environments. The pollution effects of these accidents can last for tens of years and sometimes longer, and cleanup is often costly. Therefore, the reduction of demand for fossil fuels contributes to surface and groundwater protection on a national and local base.

Preservation of forests and cultural landscape: Supplying the wood from the forests not only offers farmers added possibilities to earn money. In the biomass facility, tree bark, saw-mill residues and wood chips are processed. Therefore, by cleaning up the forests the spread of the bark beetle is drastically reduced. Additionally, the reuse of landscape preservation biomass waste solves disposal problems and contributes to cultural landscape preservation.

8.3. GREECE

The most valuable benefits from the successful implementation of the project would be the protection of soil, air and water, and the conservation of landscape and of the island character. On top of that, Milos resembles many other Greek islands and it will, after the project, present an example of sustainable development that the rest of the islands will want to follow.

- Air, water and soil protection: Although the area of the project does not face any serious air pollution, the project will help the country to achieve targets deriving from the Kyoto protocol. Water offer through RE desalination systems leads to better surface and groundwater sources protection because of avoidance of overexploitation and to better conditions for soil management and protection.

- Preservation of Natural and cultural landscape, Coastal and sea protection: Implementation of the project will cover fluctuating (between winter and summer) energy demand and will protect traditional land uses and activities. Geothermal energy applications will enhance the tourist period and regulate fluctuations of tourists that put pressure on the islands carrying capacity. All projects assist the promotion or conservation of economic activities beyond tourism. Avoiding mono-cultivation of tourism protects the environment of

the islands and reduces impacts by human activities. Since Milos, as an island, is very sensitive, development balance in time and space achieved by the projects preserves the natural and cultural environment of the area.

More specifically from the RE technologies to be installed in Milos island it should be expected:

1. From Geothermal energy systems

The technology to be applied is the "Down Hole Heat Exchanger". That means that the only outputs from the boreholes are the pumped calories without any brine to the surface.

Environmental benefits are also the substitute of A t of diesel/year for space heating and cooling and for hot water, which accounts to a gain of B t/year of CO₂.

2. From wind energy

The wind turbines to be installed will be limited to 4 or 5. So the aesthetical impact will be restricted to the hosting hill of the turbines for a 500 m distance (turbines in series). Wind energy is expected to substitute C t/year of diesel, an avoidance of D t/year of CO₂.

3. From solar energy

A small CO₂ gain is expected and the production of freshwater from the sea water. The brine problem is limited since the installations are very small and despaired around the island.

4. From biomass energy

Environmental gains from the use of biomass are: At first the recycling of Municipal Solid Waste and the use of the produced compost substituting industrial energy-demanding N sources and fertilizers in general. Second, the collection and reuse of used cooking oils will have various benefits.

8.4. ITALY

Fewer emissions from natural gas and fuel oil boilers for heating will lead to a lower emissions and thus better air quality. However, the absence of heavy industry and urban centres means that the air quality is still in general high, but at the household level this could be noticed.

8.5. FYROM

Realization of the strategy results with significant improving of the environmental protection of the region, i.e. :

- Air pollution : Due to the absence of industry in the region, quality of air is quite high. However, it can be expected significant positive influence by wider introduction of geothermal energy in tourist sector and residencies and, with that, removing the use of fossil fuels. The same with introduction of solar water heaters.
- Preservation of forests : Introduction of controlled collection of wood residues and programmed growing of new woods shall improve the state of existing and development of new forests.

8.6. SERBIA

Achievement of the strategy results means high increase in the environmental protection of the region, i.e. :

- Air pollution : As there is no industry in the region, quality of air is quite high. However, it can be expected significant positive influence by wider introduction of biomass in electricity production as this would remove the use of fossil fuels, decrease local and global pollution. The same conclusions may be reached with use of solar water heaters.
- Preservation of forests : Controlled collection of wood residues and programmed growing of new energy plants will preserve the existing forest.

8.7. COMMON ELEMENTS

The most significant environmental benefits of the implementation of RES energy systems are the protection of air and water quality, and the preservation of forests and cultural landscape. Energy produced of RES shall decrease CO₂ emissions and air and water pollution.

9. INCREASED INFLUENCE TO SOCIAL ASPECTS OF THE POPULATION

9.1. ALBANIA

Expected economic changes shall change the present well-being and self-confidence of the population. Except the feeling of life without chances and poverty, hope for stable and economy and future shall appear and, with that conditions for keeping the population in the region, i.e, it helps to stop the emigration.

9.2. GERMANY

Initiatives in bio-energy areas to, especially municipalities are a central theme when it comes to strengthen rural areas and safeguarding services of general interest in a sustainable way. Bio-energy creates and secures employment, leading to improved social well-being of the population. Information, public relation and advertisement activities, undertaken from the Biomass Centre, will lead to increased awareness for the linkage of economic benefits of regional RE-issues and climate protection. The increased awareness about the values of the own resources will also strengthen the self-confidence of the community. Experiences in other regions have shown that bio-energy projects are supported and welcomed by the majority of the local population. Moreover, they create local identity of the municipalities. The municipalities and their population are proud of their bio-energy projects that are often presented to visitors as demonstrations sites. Additionally, the increased awareness is the base for future direct participation in the regional development processes through municipality structures and state development programs.

The 'Ökomodell Achental' – project takes a key role in raising the awareness for RE and environmental issues in the region. The networking projects undertaken by the Ökomodell lead to increased social acceptability of eco-actions. Up to date, trade, industry, schools, kinder gardens and associations have been involved in the project. The Ökomodell is increasingly known and accepted and has already received several awards. Therefore, the Biomass Centre Achental as show-case project of the Ökomodell will increase the public's environmental awareness.

Bio-energy integration not only offers environmental benefits and raises the quality of life; moreover it implies economic benefits for the whole region. This happens on a direct and indirect level. The direct benefits come from job creation caused by bio-energy production and trading. Bio-energy also leads to reduction of energy imports and the direct added values for the region. The indirect economic benefits of bio-energy come from tourism, a driving economic force in the region and increasingly important source of income, employment and wealth. The municipalities in the Achental and Leukental quote approximately 1,5 Mio. tourists overnight stays per year. The region attracts tourists due to its unique and diverse landscape, ranging from high mountains to the large Chiemsee Lake and its surrounding mosses. The air quality of the region is that good, that it was even awarded as air cure location. But, while tourism provides considerable economic benefits for the region, its expansion also has negative environmental and socio-cultural impacts. Thus the promotion of sustainable tourism development is essential for maximizing its socio-economic benefits and minimizing its environmental impact. The population and stakeholders of the region are well aware of this issue and thus there is high social acceptability towards projects like the Biomass Centre Achental.

9.3. GREECE

Better energy and water supply will increase the quality of life, while new investments will create economic benefits for the population and job opportunities for young people. Moreover increasing tourist sector is a source of income employment and wealth. New ideas will stem from new RE technologies installation to stop economic stagnation and loss of employment.

Exploitation of local environmentally friendly energy sources, raises people's awareness on protection of the environment and security of energy supply, while ecological treatment of solid and liquid wastes provides a better quality of life and hygiene.

The whole procedure of new development actions will create services of general interest that will increase awareness for direct participation in the regional development processes through municipality structures and state development programs.

9.4. ITALY

As the implementation of the systems increases, people may take an initiative in becoming involved in the region, to try to increase participation. Currently, energetic use of biomass is very low in the region, hampering its applicability from a social side. However, with increasing solar energy usage, people may turn to the newer developments in northern Italy in terms of biomass usage in order to implement biofuel and other biomass plantations. What is important is that the stimulus could be given in order for further development of technologies, but also ideas for the local population to help stop economic stagnation, loss of employment and emigration of youth.

9.5. FYROM

Expected economic changes shall change the present well-being and self-confidence of the population. Except the feeling of life without chances and poverty, hope for stabile and economy and future shall appear and, with that conditions for keeping the population in the region, i.e. to stop the emigration.

9.6. SERBIA

Projected social and economic transformation of the region would improve welfare and safety of the regional inhabitants for their benefit. The impression of poor quality life without opportunities will slowly disappear. All investment actions would lead and mean stabile economy. It is to believe that these are preconditions that many young people will remain in the region.

9.7. COMMON ELEMENTS

Proposed IRES shall positively influence all the social aspects in the regions in question. Beside improving the average level of living standard (Albania, Fyrom, Serbia, and partially Greece and Italy), also positive changes of the living environment are expected, as are introduction of better urban infrastructure, sanitary warm water preparation, central heating, better electricity supply, etc. Increased quality of life should enable revitalization of the rural communities and stop the emigration to bigger towns and foreign countries (Albania, Fyrom, Serbia).

10. CONCLUSION

Social aspects are probably the most important set of factors when decision of accepting any strategy of development of an environment where humans are living. They are practically unifying all the other influencing factors, including technical/technological and economic

feasibility. No improvement of any of them can be successfully implemented if not positively accepted by the ones who should take benefit of that.

The idea of improving energy supply in rural regions by introduction of locally on disposal RES is resolving only one of the dimensions, composing the full set of local life conditions. In the concrete case, for some examples (Fyrom), it is even one of the less important life dimensions, taking into account the undeveloped energy use in the poor region. However, when the idea was step by step developed, it came that organized introduction of RES in all of the consisting communities results with changes of the other dimensions of life, too. For example, opening new employments increases the average living standard of inhabitants. That is improving the offer and quality of supply of food and other life necessities, plus restaurants, cultural events, etc. Offering ready and economically acceptable solutions for introduction of central heating and sanitary warm water preparation results with increased quality of living residencies. Tourism development results with need for different cultural and entertainment offer and mixing with people of different cultural background. That slowly increases the overall cultural level of the community in question. Having on disposal goods to be exported to the other parts of the country or abroad results with increased income of the community, resulting with investments in other life sectors, which again results with increased life conditions in the community.

All the factors, composing the local social aspects influenced by the development of proposed IRES have been carefully evaluated and estimated by the project participants. The common final finding was that organized introduction of RES in rural communities in question, results with absolute increase of the local social aspects of life, doesn't matter of the present economy, cultural level and national origin.

By careful dissemination of the positive social aspects of the organized RES introduction in concrete rural communities a wider public and political support should be reached.

At last but not least, success of such an action can be a very good demonstration for possible positive aspects of wider introduction of RES also in other similar communities, which should be a valuable contribution to the global needs of decreasing the fossil fuels use.