The project Rurale.Evolution

The project Rurale.Evolution was funded in the framework of IEE (Intelligent Energy Europe) program with contract n° IEE/07/579/SI2.499063. The main purpose of Rurale.Evolution is to design an effective Methodology for a successful application of PPP scheme to Agro-energy districts. Eight Partners, from 5 European Countries (Italy, Greece, Hungary, Portugal and Spain) have analyzed in detail all the elements influencing the successful creation of PPPs and Agro-energy districts. They will define a common methodology for the creation of PPPs tailored to the management of Agro-energy districts, and consequently, they have tested the methodology on the ground, by defining one or more PPP in each represented Country. The assessment of the methodology application has lead to a fine-tuning able to produce an effective instrument, ready to be used by rural communities, local authorities, agriculture (not only) entrepreneurs for creating further PPPs for Agro-energy districts. This instrument will be the “The Guidelines for successful application of PPP to RES Agro-energy Districts.”

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2) CRB: Biomass Research Centre (Italy);
3) Intercoop Group (Spain);
4) FCVRE: Foundation Valencian Region – European Region (Spain);
5) TCTK: Tobacco Cooperative of Toumpa Kilkis Prefecture (Greece);
6) AUTH: Aristotle University of Thessaloniki (Greece);
7) Confagri: National Confederation of the Agricultural Cooperatives and Agricultural credit of Portugal (PORTUGAL);
8) HANGYA: Cooperative Association (HUNGARY).

RuralE.Evolution Project:
“Guidelines for successful application of PPP to RES Agro-energy districts”
Coordinated by Coldiretti Umbria

Supported by INTELLIGENT ENERGY EUROPE
GUIDELINES FOR SUCCESSFUL APPLICATION
OF PPP TO RES AGRO-ENERGY DISTRICTS

(Report corresponding to D5.2 of the European project Rurale.Evolution)

CONTRACT N°: IEE/07/579/SI2.499063
# INDEX

## FIRST PART

<table>
<thead>
<tr>
<th>Chapter 1</th>
<th>Methodology definition</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1</td>
<td>Agroenergy district characteristics</td>
<td>1</td>
</tr>
<tr>
<td>1.2</td>
<td>Agroenergy district problems</td>
<td>8</td>
</tr>
<tr>
<td>1.3</td>
<td>PPP models individuated</td>
<td>11</td>
</tr>
<tr>
<td>1.4</td>
<td>PPP models adapted to the agroenergy district</td>
<td>17</td>
</tr>
<tr>
<td>1.5</td>
<td>Bibliography</td>
<td>18</td>
</tr>
</tbody>
</table>

## SECOND PART

<table>
<thead>
<tr>
<th>Chapter 2</th>
<th>PPP implementation: Italy</th>
<th>21</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1</td>
<td>Implementation of the methodology: activities of the Italian partner</td>
<td>21</td>
</tr>
<tr>
<td>2.1.1</td>
<td>First step: municipality meeting</td>
<td>22</td>
</tr>
<tr>
<td>2.1.2</td>
<td>Second step: biomass assessment</td>
<td>23</td>
</tr>
<tr>
<td>2.1.3</td>
<td>Third step: Italian PPP consultant meeting and legal framework</td>
<td>23</td>
</tr>
<tr>
<td>2.1.4</td>
<td>Fourth step: key actors meeting</td>
<td>29</td>
</tr>
<tr>
<td>2.1.5</td>
<td>Fifth step: bank meeting</td>
<td>30</td>
</tr>
<tr>
<td>2.1.6</td>
<td>Sixth step: PPP contract implementation</td>
<td>31</td>
</tr>
<tr>
<td>2.2</td>
<td>SWOT analysis</td>
<td>31</td>
</tr>
<tr>
<td>2.3</td>
<td>Bibliography</td>
<td>34</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chapter 3</th>
<th>PPP implementation: Greece</th>
<th>35</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1</td>
<td>Implementation of the methodology: activities of the Greek partner</td>
<td>35</td>
</tr>
<tr>
<td>3.1.1</td>
<td>Identification of areas’ needs</td>
<td>36</td>
</tr>
<tr>
<td>3.1.2</td>
<td>Role of stakeholders</td>
<td>38</td>
</tr>
<tr>
<td>3.1.3</td>
<td>Market testing</td>
<td>38</td>
</tr>
<tr>
<td>3.1.4</td>
<td>Potential benefits individuation</td>
<td>39</td>
</tr>
<tr>
<td>3.1.5</td>
<td>Identification of the potential actors to be involved in the planning process</td>
<td>40</td>
</tr>
<tr>
<td>3.1.6</td>
<td>Exploration of available national legal / regulatory and policy frameworks</td>
<td>41</td>
</tr>
<tr>
<td>3.1.7</td>
<td>Selection of the right PPP option</td>
<td>42</td>
</tr>
<tr>
<td>3.1.8</td>
<td>Communication strategy to reach stakeholders an community</td>
<td>42</td>
</tr>
<tr>
<td>3.1.9</td>
<td>Set up the planning team</td>
<td>43</td>
</tr>
<tr>
<td>3.1.10</td>
<td>Study of the target area characteristics and SWOT analysis</td>
<td>43</td>
</tr>
<tr>
<td>3.1.11</td>
<td>Selection of suitable partners/achievement of successful partnerships</td>
<td>44</td>
</tr>
<tr>
<td>3.1.12</td>
<td>Development of business plan</td>
<td>45</td>
</tr>
<tr>
<td>3.1.13</td>
<td>Implementation of a consensus Building strategy</td>
<td>46</td>
</tr>
<tr>
<td>3.1.14</td>
<td>Selection of suitable technology/production plan according to local characteristics</td>
<td>46</td>
</tr>
<tr>
<td>3.1.15</td>
<td>Institutional Structures and Capacity building, signing of the contract</td>
<td>48</td>
</tr>
<tr>
<td>3.1.16</td>
<td>Availability of the land</td>
<td>48</td>
</tr>
<tr>
<td>3.1.17</td>
<td>Definition of the logistic plan</td>
<td>49</td>
</tr>
<tr>
<td>3.1.18</td>
<td>Monitoring and reporting on results</td>
<td>49</td>
</tr>
<tr>
<td>3.2</td>
<td>SWOT Analysis</td>
<td>50</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chapter 4</th>
<th>PPP implementation: Hungary</th>
<th>53</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.1</td>
<td>Implementation of the methodology: activities of the Hungarian</td>
<td>53</td>
</tr>
</tbody>
</table>
partner

4.1.1 Selection of target areas 54
4.1.2 Biomass estimation 55
4.1.3 Selection of key actors 56
4.1.4 Bioenergy chain design 56
4.1.5 Identification of legal and economic circumstances 57
4.1.6 Selection of the PPP aim and frame 60
4.1.7 Preparation of the PPP contract and of the Memorandum of Understanding 61

4.2 SWOT analysis 61
4.3 Bibliography 63

Chapter 5 PPP implementation: Portugal 65
5.1 Implementation of the methodology: activities of the Portuguese partner 65
5.1.1 Definition of the target area 66
5.1.2 Cooperative meeting 66
5.1.3 Municipality meeting 67
5.1.4 PPA framework and legal framework description 68
5.1.5 Biomass estimation and pre-feasibility plan 72
5.1.6 Contact with other partners 73
5.1.7 Communication campaign 74
5.1.8 Financing proposals 78
5.1.9 Contract preparation and subscription 78
5.2 SWOT analysis 79
5.3 Bibliography 81

Chapter 6 PPP implementation: Spain 83
6.1 Implementation of the methodology: activities of the Spanish partner 83
6.1.1 Definition of the target area 84
6.1.2 Intercoop cooperative group and DPCAS meetings 84
6.1.3 PPA framework and legislation framework 86
6.1.4 Biomass inventory ad assessment and pre-feasibility plan 89
6.1.5 Partners contacts and negotiation 91
6.1.6 Communication campaign 92
6.1.7 Contract preparation, capital subscription and new Company creation 93
6.2 SWOT analysis 94
   PPP references in the useful target areas 97
   Contacts in Umbria (Italy) 97
   Contacts in Kilkis (Greece) 99
   Contacts in Abasar (Hungary) 101
   Contacts in Alvito (Portugal) 102
   Contacts in Castellon province (Spain) 103

THIRD PART

Chapter 7 Unified PPP methodology 105
7.1 Unified guidelines for PPP application in the agroenergy district in the different partner countries 105
7.1.1 Farmers PPP methodology 105
<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.1.2</td>
<td>Plant producers methodology</td>
<td>106</td>
</tr>
<tr>
<td>7.1.3</td>
<td>Public body methodology</td>
<td>106</td>
</tr>
<tr>
<td>7.2</td>
<td>Private initiative methodology in detail</td>
<td>107</td>
</tr>
<tr>
<td>7.3</td>
<td>Public initiative methodology in detail</td>
<td>113</td>
</tr>
<tr>
<td>ANNEXES</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ANNEX 1</td>
<td>Biomass assessment case study</td>
<td>119</td>
</tr>
<tr>
<td>A1.1</td>
<td>Area characteristics for biomass production exploitation</td>
<td>119</td>
</tr>
<tr>
<td>A1.2</td>
<td>Experience gained about the methodology</td>
<td>122</td>
</tr>
<tr>
<td>ANNEX 2</td>
<td>PPP contract elaborations</td>
<td>129</td>
</tr>
<tr>
<td>A2.1</td>
<td>Italy PPP contract index</td>
<td>129</td>
</tr>
<tr>
<td>A2.2</td>
<td>Greece PPP contract index</td>
<td>131</td>
</tr>
<tr>
<td>A2.3</td>
<td>Hungary PPP contract index</td>
<td>133</td>
</tr>
<tr>
<td>A2.4</td>
<td>Portugal PPP contract index</td>
<td>135</td>
</tr>
<tr>
<td>A2.5</td>
<td>Spain PPP contract index</td>
<td>138</td>
</tr>
<tr>
<td>ANNEX 3</td>
<td>Memorandum of Understanding: the Greece example</td>
<td>139</td>
</tr>
</tbody>
</table>
INTRODUCTION TO THE REPORT

This report is the final product of the research carried out during the European project Rurale.Evolution.

The project Rurale_Evolution was funded in the framework of IEE (Intelligent Energy Europe) program with contract n°IEE/07/579/SI2.499063. The main purpose of RuralE.Evolution is to design an effective Methodology for a successful application of PPP scheme to Agro-energy districts. Eight Partners, from 5 European Countries (Italy, Greece, Hungary, Portugal and Spain) have analyzed in detail all the elements influencing the successful creation of PPPs and Agro-energy districts. They will define a common methodology for the creation of PPPs tailored to the management of Agro-energy districts, and consequently, they have tested the methodology on the ground, by defining one or more PPP in each represented Country. The assessment of the methodology application has lead to a fine-tuning able to produce an effective instrument, ready to be used by rural communities, local authorities, agriculture (not only) entrepreneurs for creating further PPPs for Agro-energy districts. This instrument will be the “The Guidelines for successful application of PPP to RES Agro-energy Districts”

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7) Confagri (PORTUGAL);
8) HANGYA (HUNGARY).

This report is organized in three sections:
1) the first analyzes the agroenergy district typologies (community based, public based, private based, Public Private Partnership -PPP- based). The PPP based agroenergy district appears to be the most performing model because of the high level of integration that is granted among the partners;
2) The second section proposes the implementation of the methodology and guidelines for PPP implementation in the agroenergy district that was developed in D2.3. The implementation process that deals mainly with the target area characterization the individuation of key actors, the individuation of the technology, the preparation of a pre-feasibility plan, the communication campaign, the preparation of tender, the preparation of bids the evaluation of them and then the signing of the PPP contract and eventually contract management, was done following different approaches in the different partners’ countries. The approaches were finally evaluated through the use of a SWOT analysis;

3) In the third section, taking into account the results of the SWOT analysis performed on PPP methodology implementation in each partner country two final methodologies were developed:
- one for private partners;
- one for public partners.

Because the PPP project can be promoted by this two kinds of persons and the methodology will be influenced deeply by who is proposing the project.

The report contains also 3 annexes mainly dealing with:
A1: Biomass assessment case study: Greece;
A2: PPP contract elaborations;
A3: Memorandum of understanding: the Greece example.
1.1 **Agroenergy district characteristics**

Agro-Energy refers to the energy function of agriculture. It can make significant contributions to achieve social and environmental sustainability at local, national, regional and global levels. In fact, agricultural and livestock resources are abundant in most parts of the world, and various commercially available conversion technologies could transform current traditional and low-tech uses of these resources to modern energies. If Agro-Energy is produced efficiently and in a sustainable manner, benefits compared to fossil fuels can be achieved, including:

- food security;
- rural development;
- local self-reliance;
- sustainable agricultural management;
- biodiversity conservation and climate change mitigation;
- improved energy supply and security [1].

Attention should be placed on the trade-offs of Agro-Energy systems. Main concerns include development priorities, environmental impacts, conflicts with other land uses, technological conversion efficiency, high raw material costs and the cost-effectiveness of Agro-Energy technologies. In economic terms, incentives might be necessary at least to put Agro-Energy on a more equal footing with fossil fuels, for which environmental and social costs are not internalized. Increasing attention is focused on global climate change considerations.

To the aim of the project some more definitions have to be pointed out:
- agroenergy chain
- agroenergy district.

The agroenergy chain is characterized by three main aspects: the production chain, the transport and logistic chain and the biomass conversion technology.
Knowing this, a possible definition of biomass agroenergy chain is the process or the set of processes necessary to (eventually) produce, collect, (eventually) transport and convert biomass into energy.

The agro-energy district is defined as the territorial area hosting one or more Bioenergy chains, technologically, organizationally and economically tailored to the production and use of energy from agricultural origin, normally through (but not necessarily limited to) the use of the local and regional biomass supply.

In this outlook the agroenergy district can be seen as a set of agroenergy chains that interact together and find some synergies lowering production costs. This interaction can be subjected to different levels of integration and the agroenergy district can be developed in a closed loop or open loop.

This outlook is tailored to the territory and so it promotes decentralized projects and chains; these are characterized by:

- localization of ownership;
- localization of management;
- localization of production of bioenergy;
- localization of marketing.

The benefits of local bioenergy projects are the following:

- local ownership;
- creation of employment;
- supply of energy services;
- reduce the need for large agricultural monocultures;
- reduce environmental problems.

Decentralized bioenergy production models and case descriptions can be divided in four categories [2]:

1) Community-based bioenergy model;
2) Public based energy model;
3) Private based bioenergy model.
4) Public-private partnership;

The community based model involves the participation of community members along the bioenergy production chain including cultivation or production of feedstock, processing of feedstock into bioenergy, and marketing and distribution of bioenergy [3].
Production in a community-based bioenergy model is largely for localized use through either sharing the produced commodity among participating community members to use in other production systems such as farming or for local marketing.

Community cooperatives, partnerships and family businesses are common business types in this model. The community production model is common in agricultural communities where bioenergy is produced on farm or by a cooperation of farmers for farm use [4].

Community models are commonly driven by the need to improve and ensure local energy supply, fight climate change, provide energy in previously unsupplied areas and therefore promote local development by extending energy services to other production systems, reduce wood demand and the consequent deforestation problem, and diversify livelihood sources when energy services are extended to other production systems.

In the public based energy model, the risks involved in investing in bioenergy projects, cost of investment and the need to fight climate change, have prompted some government institutions to get involved at different levels of production and marketing of bioenergy.

The objective of the involvement is to demonstrate the socio-economical and environmental potential of clean energy to promote acceptance and achieve a fast replication of innovative energy projects. Some governments are involved in market development support programs.

For example some local governments have committed all their vehicle fleets to run on biodiesel to support the development of the market and to support research on the performance of vehicles running on biodiesel.

In certain countries local governments or government departments take a more direct responsibility of running the processing and marketing of bioenergy linking up with local communities for the production of feedstock.

Small scale decentralized private based models involve private companies on the entire bioenergy chain or in part (e.g. contracting local farmers to produce raw materials and the company processes and distribute bioenergy). Individual farmers have also engaged in bioenergy production for on farm energy use

Public–private partnerships are traditionally forged to pool financial resources, knowledge, experiences and expertise together for successful implementation and management of projects [5-6].
These partnerships are particularly important for the emerging bioenergy sector, still considered risky. Private–public collaboration minimizes the risks involved by pooling various types of resources together.

**Community based agro-energy districts**

**Juhnde bioenergy village, Germany [7]**

This case was driven by the need to replace fossil fuels with more sustainable biomass based energy. Over 70% of the 800 inhabitants of Juhnde village, formed a local cooperative that operated a combined heat and power (CHP) plant. The project was funded by the German government through a €1.3 million grant, and participating residents' contributions of €1500 (a fee to give them voting rights in the cooperative) and costs of connecting to the district heating. The participation of community members was enhanced through a number of sensitization meetings, which resulted in voluntary signing to the district heating network. The community employed two people to directly run and administer the plant.

The Juhnde plant included:
- a CHP plant;
- a wood chip boiler;
- a conventional oil boiler.

![Fig. 1.1: Juhnde bioenergy village, Germany.](image-url)
Liquid manure and whole plant silage (sourced from local farms) was used as feedstock for the gas production. About 85% of heat was produced from combustion of producer gas whilst 15% from the wood chip boiler. The district heating network of 5500 m length, serviced 145 houses. Electricity was entirely fed into the public grid. The project was largely heralded as a success attributable to synergies of the plant with local farmers, foresters and the general community. The strong cooperation of the community and the general desire to replace environmentally unfriendly fossil fuels from the community and the public office also influenced the success. The combined production of heat and electricity avoided 3300 tonnes of carbon dioxide and up to 400,000 l of oil substituted per year. The project resulted in an annual per inhabitant carbon footprint of about 2 tonnes, which is below German’s average of about 10 tonnes per year per person [8].

Public based agro-energy districts

Tervola CHP (Finland).

Small to medium scale CHP plants are common in Europe and are often considered economically viable due to the ability to produce two marketable products and also are environmentally friendly due to the ability to use a wide range of biofuel feedstock as energy sources [14].

Tervola is a northern Finnish municipality constituting about 4000 inhabitants. In addition to the need to replace an old oil plant and the increasing energy demand, the Tervola municipality was driven to bioenergy largely by the European Union energy Policy, which required doubling of the renewable energy share from the 1995 level to 12% by 2010. The project received a 27% of the investment cost (1.2 million euro) as a grant from the state government, which reduced the payback period from 7–8 years to 5–6 years.

A local manufacturing company, combined with a local University and an energy company were involved in the project that aims to develop an efficient small scale combined heat and power plant, exploiting wood fuel. The plant faced the challenge of gas cleaning, which is a common problem in biomass gasification [15], delaying the start date of the project of about a year. Despite this set back, the project was reported to have reduced greenhouse gas emissions and increased the share of renewable energy sources.

This project was run as full commercial entity with no subsidies on the operational costs of energy production.
Public Private Partnership based agro-energy districts

Bioenergy system Enköping Sweden [13].

This is a typical example of a successful private–public partnership which grew from small scale operations to medium scale decentralized production system. Concerns by the local government of Enköping about energy security and the need for local energy supplies saw the construction of small scale wood chip boilers in 1979 for experiential learning purposes. This learning phase continued through the 1980s resulting in knowledge and skills build up for local energy companies. The growing concern of climate change resulted in the introduction of a number of policies to support bioenergy development including subsidies and a carbon tax in the 1990s, which played a pivotal role in the commissioning of Enköping’s biofuels only medium scale CHP plant in 1994.

About 40% of the total investment costs were subsidised by the Swedish Government. The plant had a capacity of 45MW of heat and 24 MW of electricity. The Enköping local government formed a company, which managed the plant in collaboration with another local private energy company. Feedstock was supplied through the services of a national forestry association run organisation, Naturbränsle. The expansion of the system demanded more feedstock, which prompted research on the potential of local production of salix plantations. This resulted in the involvement of the Swedish University of
Agricultural Sciences to research on the potential of salix as a bioenergy source and Agrobränsle to ensure production.

Fig. 1.3: Bioenergy system Enköping Sweden [13].

Farmers within 20 km radius of the CHP plant were mobilized to produce salix. This was to reduce transportation costs and fuel use within the project. The project was linked to the water treatment plant to provide sludge for fertiliser (in addition to ash remaining from the burning of wood in the CHP plant) and waste water irrigation for the production of salix. Initially, 196 ha of salix were planted under contract farming. By 2003, the salix plantations had grown to 1200 ha [16].

**Private based agro-energy districts**

**Katana Limited biogas plant**

An example is the case of Katana Limited in Tanzania [17], motivated by the desire to cut its electricity bill, constituting 40% of the total running costs. Katana Limited, through Tanzania Government and UNIDO support, installed a 150 kW generator funded by biogas utilizing sisal residue to run sisal decorticating machines.

Katana Limited is a large scale producer of sisal. Only 4% of the sisal plant is recovered as fibre whilst the remaining residue is traditionally burnt producing carbon dioxide or left to rot, producing methane, both producing greenhouse gases.
1.2 Agroenergy district problems

It is evident that there is no single best case solution for the agro-energy district, due to differences in factors driving bioenergy production and use, feedstock used, production capacity, target group and type of ownership. Success of each model seemed to largely depend on synergistic alliances that support supply of feedstock, financial resources, technical skills, supportive polices and institutions, availability of direct benefits—mainly economic, availability of technologies that can be operated at relevant scales, and the levels of support and participation by the local communities.

This is why being the Public Private Partnership the best expression of the synergies between different subjects the PPP model seems to be the more appropriate for the agroenergy district. PPPs in the agroenergy district have to be promoted for environmental, economic and social reasons. That will be explained in the following paragraphs.

Emerging environmental sustainability issues
1) The need to fight climate change by replacing fossil fuels and the related greenhouse gas emissions, reduce wood demand and therefore curb deforestation and reduce air pollution by eliminating crop residue burning are some of the specific environmental drivers;
2) An advantage of the agroenergy district is that of reducing transportation distances involved in acquiring raw materials and marketing of
bioenergy. This benefit could translate into reduction of life cycle greenhouse gas emissions when compared to longer distances in centralised production systems;

3) Centralized bioenergy production systems, in addition to transportation limitations also involve large scale crop production. This often results in high demand for land, fertilizers, tractive power and energy input per unit of output, which increases environmental burden;

4) Therefore, integrating energy production and other production system (e.g. power and steam production and agricultural) could improve the environmental performance of small scale decentralised bioenergy systems.

**Emerging economic sustainability issues**

1) Small scale decentralized bioenergy systems, face economic viability challenges due to high operation costs. For example, it was estimated that operations and maintenance costs per unit could fall by 43% when load increases from 5 to 20 Kw.

2) Community based models seem to be dominating small scale decentralized bioenergy production largely to support local development as discussed above. Private sector involvement has been limited to biomass based combined heat and power plants, which benefit from the economies of producing heat and power concurrently. Other cases of private participation include bioenergy production as part of a larger scale activity to supplement industrial energy needs rather than to market bioenergy as a product.

3) Commercial viability of decentralized small scale production could be improved by integrating bioenergy production with other production systems or in a closed loop operation where waste from one process is used as an input in the production of other products. For example co-products could be further processed in the same bio-refinery to add value. An alternative could be to integrate bioenergy production with other unrelated production systems—where bioenergy is produced from waste (e.g. animal manure) and also used in supporting the production system creating the waste. This creates production cycles of energy and other non-energy products with less waste to the environment. An integrated production approach also reduces marketing cost of bioenergy whilst ensuring energy supply for more commercially viable products.

4) The potential to create employment and the resulting income, especially in marginal areas such as rural areas, are some of the small scale decentralized bioenergy system’s strengths. Downstream benefits such as local markets being created for local farmers’ products, which could indirectly
create employment, markets for previously unmarketed agricultural waste (manure and crop residue) can be created by the introduction of bioenergy plants.

5) Employment creation is greatest in primary production of feedstock in Swedish cases. Technology availability in decentralized applications was also shown to be a key determinant in the sustainability of small scale decentralized systems. Biomass based CHP plants have matured and hence the dominance of this technology in small scale decentralized systems.

**Emerging social sustainability issues**

1) The formation of a community cooperative and the establishment of the community owned plants has provided opportunities for local ownership. Decentralized bioenergy systems can involve local communities in the development of the various bioenergy projects and therefore provide an opportunity for building and/or enhancing community cooperation.

2) The challenge of losing land previously used for food production to fuel production is one of the widely debated social threats of bioenergy systems.

3) Decentralized systems have also provided essential energy services to support human livelihood especially in developing countries. The small scale nature of cases in this study provide mechanisms for social learning through operational experiences, the interaction of different stakeholders, and more formal skills development activities.

**Integrated overview of sustainability issues**

One of the strengths of decentralized PPP based agroenergy districts is cutting down on transportation and marketing distances, which provide not only environmental benefits as discussed above but also economic and social benefits. Short distances reduce transportation costs, emissions and therefore negative health impacts related to emissions (e.g. cardiovascular diseases related to intake of carbon monoxide emissions). This strength is facilitated by local availability of raw materials and local markets for bioenergy. Therefore, community participation in providing markets and feedstock is critical for the sustainability of decentralized bioenergy systems. Feedstock choices play a critical role in ensuring environmental, economic and social sustainability of decentralised bioenergy systems. Different feedstocks provide different energy yields and environmental impact. It can be created a market for agricultural waste, and the lifecycle production costs and emissions of bioenergy can be reduced.
1.3 **PPP models individuated (3-4 PPP’S) for the agroenergy district: advantages and disadvantages**

Dealing with an agroenergy district four main possible directions can be chosen:

1. auto-producing energy;
2. selling heat;
3. selling power;
4. selling heat and power.

Besides this other classification of biomass business can be made depending on the property of the biomass plant, or of the biomass itself; this can be:

1) Private property;
2) Public property;
3) Public-Private shared property.

From the two above mentioned classifications the following schemes can be traced back:

1) **Producing Heat (for the public) and or Power with public or private biomass using concession PPP model.**

**Case Description**

This case presents the reality in which the Public body produces heat and or power, using PPP model based on concession. The biomass can be public or private. If it is public there will be a risk for the public body. While if it is private the risk will be transferred to the private plant. The public biomass can be produced for example from wood that is in the lands that belong to the Public Body. To reduce the investments and allocate risks the Public Body can choose to make a concession to leave construction and management of the biomass plant to a private society. This project is born as a public project realized with private investments and know how. In any case it is strongly controlled by the public institutions. In this agro-energy district model the PPP contracts are the following:

- biomass conversion plant construction concession (BOT – Build Operate Transfer -, BOO – Build Own Operate -, BOOT – Build Own Operate Transfer -).
- PPA (Power Purchase Agreement). This kind of contract links the producer to the public authority that buys the power produced. In the “CONTRACT REDACTION” phase, so besides the concession contracts (BOT, BOO and BOOT) also the PPA (Power Purchase Agreement) can be considered. Banks can be involved to finance both the public body who is investing in a concession of a service (heat) and the private who is investing in a new plant.

![Diagram](image)

**Fig. 1.5:** Producing Heat (for the public) and or Power with private biomass using concession PPP model.

**ADVANTAGES**
- The public body reduces the total investment;
- The public body allocates the risks;
- The public body spares in heat costs;
- The private has a granted supply of biomass fuel (because it is the owner);
- The private has incomes coming from the concession of a public service;
- If the private sells electricity to the grid the incomes will be higher and so also the added value of the starting fuel. So part of the incomes will be allocated also on the Public Body.

**DISADVANTAGES**
- The property of the plant can be not public (in case of BOO);
- The community can refuse the biomass energy plant if it is not strongly promoted;
- The Public Body has to own biomass and grant a continuous supply with its own financial resources;
- If the private doesn’t sell electricity the incomes will be lower and so also the allocation to the public body of these.
- being not present a Special Purpose Vehicle (SPV) all the management of the Agroenergy district contracts will be on charge of the Public Body.

2) Auto-producing Heat with public or private biomass and/or selling electricity to the grid

**Case Description**

This case presents the Public body (ex. Municipality) that realizes a participated public-private Special Purpose Vehicle. Legally the special purpose vehicle is often a Limited Liability Company (LLC).

![Fig. 1.6: Auto-producing Heat with private biomass and/or selling electricity to the grid.](image)

Besides the SPV can be also the legal entity that gathers the subjects involved in the PPP: such as investors, biomass suppliers and the plant production enterprise. It is the Special Purpose Vehicle that deals with the Private Society that furnishes the plant, the public body that consumes heat and so spares money (ADVANTAGES), the SPV can own and operate the plant or just operate the plant that is owned by the public Body. Anyway the SPV must
have contracts that regulate biomass acquisition from farmers and heat contracting with the public Body and land lease etc..

Also the ownership of the plant has to be cleared: is it of the public body or of the special Purpose Vehicle? Besides the private farmers, as already mentioned, can play a role in the SPV, participating of the incomes given by heat contracting or just being suppliers of biomass and receiving an agreed price for it. All these aspects have to be cited in the specific contracts.

The case in which the Special Purpose Vehicle is involved also in selling electricity to the grid implies that PPA (Power Purchase Agreement) has to be added to the contract framework.

As for case number 1 the private farmers can participate to the incomes coming from heat and electricity contracting or just be biomass suppliers and being paid for it.

In this agro-energy district model the PPP contracts are the following:
- biomass conversion plant (BOT – Build Operate Transfer -, BOO – Build Own Operate -, BOOT – Build Own Operate Transfer -). This is a contract that will regulate the connections between the Special Purpose Entity (SPE) and the Public Body.
- the SPV can also stipulate contracts for fuel (with private farmers) contracts for land and for Operation and Maintenance of the plant and for the property of the same.
- PPA (Power Purchase Agreement) in case of power production.

Banks are principally related with the SPV that attracts the most of the financing resources and, as above mentioned, can contain also sponsors.

ADVANTAGES
- the public body reduces the total investment;
- the public body allocates the risks;
- the public body spares in heat costs.
- in this case the Special Purpose Vehicle works as an attractor and reference point for investments in the agroenergy district;
- the SPV will distribute incomes among its members (ex. Public Body, Privat biomass producers etc.);
- the SPV will be not charged of technical management of the biomass plant, that will be done through an Operation and Maintenance contract with a private society.

DISADVANTAGES
- the SPV has to join the different public and private interests into one compact Body; there could be problems due to the lack of balance between them;
- the SPV has to be adequately composed and able to cover technical, economical and management problems;
- if the private biomass suppliers are not inserted in the SPV biomass supply can be a difficult aspect.

3) Selling heat to privates and possibly selling power to the grid.

**Case Description**

In this case the Special Purpose Vehicle (SPV) buys biomass from private parties, contracts with the public for Land Lease for example, contracts with private for plant acquisition and operation and maintenance and contracts with private buyers for heat selling.

![Diagram](image)

**Fig. 1.7**: Selling heat to privates and possibly selling power to the grid.

This means that the public advantages are the heat contracting incomes, while in this case the private partners spare money. The private farmers that supply biomass can participate to incomes given by heat contracting or agree on a fixed price for the biomass making a fuel supply contract with the Special Purpose Vehicle (SPV).
The case in which the SPV sell electricity to the grid is similar to the previous but it adds the Power Purchase Agreement (PPA) to the contract framework.

ADVANTAGES
- the public body earns money by the property of a biomass plant that sells energy to private users;
- the public body allocates the risks given by the Operation and Maintenance costs, making a concession of Build and Operate to a private society;
- in this case the Special Purpose Vehicle works as an attractor and reference point for investments in the agroenergy district;
- the SPV will distribute incomes among its members (ex. Public Body, Private biomass producers etc.);
- the SPV will be charged of technical management of the biomass plant so it will furnish the adequate know how, and contract management;
- the SPV will work as an intermediate between public Body and private heat consumers.

DISADVANTAGES
- the SPV has to join the different public and private interests into one compact Body; there could be problems due to the lack of balance between them;
- the SPV has to be adequately composed and able to cover technical, economical and management problems;
- if the private biomass suppliers are not inserted in the SPV biomass supply can be a difficult aspect.

4) Private plant selling power to the public.

Case Description
This is a typical case of Power Purchase Agreement. In the field of renewable energies the public wants to increase the REN production, so it has to promote it with favourable contracts with the private plants.
In this case the there is only a contract that is the Power Purchase Agreement contract.
ADVANTAGES
- There is no risk for the public;
- The public authority buys renewable energy and accomplishes to its objectives;
- The private partner sells electricity and obtains an income for it;
- The private farmers have a granted income for the duration of the project and they diversify their activity becoming involved in energy production instead of conventional food commodities production.

DISADVANTAGES
- the plant doesn’t sell heat to the Municipality to maximize its electricity generating efficiency.

1.4  **PPP models adapted to the agroenergy district**

Taking into account the results presented in the publication “Application of Public Private Partnership to the agroenergy district in 5 European countries”, which represents deliverable D4.3 of the project, 5 PPP schemes have been chosen one for each partner country: Italy, Portugal, Spain, Greece, Hungary. These will be summarized in this paragraph.
### Table 1.1: Chosen PPP schemes

<table>
<thead>
<tr>
<th>PARTNER INVOLVED</th>
<th>PPP SCHEME</th>
<th>APPLICABLE CASE</th>
</tr>
</thead>
<tbody>
<tr>
<td>ITALY</td>
<td>Concession Model, according to Italian law D.lgs 12th of April 2006 n.163</td>
<td>1</td>
</tr>
<tr>
<td>GREECE</td>
<td>PPP contract, according to Greek Law 3389/2005</td>
<td>1-2</td>
</tr>
<tr>
<td>SPAIN</td>
<td>Concession model, according to art. 111.c) of the “Text Refundido de la Ley de Contractos de las Administraciones Publicas”</td>
<td>2</td>
</tr>
<tr>
<td>PORTUGAL</td>
<td>PPA (Power Purchase Agreement) with Municipality support</td>
<td>4</td>
</tr>
<tr>
<td>HUNGARY</td>
<td>PPA (Power Purchase Agreement) with Municipality support</td>
<td>4</td>
</tr>
</tbody>
</table>

### 1.6 Bibliography


[18]: Buchholz, T., Volk, T., 2007. Designing Short Rotation Coppice Based Bioenergy Systems for Rural Communities of East Africa. United States Agency for International Development;
Chapter 2

PPP IMPLEMENTATION: ITALY

2.1 Implementation of the methodology: activities of the Italian partner

The PPP implementation in the Italian target area, on the basis of the gained experience during the Rurale.Evolution project is shown in figure 2.1.

Fig. 2.1: Implementation of the methodology.
The methodology actually implemented in the Italian target area is composed by 6 steps:
1) Municipality meeting;
2) Biomass assessment;
3) Italian PPP consultant meeting and legal framework;
4) Key actors meeting;
5) Bank meeting;
6) PPP contract implementation.

2.1.1 First step: municipality meeting

The first step was that of the meeting with Montefalco Municipality staff, since 15/01/2009. The Municipality in Italy represents the main reference public body in the agroenergy district so the choice of the Municipality depends on two factors: if the PPP is made from public initiative the Municipality will be the public promoter and so it will be automatically identified, if the PPP will be made by private initiative the Municipality will be chosen on the basis of logistic and economical considerations made by the private partners.

At the above mentioned meeting the following persons were present:
- The director of CRB and the TEG (Transnational Expertise Group) responsible with the aim of consulting in the agroenergy district design process;
- The major of Montefalco municipality;
- The project coordinator;
- Two persons belonging to Coldiretti representing the farmers in the area of Montefalco municipality.

The main results of the meeting were:
- The individuation of the wine industry chain as a possible starting point for the design of the agroenergy district;
- The assessment of the possible interest of the Municipality in the agroenergy district development in Montefalco;
- The summary of previous project on bioenergy conducted in the Municipality;
- The analysis of existing legislation in Montefalco municipality dealing with PPP and green energy tenders;

The individuation of the Consortium of wine producers as a possible interlocutor for the green energy initiative.
2.1.2 Second step: biomass assessment

Once the Municipality had declared its interest in the project RuralE.Evolution, through the accurate analysis of biomass availability in the region and the needs of the area, and especially energy sinks individuation, the bioenergy chain was determined as: the production of heat with prunings for the energy supply of a public school in Montefalco.

2.1.3 Third step: Italian PPP consultant meeting and legal framework

Once the agroenergy district project was individuated the PPP legislation and contracts were examined for this reason the UTFP (Technical Unit of Project Financing), that is the responsible body for PPPs in Italy and also a consultant body for Municipalities and public partners interested in PPPs, was contacted in two meetings. The first telephone meeting was on 23/01/2009, the second on 5/02/2009 and was held in Rome. The following persons were present:
- The RuralE.Evolution project coordinator;
- A member of Coldiretti;
- The responsible of UTFP and the relative staff;

The main results of the meeting were:
- The declaration of interest from UTFP for the RuralE.Evolution project;
- The definition of a procedure to coordinate the PPP contract design and correction, given the availability of UTFP.

The meeting has to be inserted in the Italian legal framework concerning agroenergy districts PPPs. This means that: the renewable energy regulation in Italy have to be considered as well as PPP legislation.

Renewable energy regulation

At the end of 2007, the Italian government has introduced some new provisions for renewable power generators. With this framework, in order to promote RES electricity, Italy has adopted the following schemes:
1) Quota obligation;
2) Green certificates;
3) Feed in tariff system

An obligation for electricity generators to feed a given proportion of RES electricity into the power system has been introduced. In 2007, the target percentage was 3.05%. In case of non-compliance, sanctions are foreseen, but
enforcement in practice is considered difficult, because of ambiguities in the legislation. The renewable energy obligation for Italian suppliers will increase annually by 0.75% to 2012 (instead of the former 0.35%), starting from the 2007 share of about 3.05%. After 2012, a new annual increase percentage will be established by the Italian government.

The Financial law 2008 (LEGGE n.º 244, 24th December 2007) changed the green certificate system in many parts and, in parallel with the green certificate system, it has established a new feed-in tariff system for small renewable plants (P<1 MW) but these feed in tariff only applies for plants started producing from (or that were refurbished or revamped after) the 1st January 2008:

- small plants (P<1MW, Wind<200 kW) can decide to sell energy and take the green certificates or a feed-in tariff (electricity price + public grants);
- these feed-in tariffs are different for each renewable source and differ from 18 ct/kWh for gas from landfill to 34 ct/kWh for tidal and wave energy;
- feed-in tariffs will be released for 15 years (see table 6);
- priority access to the grid system is granted to electricity from RES and CHP plants.

<table>
<thead>
<tr>
<th>Plant size</th>
<th>Source</th>
<th>Feed-in tariff</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 1 MWe</td>
<td>Biodegradable waste, biomass different from the other in next point</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>Biomass and biogas via agricultural farming and forestry activities</td>
<td>30, not applied at the moment, to be implemented through a specific decree</td>
</tr>
</tbody>
</table>

In order to support RES Heating and Cooling, the investment subsidies are voted to promote micro, small scale and diffused cogeneration units. The overall amount of contributions is equal to 30.000.000 Euro, to be distributed to eligible and selected projects with the following criteria:
- up to 20% of capital cost (maximum limit of 200.000 Euro) for units fed by natural gas (increased to 30% in case of tri-generation);
- up to 30% of capital cost (maximum limit of 300.000 Euro) for units fed by biomass or for hybrid units fed by natural gas – biomass: increased
to 40% in case of tri-generation or for projects in areas not serviced by gas network the contribution is increased to 40%.

Italy planned to offer incentives for investment in renewable energy production. Qualifying production units include:

- grid connected photovoltaic plants from 20 kW to 50 kW;
- wind energy plants from 20 kW to 100 kW;
- solar thermal collectors from 50 m² to 500 m²;
- biomass plants from 150 kW to 1000 kW.

Nevertheless, the Budget Law 2008 explicitly forbid cumulating any kind of capital incentives.

Besides this, RES Investments benefit from a rebate on VAT (10% instead of 20%, the usual VAT rate) and from a 10-year corporate tax reduction, if carried out in southern regions.

**PPP legislation**

The Italian legal framework for the realization of PPP operations contract are covered in most part by the Legislative Decree no. 163/2006 [2]. Within it, in line with the directives of the EC 2004, are defined and ruled the concessions of public works and service concessions, including the sponsorship contract. Also the approval of the Finance Act in 2007 made it possible the employment of property leasing contracts for the construction of public works.

In Italy at the moment there are 7 forms of PPPs:

1) Contract of concession to build and management based on public initiative (art.143 of “Code of public contracts for works, services and supplies”, D.Lgs. n.163 of 2006). This is the traditional concession to build and operate in which the public administration, once the infrastructural needs have been individuated, elaborates a preliminary project and inserts this in the programming instruments already approved. On the basis of the preliminary project made by the public administration it starts the private tendering procedure to individuate a winner.

The private income is received during the operation phase while there are also risks of financial and technical nature. The public contribution aims to grant to the private the obtainment of an economic and financial balance.

2) Contract of concession to build and operate based on private initiative (art. 153 and following of “Code of public contracts for works, services and supplies”, D.Lgs. n.163 of 2006). This is a particular procedure in which the private sector is the promoter for the realization of a public facility or service and presents to the public administration a specific
Guidelines for successful application of PPP to RES Agro-energy districts

A project that is linked with infrastructures already inserted in the programming instruments of the administration itself. The private income is received during the operation phase while there are also risks of financial and technical nature. The public contribution aims to grant to the private the obtainments of an economic and financial balance.

The proposal, once declared of public interest by the administration, is the basis of a public tender, aimed to the identification of the dealer, articulated in two moments.

3) Other concessions of operation. These are contracts between the public authority and a private subject for the supplying of a service. The private income is perceived during the operation of the service and can be linked to a price. This is balanced by the risks in operation the service. Compared to the previous two forms in this case the supplying of the service is not linked with the realization of a facility, and if a kind of facility is required, its value is not significant with respect to that generated by the supplying of the service.

4) Mixed public-private company. The D.lgs n.267 of 2000 [3] with art. 113 and following, identifies two typologies of public-private companies: stock companies with the purpose to realize with the contractual obligation of majority participation of public bodies, to which can be assigned the only operation of services with or without economic significance; companies limited by shares realized without the contractual obligation of the majority participation of local bodies, for the operation of public services that have no economic significance and for the realization of the facilities necessary to the operation of services or for the realization of infrastructures and other works of public interest.

5) Urban transformation company. Urban transformation companies have been introduced with art. 120 of dl.lgs 267/2000. These represent a particular typology of mixed companies and are based on a specific social purpose, that is the design and realization of urban transformation works, that will operate urban plans. Private income derives from the commercialization of the works realized on the upgraded area.

6) Public sponsorship contract. These are contracts subscribed between a public body, that assumes the qualify of sponsee, and a private operator sponsor; the first will display the name and/or logo of the private sponsor that will pay for this.

7) Immovable leasing. These are contracts of lease of movable or immovable properties acquired or build by the lessor following indications of the leaseholder who will assume all the risks and who will...
have the possibility to become the proprietary of the leased properties at the end of the contract, by paying an established price. The law 27 December 2006, n. 296 (Finance Act 2007) art. 1, paragraphs 912-914 and 907.908 allows the use of the leasing contract for the construction, the acquisition and completion of public works or public utilities, by the commissioners required the application of the code of contracts public works, services and supplies.

Procedures for awarding the concession contract and management. The above mentioned PPPs forms in Italy can be summarized in Figure 2.2.

The dimensions and the structure of PPP market in Italy

PPP in the last years have assumed a growing importance in Italy. Comparing the data related to the PPPs with those of conventional project financing the impact of PPPs in terms of economical value is raised in 3 years, from 2002 to 2005, form the 12.8% to the 44.2%.

![Fig. 2.2: PPP forms in Italy [4]](image)

If the PPPs are classified based on the value, it can be seen that the most of them are middle to low value operations (inferior to 5 million euro). In 2004, there were 481 PPPs of which 367, that is 76%, had a value inferior to 5 million
euro. In 2005 the percentage raised to 82%. Regarding the sectors in which PPPs initiatives are concentrated, these are medical facilities and utilities such as: water, methane, energy, telecommunications, and transports, that all together represent the 80% of the market of 2005 with 9 billion euro of value.

The dimensions and the structure of PPP market in the renewable sector in Italy.

Fig. 2.3 (and the accompanied graph) gives the PPP that have interested the renewable energy sector in Italy from 2003 to 2008 (Total number is 254), while the quantity of PPPs to be assigned is proposed in fig 2.4.

![Fig. 2.3 PPP Typologies in Italy.](image)
* Elaborations made by Coldiretti and CRB based on PPP Italian Observatory data

The evolution of PPPs of the renewable sector during years is proposed in the following fig.2.4 (and the accompanying graphs).
2.1.4 **Fourth step: key actors meeting**

Once the energy sink (represented by a public local school) was individuated, the technical availability of biomass was estimated organizing a meeting in Montefalco (20/7/2010), joining so the farmers interested to the project (biomass supply) and the personal of the municipality of Montefalco (responsible for the public school that represents the sink).

In the meeting held in Montefalco in 20/7/2010 the following persons were present (see also figure 2.5).

The third parties involved were the following: 6 farmers, 2 representatives of the Municipality of Montefalco, a bank. Two further banks have been contacted in other meeting and also a biomass plant producer.

The main results of the meeting were:
- The individuation the real biomass availability;
- The individuation of the possible energy sinks;
- The confirmation of the interest of the Municipality of Montefalco;
- A detailed communication campaign with the aim to show the contents of the project RuralE.Evolution and to inform the farmers and the Municipality on the importance of the PPP contract;
- The availability of the farmers and of the Montefalco municipality to sing the Memorandum of understanding, object of the project.

### 2.1.5 Fifth step: bank meeting

Once the biomass availability and biomass demand were individuated and the whole feasibility of the bioenergy chain was analyzed the fund raising has to be taken into account. In this project the contacts made were basically 4:

1) with Creditagri dated 20/07/2010 (meeting inserted during the local event);
2) with CR Foligno dated 20/07/2010 (meeting inserted during the local event);
3) with UNICREDIT Perugia dated 31/1/2011 during a meeting happened between a CRB (Biomass Research Centre) representative and a UNICREDIT representative.
4) with BNL-Pariba in Perugia, dated 18th February 2011 between a CRB representative and BNL-Pariba representative.

The main results of the meetings were:
- Credit Agriumbria has developed a financial product specific for agroenergy, that has been taken into account in this project;
- Unicredit Umbria has not developed a biomass specific product but it has given an example of the conditions and grants required to a private investor to have access to funds;
- BNL-Pariba has not developed a biomass specific product but it has furnished a clear outlook of the procedure needed to access funds both for public bodies and private investors.

### 2.1.6 Sixth step: PPP contract implementation

The feasibility plan and business plan of the bioenergy chain was implemented by CRB using a Canadian software (Retscreen International);

The contract was redacted based on the improved existing case in the renewable field.
2.2 **SWOT analysis**

From fig.2.1 it can be inferred that 7 steps for the methodology implementation have been realized. The strengths, weaknesses, opportunities and threats of each methodology macro-area, that is:

1) Target area characterization;

2) PPP implementation;

3) Contract redaction;

Are shown in tables 2.1-2.2-2.3.

1. Target area characterization

**Tab. 2.2: Target area SWOT analysis**

<table>
<thead>
<tr>
<th>STRENGTHS</th>
<th>WEAKNESSES</th>
</tr>
</thead>
<tbody>
<tr>
<td>There are always statistics available about the target area main characteristics</td>
<td>The coefficient used to estimate biomass production are not always updated and reliable</td>
</tr>
<tr>
<td>The identification of potential actors is easier if there is some collaboration with farmers organizations (ex. Coldiretti)</td>
<td>The study of area characteristics may require time and imply elevated costs</td>
</tr>
<tr>
<td>Biomass availability study have been already realized and are available in the Literature (es. European projects BEE and CEUBIOM etc.)</td>
<td>The area potential production is not the same of the real production</td>
</tr>
<tr>
<td></td>
<td>The communication campaign could be difficult to realize if there is few interest from the population and the industrial sector</td>
</tr>
<tr>
<td></td>
<td>It is difficult to have detailed information about the energy sinks</td>
</tr>
<tr>
<td></td>
<td>There are few examples of agro-energy districts working</td>
</tr>
</tbody>
</table>
GUIDELINES FOR SUCCESSFUL APPLICATION OF PPP TO RES AGRO-ENERGY DISTRICTS

There are in the area great quantities of not used residual biomasses (ex. Prunings).

Some innovative instrumentation has been developed to describe the biomass potential of an area through the use of Geographical Information Systems.

The identification of key actors and stakeholders was made easier by the fact that already in other projects (ex. BEN) networks of biomass enterprises in the Umbria region have been already developed.

There are some technologies commercially available to produce energy from biomasses (ex. Biogas, vegetable oils fed in an internal combustion engine etc.).

The harvest or collection of biomass is very expensive.

The individuation of the right conversion technology to transform biomass into energy has to be done with accurate analysis.

The tendering procedure for the individuation of the partners is very important.

Biomass production shall be proportional to the demand of energy.

2. PPP IMPLEMENTATION

<table>
<thead>
<tr>
<th>OPPORTUNITIES</th>
<th>THREATS</th>
</tr>
</thead>
<tbody>
<tr>
<td>There are in the area great quantities of not used residual biomasses (ex. Prunings)</td>
<td>It is difficult to find local legislation about PPPs</td>
</tr>
<tr>
<td>Some innovative instrumentation has been developed to describe the biomass potential of an area through the use of Geographical Information Systems</td>
<td>The harvest or collection of biomass is very expensive</td>
</tr>
<tr>
<td>The identification of key actors and stakeholders was made easier by the fact that already in other projects (ex. BEN) networks of biomass enterprises in the Umbria region have been already developed</td>
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</tr>
<tr>
<td>Biomass production shall be proportional to the demand of energy</td>
<td></td>
</tr>
</tbody>
</table>

Tab. 2.3: PPP implementation SWOT analysis

<table>
<thead>
<tr>
<th>STRENGTHS</th>
<th>WEAKNESSES</th>
</tr>
</thead>
<tbody>
<tr>
<td>The feasibility study can use a plenty of data available on the web.</td>
<td>It is difficult to find local legislation about PPPs</td>
</tr>
<tr>
<td>The tender procedure is standardized and always the same</td>
<td>It is difficult to get connections with the charged bodies that deal with PPP design and legal consultancy</td>
</tr>
<tr>
<td>The economic feasibility of the project can be estimated using also adequate software</td>
<td>Most of the times banks have not yet developed financial products to be used to promote the production of energy from biomasses</td>
</tr>
<tr>
<td>The Public Private Partnership organization will reduce the risk connected with the business model for the private</td>
<td>The tendering procedure is of fundamental importance for the exit of the partners search</td>
</tr>
<tr>
<td></td>
<td>The promotion of a bioenergy project in a municipal area requires numerous meeting with the population to explain better advantages and disadvantages of this kind of new energy source</td>
</tr>
<tr>
<td></td>
<td>PPPs budget in the agroenergy sector is quite low.</td>
</tr>
</tbody>
</table>
OPPORTUNITIES

All the PPPs schemes push toward a reduction for the risk for privates

The competition among private bidders will produce lower costs for the service for the public counterpart

To evaluate the investment costs a detailed analysis of the conversion technologies available on the market has to be made

3 CONTRACT REDACTION

Tab. 2.4: Contract redaction SWOT analysis

STRENGTHS

The contract is the fundamental instrument that will regulate all the relationships between the partners of the PPP

Often it is possible to have a concession type of contract

There are some sample contracts available on the web

WEAKNESSES

In the agroenergy district most of the times more than one contract is required

It is possible to have sub-tenders besides the concessionaire

It is possible that the Municipality will recur to more than one raw biomass producer (ex. Consortium)

OPPORTUNITIES

The contract will defend public needs and interests and grant good conditions of service by the concessionaire

The contract has to protect the end user’s interests and public interests also

Land acquisition has to be taken into account

The connection to the electrical grid has to be taken into account

THREATS

It can be difficult to find all the prices for the investment and operating costs linked with the functioning of the plant

The selection of the public partner has to be based on clear motivations

The selection of the private partners has to be based on clear motivations

The communication campaign can be very expensive and not useful

The public private partnership could require the case of forming a new participated society that will contain public and private members.

Banks loans are very difficult to obtain and are interested by very restrictive conditions
2.3 Bibliography

[2]: Decreto legislativo 12 aprile 2006, n. 163, Codice dei contratti pubblici relativi a lavori, servizi e forniture in attuazione delle direttive 2004/17/CE e 2004/18/CE (G.U. n. 100 del 2 maggio 2006);
[3]: Decreto Legislativo 18 agosto 2000, n. 267 "Testo unico delle leggi sull'ordinamento degli enti locali" pubblicato nella Gazzetta Ufficiale n. 227 del 28 settembre 2000 - Supplemento Ordinario n. 162;
[4]: http://www.utfp.it/docs/interventi/BI_Forum%20Rinnovabili_%20PF_Ferrante_.pdf
Chapter 3

PPP IMPLEMENTATION: GREECE

3.1 Implementation of the methodology: activities of the Greek partner

The PPP implementation in the Greek target area, on the basis of the gained experience during the Rurale.Evolution project is shown in figure 3.1 and figure 3.2, divided into: preliminary actions and PPP implementation.

![Diagram of PPP implementation process]

**Fig. 3.1**: Implementation of the methodology: preliminary actions.
Fig. 3.2: Implementation of the methodology: PPP implementation.

Below we present the activities and lessons learned from the implementation of the above methodology in Greece.

### 3.1.1 Identification of areas' needs

The first step in preparing the PPP for Greece was the study of the area where the project will be developed in order to identify the desired coverage targets and service needs. As TCTK initially conceived the idea for an agro-energy district in Greece, it also carried out a sector analysis and defined the technical specifications of the proposed PPP project.
Fig. 3.3: Kilkis prefecture

The selected area was the Kilkis Prefecture which is located in Central Macedonia Region in the northernmost point of Greece. Its capital is the city of Kilkis. Our main area of concern is the Municipality of Evropos, where the “Tobacco Cooperative of Toumpa Kilkis” (TCKT) is based. TCKT was founded in 1983 in order to organize and trade its members’ production of eastern type tobacco. Today it is the longest lived tobacco co-operative in Greece that was established as one of the leading co-operatives in production, processing and supply of Virginia variety tobacco. However, following the adoption of total decoupling for the tobacco sector in Greece, production fell by 80%. Only four processing plants remained operative in 2009 in the whole country. Concerning employment, existing estimates suggest that the number of permanent employees has reduced by 50%, whilst the number of seasonal workers has been reduced from pre-reform levels of 7,000 to about 2,000.

Therefore, in 2006, almost all the members of TCKT abandoned the Virginia tobacco growing and turned to the search and experimentation of other alternative cultivations. In this context and evaluating the trends of the European and global market, they have initiated the plantation of pomegranate trees. The production of pomegranate fruits in 2008 reached 4000-8000 tonnes and there are plans to increase the cultivated hectares within the next years and plant even more different kinds of trees. This choice was seen as an opportunity to maintain farmers’ jobs and create a competitive rural economy that will be independent from subsidies and will eventually lead to sustainable agriculture and sustainable development of the Prefecture that currently possesses the last place in the development indicators (GDP etc.) and has been also included in
the list of Greek areas with high risk of desertification due to intensive agriculture & soil degradation. The pomegranate project included the construction of a plant to produce pomegranate juice. In the context of the RuralE.Evolution project, TCTK was considering the idea of using the biomass residues from this plant (seeds or shells or both) to produce bioenergy. It was demonstrated to have 2000 tonnes of dry matter, with 19,000 KJ/kg LHV.

3.1.2 Role of stakeholders

The initial stakeholders were the Tobacco Cooperative of Toumpa Kilkis and the Municipality of Evropos. TCTK is a partner in the RuralE.Evolution project. The Municipality of Evropos is in the area where the cooperative is operating; discussions took place with the Mayor and with members of the Municipal Board. The target area (Municipality of Evropos) has been defined in the application form, and is mentioned in the signed project contract of the RuralE.Evolution project.

3.1.3 Market testing

Market testing revealed that there is a great potential for the use of the field crop residues, in addition to the pomegranate residues. Expansion of the initial considerations was facilitated by the support of EACI through the RuralE.Evolution project, and revealed that the general treatment of field crop residues in Greece is either to incorporate them into the soil or burn them in the field. A part is already exploited and used in several energy and non-energy markets, for example:

- cereal straw is used for various purposes such as animal feeding and animal bedding; in some cases also used for heat production in greenhouses;
- there are no alternative markets for cotton, corn stalks and corncobs but difficulties in harvesting and handling;
- olive prunings (especially the large stems) are used in stoves and chimneys for residential heating.

The expansion of the feasibility study of the project revealed that biomass from adjacent areas can also be used in addition to the pomegranate residues and the energy produced can be not only used for refrigeration purposes but also for covering the energy needs of the adjacent Municipality of Evropos; energy in excess can be also sold to the national grid. Furthermore, Organic Rankine Cycle (ORC) technology was selected for the biomass utilisation plant.
ORC is more cost effective than CHP (Combined Heat and Power) technologies such as gasification coupled to ICE (Internal Combustion Engines) or GT (Gas Turbines), and do not also have to be supervised by specially trained personnel which leads to a much more economic working.

### 3.1.4 Potential benefits individuation

The potential benefits of the proposed partnership were defined in relation to the available income for the farmers, as well as in relation to the benefits of obtaining this income through a PPP. Specifically it was recognized that:

- finding new economic opportunities for farmers in the region is essential for the maintenance of employment and for the prosperity of the region of Kilkis in general.
  - the great advantage of the area is the availability of agro-forestry residues due to the extensive agricultural land. Zootechnical and food industry residues also exist for future use;
  - farmers want to get rid of the residues from their fields so it's easy to collect them;
  - the scheme will offer an alternative income for farmers.

- The sector of renewable energy is an important productive factor and a tool for promoting employment, for the sustainable development and for the competitiveness of the region of Kilkis in general.

- The climate protection through the promotion of the production of electricity from renewable energy is an environmental and energy high priority for the country and defends the public interest.
  - The deregulation of the energy market of Greece facilitates the selling of electricity produced by an agro-energy plant to the Public Power Corporation / The connection to the PPC network is relatively easy;
  - The introduction of Greek Law 3851 / 4 June 2010 offers high guaranteed revenue to operators of renewable energy plants for a period of 20 years.

- In PPPs it is recognized that each contracting party has an advantage over the other in carrying out certain tasks under the contract, so by assigning to each party the tasks that this party performs better, what is achieved is the provision of public services and infrastructure at the best economically acceptable way.
  - the Introduction of Law N.3389/2005 on PPP that concentrates all relevant aspects in one coherent framework, has created a much
more transparent framework that lowers the hesitations of partners to enter partnerships;
  - the deregulation of the energy market of Greece facilitates the selling of electricity produced by an agro-energy plant to the Public Power Corporation;
  - the connection to the PPC network is relatively easy;
  - there will be sufficient profit to the investors.

3.1.5 Identification of potential actors to be involved in the planning process

Due to location specificities (i.e. partners needed to be close) the selection process was not wide in relation to the main actors. The two main parties in the PPP were TCTK and the Municipality of Evropos TCTK, leading the process as RuralE project partner, selected actors located in (or close to) the target area, together with the one private company that had demonstrated the strongest experience in biomass utilisation and a genuine commercial interest in the venture. These actors included the company Rodonas S.A. that was founded from members of the cooperative; discussions took place with the Management of the company and with shareholders. The company PHILIPPOPOULOS ENERGY TECHNICAL S.A. was selected as a technology provider after a thorough review of the market for companies able and willing to participate in the scheme, and after initial discussions with other companies and actors. The company has 35 years of specialist experience and already more than 100 installed projects. TCTK consulted at least 6 private companies and the Greek Environment Ministry in order to discuss options for the development of a PPP specific to agro-energy schemes. Area farmers were contacted in order to provide raw material to the plant. The Aristotle University of Thessaloniki agreed to provide the know-how and steer the process, and banks / financiers were sought to provided loan funding for the venture.

In summary the stakeholders identified were the following:
- Tobacco Cooperative of Toumpa Kilkis: Private actor (farmers’ cooperative).
- Municipality of Evropos: Public actor.
- PHILIPPOPOULOS ENERGY TECHNICAL S.A.: Private actor.
- The Aristotle University of Thessaloniki: Public actor.
- Farmers / agricultural SMEs of the area: Private actors.
- Investment banks: Private actors.
3.1.6 Exploration of available national legal / regulatory and policy frameworks

The legal framework of PPPs

Law 3389/2005 establishes the legal framework for the implementation of PPPs in Greece. This legal framework aims to promote the implementation of PPP projects, taking into consideration the experience gained from concession agreements that were successfully implemented in Greece, but also the important attempts to implement privately funded projects, many of which, however, were not successful because of the inadequate preparation of the contracting authority, the incomplete business justification or the unrealistic estimation of their feasibility. For the first time, Law 3389/2005 introduced a stable legal framework that overcomes the above mentioned obstacles.

Specifically the law defines the Public Entities (Central Administration, local government organizations, legal entities under public law) that can implement partnership contracts with Private Entities, in areas falling within the scope of their competence. The private sector undertakes a significant part of risk, related with financing, constructing and providing infrastructure or services. PPPs are not allowed to engage in projects or activities that are the direct and exclusive province of the State, under the terms of the Constitution of the Hellenic Republic, such as national defense, police work, the award of justice, and the execution of judicially imposed penalties and sentences.

Law 3398/2005 provides incentives for both public and private entities to be engaged in partnerships for constructing infrastructure or delivering services, mainly through the simplification of relevant procedures. Under Law 3389/2005, two new administrative bodies have been established, aiming at the support of Public Authorities, in order to improve the effective preparation and management of PPP projects:

- the Inter-Ministerial Committee for PPPs (IM PPP Committee) is a collective governmental body that defines and specializes PPP policy, approves PPP projects that fall under Law 3385/2005 for the provision of infrastructure and the delivery of services by private funds, and coordinates and monitors the implementation of PPP projects;
- the Special Secretariat for PPPs (PPP Unit) has been established within the Ministry of Economy and Finance. This Special Unit identifies projects that can be delivered via a PPP scheme, promotes their implementation and provides support and assistance to IM PPP Committee and to the Public Entities in the context of all necessary procedures for the finalization of a PPP project.
According to the legal framework, parliament ratification of PPP contracts is not needed. The procurement procedures are in line with the EC Directive 2004/18, aiming at the customization of relevant procedures and the improvement of the efficiency of public administration.

**Law 3851/2010 on Renewable Energy Sources**
Greek Law 3851/2010 on “accelerating the development of Renewable Energy Sources to deal with climate change and other regulations addressing issues under the authority of the Ministry of Environment, Energy and Climate Change” simplifies the licensing procedure for RES projects and aspires to give Greece up to 40 per cent electricity from RES until 2020. The Law offers a fixed guaranteed price of 0.23 cents / KW for biomass utilization plants that are established without public subsidies. This price is reduced to 0.20 cents / KW if public subsidies are utilized for the establishment of the plant. The price is guaranteed for 20 years for operations that start after 2011 and until a new price is set.

### 3.1.7 Selection of the right PPP option

See page 44 in the publication “Application of public private partnership to the agro-energy district in 5 European countries”.

### 3.1.8 Communication strategy to reach stakeholders and community

The Tobacco Cooperative of Toumpa Kilkis with the assistance of the Aristotle University of Thessaloniki started its communication strategy organizing the 1st project Local Initiative in Toumpa Kilkis on the 8th of May 2009. The event was hosted by the Municipality of Evropos and managed to attract the interest of local stakeholders, entrepreneurs and farmers. 35 persons participated in this initiative that aimed to illustrate the concept of PPP applied to agro-energy districts to the local community. This was the first of a series of events that took place during the lifespan of the project in order to raise awareness of the local population on the implementation of agro-energy districts and discuss the risks and opportunities related to the involvement in a local PPP for an agro-energy district. The investigation of the local needs and expectations was also a main objective of these events, as well as of round table discussions and personal meetings that took place throughout the duration of the RuralE.Evolution project.

Two possible scenarios for agro-energy districts were considered and communicated to the area actors. The first scenario concerned the introduction
of energy crops in the region with the aim that energy plants can substitute the
conventional cultivations and bring benefits to the local farmers. Farmers had
hesitations for the successful implementation of this scenario, as it has been
tested in the past with no significant benefits. The second scenario concerned
the use of biomass for energy production through a possible PPP formation for
the use of agricultural residues in the production of energy. This scenario
seemed more promising and attracted higher interest from the area farmers,
especially if the energy surplus is sold to the Public Power Corporation as
electricity.

Further meetings and discussions helped to define the exact role of each
actor in the area, and lead to the signature of a Memorandum of Understanding
(MoU) among the concerned parties.

3.1.9 Set up the planning team

The RuralE.Evolution project materialised latent concerns on how to utilise
agricultural residues in the area. Indeed, no plans to utilise these residues have
been in place until the realisation of the RuralE.Evolution project. The project
provided the main concepts and is currently developing the methodology to
implement the planned initiative; without the project no such implementation
would have happened. Therefore the planning team set up for the
implementation of the foreseen PPP in Greece was in essence the same team
of the RuralE.Evolution project (as this was actually the subject of the project),
having people working jointly between TCTK and AUTH. Employees and
external collaborators of TCTK were also consulted (outside the
RuralE.Evolution project team), such as geotechnical experts, as well as area
farmers. No formal roles were given to this team in relation to the planning of the
PPP (e.g. financial manager, technical manager, etc); instead the team kept a
structure to also comply with the requirements of the RuralE.Evolution project
(e.g. project manager, external expert, etc).

3.1.10 Study of the target area characteristics and SWOT analysis

The characteristics of biomass production and exploitation were studied
based on a common methodology composed by the following steps:

1. crop surface data collection;
2. residue production per surface unit coefficients collection;
3. biomass production estimation;
4. heat and electricity production estimation based on biomass LHV and technology efficiencies;
5. thermal power and electrical power production, based on bioenergy plant working hours.

The results are proposed in Annex 1.

Finally Strengths Weaknesses Opportunities and Threats were analyzed through a SWOT analysis.

### 3.1.11 Selection of suitable partners / Achievement of successful partnerships

TCKT and the Municipality of Evropos individuated the following activities in order to achieve a successful partnership agreement:

a. TCKT took actions to raise awareness among its members and among area farmers about the supply of biomass for the production of electricity and heat and invite its members to offer this biomass to the plant. The member of TCKT and all other area farmers were asked to sign the PPP’s Memorandum of Understanding.

b. TCKT initiated procedures to sign a contract with the company Rodonas SA which will be asked to supply the land for the establishment of the electricity generation plant and the biomass from the processing of pomegranates to be utilised in the operation of the plant producing electricity and heat. Rodonas SA was also asked to sign the PPP’s Memorandum of Understanding.

c. TCKT initiated procedures to sign a contract with the company FILIPPOPOULOS ENERGY SA which was asked to undertake the technical implementation of the electricity and heat production plant. FILIPPOPOULOS ENERGY SA was also asked to sign the PPP’s Memorandum of Understanding.

d. TCKT asked for the support of the Department of Agricultural Economics of the Aristotle University of Thessaloniki, to provide expertise on the implementation of the PPP and to support the PPP in its communication needs. A representative from the University was also asked to sign the PPP’s Memorandum of Understanding.

e. The Municipality of Evropos agreed to examine the possibility to use the generated energy to meet energy needs of its buildings and prepare accordingly.

f. The Municipality also agreed to promote and publish its intention to participate in this effort and to inform its residents inviting them to take part and actively intervene in the implementation of the PPP.
Besides the above entities, the concerned parties agreed to also cooperate in integrating new parties in the PPP, such as:
   a. farmers;
   b. small and medium-sized farms and agricultural cooperatives;
   c. local public bodies;
   d. banks, financial bodies and credit institutions;
   e. local small and medium-sized enterprises;
   f. consumer associations;
   g. regional bodies and bodies of the local authorities dealing with energy and environmental issues.

3.1.12 Development of Business plan

To plan the investment, two types of costs have estimated:

1. Costs for the initial investment (start-up costs).
2. Costs for the operation of the plant (operational costs).

These two types of costs are presented with more detail in the publication “Application of Public Private Partnership to the agroenergy district in 5 European countries”.

The initial investment costs are composed by:
   • Acquisition of existing buildings (offices, common facilities, storage rooms);
   • New buildings and infrastructure (access roads, etc.);
   • Equipment;
   • Vehicles (tracks) to transport biomass;
   • Office and other equipment (PCs, lifts, trailers, etc.);
   • Land acquisition.

The Operational costs (per year) are composed by:
   • Personnel;
   • Cost of biomass (including transport and compensations paid to area farmers for their biomass);
   • Electricity consumption;
   • Equipment maintenance and consumables.

The revenues are represented by the electricity sold to the grid.
3.1.13 Implementation of a Consensus Building Strategy

Discussions in relation to the implementation of the PPP led to the signing on a Memorandum of Understanding (MoU) in relation to the PPP development among many of the concerned and contacted actors. The MoU was signed by two public entities (the Municipality of Evropos and the Aristotle University of Thessaloniki), The Tobacco Cooperative of Toumba Kilkis, two private companies (Rodonas SA and Filippopoulos SA), 8 area farmers, and two agricultural technicians, on the 4th of October 2010. This MoU is clarifying actions for each party, and sets implementation goals.

Specifically, the signatory parties of the MoU have agreed to cooperate towards the creation of an agro-energy district in Evropos, Kilkis, through the preparation and implementation of a Public Private Partnership (PPP).

They further agreed on a common framework that includes:

a. The calculation of the amount of biomass that could be provided for exploitation in the agro-energy district of interest and the preparation of a feasibility study for this purpose.

b. The preparation of an indicative PPP contract plan which includes the basic parameters of the participation of each party.

Any third parties signing the Memorandum have to state that they fully accept all its articles and are committed to assist the main signatories in its successful implementation. New parties may sign at any time after acceptance by TCKT and the Municipality.

Round table meetings with new potential partners are continuous in order to define the exact role of each partner and include more potential actors in the PPP scheme.

3.1.14 Selection of suitable technology/production plan according to local characteristics

The initial considerations included the idea of using the biomass residues from a plant to produce pomegranate juice for refrigeration purposes, e.g. to cool the storage rooms of TCTK (~300m2) and maintain there the pomegranates or the packed juices. For the purpose of the RuralE.Evolution project, we supposed to have 2000 tonnes of dry matter, with 19,000 KJ/kg LHV; this is equal to 760 KWf available for refrigeration. The technology used would be an ammonia absorption refrigeration plant (351 kw power) coupled with a biomass boiler (of about 555kw thermal power).
The expansion of the feasibility study revealed that biomass from adjacent areas can also be used in addition to the pomegranate residues and the energy produced can not only be used for refrigeration purposes but also for covering the energy needs of the adjacent Municipality of Evropos; excessive energy could be also sold to the national grid. Furthermore, Organic Rankine Cycle (ORC) technology was selected for the biomass utilisation plant. ORC is more cost effective than steam powered machines (especially the boiler), and do not also have to be supervised by specially trained personnel which leads to a much more economic working.

Typical ORC systems burn biomass fuel in a combustor made according to the same techniques used for hot water boilers. Hot thermal oil is used as heat transfer medium, providing several advantages, including low pressure in the boiler, large inertia and insensitivity to load changes, simple and safe control and operation. An Organic Rankine Cycle turbogenerator converts the available heat to electricity. The condensation heat of the turbogenerator produces hot water at typically 80°C-120°C, a temperature suitable for district heating and other low-temperature uses such as wood drying and cooling through absorption chillers.

In this respect, ORC technology functions similarly to a traditional steam turbine, but instead of water, the ORC system vaporizes a high molecular mass organic fluid, offering cycles with superior electric performance (up to 10 MW) and several mechanical advantages:

- slower turbine rotation;
- lower pressure;
- no erosion of piping and blades.

The ORC turbogenerator is pre-assembled onto one or more skids and can be easily transported. Technical advantages of ORC turbogenerators are:

- high cycle efficiency;
- very high turbine efficiency (up to 90%);
- low turbine mechanical stress due to low peripheral speed;
- no erosion of blades, due to the absence of moisture in the vapor nozzles.

Operational advantages include:

- simple start-stop procedures;
- automatic and continuous operation;
- no operator attendance needed;
- quiet operation;
- high efficiency event at partial load;
- low operation and maintenance requirements: about 3-5 hours/week;
3.1.15 Institutional Structures and Capacity building, signing of the contract

Through the RuralE.Evolution project, a range of stakeholders came together, discussed and examined a variety of issues towards the creation of an agro-energy district. Issues that were considered included not only the institutional and legislative frameworks in place to support the PPP, but also the ability and willingness of the public parties to trust the private partners into delivering the required service, as well as the clear understanding of the private parties towards their obligations. All these were codified and mentioned in principles in the signed MoU.

Following the signature of the MoU, the partners are able to initiate the preparation activities based on the guidelines detailed in it. A company will more likely be established to supervise the construction of the agro-energy plant and take up all the legal and financial responsibilities of the consortium. Furthermore, the pre-feasibility study for the PPP provided a detailed description of the technical requirements for the construction of the energy production plant, as well as an estimation of the operating costs and revenues of the plant. These issues are now further detailed; upon completion, the draft PPP contract / tender will be prepared, according to Greek regulations, and especially according to Greek Law 3389/20051.

3.1.16 Availability of the land

The land for the construction of the plant is owned by the company Rodonas S.A., which has been formed by members of the Tobacco Co-operative of Toumba of the Prefecture of Kilkis in 2006 to reinforce the producers’ personal responsibility in all collective activities that have to do with production, processing and trading of their products. The company’s main guideline is a turn to products that are safe and beneficial (in addition to their alimentary value) for the consumer’s health (functional food). Its goal is powerful and flexible access of these products to the local and international market. Today, in cooperation with the Tobacco Co-operative of Toumba Kilkis it activates in pomegranate growing.

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1 The PPP contract, according to Law 3389/2005, is proposed in paragraph A2.2 of annex 2;
This company acts as a private investor in the PPP venture, and specifically as an SME interested to share the entrepreneurial risk. The company has been asked to supply the land for the construction of the plant, and has agreed to it by signing a Memorandum of Understanding (MoU) that contains a relevant clause. Further discussions with the company to define the terms for the provision of land are ongoing, but delayed due to the situation with EACI defaulting on the second project pre-financing described in the previous section.

3.1.17 Definition of the logistic plan

The costs for biomass as a fuel are divided into three parts: the purchase price, the logistic costs for the collection, and the costs for establishing and running the energy plant. The costs of the logistics of the biomass fuel collection may determine for a major part the feasibility of these plans, especially when the purchase price is low as may be expected when rest-products or by products are used. The logistics, which include transport, storage, handling and pre-treatment can be set up in many ways. Thus, it is difficult to estimate the logistical costs. For the purposes of the current project, a price of 40€/ton of biomass is estimated, based on the analysis of other uses. This price is currently “tested” with area farmers (as of February 2011) to understand if it is valid or not.

The biomass fuel collection is a logistical process consisting of flows originating in source locations directed towards the energy plant. The logistics of the collection include transport, storage, handling and pre-treatment.

3.1.18 Monitoring and reporting on results

For the purpose of fulfilling their obligations under the signed Memorandum of Understanding (MoU) as above, TCTK and the Municipality of Evropos undertook to establish a Coordination and Monitoring Committee, which would undertake the monitoring of actions for the implementation of the MoU and the submission of annual progress reports to the Parties. The first report was required to be delivered on 31-10-2011. However, problems were created because of a programme initiated by the Greek National Government for the restructuring of the Local Administrative Units. According to the programme (named „Kallikratis”), the existing 1,034 municipalities in Greece will be whittled down to less than 370. The new municipal authorities were created on January
1. 2011 with newly elected officials, so a new arrangement with the enlarged Municipality might need to be established.

### 3.2 SWOT analysis

From fig.3.1 it can be inferred that 10 steps for the methodology implementation have been realized. The final objective of the project methodology, that was the signing of the Memorandum of Understanding (MOU) was finally achieved. The strengths, weaknesses, opportunities and threats of each methodology macro-area, that is:

1) Target area characterization;  
2) PPP implementation;  
3) Contract redaction;  

Are shown in tables 3.1-3.2-3.3.

#### 1. Target area characterization

**Tab. 3.1: Target area SWOT analysis**

<table>
<thead>
<tr>
<th>STRENGTHS</th>
<th>WEAKNESSES</th>
</tr>
</thead>
<tbody>
<tr>
<td>High biomass availability from agricultural and</td>
<td>Agricultural land divided in many small parts, e.g. many land owners</td>
</tr>
<tr>
<td>agro-forest residues due to the extensive agricultural</td>
<td></td>
</tr>
<tr>
<td>land</td>
<td></td>
</tr>
<tr>
<td>Zootechanical and food industry residues also exist</td>
<td>A common initiative is absolutely necessary</td>
</tr>
<tr>
<td>Easy to collect most residues from the fields</td>
<td>There are high harvesting and transportation costs</td>
</tr>
<tr>
<td>RES potential (eg. Solar radiation, biomass, residues</td>
<td>Opportunity costs of some residues (i.e. with market price)</td>
</tr>
<tr>
<td>etc)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Equipment to collect some types of residues not in place</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>OPPORTUNITIES</th>
<th>THREATS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Country commitments</td>
<td>Excessive dependency on fossil fuels (eg. Lignite).</td>
</tr>
<tr>
<td>Existence of areas suitable of taking measures</td>
<td>Bureaucracy</td>
</tr>
<tr>
<td>Suitable climate for bioclimatic applications</td>
<td>Unwillingness to changes</td>
</tr>
<tr>
<td>Funds to invest in clean technologies</td>
<td>Lack of capacity and resources at regional and local level</td>
</tr>
</tbody>
</table>
2. PPP Implementation

**Tab. 3.2: PPP implementation SWOT analysis**

<table>
<thead>
<tr>
<th>STRENGTHS</th>
<th>WEAKNESSES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strong will from principal stakeholders to proceed with the scheme</td>
<td>Low sensitiveness to energy saving</td>
</tr>
<tr>
<td>High value of natural heritage, favouring the development of clean energies</td>
<td>Low public awareness</td>
</tr>
<tr>
<td>Research &amp; Development in renewable energies issues</td>
<td>Insufficient infrastructure for renewable energies use (eg. Injection of Biomethane into the natural gas grid)</td>
</tr>
<tr>
<td>Existence of energy market</td>
<td>Energy efficiency in buildings in not an obligation yet</td>
</tr>
<tr>
<td>Existence of Energy Management Agency</td>
<td>No feed-in-law for thermal applications</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>OPPORTUNITIES</th>
<th>THREATS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deregulation of the energy market of Greece</td>
<td>High bureaucracy of small-scale PPP approval</td>
</tr>
<tr>
<td>Easy connection to the PPC network</td>
<td>Lack of safe biomass supply in long term</td>
</tr>
<tr>
<td>Law 3851/2010 offers a guaranteed income of 230€/MWh for 20 years</td>
<td>Unbalanced risk amongst partners</td>
</tr>
<tr>
<td>The scheme will offer an alternative income to farmers</td>
<td>Changing of the motivation of potential partners</td>
</tr>
<tr>
<td>External energy dependency will decrease for owners</td>
<td>Changing of the economic circumstances</td>
</tr>
<tr>
<td>Environmental benefits do exist</td>
<td>Changing in the legal frame</td>
</tr>
</tbody>
</table>
### 3 CONTRACT REDACTION

**Tab. 3.3: Contract redaction SWOT analysis**

<table>
<thead>
<tr>
<th>STRENGTHS</th>
<th>WEAKNESSES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private sector is in general a better and more experienced manager than the Public</td>
<td>In Greece the process of PPP implementation is long and bureaucratic, especially for small scale projects that face a proportionately bigger share of administrative burden.</td>
</tr>
<tr>
<td>There is need for full understanding / acknowledgement of the Social Character of the PPP and of the benefits it can bring to the area’s actors.</td>
<td>Even though the public sector is involved since the beginning of the venture, the public control of it is very limited.</td>
</tr>
<tr>
<td>The partnership structure is essential, together with the dedication and cooperation among the parties, reinforcing the value of the concept.</td>
<td>There are political risks, as the Mayor who committed in the PPP had to face elections; as the public’s view on PPPs can often be negative this could have created problems toward his election.</td>
</tr>
<tr>
<td>The replication of a PPP model or of a technological solution is definitely a success factor, especially if the same persons are involved again.</td>
<td>Political preferences matter. In Greece, and in the EU in general, the Government’s “pro-business orientation” creates a much better environment for encouraging public research actors and private companies to make joint innovation efforts.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>OPPORTUNITIES</th>
<th>THREATS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private parties bring more innovation capacity in the partnerships that the public can absorb.</td>
<td>As far as the supply concerns (agricultural residues), there is need to ensure it in a long-term period in order to recover the investment.</td>
</tr>
<tr>
<td>The re-structuring of the partnership did not create problems to the overall progress of the project. On the contrary, the entrance of new parties offered renewed strength to the venture</td>
<td>Lack of competition might create an inefficient structure.</td>
</tr>
<tr>
<td>Blurriness in the partners selection procedure can jeopardise the venture; the guarantee of meritocracy and the performance evaluation during the contracting procedures is essential</td>
<td>There is a general lack of experience in the administration of the public units; capacity building at central level in relation to the implementation of PPPs has not been accompanied by parallel actions at the local and regional level.</td>
</tr>
</tbody>
</table>
Chapter 4

PPP IMPLEMENTATION: HUNGARY

4.1 Implementation of the methodology: activities of the Hungarian partner

The methodology actually implemented in the Hungarian target Area (Abasar) is composed by 6 steps.

1) selection of target areas;
2) biomass estimation;
3) selection of key actors;
4) bioenergy chain design and plant design, business plan redaction;
5) identification of legal and economic circumstances;
6) contract redaction.

Fig. 4.1: Methodology implementation Rurale.Evolution in Hungary

The methodology actually implemented in the Hungarian target Area (Abasar) is composed by 6 steps.

1) selection of target areas;
2) biomass estimation;
3) selection of key actors;
4) bioenergy chain design and plant design, business plan redaction;
5) identification of legal and economic circumstances;
6) preparing of PPP contract.
The above mentioned point will be further discussed in the following paragraphs.

4.1.1 Selection of target areas

During the preparation of RuralE.Evolution project in Hungary at the beginning of 2008 two options aroused as potential communities joining to the project „PPP for RES Agro-energy district“. The communities are: Abasár and Zalakaros. The conditions significantly differ between the two locations, the comparison of their main characters is proposed below:

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Abasár</th>
<th>Zalakaros</th>
</tr>
</thead>
<tbody>
<tr>
<td>Localization</td>
<td>North-East Hungary (80 km from the capital)</td>
<td>South-West Hungary (190 km from capital, 30 km from Slovenia, Croatia)</td>
</tr>
<tr>
<td>Covered area</td>
<td>150 km²</td>
<td>166 km²</td>
</tr>
<tr>
<td>Number of inhabitants</td>
<td>18000</td>
<td>6500</td>
</tr>
<tr>
<td>Main economic activity</td>
<td>Agriculture</td>
<td>Tourism</td>
</tr>
<tr>
<td>Potential RES</td>
<td>by products of agriculture</td>
<td>thermal water</td>
</tr>
<tr>
<td>Present heating systems</td>
<td>mainly earth gas</td>
<td>mainly earth gas</td>
</tr>
<tr>
<td>Electricity</td>
<td>nationwide system</td>
<td>nationwide system</td>
</tr>
</tbody>
</table>

The preparation also includes the personal meeting with the mayors of two settlements, inviting them to declare their willingness to join to the project.

During these meetings the advantages and disadvantages shown in tables 4.2 and 4.3 were identified:

<table>
<thead>
<tr>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>The importance of agriculture in the incomes of local inhabitants;</td>
<td>Lack of capital to the invest a local power plant;</td>
</tr>
<tr>
<td>Strong willingness to utilise the agricultural residues (winegrape cutting etc.);</td>
<td>Historical revulsion related to farmers’ collaboration;</td>
</tr>
<tr>
<td>Openness to collaborate with surrounding settlements;</td>
<td>Existing alternative utilisation of own agricultural residues.</td>
</tr>
<tr>
<td>Clear vision to the benefits from creating jobs;</td>
<td>General legal conditions of PPP</td>
</tr>
<tr>
<td>Willingness to create more clean settlement.</td>
<td>Limited preference of utilisation of RES in Hungary</td>
</tr>
<tr>
<td>Good collaboration amongst the local authorities of the area;</td>
<td></td>
</tr>
<tr>
<td>Good relation of local authorities with the Mátra Power Plant</td>
<td></td>
</tr>
</tbody>
</table>
Fig. 4.2: The project area

<table>
<thead>
<tr>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formal and existing collaboration amongst the local authorities</td>
<td>Significant migration of population to the surrounding cities</td>
</tr>
<tr>
<td>Existing culture of utilisation of RES (thermal energy)</td>
<td>More attractive jobs in the area in comparison with agriculture (tourism)</td>
</tr>
<tr>
<td>Increasing importance of the local incomes from agriculture as part-time job</td>
<td>General legal conditions of PPP</td>
</tr>
<tr>
<td>Good collaboration amongst the local authorities of the area</td>
<td>Limited preference of utilisation of RES in Hungary</td>
</tr>
</tbody>
</table>

After the meeting both mayors were invited to give their letter of intent and finally only Abasár produced a satisfying document as answer, for this reason the selected area is Abasár and its surroundings.

4.1.2 Biomass estimation

Biomass estimation was made through a common methodology also defined at page 16 of the publication “Application of public private partnership to the agroenergy district in 5 European countries”.

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4.1.3 Selection of key actors

The potential key actors were in the first option of the project the farmers, Abasár local authority and other local private companies. In this concept the farmers who owned the agricultural residues formed a company/co-operative to sell this residues to the new local power plant which would supply with thermal energy the buildings of public institutes and industrial area of village. According to this approach the new power plant would be owned by the farmers’ company/co-operative, the beneficial private companies in industrial area and Abasár village.

Based on the first draft analysis of the potential investment the partners rejected this option because:

- the cost/benefit ratio is too high;
- the financial background of potential beneficiaries did not allow the investment;
- the existing raw material in Abasár provides limited capacity, the external supply of the small power plant is too expensive;
- the connection to the national grid to balance the surplus or deficit in electric supply is too expensive;
- within the subregion there is a more economic and practiced utilisation of the agricultural residues respect to Mátra Power Plant.

Based on these statements the key actors of project were identified between August and October 2009. Due to the potential partnership with the Power Plant, according to its demands of high volume supply it was determined that not only one local authority, but all local authorities of whole subregion will join to this project. At the same time the above mentioned weakness arising from the high investment costs can reduce the convenience of the project. The Mátra Power Plant was open towards the partnership, because they have high level of interest due to their obligations concerning CO₂ quota. According to these interests the 7 local authorities and the relative farmers and the Mátra Power Plant were defined as key actors.

4.1.4 Bioenergy chain design

Due to the technology of the Power Plant, a very broad scale of materials are applicable for energy utilization. At the same time within this project some biomasses are excluded from this utilization, due to lack of locally accessible technology of collection, pretreatment and storage. These biomasses are municipal waste, slurry and other liquid materials.
The project partners also exclude the agricultural products which has food or animal feed uses. For this reason the main products (grain, seed) are also excluded from this utilization. Consequently the biomasses utilized in this project are the following:
- straw of cereals (wheat, triticale, oak, oat);
- stalks (maize, oilseeds);
- pruinings (winegrape, orchard, forestry);
- wood.

The yearly production of these materials is estimated based on the research of Károly Róbert High School (Gyöngyös) which is an highly active partner in this region in the improvement of biomass utilization. The type and quantity of potential biomass and its energy basis are proposed in detail in the publication “Application of Public Private partnership to the agroenergy district in 5 European countries”.

The estimated production does not fulfill the capacity of the Mátra Power Plant therefore its technological supply only partly will be based on local production. At the same time this project as PPP initiative can motivate further neighbouring local authorities to join this system, increasing the available quantity of the biomass.

4.1.5 Identification of the legal and economic circumstances

Legal issues [1-3]

As there is no official definition of PPP in Hungarian law, no clear distinctions can be made when categorising a project as a PPP project. Therefore, no legislation can be identified as the supreme law governing PPP; several legal provisions may be relevant depending on the characteristics of the project.

Generally speaking, the legal framework consists of laws that are relevant to all PPPs and laws that are project specific. The most important law is the Act on Public Procurement (Act 129 of 2003 and its modification Act 108 of 2008), which sets out the entire bidding procedure. The Act on Concessions (Act 16 of 1991) provides for additional procedural rules where the project matter is exclusively state or local government property under the Civil Code (Act 4 of 1959). For local PPPs, the Act on Local Governments (Act 65 of 1990) is the relevant piece of legislation. For central government projects, the Act on the State Budget (Act 38 of 1992 and its modification Act 65 of 2006) and a number

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1 Lukács Gergely Sándor [1]
Guidelines for successful application of PPP to RES Agro-energy districts

of corresponding government decrees apply. When preparing bids and project agreements, the Civil Code and sector-specific legislation must be taken into account.

The first thing to consider is the procedural framework, which in most cases is dominated by the public procurement rules. The question of whether the contracting entity is considered a public entity under the Act on Public Procurement and the nature of services procured, together with the gross value of the PPP, determine whether or not a public procurement procedure must be followed. The European and national legislation governing public procurement clearly defines the entities and project values that necessitate the use of a transparent and competitive public procurement procedure when purchasing goods or services or facilitating construction projects. In most cases these criteria are fulfilled, making public procurement mandatory. However, as most of the public procurement rules were enacted before PPP projects became common, some provisions may hinder the development of PPP projects.

The nature of the services to be provided in a PPP structure may mean that the tendering procedure set out in the Act on Concessions is also applied. In certain cases both the public procurement provisions and the tendering procedure set out in the Act on Concessions must be applied at the same time. Both the Act on Public Procurement and the Act on Concessions contain provisions governing the interaction of the two procedures to resolve any inconsistencies. Article 10/A of the Act on Concessions could be considered an example of specific PPP legislation. Where public services are provided by a concessionaire company in which the state or local government has a majority stake and that is being passed on to private investors, a tender must be issued for the provision of services that the concessionaire company has been performing and that fall under the Act on Concessions. This could be considered a case of the private sector taking over a public service, which may represent a PPP if, while purchasing majority stakes in the concessionaire, the buyers undertake to develop those public services further at their own expense and, even, at their own risk.

The legislation leaves a number of questions unanswered, creating possible pitfalls for PPP projects. These inconsistencies are not necessarily caused by national legislation directly but may also go back to the problem of some EU-wide provisions not being completely PPP compatible. One example is the handling of perfected securities created over PPP assets where the private financing party steps in to replace an original service provider that failed to meet its financial obligations towards the financing party. In such cases there is a risk that the obligation to procure public services under the designated procedure
laid down by the Act on Public Procurement may prevent the financing party from: (i) performing the services itself since it was awarded to the original service provider in a public procurement procedure; or (ii) if not providing the services itself, passing the assets gained by perfecting the securities to another enterprise that can provide the public services in question.

**Main economic circumstances**

The intentions to improve biomass utilisation in Matra Power Plant sped up after 1st of January 2005 because in Hungary expired the environmental moratorium which allowed higher emissions. This improvement was also motivated by the state laws, so the service provider of energy sector was obliged to receive the produced energy from alternative energy resources on fixed price. This fixed price is 0,09 €/kWh and the state subsidy is 0,048 €/kWh which covered by the incomes of system provider from final users. The national grid is owned by state. This support was determined by the National Electricity Authority to Mátra Power Plant till 31st December 2010.

![Fig. 4.3: Transportation cost and incomes of biomass (HUF/t)](image)

The cost of energy production from biomass only by this support is rentable² therefore the intention of wide diffusion from the side of Power Plants is limited.

The spreading of biomass utilisation to electricity by cofiring technologies is also limited due to economic reason. The close zero difference of price to the Power Plant amongst the fossile raw material and biomasses seriously depends from the transportation cost. According to a Hungarian analysis³ the transportation cost (brown line) and all incomes (blue line) provides profit if the transportation is below 45 km.

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² Balogh L. [2]:
³ Pintér K.- Németh G.- Kis-Simon T.[3]
### 4.1.6 Selection of the PPP aim and frame

The common interest of the main actors (local authorities, Power Plant and producers) is to set up and optimisation of the logistic system which supplies of Power Plant with biomass. Therefore the main object of this project to establish this frame which provides guarantee their benefits to the partners in this logistic chain. The biomass producers are in different situation, the farmers need services to transform their biomass outputs suitable to utilize by Power Plant, the Forestry Co. has all equipments and conditions to supply the partner. The farmers provided materials are available in a narrow period of vegetation, therefore the forestry can and has to well buffering the continuous demands of energy producer.

Based on these the main actors and potential founder of the PPP scheme are the local authorities providing services to the farmers and the Power Plant which has a strong commitment to utilize the by-product biomass from its surroundings. The Power Plant expect the following preparation of biomass:

- collection from the production site
- temporary storage
- standardization /size, water content etc./ (according to the character of the matter)
- preparation to the transport
- transportation to Power Plant

The consortia of local authorities generally are able and ready to realize these activities providing service to the farmers except the first step (collection of matters from the fields) therefore this step has to solve by the farmers. There is need also some investment to the equipments of standardization and preparation to the transport. These investment and the actuation of the whole service will be realized by the joint venture of the consortia and Power Plant (see the green arrow below) forming the PPP scheme. The Forestry Co. foreseeable will contract directly with Power Plant, but its supplying period will harmonize with the supply from the joint venture (see the red arrow below, representing the way of biomass).

This PPP scheme can optimize the physical and financial resources to utilize the waste biomass of the producers providing opportunities:

- to create more job and more income to the local peoples
- to improve the environment of the villages giving chance to the tourism and health care
The threats related to the sustainability of the project can arise due to:
- low level of farmers’ interest to sell the waste materials via joint venture;
- unbalanced internal forces within joint venture (potential power superiority of Power Plant);
- changing of priorities due to political change on the level of local authorities.

4.1.7 Preparation of PPP contract and of a Memorandum of Understanding

The PPP contract is proposed on Annex 2 paragraph A2.3.

4.2 SWOT analysis

From fig.4.1 it can be inferred that 6 steps for the methodology implementation have been realized. The strengths, weaknesses, opportunities and threats of each methodology macro-area, that is:
1) Target area characterization;
2) PPP implementation;
3) Contract redaction;
Are shown in tables 4.4-4.5-4.6.

**SWOT 1 Target area characterization**

**Tab. 4.4: Target area SWOT analysis**

<table>
<thead>
<tr>
<th>Strengths</th>
<th>Weaknesses</th>
</tr>
</thead>
<tbody>
<tr>
<td>the importance of agriculture in the incomes of local inhabitants</td>
<td>lack of capital to invest in a local power plant</td>
</tr>
<tr>
<td>strong willingness to utilize the agricultural residues (winegrape cutting etc.)</td>
<td>historical revulsion related to farmers’ collaboration</td>
</tr>
<tr>
<td>openness to collaborate with surrounding settlements</td>
<td>existing alternative utilization of own agricultural residues</td>
</tr>
<tr>
<td>clear vision to the benefits from creating jobs</td>
<td>willingness to create more clean settlement</td>
</tr>
<tr>
<td>good collaboration amongst the local authorities of the area</td>
<td>limited preference of utilization of RES in Hungary</td>
</tr>
<tr>
<td>good relation of local authorities with the Mátra Power Plant</td>
<td></td>
</tr>
</tbody>
</table>

**SWOT 2 PPP implementation**

**Tab. 4.5: PPP implementation SWOT analysis**

<table>
<thead>
<tr>
<th>Strengths</th>
<th>Weaknesses</th>
</tr>
</thead>
<tbody>
<tr>
<td>existing team of Power Plant providing technical support to the planning</td>
<td>lack of experienced team to the financing of PPP</td>
</tr>
<tr>
<td>committed partners in recovery of agricultural residues</td>
<td>overloaded staff in the office of the municipality both to the planning, implementation and monitoring as well</td>
</tr>
<tr>
<td>existing solid market from biomass till electricity</td>
<td>lack of information concerning the local energy demands</td>
</tr>
<tr>
<td>solid scientifically elaborated analysis related agricultural capacity of target area</td>
<td>bank worries related to the investments of municipalities</td>
</tr>
<tr>
<td>due to existing technology within the Power Plant</td>
<td></td>
</tr>
<tr>
<td>clear terms of reference to the activity</td>
<td></td>
</tr>
<tr>
<td>existing areas owned by local authorities to their planned activity</td>
<td></td>
</tr>
<tr>
<td>good co-operation of RuralE.Evolution partners with local authorities</td>
<td>changing of the governmental policies related PPP construction</td>
</tr>
<tr>
<td>good scientific advisory teams in the environment of the target area to prepare the detailed business plan</td>
<td>underestimation of the risks due to strong commitment</td>
</tr>
</tbody>
</table>

Opportunities  | Threats
**SWOT 3** Contract redaction

<table>
<thead>
<tr>
<th>Strengths</th>
<th>Weaknesses</th>
</tr>
</thead>
<tbody>
<tr>
<td>clear distribution of obligation amongst partners</td>
<td>lack of experience in PPP legislation</td>
</tr>
<tr>
<td>not sufficiently detailed business plan</td>
<td></td>
</tr>
<tr>
<td>strong willingness of partners to co-operate</td>
<td>changing legal conditions</td>
</tr>
<tr>
<td>due to trucks within the former large PPP</td>
<td>due to trucks within the former large PPP</td>
</tr>
<tr>
<td>contracts</td>
<td>contracts</td>
</tr>
<tr>
<td>bad social image of PPP-s</td>
<td>bad social image of PPP-s</td>
</tr>
</tbody>
</table>

**4.3 Bibliography**


[3]: Pintér K.- Németh G.- Kis-Simon T.: A szőlővenyige és fanyesedék biomassza erőművi beszállításának elemzése /Analysis of supply of Power Plants with winegrape cutting and trees parings/ (Gazdálkodás LIII./357-363; 2009)
Chapter 5

PPP IMPLEMENTATION: PORTUGAL

5.1 Implementation of the methodology: activities of the Portuguese partner

The PPP implementation, on the basis of the gained experience during the RuralE.Evolution project is shown in fig. 5.1.

Fig. 5.1: Implementation of the methodology
The methodology actually implemented in Alvito’s region is composed by 6 steps. Please notice that, although the steps are well defined below, they are iterative, meaning that the development of one will enrich not only the next steps, but also the output of the previous steps taken.

5.1.1 Definition of the target area

A location for the target area was individuated, considering regions where it could be found:
- a high concentration of biomass usable for the production of energy;
- known actors, interested to become partners to the project.

Some phone and personal contacts were made and a region that combined all these factors was found: Alvito, in Alentejo.

5.1.2 Cooperative meeting

After some phone contacts we had a private meeting in UCASUL plant, Alvito, on 18th of May of 2009. In this meeting were present three people from CONFAGRI involved in the project and two from UCASUL, one administrator and one director.

UCASUL, União das Cooperativas Agrícolas UCRL, has as main activity the extraction of olive oil from the olive’s pomace. This pomace is received from several olive oil producers from the south and center of the country, as explained in a more detailed way in the other publication of the project: “Application of Public Private Partnership to the agroenergy district in 5 European countries”.

The main results from the meeting were:
- CONFAGRI will estimate the biomass available in the target area (Alvito’s district);
- UCASUL agreed with CONFAGRI’s intention to involve different partners in the project, specially the Municipality. For UCASUL, as many other farmer’s organizations, the technical skills are very focused for the main activities. UCASUL recognized that in order to implement new projects, it is important some support (technical and administrative) from the Municipality and his collaboration as a sponsor of the project;
- CONFAGRI will schedule a meeting with the Mayor to involve the Municipality in the project;
UCASUL already had the idea to create a solution for local use of biomass for power and/or heat production, but it hadn’t studied it deeply; it showed availability to share the information they have collected;

- UCASUL identified two main constraints for the implementation of a project of this nature: requirements to apply for a “PIP” (start the process of license to connect the network of public service) and a special tariff for those who produce power from renewable energies;
- To implement the project UCASUL needed a partner with experience in implementing projects of producing renewable energy to decrease and share the risk of the project.

5.1.3 Municipality meeting

After some phone contacts, CONFAGRI held a meeting with Alvito’s Mayor, in 21st September of 2009. Two persons from CONFAGRI, other two from UCASUL and the Mayor of Alvito were present in a round table.

The main results of the meeting were:
- The mayor showed interest in the project. Afterwards, he put it into consideration in the Municipality’s Council. The involvement was then approved by unanimity (some days later).
- The mayor considered that the exact terms of the involvement of the Municipality should be defined by the future Mayor, because the municipal elections would be on the 11th of November.

In reality, with those elections, the Mayor was changed. It was held then a new round table with the new Mayor and UCASUL.

The main results of this second meeting were:
- Clarification on the role the Municipality could have in the Project: the new Mayor stated that there was a chance for some support on administrative and technical issues. Also stated that will be no space for additional expenditure or even be part of the consortium that will implement and manage the plant;
- The Mayor stated the importance that the biomass produced in the activity of UCASUL could be transformed locally, in the name of local development and for environmental reasons;
- The Mayor showed interest in the project. Afterwards, he put it into consideration of the Municipality’s Council. The involvement was then approved (some days later).

5.1.4 PPA Framework and legal framework description

To have a clear view on the process of connecting to the public electrical network and about the tariff that will be paid for energy produced from renewable sources, the following activities were implemented:

- desk research;
- two meetings and several contacts with Ministry of Economy (DGEG);
- contacts to EDP, the national distributor of electricity;
- contacts with companies that have a recent license to connect the network;
- meetings with the National Agency of Energy (Agência Nacional de Energia).

This is a central point of the project because getting the connection allows to formalize the PPA (detailed in the next point).

PPP consultant meeting

Before the individuation of the definitive target area, a meeting with an expert in administrative law at Parpublica, the Public company responsible for the Portuguese PPP implementation, was held. According the Portuguese Law, a PPP must be considered between the Central State and Privates, and not with Municipality. Besides that, the law only specifies some particular areas (energy not included). For the purpose of the Project we then have considered PPP in a broad sense.

The PPP form will be based on the PPA (Power Purchase Agreement), a long term contract. This is a basic form of PPP in which two parties are involved: one who generates electricity for the purpose of sale (the seller, private partner) and one who is looking to purchase electricity (the buyer, public partner). Even if this model is not still contemplated in Portuguese law as a PPP, it is in other countries.

This type of agreements provide the template for modern PPP Contracts. Considering the different types of Contract on PPP, the choice for Alvito’s area is closer to the BOO, Build-Own-Operate. In figure 6.6 page 69 of the publication “Application of public private partnership to the agroenergy district in 5 European countries”, the scheme that will be used for the partnership is presented.
Energy legislation

Regarding the activity of producing electricity, special regime production (PRE) is based in a set of technologies of producing electricity through renewable sources, such as wind, water, sun and biomass, and through the use of technologies of high energetic efficiency like co-generation. In PRE can be distinguished several categories with some specific legal procedures:

- Co-generation
- Renewables
- Micro-production (until 5,75 kW)
- Producer-consumer in low voltage (until 150 kW)
- Mini-hydro power (until 20 MW)

![Diagram of SEP’s network connection process](DL 312/2001 amended by DL 118-A/2010)

Therefore, the production of electricity from biomass can be done through co-generation with renewable sources or in the frame of the category "renewables".

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**Fig. 5.2: SEP’s network connection process (DL 312/2001 amended by DL 118-A/2010)**
The government, through the General Direction of Energy and Geology (DGEG) of the Ministry of Economy, is responsible for the regulation of PRE, while the incorporation of additional costs arising from the PRE in tariffs is attributed to the Regulatory Authority for the Electricity Sector.

The producers of electricity based on renewable energy sources must be licensed under DL n.º 189/88 and 312/2001, as amended by DL n.º 33-A/2005 (including the rate guaranteed by 15 years and updating the tariff’s remuneration) and DL n.º 225/2007 (the possibility of license renewal for another 10 years).

More specifically, Decreto-Lei n.º 312/2001 and subsequent amendments regulate the establishment of plants of electrical energy production. The procedure for obtaining the legal permits and facilities’ suitability verification for the technical requirements of connecting power stations to networks of SEP starts with a request for prior information (PIP), as systematized in Figure 5.2.

This PIP opens in four specific periods during the year; however, that possibility of a request for prior information has been closed in the last periods and priorities have been given to projects included in specific programme approved by the Government as part of National Energetic Policies Options and/or tenders launched by DGEG.

In fact, with the changes brought by DL n.º 33-A/2005 to DL n.º 312/2001, the power available in the SEP’s network and the reception points needed for the network connection could be allocated through a competitive tender process or direct contracting, giving priority to projects included in specific programs approved by the Government as part of National Energetic Policies Options, p.e. in Resolução do Conselho de Ministros n.º 29/2010, that approves the national energy strategy till 2020.

This is the case of the tenders launched by DGEG, opening specific periods for applications on prior information (PIP) for grid connection of power plants that use forest biomass (in 2006 opened 15 bids for new power plants with a total maximum power of 100 MW) or, in 2010, tender procedures opening for the implementation of mini--hydroelectric power plants to capture water to electricity generation with installation capacity up to 20 MW.

The main steps, after obtaining the license of operation are described below (www.edpsu.pt):

- Presentation by the promoter of the License to the Network Operator, after an inspection carried out by competent authorities;
- Signature of the act of connection of the production facility that is a part of the Power Purchase Agreement;
- Preparing and Signing the Protocol of operation.
The operation’s license, the connection’s act, the operation protocol and the provisional diagram of power supply are attached as an integral part of the Power Purchase Agreement.

Besides the license of operation, associated with the higher costs of producing electricity from renewable energies, a special tariff is also legally established for those licensed plants, that produce electricity from renewable energy sources.

These producers are paid based on a formula established in the Law. The elements of the formula represent different factors that influence the value of the payment for the supply of electricity from renewable energy power delivered to the network. Due to the introduction of the coefficient Z with DL n.º 339-C/2001, the payment system for renewable energy, that was only based on avoided costs, has evolved into a concept that considers the costs according to different technologies, establishing a differentiated tariff by technology and production system.

The upgrade of remuneration has been done, ensuring that remuneration for a period deemed sufficient to allow recovery of investments and least the minimum expected economic return of the promoters.

With the upgraded values for electricity from RES in 2005, the tariff increased by 39% for biomass (67 €/MWh produced to 105 €/MWh produced).

A detailed list of the national legislation on energy issues can be found at http://www.confagri.pt/Ambiente/Pages/RuralEvolution.aspx.

**PPP legislation**

The general framework for PPP (Decreto-Lei n.º 86/2003, 26th of April, reviewed by DL 141/2006, 27th July) does not include the energy sector, but the experience from the PPP’s established in Portugal can contribute for the success of a future partnership to establish in this project between private and public partners.

Experience can be collected from the institutions specially created to deal with PPP’s such as [1]:

- Parpublica's PPP Unit, established on behalf of the Finance Minister (Despacho Normativo n.º 35/2003, 20th August),
- Cabinet that follows up the State business sector, the PPP and the concessions (Cabinet for the Follow up of the State Enterprise, PPP and Concessions Sector – GASEPC) (Despacho n.º 936/07-SETF, 21th September);
- PPP's Observatory (OPPP) implemented by the Portuguese Catholic University in 2009, for the systematization of Portuguese PPP data; however...
this information is only available to members, that include different stakeholders from the PPP’s markets: bank, consultants, regulators, ministries, lawyers societies and equipment suppliers;

Court of Auditors, as the control of PPP has been one of their strategic objectives.

More details on PPP’s Portuguese experiences and legal framework can be found in [1] and [2].

5.1.5 Biomass estimation and pre-feasibility plan

Biomass estimation in the Municipality of Alvito was made, considering the statistical data available at the Ministry of Agriculture (GPP) and consulting experts on the olive oil sector. It was concluded that the most significant was the treated pomace which is a by-product of UCASUL’s plant. The amount of this biomass is in an increasing trend and UCASUL made recently improvements in the factory to assure it can respond to the increasing amount of olive pomace produced in the region of Alentejo.

Discussing the trend evolution of the production of olive oil in Alentejo with the plant director, it was considered an amount of 77500 ton of biomass (olive pomace after the extraction of oil) each year for the pre-feasibility study. With this amount of biomass, the choice taken for the study was to sell the energy for the public electrical network.

The technology’s choice was oriented to use this biomass for electrical power production.

For the prefeasibility study we made some contacts with sellers of equipment to estimate the total investment and other costs. The incomes are calculated based on the tariff, which is fixed by law.

Pre-feasibility plan

With the biomass estimation it is necessary to evaluate the existing technologies (excluding non-proved technologies).

Steps that have to be done in the Prefeasibility plan:
- Consultation of suppliers of existing energy producer plants;
- Analysis maintenance and operative costs;
• Evaluate the cost of the same biomass in the market. The project will only be feasible if it is able to pay the biomass, at least, at the market price;
• Evaluate the cost to connect the public electric system network;
• Evaluate the cost of the land, the engineering and the development;
• Evaluate the electricity exported to the grid and with the tariff calculate the incomes;
• Calculate the data financial indicators (Pay-back, NPV);
• Compare with other projects.

5.1.6 Contact with other partners

Contact with other stakeholders were made through direct contact, personal or by phone and inviting them to the two local initiatives, held in Alvito. In both local cooperative banks, technological partners, local representatives of political parties, representatives of olive oil cooperatives that supply UCASUL with pomace, local citizens, UCASUL and the Mayor were present. In both meetings the project was presented and discussed.

In the first meeting, as speakers, CONFAGRI and UCASUL were represented. The mayor missed this initiative, retained by unavoidable natural reasons.

In the second initiative, besides CONFAGRI and UCASUL, speakers included the Minister of Agriculture and the Mayor of Alvito. The Mayor stated publicly his commitment to the project. The Minister recognized the importance of finding a way to implement the project. This event had a higher coverage by the press and much more people attended. The Secretariat of Energy was also invited, but was not able to attend to this initiative.

Bank meeting

The Local Agricultural Cooperative Banks were present in both local initiatives and were held private meetings and phone contacts with them.

The local banks (Crédito Agrícola) are partners of one Central Agricultural Cooperative Bank (Caixa Central de Crédito Agrícola). During the local initiatives it was declared that financing projects over a certain investment size must go through this Central Bank. Then also held a private meeting with the Central Agricultural Cooperative Bank, was held discussing the project with them.

In a PPA, the common option is a project finance (loan structure that relies primarily on the project's cash flow for repayment, with the project's assets,
rights and interests held as secondary security or collateral). In this kind of contract, for the Bank, it is very important to assure all the aspects that may influence the cash flow and to identify the risk.

The main results of the meeting identified the clarifications that should be available in the contract to finance the project:
- Assurance of the supply of biomass (in contract);
- Price of the biomass. Definition of the price along the contract;
- To start a formal commitment between the bank and the partnership, the partnership must be formally constituted. A bank’s agreement to finance a project will only happen with the formal entity that would implement the project.
- The general conditions are:
  o Maximum loan period: 15 years;
  o Maximum grace period of the loan: 3 years;
  o The partnership will be in a favorable position if paying monthly;
  o For interest the spread will be marked over an indexing;
  o Consignation of revenues;
  o Mortgage of buildings and equipments.

Technological partner
The contacts with the technological partner started with UCASUL and the first contact was made in the 2nd local initiative, held in Alvito. It is a company with experience in implementing and managing plants of renewable energy. This and further contacts were important to understand the critical points between the relationship of the biomass supplier with the entity that will manage the plant.

5.1.7 Communication campaign

The communication campaign should include different types of formats and initiatives, depending on the moment of the project (start-up, development, terminal) and the development of the project.

This campaign will be important, namely for the selection of suitable partners (for the project) and project’s dissemination (local population auscultation and sensitization; dissemination of achieved results and main constraints identified; etc.).

The communication campaign should then include:
Flyer / brochure (project’s presentation);
Web-page on the project
Contacts database
Newsletter
Press releases (before and after each public initiative);
Public initiatives (local and national);
Private meetings and round tables.
Next, these elements will be described.

Flyer / brochure
As soon as the farmers organization has a biomass estimation and a pre-feasibility analysis, the information about the project should be compiled in an attractive format (i.e. brochure or flyer) and answer, in a broad sense, to the general questions about the project: Why? How? Where? When?
The web-site address and contacts (phone and e-mail) should also be provided for further information.

Web-page
A web page should be created about the project. It is a fast way to disseminate information on the project, that can be spread locally, nationally and internationally.
This web-page should concentrate all the public material on the project that will be developed (i.e. brochure / leaflet, press releases, newsletters, public initiatives, etc.).
Again, a contact (phone and e-mail) should also be provided for further information and to ask for regularly updates.

Contacts database
Keeping the project’s objectives in mind and with the target’s area definition, a list of contacts should be compiled.
The contact’s list should include e-mail and phone contacts for the following categories:
• Local: Mayor(s) from the target area, farmers’ organizations, local enterprises (industrial and technological); local energy agencies; local banks; local media; local universities; other local public bodies; political actors (p.e. municipality’s assembly and parishes elected members);
• National: Head representants from the Government, with responsibility on agriculture, environment, energetic and PPP issues; Energy Agencies; Universities; Technology companies; consumer’s associations; banks; experts on agri-energy issues;

• Others: that can be relevant to include, according to specific project in question.

Regularly updates should happen according to the contacts that will be made and new contacts obtained that could have interest for more information on the project and / or even get more involved in it.

The contacts to be invited for each particular communication initiative should be selected from the list, according to the respective objectives.

**Private meeting with the public body**

Unless the farmer’s organization has good informal contacts with technological partners, that are willing to get involved to the project, the first contact to be made in a private meeting, for support should be the local public body, especially the municipality. The private meeting should preferably be held with the mayor for a brief presentation of the project.

The information provided in the meeting should include: the flyer/brochure (physical support); numbers on the project’s benefits for the local community (i.e. employment, solving environmental problems); the needs for this project that the public body might satisfy (i.e. public support, dissemination, administrative and legal support, land acquisition, etc.). A contact for further information and clarifications should be provided.

**Newsletter**

A periodical newsletter should be published, giving an overview of the current development of the project. The Newsletter should include a reference to the web page and a contact (phone and e-mail) for further information. Also, it should be provided a link to the previous editions and a way for those that wish to subscribe / unsubscribe. The first edition of the Newsletter should include a brief overview on the project, including the benefits for the local community and the results to be achieved. It would be important that in this first Newsletter there could appear the commitment from the public body. This first edition should be sent to the contacts already compiled in the database.
Press releases
Press releases should be prepared and sent (preferably by e-mail, whenever possible) to the adequate press contacts and other contacts (local and national) when:

- An initiative will be held – stating where, when, why, target audience and contacts for more information; an invitation for the press to be present can also be considered;
- Whenever there are new developments on the project – p.e., when there are new partners who formally commit to the project; when the construction phase or the operation phase begins;
- Etc.

It has to be kept in mind that to involve the partners on the press releases elaborated – they may want to improve it and also distribute to their contacts. E.g., the municipality might also want to prepare a press release and make sure the information is not contradictory.

Public initiatives
A press release should follow to all the pertinent contacts, to invite for every local initiative. Contacts and project’s webpage should be included for more information.

The first public initiative should include the following themes:

- Project’s presentation (including partners involved, main results to be achieved);
- Discussion / Clarifications.

For those potential partners that the organization recognizes more important to be present, a reinforcement by phone on the invitation could be made, to assure their presence.

This initiative would have has main results the dissemination to the local community of the project, with the respective benefits and needs, as well as motivating potential partners to adhere to the project.

If the first initiative has not had the impact intended, revise the speakers that were present, the invitations made, the information given during the event and on the press release. If not present before, having the mayor or the minister as speakers, in the next meeting, recognizing the importance of the project is always a good help to promote more audience. Also, it is recommendable a reinforcement on phone contacts for potential actors to be present, stating the project’s benefits that solve some of the potential actors needs.
After having the commitment from the partners needed (farmers, public body, technological and financial partners, amongst others), there could take place a formal initiative to sign the agreement among all.

**Private meetings and round tables**

With the potential partners that have shown interest to become part of the project, after or before any public meeting, should be scheduled private meetings with them, in order to clarify the project and the role of each partner.

Sometimes, round tables will also be important, to confront different partners and conceal their needs, duties and rights. An initiative mainly focused on farmers (to get their commitment on assuring a constant supply of biomass) should be held when the partnership has evolved and there is a refinement on the pre-feasibility analysis, in order to estimate a more adequate revenue for farmers. After that initiative and with all doubts cleared, a formal commitment from the farmers should happen.

### 5.1.8 Financing proposals

Different banks (locally and nationally) should be consulted to evaluate the conditions. Note that it will only be possible a formal commitment with a bank, after the consortium that will implement and own the plant be formally constituted. We didn’t find any bank products specialized in this kind of project. This kind of project of PPA is a long term financing, based mainly on the future cash flows of the project and only secondarily in the assets of the project (project finance).

### 5.1.9 Contract preparation and subscription

For the contracts that are made between the independent producers of energy and the entity that explores the public energy network (PPA), Portaria 416/90 of 6th June, includes a contract scheme in which the clauses as well as the annexes, must be included. It can be easily found in: http://siddamb.apambiente.pt/publico/documentoPublico.asp?documento=1873&versao=1. To update in the contract-scheme all the changes that have occurred in legislation on the production of renewables after 6th June of 1990, an updated version of the contract scheme annexed to the Portaria 416/90 was published in the site of EDP. It can be found in: [http://www.edpsu.pt/pt/PRE/renovaveis/ContrataoDocs/ContratoProdutosRegimeEspecial.pdf](http://www.edpsu.pt/pt/PRE/renovaveis/ContrataoDocs/ContratoProdutosRegimeEspecial.pdf)
The contract to be established between the supplier of biomass and the other partners of the consortium that will implement and manage the plant must clarify:

- Amount of biomass to be supplied;
- Price of the biomass and conditions to furnish it;
- Amount of participation of each partner in the society to be established;
- Form of company management;
- Responsibility of each partner in the preparation of the project and the feasibility study;
- Responsibility of each partner in the execution of the project;
- Acquisition/rental of the land to install the plant.

### 5.2 SWOT analysis

From fig.5.1 it can be inferred that 6 steps for the methodology implementation have been realized. The final objective of the project methodology, that was the signing of the Memorandum of Understanding (MOU) was finally achieved.

**Target area characterization**

**Tab. 5.1: Target area SWOT analysis**

<table>
<thead>
<tr>
<th>Strengths</th>
<th>Weaknesses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Availability of biomass (pomace)</td>
<td>Lower heating value than other fuels</td>
</tr>
<tr>
<td>Strong production organization of (union of cooperatives), ensuring the supply growing awareness of the importance of renewables, enhanced with oil prices increases and favorable energy policy</td>
<td>Lack of clarification of the tariff</td>
</tr>
<tr>
<td></td>
<td>Difficult connection points’ assignment for agricultural biomass usage</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Opportunities</th>
<th>Threats</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public support for renewable energy production</td>
<td>Competition at the market level of the various alternative energy sources</td>
</tr>
<tr>
<td>Increased availability of biomass, given the increase in area under olive trees planted in Alentejo</td>
<td>Lack of information circuits that establish policies, incentives, technology for the usage of biomass</td>
</tr>
<tr>
<td>Potential for the concentration of pomace</td>
<td>Undeveloped state of applicable technology, often involving a high initial investment, ongoing maintenance and high cost of obtaining raw material</td>
</tr>
<tr>
<td>Reduced risk of contamination of soil and water resources for the collection and local utilization of pomace</td>
<td></td>
</tr>
<tr>
<td>Data knowledge of the availability of pomace oil for energy (biomass), duly typed on their geographical location</td>
<td></td>
</tr>
<tr>
<td>Reduction on energy imports’ national dependence</td>
<td></td>
</tr>
</tbody>
</table>


**PPP implementation**

**Tab. 5.2: PPP implementation SWOT analysis**

<table>
<thead>
<tr>
<th>Strengths</th>
<th>Weaknesses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Importance of the union of cooperatives, UCASUL, in the town of Alvito and strong connection to City Hall</td>
<td>Need for high investment</td>
</tr>
<tr>
<td></td>
<td>High cost to connect to the national electrical grid</td>
</tr>
<tr>
<td></td>
<td>Lack of coordination between the Ministries of Economy and Agriculture to define the national strategy to be adopted within the agricultural use of biomass for energy production</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Opportunities</th>
<th>Threats</th>
</tr>
</thead>
<tbody>
<tr>
<td>Development of rural areas, maintaining and creating jobs, against the risk of land abandonment</td>
<td>Long and bureaucratic process to get the point of attachment to the national electrical grid</td>
</tr>
<tr>
<td>Progress in the organization of the olive sector</td>
<td></td>
</tr>
</tbody>
</table>

**Contract redaction**

Two critical issues were identified in the contract redaction. First the risk of failure in the supply of biomass, the pomace after the extraction of the oil (UCASUL will supply the biomass to the consortium, but how will be shared the risk of production failing in any year?). The second is how to value the biomass, considering the market. This biomass has a price in the market and the price as a supply to this consortium should either follow the market for this biomass, be linked to the tariff or to other kind of fuel.

1 Supply of biomass

**Tab. 5.3: PPP contract: supply of biomass**

<table>
<thead>
<tr>
<th>Strengths</th>
<th>Weaknesses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strength of the sector to ensure availability of biomass</td>
<td>Availability of biomass depends not only on the union of cooperatives (UCASUL) but also on the producers of olives, cooperatives and other mills producing olive oil</td>
</tr>
<tr>
<td>Good soil and climate conditions for the production of olive oil in the area. Increasing production in the area.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Opportunities</th>
<th>Threats</th>
</tr>
</thead>
<tbody>
<tr>
<td>Possibility of sharing the risk of failure in the supply of biomass with partner</td>
<td>Volatility of markets and the risk of climate extreme situations that could jeopardize the availability of biomass</td>
</tr>
<tr>
<td></td>
<td>Possible competition for the acquisition of biomass</td>
</tr>
</tbody>
</table>
2. Price of biomass

**Tab. 5.4: PPP contract: price of biomass**

<table>
<thead>
<tr>
<th><strong>Strengths</strong></th>
<th><strong>Weaknesses</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Price of biomass in the contract totally dependent on the tariff that the State sets for power generation produced from this</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Opportunities</strong></th>
<th><strong>Threats</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>National policy option for producing electricity from renewable energy, allowing the use of biomass</td>
<td>Rate for biomass in the market floating according to energetic policies in different countries. Portuguese State Budget problems</td>
</tr>
</tbody>
</table>

5.3 **Bibliography**


Guidelines for successful application of PPP to RES Agro-energy districts
6.1 **Implementation of the methodology: activities of the Spanish partner**

The PPP implementation, on the basis of the gained experience during RuralE.Evolution project is shown in fig. 6.1.

![Diagram of PPP Implementation](image)

**Fig. 6.1:** *Methodology implementation RuralE.Evolution in Spain*
The methodology actually implemented in the Spanish target Area (Castellon Spain) is composed by 7 steps, that will be further discussed.

### 6.1.1 Definition of the target area

The target area, initially was focused in the northern part of the Castellon Province when the major part of the livestocks farm are concentrated (> 1.200.000 permanent heads of swine intensive farms narrow-to-finish).

The municipality location for the target area was studied, considering a theoretically mass center plant treatment plant facility where it could be found:

- a high concentration of swine manure and other organic livestocks and secondary wastes and by-products for AD co-digestion, biogas recovery and energy production;
- knowledge and relationship with Intercoop local and municipal cooperatives (agricultural and livestocks as well), interested to become partners of the project;
- good and fluent relations with the Province Government of Castellon (DIPCAS-Diputacion Provincial de Castellon).

### 6.1.2 Intercoop cooperative group and DPCAS meetings

Several private meetings carried out during the end of 2008 and early 2009 with the local and municipal cooperatives in the north of the Castellon Province and with the Rural Development VP of the Province Government (DIPCAS) in order to identify the past, present and trends for the rural sustainability and animal agricultural economy conditioned for a recent “battery” of CE Directives and domestic laws applied to animal welfare, food safety, environmental protection and energy dependency. In a total of 5 meetings held during the period January-June 2009 Intercoop develops a biggest research in order to identify and to assess the livestocks & other organic wastes generated in intensive livestocks farms (mostly from swine) and other organic wastes and/or by-products. The main results from the meeting were:

- The major part of the livestock farms located in the target area they are part of the INTERCOOP Group as cooperatives, so they will produce an estimate of the biomass available in the target area (Municipality of Benassal and nearby municipalities);
- Close to the Benassal Municipality (20 km far at SE) the Province Government (DIPCAS) have a non-active facility as storage lagoon from swine manure waste and other organic wastes, DIPCAS offers to INTERCOOP the utilization without cost of this non-active facility (Salsadella-Albocasser);
- DIPCAS agreed with INTERCOOP to involve different partners in the project, especially the municipality, technological and financial interested parties. For INTERCOOP, as farmer’s organizations and cooperatives adviser, the technical and managerial skills are very focused in the main activities. DIPCAS recognized that in order to implement new projects, it is important some support (grants and administrative) as a sponsor of the future RuralE.Evolution project;
- INTERCOOP will schedule a meeting plan with the other interested parties potentially involved in the project to provide part of the technology and financial needs;
- INTERCOOP already had the idea to create a solution for local use of swine manure via co-digestion in anaerobic digester and biogas recovery with cogeneration for power and/or heat production, but it hadn’t studied it deeply; it showed availability to share the information they have collected;
- INTERCOOP identified two main constraints for the implementation of a project of this nature: requirements to apply for a “PIP” (start the process of license to connect the network of public service) and the technical grid network capacity for exporting the electrical energy generated in the Anaerobic Digestion - cogeneration plants;
- To implement the project INTERCOOP needed a partner with tech know-how, experience in implementing projects of producing renewable energy to decrease and share the risk of the project.

**PPP approach in the Province Government (DIPCAS)**

Between September and October 2009, several meetings were carried out in which INTERCOOP presented to DIPCAS the project plan and potential stakeholders interested as PPP partners.

The main conclusions of the meetings were:

- The Benassal mayor showed interest in the project. Afterwards, he put it into consideration in the Municipality’s Council, as the municipal representatives of Albocasser-Salsadella as well. The mayors and representatives considered that the exact terms of the involvement of the Municipality should be defined for the Province Government;
- Clarification on the role that INTERCOOP could have in the Project as Representative and Head of the Farms Cooperatives: INTERCOOP had a chance for support on administrative managerial, leading and making part of the potential technical issues. Also stated that will be no space for additional expenditure or even for the possibility to be part be part of the future PPP that will implement and manage the plant;

- DIPCAS stated the importance that the actual available infrastructure (and non-active) present in n.br.5 (five) plots on the target area represented for the project feasibility and sustainability. DIPCAS can confirm the legal procedure for making a new public agreement for this initiative.

- INTERCOOP confirms the special interest in the project from a private non-domestic company (Dutch and British). Afterwards, it was put into consideration for a ulterior meeting with all the interested parties (INTERCOOP, private partner, DIPCAS and Municipalities).

6.1.3 **PPA Framework and legislation framework**

To have a clear view on the process of connecting to the public electrical network and about the tariff that will be paid for energy produced from renewable sources, the following activities were implemented:

- desk research;
- meetings and several contacts with Ministry involved (Industry and Environment);
- contacts and meetings to EDP, the national-regional electricity company distributor;
- contacts with companies that have a recent similar experiences;
- meeting in the regional and national agency of energy (AVEN-IDAE).

**PPP internal by law consultancy**

In order to verify the Spanish target area project we had held an internal meeting with our legal experts in PPP according with the Spanish Regulations. At the light of the Spanish Law, a PPP must be considered between the Central State and Privates, and not with Municipality, some doubts can occurs about the interpretation with Regional and or Provincial Governments. Besides that, the law only specifies some particular sectors (energy not included). For the purpose of the Project we then have considered PPP in a broad sense.

The PPP form will be based on the PPA (Power Purchase Agreement), a long term contract. This is a basic form of PPP in which two parties are involved: one who generates electricity for the purpose of sale (the seller, private partner)
and one who is looking to purchase electricity (the buyer, public partner). Even if this model is not still contemplated in the Kingdom of Spain Laws as a PPP.

This type of agreements provide the template for modern PPP Contracts. Considering the different types of Contract on PPP, the choice for DIPCAS-INTERCOOP’s-THIRD private partner is closer to the BOO, Build-Own-Operate.

In figure 7.4 of the publication “Application of public private partnership to the agroenergy district in 5 European countries”, it is presented the scheme that will be used for the partnership.

**Energy legislation**

Regarding the activity of electricity production, special regime production (PRE) is based in a set of technologies that use renewable sources, such as wind, water, sun and biomass, and through the use of technologies of high energetic efficiency like co-generation. In PRE several categories can be distinguished with some specific legal procedures:

- Co-generation;
- Renewable;
- Micro-production (until 4,90 kW);
- Producer-consumer in low voltage (until 150 kW).

Therefore, the production of electricity from manure and other liquid animal wastes can be done through co-generation with renewable sources or in the frame of the category “renewable”.

The government, through the General Direction of Energy (DGE) of the Spanish Ministry of Industry and Energy, it is responsible for the regulation of PRE, while the incorporation of additional costs arising from the PRE in tariffs is attributed to the Regulatory Authority for the Electricity Sector.

The producers of electricity based on renewable energy sources must be licensed under RD n.º 667/2007.

More specifically, further developments of RD.667/2007 and subsequent amendments regulates the establishment of plants of electrical energy production. The procedure for obtaining the legal permits and facilities’ suitability verification for the technical requirements of connecting power stations to networks of SEP starts with a request for prior information (PIP), as shown in Figure n.6.2 This PIP opens in four specific periods during the year; however, that possibility of a request for prior information has been closed in the last periods and priorities have been given to projects included in specific programmes approved by the Government as part of National Energetic Policies Options and/or tenders launched by DGE (Spanish Ministry of Industry and Energy).
In fact, with the changes brought by RD.667/2007, the power available in
the REE network and the reception points needed for the network connection could
be allocated through a competitive tender process or direct contracting, giving
priority to projects included in specific programs approved by the Government
as part of National Energetic Policies Options (IDAE) that approves the national
energy strategy till 2020.

This is the case of the tenders launched by DGE, opening specific periods
for applications on prior information (PIP) for grid connection of power plants
that use liquid animal wastes (manures) and other animal wastes (Sandach).

The main steps, after obtaining the license of operation are described below
(http://www.marm.es; http://www.mityc.es/energia)

- Presentation by the promoter of the License to the Network Operator, after
  an inspection carried out by competent authorities;
- Signature of the act of connection of the production facility that is a part of
  the Power Purchase Agreement;

Fig. 6.2: REE’s network connection process (RD 667/2007 and ulterior modifications)
Preparing and Signing the Protocol of operation.

The operation's license, the connection's act, the operation protocol and the provisional diagram of power supply are attached as an integral part of the Power Purchase Agreement. Besides the license of operation, associated with the higher costs of producing electricity from renewable energies, a special tariff is also legally established for those licensed plants, that produce electricity from renewable energy sources. These producers are paid based on a formula established in the Law. The elements of the formula represent different factors that influence the value of the payment for the supply of electricity from renewable energy power delivered to the network. For the upgrade of remuneration has been done, ensuring that remuneration for a period deemed sufficient to allow recovery of investments and least the minimum expected economic return of the promoters.

A detailed list of the national legislation on energy issues can be found at http://www.mitcyc.es/energia.

**PPP legislation**

In Spain, the legal significance of PPP is strict and applies only to contracts between the central state and private in specific areas laid down by law, including roads, health, transports. Energy is not included at the moment. The meaning of public-private partnership for the purpose of the project will be broadly based and it must be defined the exact role of each partner in the project. Biogás Castellón has identified its main needs that the Province Government (DIPCAS) might contribute: administrative and legal issues for a 20 years management contract. The model of PPP should be closer to the Build-Own-Operate (BOO). The main constraint identified is for a “PIP” – request for previous information, which, if positive, is a license to link the private production of electricity to the public electricity line, and consequent the long time needed for achieving the final electrical network permits.

**6.1.4 Biomass inventory and assessment and pre-feasibility plan**

When we started RuralE.Evolution was started, the scope of the project was Benassal’s municipality, and the aim the constitution of a PPP for the utilization of the animal wastes coming from about a 2,100 pigs breeding to obtain biogas, his thermoelectric recovery and utilization, to improve the environmental conditions and the economic diversification of the target area.
Guidelines for successful application of PPP to RES Agro-energy districts

Since then, a series of events have modified the aim of the project, extending his potential applicability to other four (4) municipalities following the model initially chosen as PPP.

This change of target area delayed the project, namely because the Local Initiatives had been delayed and contacts with new stakeholders were started and new potential partners chosen.

The area (Benassal and North East of Castellón Province) inland is a rural area with economy of scarce value, based on some crops culture, incipient rural tourism and a big concentration of animal livestock, basically swine farms (in intensive growing) and cattle in extensive (half-pastureland) production. These are around 1.2 millions permanent head of swine alive in this area of Castellon Northern, the environmental impact it is relevant, the nuisance for the population and potential rural tourism too and the possibilities for a potential manure and other animal by-products treatment and recovery are high.

In 1999, a project initiative promoted from the Castellón Province Government threw an ambitious project for the construction, storage and managing of these residues in the province by means of 4 lagoons of storage and ulterior treatment of the lines of liquid and solid.

The project, due to different reasons, did not reach the aims that it had planned, but part of the facilities are usable and are located in geographically good places for the logistics and the later treatment, effecting the necessary technological Up-Grades to the current plants.

The technology’s choice was the known proved, feasible and sustainable power production from anaerobic digestion and biogas recovery, based on the swine manure and other organic wastes and by-products in the target area.

During the prefaseability study several contacts were made with specialized companies, in order to estimate the total investment and his related costs. The incomes are calculated based on the electricity official prices, which is fixed by law and yearly up-dated.

**Pre-feasibility plan**

With the animal wastes inventory it is necessary to evaluate the existing technologies (excluding non-proved technologies).

The steps that have been done in the Prefeasibility plan are:

- Individuation of providers (for commissioning) of existing energy producer plants;
- Analysis of maintenance and operative costs;
• Evaluation of the cost of alternative AD substrate-co/substrates (as manures) in the market. The project will only be feasible if it the animal waste as raw material is able to have-very low cost;
• Evaluation of the cost to connect to the public electric network;
• Evaluation of the cost of the public concessions, the engineering and the construction;
• Evaluation of the electricity exported to the grid and the related income, based on the tariff;
• Calculation of the financial indicators (Pay-back, NPV);
• Comparison with other similar projects as similar contexts as well.

6.1.5 Partners contacts and negotiation

The Municipality of Benassal is at about 15 km from Albocasser Municipality, place where exists one of four oldest provincial facilities for swine manure treatment plant and center of an area with problems of rural and economic development, including the others three manure treatment facilities (Salsadella, Sant Mateu and Todolella). The project can be an opportunity to create jobs and develop the local economy. Moreover, is very important to create a solution for the swine and other animal by-products treatment, recovery and valuation because it may become a big environmental, animal welfare and human health problem due to bad agricultural practices applied in the past.

Financial Partners: Intercoop Group, with other private investors (Biotecnología Agrícola and a Britain-Dutch Company) created a new company named “Biogás Castellón”, and negotiated with the Province Government a new administrative permit and contract to manage the 4 facilities during the next 20 years. The Province Government (DIPCAS) contributes with a fix price for m³ of treated manure.

The Castellon Province Government (DIPCAS) will make a public contract concession to Biogas Castellon for an EPMC biomass Anaerobic Digester and energy recovery. The plant will be realized by Biogas Castellon like private partner. The biomass will be collected from livestock farms integrated in the municipality cooperatives of INTERCOOP GROUP also tertiary producers as well as private partners will be contacted. The electrical energy produced by means of biogas generated in anaerobic digestion conditions and cogeneration will be exported ( invoiced) to the electrical network grid and the thermal energy recovered and applied for partial or total removal of N forms contained in the digestate liquid fraction for further agronomical application, increasing the competitiveness of the farmers involved as part of INTERCOOP GROUP
cooperatives and contributing to make environmentally friendly the livestock production in the target area group.

6.1.6 Communication campaign

The communication campaign should include different types of formats and initiatives, depending on the moment of the project (start-up, development, terminal) and the development of the project. This campaign will be important, namely for the selection of suitable partners (for the project) and project’s dissemination (local population sensitization; dissemination of achieved results and main constraints identified; etc.).

Table 6.1: Communication campaign results

<table>
<thead>
<tr>
<th>Activities</th>
<th>When</th>
<th>Stakeholders</th>
<th>Objective(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal contacts</td>
<td>2009</td>
<td>Regional and Provincial Governments, Private Partners</td>
<td>Introduction to the RuralE.Evolution project Scheduling on-person meetings</td>
</tr>
<tr>
<td>Meeting</td>
<td>November, 2009</td>
<td>FCVRE-Feria EGETICA Valencia</td>
<td>RuralE.Evolution project presentation</td>
</tr>
<tr>
<td>Round table</td>
<td>September, 2009</td>
<td>EGETICA</td>
<td>RuralE.Evolution project presentation.</td>
</tr>
<tr>
<td>Meetings</td>
<td>November 2009-July 2010</td>
<td>Province Gov, private investors, Intercoop</td>
<td>Discussion of the main advantages and constraints of the project’s implementation. New permits long term exploitation and managing.</td>
</tr>
<tr>
<td>Local initiative</td>
<td>February, 2010</td>
<td>Intercoop organizations and stakeholders</td>
<td>RuralE.Evolution project presentation, including its background, objectives, what has been done, advantages and constraints and the next steps of the project. Open ground to discuss the interest of the local stakeholders on the project, as well as their view and role on the project</td>
</tr>
<tr>
<td>Round table</td>
<td>February, 2010</td>
<td>Intercoop and stakeholders</td>
<td>RuralE.Evolution project presentation, including the role that the Province Gov can have – its duties and benefits as a partner in the project for the authorization.</td>
</tr>
<tr>
<td>Local initiative (1)</td>
<td>July, 2010</td>
<td>Intercoop and new PPP created (Biogás Castellón)</td>
<td>RuralE.Evolution project presentation, identifying the main advantages and constraints. Due Diligence made through Province Gov, electrical connection permits presented, technical projects design and</td>
</tr>
</tbody>
</table>
The communication campaign should then include:

- Flyer / brochure (project’s presentation);
- Web-page on the project;
- Contacts database;
- Newsletter;
- Press releases (before and after each public initiative);
- Public initiatives (local and national);
- Private meetings and round tables.

Next, these elements will be described.

INTERCOOP Group, gave preference to personal contacts of the potential partners identified, as well as meetings with those. Depending on the interest shown, it held private meetings, round tables and public local initiatives. It also disseminated the information on the project RuralE.Evolution in its website www.intercoop.es in its different Intercoop’s magazines and brochures and made available to Fundation Valenciana-FCVRE a list of e-mail contacts to send the RuralE.Evolution Newsletter.

The information and communication activities during the implementation are presented in tab. 6.1.

6.1.7 Contract preparation, capital subscription and new Company creation

Concerning the contracts that are made between the partners, it can be said that a public act and ulterior public registration of a new Company (Biogas Castellon) were made, copies of this official documentation were sent to Project Leader as objective evidence.

The private contract to be established between the consortium partners that will implement and manage the plant must clarify:

- Amount of manure and other organic wastes to be supplied;
- Cost (min/max) the biomass and conditions to furnish it;
• Amount of participation of each partner in the new society established;

• Management, responsibilities and governance;

• Responsibility of each partner in the preparation of the project and the feasibility study, management and operation;

• Responsibility of each partner in the execution (construction) of the project;

• Acquisition/rental of the land to install the plant (under public concession from DIPCAS).

### 6.2 SWOT analysis

From fig.6.1 it can be inferred that 7 steps for the methodology implementation have been realized. The final objective of the project methodology, that was the signing of the Memorandum of Understanding (MOU) was finally achieved.

**Target area characterization**

<table>
<thead>
<tr>
<th></th>
<th>W</th>
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<tbody>
<tr>
<td>S</td>
<td></td>
</tr>
<tr>
<td>High livestock concentration</td>
<td>Nitrate CE Directive (agricultural land availability for application)</td>
</tr>
<tr>
<td>Intercoop role as a farmer cooperatives adviser</td>
<td>Electrical grid network infrastructure</td>
</tr>
</tbody>
</table>

**O**

| Existence of mass center manure storage (lagoons) in 5 places as future facilities (Anaerobic Digestion and cogeneration) | Impacts of transport cost (from farms to Anaerobic Digestion facilities and from facilities to land application as well) |
|Province Government commitment for treatment and disposal contract | Electrical grid network availability for energy generated exportation

Possibilities and potential availability for other organic substrates for co-digestion
### PPP implementation

**Tab. 6.3: PPP implementation SWOT analysis**

<table>
<thead>
<tr>
<th>S</th>
<th>W</th>
</tr>
</thead>
<tbody>
<tr>
<td>PPP synergies: farmers-cooperatives-technologies-financing-province government</td>
<td>Energy PPPs are not covered by the Spanish law</td>
</tr>
<tr>
<td>Integration of different skills and professionals</td>
<td>There are political risks</td>
</tr>
<tr>
<td>O</td>
<td>T</td>
</tr>
<tr>
<td>Easier authorization path</td>
<td>The process of PPP implementation can be long and bureaucratic</td>
</tr>
</tbody>
</table>

<table>
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<tr>
<th>O</th>
<th>T</th>
</tr>
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<tbody>
<tr>
<td>Lack of experience in the administration of the public units; the capacity building at central level is not always accompanied by parallel actions at the local and regional level</td>
<td></td>
</tr>
</tbody>
</table>

### Contract redaction

**Tab. 6.4: PPP contract: supply of biomass**

<table>
<thead>
<tr>
<th>S</th>
<th>W</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private partner is a better and more experienced manager than the Public</td>
<td>Changes in administrative structures can create problems to the venture</td>
</tr>
<tr>
<td>Blurriness in the partners selection procedure can jeopardise the venture; the guarantee of meritocracy and the performance evaluation during the contracting procedures is essential. In Greece this is ensured by Public Procurement guidelines. However, there is a balance that needs to be kept, especially for small scale projects, where interpersonal relationships are crucial.</td>
<td></td>
</tr>
<tr>
<td>O</td>
<td>T</td>
</tr>
<tr>
<td>The replication of a PPP project is definitely a success factor, especially if the same persons are involved again. There is a high level of experience and also the project concept has been already tested decreasing the risk of failure.</td>
<td>There is need to ensure supply of biomass with long term contracts</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>O</th>
<th>T</th>
</tr>
</thead>
<tbody>
<tr>
<td>The consideration of experience and lessons learned abroad is very useful</td>
<td></td>
</tr>
</tbody>
</table>
**PPP references in the different target areas**

In the following section the contacts useful for private or public operators interested in promoting a PPP project in the different target areas: Umbria region (Italy), Kilkis prefecture (Greece), Abasar municipality (Hungary), Alvito municipality (Portugal), Castellon province (Spain) are proposed.

**Contacts in Umbria (Italy)**

Contacts:
PPP consulting
- UTFP [http://www.utfp.it/](http://www.utfp.it/)

Agroenergy district consulting
- CRB: [http://www.crbnet.it/](http://www.crbnet.it/)
- GAIA: [http://www.gaiaspa.eu/atf_service.html](http://www.gaiaspa.eu/atf_service.html)

Consultancy
- Santucci e partners [http://www.santuccipartners.it/](http://www.santuccipartners.it/)
- Agenzia per l’energia e l’ambiente [http://www.aea.perugia.it/](http://www.aea.perugia.it/)

Financial Consulting
- Umbria Innovazione SCARL [http://www.umbriainnovazione.it/](http://www.umbriainnovazione.it/)
- Banca Monte dei Paschi di Siena [http://www.mps.it/default.htm](http://www.mps.it/default.htm)
- Creditagri [http://www.creditagri.com/Pagine/default.aspx](http://www.creditagri.com/Pagine/default.aspx)
- Unicredit Fabrizia Primieri, [http://www unicreditbanca.it](http://www unicreditbanca.it)

Plant producers
- GEM [http://www.geminc.it/](http://www.geminc.it/)
Biomass producers and mechanization enterprises
- Azienda agricola Montalba http://montemalbe.com/az_montemalbe.html
- Athena srl http://www.cner.it/index.php?pg=socio&s=4
- Consorzio Nazionale Energie Rinnovabili Agricole http://www.cner.it/
- Spapperi http://www.spapperi.it/

Farmers Unions
- Coldiretti Umbria http://www.umbria.coldiretti.it/

Energy systems management
- VUS: http://www.valleumbraservizi.it/

Regional institutions
- Umbria region http://www.regione.umbria.it/mediacenter/FE/home.aspx
- ARPA http://www.arpa.umbria.it/canale.asp

Interesting links
- Retscreen International http://www.retscreen.net/
- Phyllis database http://www.ecn.nl/phyllis/
- Biobib http://www.vt.tuwien.ac.at/biobib/biobib.html
Contacts in Kilkis prefecture (Greece)

1. Energy and government organizations
   www.rae.gr
   www.desmie.gr
   www.dei.gr
   www.ypan.gr/ape/index.php
   www.minenv.gr
   www.cres.gr

2. PPPs
   www.sdit.mnec.gr/el
   www.euroconsultants.gr

3. Agro-energy districts
   www.ruralevolution.eu
   www.eea.europa.eu/themes/landuse/interactive/clc-viewer

4. Financial actors
   www.hvca.gr
   www.insmoney.gr/banks.htm
   www.ibg.gr/IBGPublicSite/Forms/Greek/Index.aspx
   www.econews.gr/2011/03/01/europaiki-trapeza-ependyseon

5. Technology partners
   www.biomass.com.gr
   www.biofuels.gr
   www.intelen.com
   www.rokasgroup.gr
   www.endesa.es/Portal/en/our_business/electricity/europe/default.htm

6. Area stakeholders and farmers
   www.rodonas.gr
   www.opekepe.gr

7. Interesting links
   www.hellasres.gr
   www.energypress.gr
8. Interesting reading

- Interco-PPP: INTERREG III C (East Zone), Community Initiative on interregional co-operation across the entire EU territory and neighbouring countries, Project "Interregional Co-Operation for Exchange of Experiences and Knowledge Concerning Public - Private Partnerships".
- V. Kanakoudis, A. Sanopoulos and A. Papotis: "The progress of the legislative framework ruling PPPs in EU" (Open Days 2005 International Conference & Workshops, EC- Regional Policy DG).
### Contacts in Abasar (Hungary)

<table>
<thead>
<tr>
<th>Contact</th>
<th>Address</th>
<th>Email</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mátrai Erőmű Zrt.</td>
<td>H-3271 Visonta, Erőmű u. 11</td>
<td><a href="mailto:matra@mert.hu">matra@mert.hu</a></td>
</tr>
<tr>
<td>Községi Önkormányzat Abasár</td>
<td>H-3261 Abasár Fő tér 1.</td>
<td><a href="mailto:abasar@abasar.hu">abasar@abasar.hu</a></td>
</tr>
<tr>
<td>Községi Önkormányzat Domoszló</td>
<td>H-3263 Domoszló, Petőfi Sándor út 5.</td>
<td><a href="mailto:polgarmester@domoszo.hu">polgarmester@domoszo.hu</a></td>
</tr>
<tr>
<td>Községi Önkormányzat Halmajugra</td>
<td>H-3273 Halmajugra Kossuth u. 163</td>
<td><a href="mailto:halmajugra@axelero.hu">halmajugra@axelero.hu</a></td>
</tr>
<tr>
<td>Községi Önkormányzat Karácsond</td>
<td>H-3281 Karácsond Szent István u. 42</td>
<td><a href="mailto:polgarmester@karacsond.t-online.hu">polgarmester@karacsond.t-online.hu</a></td>
</tr>
<tr>
<td>Községi Önkormányzat Kisnána</td>
<td>H-3264 Kisnána Szabadság u. 3.</td>
<td><a href="mailto:kisnana@domnet.hu">kisnana@domnet.hu</a></td>
</tr>
<tr>
<td>Községi Önkormányzat Markaz</td>
<td>H- 3262 Markaz Mikes K út 5-7.</td>
<td><a href="mailto:polgarmester@markaz.hu">polgarmester@markaz.hu</a></td>
</tr>
<tr>
<td>Községi Önkormányzat Visonta</td>
<td>H- 3271 Visonta, Árpád u. 3.</td>
<td><a href="mailto:polgarmester@visonta.hu">polgarmester@visonta.hu</a></td>
</tr>
<tr>
<td>Károly Róbert Főiskola</td>
<td>H-3200 Gyöngyös Mátrai u.36.</td>
<td><a href="mailto:smagda@karolyrobert.hu">smagda@karolyrobert.hu</a></td>
</tr>
<tr>
<td>Ökoland Szövetség</td>
<td>H-3200 Gyöngyös Mátrai u.36.</td>
<td><a href="mailto:ldinya@karolyrobert.hu">ldinya@karolyrobert.hu</a></td>
</tr>
</tbody>
</table>
Contacts in Alvito (Portugal)

Energy organizations
http://www.dgge.pt/
http://www.edpsu.pt

PPP consulting
http://www.parpublicasgps.com/

Agroenergy district consulting
http://www.confagri.pt/Ambiente/Pages/RuralEvolution.aspx
http://www.ruralevolution.eu/

Financial consulting
http://www.credito-agricola.pt/CAI

Technology partners
http://www.siemens.com/entry/pt/pt/

Farmers cooperatives
http://www.confagri.pt/
http://ucasul.pt/site/

Interesting links
http://www.apren.pt/
http://www.apenergia.pt
http://www.mae.pt
http://www.opppcatolica.org/
http://www.dgtf.pt
http://www.tcontas.pt
http://www.centrodabiomassa.pt/
http://www.erne.pt
http://www.ren.pt
http://www.renewablesb2b.com
Contacts in Castellon Province (Spain)

Energy organizations
http://www.idae.es/
http://www.mitcyt.es
http://www.aven.es
http://www.avaesen.es

PPP consulting
http://www.marm.es/
http://www.aeat.es

Agroenergy district consulting
http://www.marm.es
http://www.ruraleevolution.eu/
http://www.rurener.eu

Financial consulting
http://www.bbva.es

Technology partners
http://www.einvest.com
http://bioenergiaagricola.es

Intercoop Farmers cooperatives
http://www.intercoop.es
Chapter 7

UNIFIED PPP METHODOLOGY

7.1 Unified guidelines for PPP application in the agroenergy district in the different partner countries

For what has been above mentioned and the experience gained in the project Rurale_evolution the possible methodology for a PPP implementation in Italy can be explained by three points of view:

- farmers point of view;
- municipality/public body point of view;
- plant producer point of view.

7.1.1 Farmers PPP methodology

Before going into deep in the Methodology very important is to consider farmers needs and responsibilities and risks.

NEEDS:
- Farmers need to find diversified incomes;
- Farmers need to differentiate their productions;
- Farmers need to sell their products;
- farmers need to reduce the energy consumption in their activities

RESPONSABILITIES:
- Farmers have to supply constantly the plant with biomass for a period lasting at least 10 years;
- Farmers have to commit themselves to made a constant price to the buyer of biomass;

RISKS
- In case of plant failure the farmers will not have a granted income;
- Farmers have no income for heat sells;
- Farmers have not always the technical know-how to analyze correctly the bioenergy chain and understand the technical, economical and environmental feasibility of the production of energy from biomasses.

### 7.1.2 Plant producers methodology

Before going into deep in the Methodology very important is to consider plant producers needs and responsibilities and risks.

**NEEDS:**
- plant producer needs biomass to be supplied;
- plant producer needs a sink;
- the main interest of the plant producers is to sell plants on the market.

**RESPONSABILITIES:**
- the plant producer has to grant an amount of working hours during the year;
- the plant has to be competitive compared with the other technologies on the market by the point of view efficiency, economic balance and environmental performance;

**RISKS**
- if the plant will not work at optimal levels the user could request some payments of the damage undergone.

For the above mentioned reasons if a private bioenergy plant producing society is interested to realize an agroenergy district involving a public body, such as a municipality and private suppliers of biomass (ex farmer or group of farmers), the following steps have to be followed:

1. the choice of the target area and biomass estimation;
2. agroenergy district feasibility plan;
3. communication campaign and partner search;
4. bid preparation;
5. signing of the contract.

### 7.1.3 Public body methodology

**NEEDS:**
- The public body needs biomass to be supplied;
- public body needs energy;
- The main interest of the public body is to spare financial resources involved in the energy sector.

**RESPONSABILITIES:**
- The public body has to check that the energy service required will be produced in a way that is satisfactory for the end consumer;
- The public body has to select the right technology and the right biomass;

**RISKS**
- If the plant will not work at optimal levels the public body will respond to the end consumer.

For the above mentioned reasons if a public body is interested to design an agroenergy district involving a public body such as a municipality the following steps have to be followed:
1. biomass estimation;
2. agroenergy district feasibility plan;
3. prepare the tender documents and tender procedure;
4. Invitation to tender;
5. bid evaluation.
Preparing and signing of the contract.

### 7.2 Private initiative methodology in detail

For the above mentioned reasons if a farmer or a group of farmers or a bioenergy plant producing firm is interested to design an agroenergy district involving a public body, such as a municipality, the following steps have to be followed:
1. the choice of the target area;
2. biomass estimation;
3. agroenergy district feasibility plan;
4. communication campaign and partner search;
5. Bid preparation and submission;
6. signing of the contract.

**The choice of the target area**
The following operations are recommended:
- Consider biomass availability;
- Consider biomass production and collection cost;
- Consider logistic issues;
- Consider authorization and legislation issues.
- Eventually integrate all the decision variable into a SWOT analysis.

**Biomass estimation**

- Dealing with biomass estimation, this role could be covered by research institutes or consultancy agencies that have to collect statistical data on:
  - the main cultivations present in the area (and the relative surfaces in hectares);
  - the main animal species breaded (and the number of heads);
  - the main industrial and agroindustrial productions (and the relative quantities of residues produced);
- Multiplying cultivated surface and the number of heads for coefficients that describe the residues productions the final residual biomass quantities are derived;
- If residual biomasses are not enough to supply fuel for the bioenergy plant the possible cultivation of dedicated energy crops has to be taken into account;
- Knowing the energetic characteristics of biomasses (that could be taken also from databases available on the web (such as: BIOBIB, [http://www.vt.tuwien.ac.at/biobib/biobib.html](http://www.vt.tuwien.ac.at/biobib/biobib.html), or Phyllis, [http://www.ecn.nl/phyllis/](http://www.ecn.nl/phyllis/)) the net energy that can be produced could be calculated.
- Different biomasses will correspond to different technologies. Once the individuation of the starting biomass has been done there will be more information available also to chose the most convenient technology.

**Agroenergy district feasibility plan**

Once the biomass source has been individuated and so also the technology is more clear, the feasibility of the entire bioenergy chain has to be evaluated and then compared with existing biomass plants and competitor technologies, on the basis of economical technical and environmental convenience. To this aim the following actions have to be undertaken:
- the investment costs of the plant have to be individuated eventually asking for bids of existing bioenergy plants producers;
- the maintenance and operative costs have to be evaluated;
- the cost of fuel (that is biomass) has to be analyzed;
- the incentivation tariffs have to be clearly individuated;
Chapter 7 – Unified PPP Methodology

- the costs connected with the bioenergy chain residuals disposal and for the buildings and the operations of technical design, engineering and development of the project have to individuated;
- through the above mentioned data financial indicators will be calculated;
- the data mentioned above can be compared with the financial indicators of different energy sources (renewable and not).

A key issue in this case appears to be biomass price that will influence all the economic sustainability of the bioenergy chain by the point of view of the farmers.

It is also fundamental to break down from the cost of biomass the transport quota, the harvest quota and the eventual cultivation quota. In this way the biomass that is practically and economically available will be found.

**Communication campaign and partner search**

Dealing with the communication campaign and partners search. This process has three main objectives: to find the energy sink, to find the possible technology to implement the bioenergy chain and to find funds (funds raising).

The energy sink will be found knowing which are the needs of the public body and which concentrated sinks can be supplied with the biomass assessed during the previous analysis.

Dealing with technology individuation in this phase the information about different biomass plant bids and prices, already collected during the feasibility plant investment analysis, will be used. Besides in the biomass plant bids it has to be specified who will be involved in the maintenance operations and running the plant whether a private society or the farmers themselves.

Dealing with fund raising, this is a typical scope of the private investor, that can find different sources of finance that can be also available at different times during the project life, such as:

- equity\(^1\);
- mezzanine finance;
- commercial lending for senior debt;
- equity bridge finance;
- project leasing;

\(^1\) Dealing with equity in PPP projects, the main providers of funds can be the project sponsors, though there may be other investors (ex. Institutional investors often acting through an investment fund and in general the public body in local or international capital markets). Mezzanine finance has characteristics of both debt and equity, and will rank between the two in terms of priority. Essentially this type of finance is treated as debt, while the project has sufficient resources to service it, but is treated as equivalent to equity if it has not. Commercial lending for senior debt is covered mainly by commercial banks. The financing of projects is a specialized area, particularly as it requires the term of the debt to be much longer than the term of loans for general corporate purposes. Equity bridge finance is provided during the construction phase instead of sponsor provided equity and debt. Dealing with project leasing, it can be advantageous to consider tax based leasing facilities in respect of the project equipment. The feasibility of this will depend upon such issues as the jurisdiction in question, its tax regime and the type of equipment.
Once the communication campaign is completed and all the key actors have been found (banks, farmers, public body and plant producer) some of them can chose to constitute also a SPV\(^2\) (special Purpose Vehicle).

**Bid preparation and submission**

Bid preparation and submission The process could be considered as a number of stages [1]:

1. the pre-selection stage;
2. the decision to bid;
3. establishing the basis of the estimate;
4. the preparation and submission of the bid.

The pre-selection process involves the following activities within the contractor’s organization:
- the assessment of the need for work;
- the identification of market opportunities
- the pre-selection assessment.

The decision to bid is based on the following parameters:
- what is the real likelihood of the project and when?
- where is the project located?
- are we proficient in the construction of the work involved in the project?
- how many competitors for the work are there?
- who are the competitors?
- do we have favourable experience to the client?
- what is the duration of the project and does this justify the financial outlay in starting work in this new location?
- does the project offer adequate return for the risks involved?

Dealing with the estimation of the convenience to bid this could be evaluated based on the following economic criteria. A construction company preparing a bid is calculating assembling or assessing the bid elements in the following equation:

\[
\text{Bid} = \text{direct cost estimate} + \text{mark up} [1]
\]

The direct cost estimate includes the costs of the labour, plant, materials, and subcontractors who are directly involved in the construction. To these direct costs is added the site on-costs such as the site management team and the

---

2 Legal entity (usually a limited company of some type or, sometimes, a limited partnership) created to fulfill narrow, specific or temporary objectives.
service functions of safety, security and welfare together with the offices, canteens and other facilities all directly employed on the individual project.

Fig. 7.1: Preparation of the bid [1]
The mark-up includes the allowances of the company or head office overheads, profit and risk. These are not included in the direct costs to the contractor of the project.

The preparation of the bid is shown on figure 7.1.

- A check will be made of the contract documents received and a thorough review made of these documents. Any anomalies or queries will be listed so that a formal query may be raised with the client’s representatives and answers obtained;
- Following discussions between the estimating and planning staff an outline of the construction method and the contract program will be agreed;
- An early decision must be made as the items of work that will be subcontracted. These items must be listed, prospective subcontractors identified and copies of the documentation that will need to be forwarded to these subcontractors produced;
- The contract documents must be reviewed and a list of all the materials required for the project prepared. This list will then be used to identify the materials for which it will be necessary to seek quotations;
- For some items of work the client’s representative may have decided to identify items as Provisional Sums or Prime Cost Items. These items must be identified and their implications considered separately from the main work items;
- In some bids the contractor is invited to price the works based on alternative designs. As design changes will have a fundamental effect on the bid preparation this decision must be made as soon as possible after the decision to proceed.

Where the client’s representative has prepared a Bill of Quantities document, the contract will produce an abstract of the principal quantities of work involved if this has not already been prepared.

Where a Bill of Quantities document has not already been prepared it will be necessary to produce the principal quantities of work by measurement from the contract drawings.
Signing of the contract³
Dealing with the signing of the contract an important choice is whether the farmer will manage the energy plant and participate to the incomes or it will be subcontracted to another private enterprise.

7.3  **Public initiative methodology in detail**

**Biomass estimation**
In the case of the public body the target area will be automatically individuated in the area of the municipality. Once the target area is individuated biomass availability has to be analyzed and then the single biomass owners have to be individuated to understand if the potential biomass is practically available. Biomass potential can be estimated with statistical elaboration. Practical availability will be individuated and confirmed only by specific meeting, and an organized and dedicated communication campaign.

**Agroenergy district feasibility plan**
Once that the biomass source has been individuated and so the technology is more clear, the feasibility of the entire bioenergy chain has to be evaluated and then compared with existing biomass plants and technologies, on the basis of economical, technical and environmental convenience. To this aim the following actions have to be undertaken:

- the investment costs of the plant have to be individuated eventually asking for bids of existing bioenergy plants producers;
- the maintenance and operative costs have to be evaluated;
- the cost of fuel (that is biomass) has to be analyzed;
- the incentivation tariffs have to be clearly individuated;
- the costs connected with the bioenergy chain residuals disposal and for the buildings and the operations of technical design engineering and development of the project have to individuated;
- through the above mentioned data financial indicators will be calculates;
- the data mentioned above can be compared with the financial indicators of different energy sources (renewable and not).

³ Referring to the preparation of the contract, in the Italian law the D.lgs 12th April 2006 n.163 has to be considered: “Codice dei contratti pubblici relative a lavori, servizi, furnitures in attuazione della direttiva 2004/17/CE e 2004/18/CE”. The contract in this case can be prepared by:
1) the private partner if it is followed the article 133 and in this case it is the private partner to be the promoter of the PPP;
2) the public partner if it is followed the article 143 (the public partner is the promoter of the PPP).
The key issue in this case appears to be the heat/electricity price, compared to that of the base case. The bioenergy chain has to produce evident advantages to the main consumer served by the public service if this is not granted the project will be considered not feasible.

**Prepare the tender documents and tender procedure**

There are a variety of names for tender documents package, depending on the nature of the bidding procedure:

- restricted procedure – invitation to tender (ITT), Invitation to Bid (ITB) or Request for proposal (RFP);
- negotiated procedure – Invitation to negotiate (ITN), or Project Brief;
- competitive dialogue – Invitation to Competitive Dialogue (ICD).

The basic content of all these tender documents it is the same; it is mainly the dialogue with bidders and procedures before and after they are issued, as discussed above, which differ. The tender documents are accompanied with an information package which sets out:

- general legislative and policy background;
- project raison d’etre;
- service requirements;
- support to be provided by the Public Authority, either financial, or, e.g. through building a connecting road;
- data on the market, e.g. traffic flows, for PPPs where usage risk is being transferred to the private sector;
- a draft PPP contract, including risk-transfer provisions, performance specification and proposed pricing formula;
- programme for site visits, bid meetings, and procedure for clarifications;
- the form of bid required;
- bid deadline;
- bid-evaluation criteria;
- overall project timetable.

The bidder’s response to the tender is likely to be required to cover issues (insofar as these have not been clarified in advance) such as:

- technology and design;
- construction programme;
- service standards and delivery;
- details of Subcontracts and Subcontractors;
- management structures for both the construction and service delivery/operation phases;
- quality – and safety – assurance procedures;
Chapter 7 – Unified PPP Methodology

- commercial viability (e.g. traffic or demand projections for a Concession);
- insurance coverage;
- project costs;
- financing strategy and structure;
- qualifications or proposed amendments to the proposed draft PPP Contract;
- proposals for the Service Fees.

Invitation to tender

The invitation will have two main objectives: to find the biomass source and to find the possible technology to implement the bioenergy chain.

Tender-based projects are usually begun by advertisement. Those partners expressing interest have been invited to submit basic information about themselves and, based on this information (and sometimes after an interview), a shortlist of between three and five organizations has been drawn up to go forward into the tender process.

Leaving aside any advertisements required by applicable procurement law, the invitation to tender documentation is the first legal stage in carrying forward a project. The form of the invitation to tender (ITT) will vary from project to project, and particularly will vary depending upon the type of tender process adopted. Nevertheless, the ITT will set out the rules and basis upon which the tender competition will take place and, in certain cases, the host government may be held legally liable if it fails to conduct the tender in line with the mechanisms set out in the invitation.

Bid evaluation

Whatever the bid procedure, the same information should be made available to all bidders, e.g.:
- holding bidder meetings and site visits which all attend, which can be helpful to flush out any major issues which bidders may have with the project; and
- copying written answers to questions or issues raised by one bidder to all of them, without indicating who asked the original question;

Bidders should be given a specific point of contact within the Public Authority, and should not be allowed to make contacts elsewhere in the organization. Discussions with bidders may lead to modifications in the bid requirements: in such cases the bid schedule may have to be delayed to give bidders enough time to deal with these modifications. On the other hand bidder
confidentiality has to be respect, e.g. where there may be several different solutions to executing the project.

A method is needed to compare the bids with each other, and bidders need to understand clearly what they have to do to produce the best bid. There are various approaches for comparing the bids:

- Price comparison
- Contract term
- Level of subsidy
- Most economically advantageous bid

Preparing and signing the contract

A concession agreement is likely to contain some or all of the following provisions:

<table>
<thead>
<tr>
<th>Tab. 7.1: Contract provisions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provision</td>
</tr>
<tr>
<td>Parties</td>
</tr>
<tr>
<td>Conditions precedent</td>
</tr>
<tr>
<td>Term</td>
</tr>
<tr>
<td>Design and construction</td>
</tr>
<tr>
<td>Inspection and approval</td>
</tr>
<tr>
<td>Site acquisition</td>
</tr>
<tr>
<td>Financing documents</td>
</tr>
<tr>
<td>Various facilities</td>
</tr>
<tr>
<td>---------------------</td>
</tr>
<tr>
<td>Ancillary developments</td>
</tr>
<tr>
<td>Operation</td>
</tr>
<tr>
<td>Charges</td>
</tr>
<tr>
<td>Change of circumstances</td>
</tr>
<tr>
<td>Force majeure</td>
</tr>
<tr>
<td>Termination</td>
</tr>
<tr>
<td>Step-in rights</td>
</tr>
<tr>
<td>Compensation</td>
</tr>
<tr>
<td>Transfer of assets</td>
</tr>
<tr>
<td>Competition and interference</td>
</tr>
<tr>
<td>Refinancing</td>
</tr>
<tr>
<td>Inflation risk, cost impact of changes in law and benchmarking/market testing</td>
</tr>
</tbody>
</table>
Law and disputes

Provisions specifying the proper law of the agreement, and the dispute resolution mechanism(s) applicable to it, will also be included.

Miscellaneous

The agreement is also likely to contain provisions dealing with the following matters:

- insurance;
- liability (and cross-indemnities);
- environmental requirements;
- intellectual property;
- provisions dealing with any existing government employees being transferred to the concessionaire or the operator;
- confidentiality;
- records and accounts; and
- legal ‘boilerplate’ (assignment, change of control (including restrictions on the sponsors disposing of shares in the SPV), sub-contracting, and the like).

The contract management is not comprised in this methodology.

7.4 Bibliography

Annex 1

BIOMASS ASSESSMENT CASE STUDY: GREECE

A1.1 Area characteristics for biomass production exploitation

Four zones have been set in relation to the exploitation of biomass in the area. These zones correspond to a radius of 5, 10, 20, and 30km from the point of construction of the biomass utilization plant. These zones were set as the availability and price of biomass differs accordingly to the zone originating from. Biomass that takes longer to travel to the plant has a higher cost (in transport). These four zones are depicted below (the Greek national border to the North limits the fourth zone).

Fig. A.1: Zones of influence for biomass production exploitation at 5, 10, 20 and 30 km radius from Toumpa Kilkis.
Tab. A.1: Area coverage for each zone

<table>
<thead>
<tr>
<th>Zone</th>
<th>Radius (km)</th>
<th>Area (km²)</th>
<th>Distribution %</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>5</td>
<td>78.5</td>
<td>2.99%</td>
</tr>
<tr>
<td>B</td>
<td>10</td>
<td>235.6</td>
<td>8.98%</td>
</tr>
<tr>
<td>C</td>
<td>20</td>
<td>942.5</td>
<td>35.92%</td>
</tr>
<tr>
<td>D</td>
<td>30</td>
<td>1367.3</td>
<td>52.11%</td>
</tr>
<tr>
<td>SUM</td>
<td></td>
<td>2623.9</td>
<td>100.00%</td>
</tr>
</tbody>
</table>

Fig. A.2: Terrain elevation of the study area and zones of influence at 5, 10, 20 and 30 km radius from Toumpa Kilkis.

Dealing with terrain elevation, the characteristics of the area are the following:
1. minimum altitude: 1 m;
2. mean altitude: 247 m;
3. maximum altitude: 1648 m.
Dealing with terrain slope, the characteristics of the area are the following:
1. Minimum slope: 0 %
2. Mean slope: 11.3 %
3. Maximum slope: 148.6 %
Agricultural land was computed at 1907.8 km² using Corine Land Cover. The net agricultural area was computed by neglecting pastures (5,460.7 ha according to corine) and a 40% of the remaining land, which was attributed to roads and buffer zones (it was determined using sampling sites using orthophotos).

Fig. A.3: Terrain slope % of the study area.

The net agricultural land distributed in the four zones is given in Table 2.
Guidelines for successful application of PPP to RES Agro-energy districts

Tab. A.2: Land uses distribution in the study area (CLC2000)

<table>
<thead>
<tr>
<th>Type</th>
<th>Area (km²)</th>
<th>Distribution %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agricultural land</td>
<td>1907.8</td>
<td>72.71%</td>
</tr>
<tr>
<td>Artificial surfaces</td>
<td>58.7</td>
<td>2.24%</td>
</tr>
<tr>
<td>Forest and seminatural areas</td>
<td>622.8</td>
<td>23.74%</td>
</tr>
<tr>
<td>Water bodies - wetlands</td>
<td>34.6</td>
<td>1.32%</td>
</tr>
<tr>
<td>SUM</td>
<td>2623.9</td>
<td>100.00%</td>
</tr>
</tbody>
</table>

Tab. A.3: Net agricultural land distributed in the four zones

<table>
<thead>
<tr>
<th>Zone</th>
<th>Area (ha)</th>
<th>Distribution %</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>4313.0</td>
<td>3.9%</td>
</tr>
<tr>
<td>B</td>
<td>11806.2</td>
<td>10.6%</td>
</tr>
<tr>
<td>C</td>
<td>37186.3</td>
<td>33.4%</td>
</tr>
<tr>
<td>D</td>
<td>57884.0</td>
<td>52.1%</td>
</tr>
<tr>
<td>SUM</td>
<td>111189.5</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

A1.2 Experience gained about the methodology

Table A.4. Crop distribution (ha) per zone

<table>
<thead>
<tr>
<th>Crop</th>
<th>Zone (area in ha)</th>
<th>SUM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>pomegranate</td>
<td>163.0</td>
<td>85.3</td>
</tr>
<tr>
<td>cherry trees</td>
<td>54.3</td>
<td>22.7</td>
</tr>
<tr>
<td>vineyards</td>
<td>25.0</td>
<td>71.7</td>
</tr>
<tr>
<td>tobacco</td>
<td>15.8</td>
<td>13.0</td>
</tr>
<tr>
<td>rice</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>sunflower</td>
<td>1.9</td>
<td>5.5</td>
</tr>
<tr>
<td>cotton</td>
<td>331.3</td>
<td>949.2</td>
</tr>
<tr>
<td>hard wheat</td>
<td>3,166.1</td>
<td>9,067.2</td>
</tr>
<tr>
<td>maize</td>
<td>257.2</td>
<td>736.7</td>
</tr>
<tr>
<td>oat</td>
<td>3.5</td>
<td>10.1</td>
</tr>
<tr>
<td>barley</td>
<td>151.8</td>
<td>435.0</td>
</tr>
<tr>
<td>rye</td>
<td>125.7</td>
<td>360.1</td>
</tr>
<tr>
<td>olives</td>
<td>17.3</td>
<td>49.6</td>
</tr>
<tr>
<td>SUM</td>
<td>4,313.0</td>
<td>11,806.2</td>
</tr>
</tbody>
</table>
In Table A.4. is given the crop distribution for each exploitation zone. In Table 5. is given the type and the yield (t/ha) of residues according to published literature referred to Greek and Italian conditions (Di Blasi et al., 1997; Gemtos et al., 1999).

<table>
<thead>
<tr>
<th>Crop</th>
<th>Residue type</th>
<th>Residue yield (wet basis) (t/ha)</th>
<th>Moisture %</th>
<th>Residue yield (dry basis) (t/ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>pomegranate</td>
<td>prunning</td>
<td>2</td>
<td>40%</td>
<td>1.2</td>
</tr>
<tr>
<td>cherry trees</td>
<td>prunning</td>
<td>2.5</td>
<td>40%</td>
<td>1.5</td>
</tr>
<tr>
<td>vineyards</td>
<td>sarmenta</td>
<td>2.9</td>
<td>50%</td>
<td>1.5</td>
</tr>
<tr>
<td>tobacco</td>
<td>stems</td>
<td>2.2</td>
<td>85%</td>
<td>0.3</td>
</tr>
<tr>
<td>rice</td>
<td>straw</td>
<td>3.8</td>
<td>25%</td>
<td>2.9</td>
</tr>
<tr>
<td>sunflower</td>
<td>stalks and straw</td>
<td>4</td>
<td>40%</td>
<td>2.4</td>
</tr>
<tr>
<td>cotton</td>
<td>stalks and straw</td>
<td>4.25</td>
<td>41%</td>
<td>2.5</td>
</tr>
<tr>
<td>hard wheat</td>
<td>straw</td>
<td>1.6</td>
<td>15%</td>
<td>1.4</td>
</tr>
<tr>
<td>maize</td>
<td>stalks</td>
<td>9.1</td>
<td>60%</td>
<td>3.6</td>
</tr>
<tr>
<td>maize</td>
<td>cobs</td>
<td>1.4</td>
<td>50%</td>
<td>0.7</td>
</tr>
<tr>
<td>oat</td>
<td>straw</td>
<td>1.4</td>
<td>15%</td>
<td>1.2</td>
</tr>
<tr>
<td>barley</td>
<td>straw</td>
<td>2.7</td>
<td>15%</td>
<td>2.3</td>
</tr>
<tr>
<td>rye</td>
<td>straw</td>
<td>1.8</td>
<td>15%</td>
<td>1.5</td>
</tr>
<tr>
<td>olives</td>
<td>prunning</td>
<td>1.7</td>
<td>40%</td>
<td>1.0</td>
</tr>
</tbody>
</table>

Using the Tables A.4 and A.5, the biomass production (tones) per zone and per crop was determined and is given in Table A.6.

Using the LHV values for each crop from Di Blasi et al. (1997) and Gemtos et al. (1999), heat and electricity production using biomass was determined. Heat and electrical energy was determined using the following equations (Tables 4 and 5), respectively:

\[
\text{Heat production (MJ)} = 0.9 \cdot \text{Biomass (kg)} \cdot \text{LHV (MJ/kg)}
\]

Assuming that the boiler efficiency is 90% \hspace{1cm} (1)

\[
\text{Electricity production (MJ)} = 0.2 \cdot \text{Biomass (kg)} \cdot \text{LHV (MJ/kg)}
\]

Assuming that the power plant efficiency is 20% \hspace{1cm} (2)
Table A.6. Biomass production (tn) per crop and per zone

<table>
<thead>
<tr>
<th>Crop</th>
<th>Zone</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>SUM</th>
</tr>
</thead>
<tbody>
<tr>
<td>pomegranate</td>
<td></td>
<td>195.5</td>
<td>102.3</td>
<td>68.6</td>
<td>35.6</td>
<td>402.0</td>
</tr>
<tr>
<td>cherry trees</td>
<td></td>
<td>81.5</td>
<td>34.1</td>
<td>102.8</td>
<td>213.4</td>
<td>431.8</td>
</tr>
<tr>
<td>vineyards</td>
<td></td>
<td>36.3</td>
<td>103.9</td>
<td>328.9</td>
<td>495.8</td>
<td>964.9</td>
</tr>
<tr>
<td>tobacco</td>
<td></td>
<td>5.2</td>
<td>4.3</td>
<td>22.5</td>
<td>34.0</td>
<td>66.0</td>
</tr>
<tr>
<td>rice</td>
<td></td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>5,264.2</td>
<td>5,264.2</td>
</tr>
<tr>
<td>sunflower</td>
<td></td>
<td>4.6</td>
<td>13.2</td>
<td>41.8</td>
<td>63.0</td>
<td>122.6</td>
</tr>
<tr>
<td>cotton</td>
<td></td>
<td>830.8</td>
<td>2,380.2</td>
<td>7,534.5</td>
<td>11,358.3</td>
<td>22,103.8</td>
</tr>
<tr>
<td>hard wheat</td>
<td></td>
<td>4,305.9</td>
<td>12,331.4</td>
<td>39,038.7</td>
<td>58,845.5</td>
<td>114,521.5</td>
</tr>
<tr>
<td>maize (stalks)</td>
<td></td>
<td>936.0</td>
<td>2,681.7</td>
<td>8,489.0</td>
<td>2,797.1</td>
<td>24,903.8</td>
</tr>
<tr>
<td>maize (cobs)</td>
<td></td>
<td>180.0</td>
<td>515.7</td>
<td>1,632.5</td>
<td>2,461.0</td>
<td>4,789.2</td>
</tr>
<tr>
<td>oat</td>
<td></td>
<td>4.2</td>
<td>12.1</td>
<td>38.2</td>
<td>57.5</td>
<td>111.9</td>
</tr>
<tr>
<td>barley</td>
<td></td>
<td>348.5</td>
<td>998.3</td>
<td>3,160.2</td>
<td>4,764.0</td>
<td>9,271.1</td>
</tr>
<tr>
<td>rye</td>
<td></td>
<td>192.3</td>
<td>551.0</td>
<td>1,744.3</td>
<td>2,629.5</td>
<td>5,117.1</td>
</tr>
<tr>
<td>olives</td>
<td></td>
<td>17.7</td>
<td>50.6</td>
<td>160.3</td>
<td>241.7</td>
<td>470.3</td>
</tr>
<tr>
<td>SUM</td>
<td></td>
<td>7,138.6</td>
<td>19,778.8</td>
<td>62,362.3</td>
<td>99,260.5</td>
<td>188,540.1</td>
</tr>
</tbody>
</table>

Tab. A.7. Heat production (GJ) using the total available biomass

<table>
<thead>
<tr>
<th>Crop</th>
<th>LHV (MJ/kg)</th>
<th>Zone</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>SUM</th>
</tr>
</thead>
<tbody>
<tr>
<td>pomegranate</td>
<td>22</td>
<td></td>
<td>3,872</td>
<td>2,026</td>
<td>1,357</td>
<td>704</td>
<td>7,959</td>
</tr>
<tr>
<td>cherry trees</td>
<td>22</td>
<td></td>
<td>1,613</td>
<td>675</td>
<td>2,036</td>
<td>4,225</td>
<td>8,550</td>
</tr>
<tr>
<td>vineyards</td>
<td>22</td>
<td></td>
<td>718</td>
<td>2,057</td>
<td>6,512</td>
<td>9,817</td>
<td>19,105</td>
</tr>
<tr>
<td>tobacco</td>
<td>16</td>
<td></td>
<td>74</td>
<td>61</td>
<td>324</td>
<td>489</td>
<td>950</td>
</tr>
<tr>
<td>rice</td>
<td>15</td>
<td></td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>71,067</td>
<td>71,067</td>
</tr>
<tr>
<td>sunflower</td>
<td>17</td>
<td></td>
<td>70</td>
<td>202</td>
<td>639</td>
<td>964</td>
<td>1,876</td>
</tr>
<tr>
<td>cotton</td>
<td>18</td>
<td></td>
<td>13,459</td>
<td>38,558</td>
<td>122,059</td>
<td>184,004</td>
<td>358,081</td>
</tr>
<tr>
<td>hard wheat</td>
<td>16</td>
<td></td>
<td>62,005</td>
<td>177,571</td>
<td>562,156</td>
<td>847,374</td>
<td>1,649,108</td>
</tr>
<tr>
<td>maize (stalks)</td>
<td>16</td>
<td></td>
<td>13,479</td>
<td>38,616</td>
<td>122,241</td>
<td>184,277</td>
<td>358,614</td>
</tr>
<tr>
<td>maize (cobs)</td>
<td>18</td>
<td></td>
<td>2,916</td>
<td>8,354</td>
<td>26,446</td>
<td>39,867</td>
<td>77,584</td>
</tr>
<tr>
<td>oat</td>
<td>17</td>
<td></td>
<td>64</td>
<td>184</td>
<td>583</td>
<td>880</td>
<td>1,712</td>
</tr>
<tr>
<td>barley</td>
<td>17</td>
<td></td>
<td>5,331</td>
<td>15,274</td>
<td>48,351</td>
<td>72,889</td>
<td>141,847</td>
</tr>
<tr>
<td>rye</td>
<td>17</td>
<td></td>
<td>2,942</td>
<td>8,430</td>
<td>26,687</td>
<td>40,230</td>
<td>78,291</td>
</tr>
<tr>
<td>olives</td>
<td>22</td>
<td></td>
<td>349</td>
<td>1,002</td>
<td>3,174</td>
<td>4,784</td>
<td>9,311</td>
</tr>
<tr>
<td>SUM</td>
<td>-</td>
<td></td>
<td>106,896</td>
<td>293,016</td>
<td>922,570</td>
<td>1,461,577</td>
<td>2,784,060</td>
</tr>
</tbody>
</table>
Heat and electricity production (MJ) was transformed to MWh using the following transformation \(1 \text{MJ} = 0.0002778 \text{ MWh}\) (Tables A.9 and A.10). Considering that thermal power is distributed for 2000 hours per year of operating time, and electrical power for 7000 hours per year of operating time, the conversion to MW power production was performed in Tables A.11 and A.12, respectively.

**Table A.8. Electricity production (GJ) using the total available biomass**

<table>
<thead>
<tr>
<th>Crop</th>
<th>LHV (MJ/kg)</th>
<th>Zone</th>
<th>SUM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>pomegranate</td>
<td>22</td>
<td>860</td>
<td>450</td>
</tr>
<tr>
<td>cherry trees</td>
<td>22</td>
<td>358</td>
<td>150</td>
</tr>
<tr>
<td>vineyards</td>
<td>22</td>
<td>159</td>
<td>457</td>
</tr>
<tr>
<td>tobacco</td>
<td>16</td>
<td>16</td>
<td>13</td>
</tr>
<tr>
<td>rice</td>
<td>15</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>sunflower</td>
<td>17</td>
<td>15</td>
<td>44</td>
</tr>
<tr>
<td>cotton</td>
<td>18</td>
<td>2,990</td>
<td>8,568</td>
</tr>
<tr>
<td>hard wheat</td>
<td>16</td>
<td>13,778</td>
<td>39,460</td>
</tr>
<tr>
<td>maize (stalks)</td>
<td>16</td>
<td>2,995</td>
<td>8,581</td>
</tr>
<tr>
<td>maize (cobs)</td>
<td>18</td>
<td>648</td>
<td>1,856</td>
</tr>
<tr>
<td>oat</td>
<td>17</td>
<td>14</td>
<td>40</td>
</tr>
<tr>
<td>barley</td>
<td>17</td>
<td>1,184</td>
<td>3,394</td>
</tr>
<tr>
<td>rye</td>
<td>17</td>
<td>653</td>
<td>1,873</td>
</tr>
<tr>
<td>olives</td>
<td>22</td>
<td>77</td>
<td>222</td>
</tr>
<tr>
<td>SUM</td>
<td>-</td>
<td>23,754</td>
<td>65,114</td>
</tr>
</tbody>
</table>
Table A.9. Thermal power (MWh) using the total available biomass

<table>
<thead>
<tr>
<th>Crop</th>
<th>Zone</th>
<th>SUM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>C</td>
</tr>
<tr>
<td>pomegranate</td>
<td>1,075.5</td>
<td>562.8</td>
</tr>
<tr>
<td>cherry trees</td>
<td>448.1</td>
<td>187.6</td>
</tr>
<tr>
<td>vineyards</td>
<td>199.5</td>
<td>571.5</td>
</tr>
<tr>
<td>tobacco</td>
<td>20.8</td>
<td>17.1</td>
</tr>
<tr>
<td>rice</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>sunflower</td>
<td>19.6</td>
<td>56.1</td>
</tr>
<tr>
<td>cotton</td>
<td>3,738.6</td>
<td>10,710.8</td>
</tr>
<tr>
<td>hard wheat</td>
<td>17,223.7</td>
<td>49,325.5</td>
</tr>
<tr>
<td>maize (stalks)</td>
<td>3,744.2</td>
<td>10,726.8</td>
</tr>
<tr>
<td>maize (cobs)</td>
<td>810.0</td>
<td>2,320.7</td>
</tr>
<tr>
<td>oat</td>
<td>17.9</td>
<td>51.2</td>
</tr>
<tr>
<td>barley</td>
<td>1,481.0</td>
<td>4,242.9</td>
</tr>
<tr>
<td>rye</td>
<td>817.4</td>
<td>2,341.8</td>
</tr>
<tr>
<td>olives</td>
<td>97.2</td>
<td>278.5</td>
</tr>
<tr>
<td>SUM</td>
<td>29,693.5</td>
<td>81,393.4</td>
</tr>
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</table>

Table A.10. Electrical power (MWh) using the total available biomass

<table>
<thead>
<tr>
<th>Crop</th>
<th>Zone</th>
<th>SUM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>pomegranate</td>
<td>239.0</td>
<td>125.1</td>
</tr>
<tr>
<td>cherry trees</td>
<td>99.6</td>
<td>41.7</td>
</tr>
<tr>
<td>vineyards</td>
<td>44.3</td>
<td>127.0</td>
</tr>
<tr>
<td>tobacco</td>
<td>4.6</td>
<td>3.8</td>
</tr>
<tr>
<td>rice</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>sunflower</td>
<td>4.4</td>
<td>12.5</td>
</tr>
<tr>
<td>cotton</td>
<td>830.8</td>
<td>2,380.2</td>
</tr>
<tr>
<td>hard wheat</td>
<td>3,827.5</td>
<td>10,961.2</td>
</tr>
<tr>
<td>maize (stalks)</td>
<td>832.0</td>
<td>2,383.7</td>
</tr>
<tr>
<td>maize (cobs)</td>
<td>180.0</td>
<td>515.7</td>
</tr>
<tr>
<td>oat</td>
<td>4.0</td>
<td>11.4</td>
</tr>
<tr>
<td>barley</td>
<td>329.1</td>
<td>942.9</td>
</tr>
<tr>
<td>rye</td>
<td>181.6</td>
<td>520.4</td>
</tr>
<tr>
<td>olives</td>
<td>21.6</td>
<td>61.9</td>
</tr>
<tr>
<td>SUM</td>
<td>6,598.6</td>
<td>18,087.4</td>
</tr>
</tbody>
</table>
Table A.11. Thermal power (MW) using the total available biomass for 2000 hours operation

<table>
<thead>
<tr>
<th>Crop</th>
<th>Zone</th>
<th>SUM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>pomegranate</td>
<td>0.538</td>
<td>0.281</td>
</tr>
<tr>
<td>cherry trees</td>
<td>0.224</td>
<td>0.094</td>
</tr>
<tr>
<td>vineyards</td>
<td>0.100</td>
<td>0.286</td>
</tr>
<tr>
<td>tobacco</td>
<td>0.010</td>
<td>0.009</td>
</tr>
<tr>
<td>rice</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>sunflower</td>
<td>0.010</td>
<td>0.028</td>
</tr>
<tr>
<td>cotton</td>
<td>1.869</td>
<td>5.355</td>
</tr>
<tr>
<td>hard wheat</td>
<td>8.612</td>
<td>24.663</td>
</tr>
<tr>
<td>maize (stalks)</td>
<td>1.872</td>
<td>5.363</td>
</tr>
<tr>
<td>maize (cobs)</td>
<td>0.405</td>
<td>1.160</td>
</tr>
<tr>
<td>oat</td>
<td>0.009</td>
<td>0.026</td>
</tr>
<tr>
<td>barley</td>
<td>0.740</td>
<td>2.121</td>
</tr>
<tr>
<td>rye</td>
<td>0.409</td>
<td>1.171</td>
</tr>
<tr>
<td>olives</td>
<td>0.049</td>
<td>0.139</td>
</tr>
<tr>
<td><strong>SUM</strong></td>
<td>14.847</td>
<td>40.697</td>
</tr>
</tbody>
</table>

Table A.12. Electrical power (MW) using the total available biomass for 7000 hours operation

<table>
<thead>
<tr>
<th>Crop</th>
<th>Zone</th>
<th>SUM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>pomegranate</td>
<td>0.034</td>
<td>0.018</td>
</tr>
<tr>
<td>cherry trees</td>
<td>0.014</td>
<td>0.006</td>
</tr>
<tr>
<td>vineyards</td>
<td>0.006</td>
<td>0.018</td>
</tr>
<tr>
<td>tobacco</td>
<td>0.001</td>
<td>0.001</td>
</tr>
<tr>
<td>rice</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>sunflower</td>
<td>0.001</td>
<td>0.002</td>
</tr>
<tr>
<td>cotton</td>
<td>0.119</td>
<td>0.340</td>
</tr>
<tr>
<td>hard wheat</td>
<td>0.547</td>
<td>1.566</td>
</tr>
<tr>
<td>maize (stalks)</td>
<td>0.119</td>
<td>0.341</td>
</tr>
<tr>
<td>maize (cobs)</td>
<td>0.026</td>
<td>0.074</td>
</tr>
<tr>
<td>oat</td>
<td>0.001</td>
<td>0.002</td>
</tr>
<tr>
<td>barley</td>
<td>0.047</td>
<td>0.135</td>
</tr>
<tr>
<td>rye</td>
<td>0.026</td>
<td>0.074</td>
</tr>
<tr>
<td>olives</td>
<td>0.003</td>
<td>0.009</td>
</tr>
<tr>
<td><strong>SUM</strong></td>
<td>0.943</td>
<td>2.584</td>
</tr>
</tbody>
</table>
Annex 2

PPP contract elaborations

A2.1 Italy PPP contract index

The index of the PPP contract scheme for Italy is proposed below, the detail of the contract is proposed in D4.2:

Section 1: Object and duration of the concession
Art.1: Object of the concession;
Art.2: Responsible of the procedure;
Art.3: Agreement duration;

Section 2: work
Art.4: Object of the work;
Art 5: Project documentation and attachments;
Art.6: Integrative parts of the contract;
Art.7: Executive project revision and relative authorizations;
Art.8: Area delivery and beginning of the work;
Art.9: Work execution;
Art.10: Legislation and regulation observance;
Art.11: Work director, responsible of work and security coordinator in execution phase;
Art.12: Particular dues of the concessionaire
Art.13: Responsibility of the project and work;
Art.14: Variations of the project and contingencies;
Art.15: Invariability of the economical and financial plan;
Art.16: Work completion deadline
Art.17: Delay penalty;
Art.18: Resolving clause for the execution of the work;
Art.19: Definitive deposit for the work;
Art.20: Assurance bill CAR;
Art.21: Entrusting of the work to third enterprises;
Art.22: Social assurance of the workers;
Art.23: Security plan;
Art.24: work completion and start of management;
Art.25: Trial during the work and final trial;
Art.26: Guarantee for faults and defects in the work;
Art.27: Responsibility of work execution;

Section 3: Functional and economical management
Art.28: Object of the management;
Art.29: Incomes from management and tariff;
Art.30: Tariff adjustment;  
Art.31: Amortization;  
Art.32: Contribution or price;  
Art.33: responsibility of management;  
Art.34: Periods and time of service;  
Art.35: Extraordinary maintenance of the plant;  
Art.36: Modifies to the plant;  
Art.37: Maintenance legislation and normative;  
Art.38: Heat supply contracts and further dues;  
Art.39: Accounting devices;  
Art.40: Conduction and technical assistance;  
Art.41: Facilities and contribution;  
Art.42: Responsibilities of the management and other penalties;  
Art.43: Delivery of the work of the plant and final verify;  
Art.44: Assurance policies;  
Art.45: Contract transfer;  
Art.46: Management of the rescission clause;  
Art.47: Guarantee for the management;  
Section 4: End of the contract  
Art.48: Economical accounting;  
Art.49: Contract decay;  
Art.50: Disagreement between the documents;  
Art.51: Competent forum;
A2.2 Greece PPP contract index

A PPP contract, according to Law 3389/2005, should include any of the following clauses that are applicable to it:

1. Summary of the PPP scheme, including major requirements for the plant operation, contractual payments, applicable laws / regulations, methodology to allocate payments among partners.
2. Description of the procedures for the monitoring the operation of the plant, either through independent (third) companies, or through public services.
3. Methodology for quality assurance of the provided services.
4. Time plan, including prerequisites for possible amendments, penalty clauses in relation to non-compliance with the time plan, duration of validity of the PPP contract, and prerequisites for extension or reduction of its time.
5. The way with which the private party will utilise any public assets needed for the development and operation of the plant, and the foreseen compensatory payments.
6. The way with which the PPP scheme will be financed.
7. Any needed approvals of the financing plans of the private entities by the public partners.
8. Risk allocation and liabilities among public and private parties, and force majeure clauses.
9. Insurance policies in place, either directly concerning the plant, or the operation of the private party in general.
10. Protection of environmental and cultural resources, including antiquities.
12. The method of operation, maintenance, and commercial exploitation of the plant.
13. Payments in place for the use of the plant’s services by the end users, including billing and payment procedures, and prerequisites for any changes to the level of payments.
14. The way to allocate benefits among the public and the private parties, including any re-financing provisions or the set up of financial targets.
15. The level and form of guarantees that the private parties offer in relation to the timely and according to plan development, operation and maintenance of the plant.
16. Any provisions for the replacement of the private partners operating the plant, or of the financiers.
17. Any provisions for remunerations in case that one of the parties defaults in its contractual obligations.
18. Any reasons for bringing court action to terminate the contract.
19. Applicable law.
20. Conflict resolution procedures.
21. Clear references to the Annexes of the contract.
22. Analysis of the minimum technical requirements for the operation and maintenance of the plant, following the descriptions and requirements set in the tender documents.
23. Definition of the procedures for the passing of the plant to the public sector after the end of the commercial exploitation period by the private party, including provisions for the training and know-how transfer from the private parties to the public parties.
24. Health and safety requirements for the employees of the plant.

Greek PPP contracts have generally been modeled according to the UK Treasury contracts.
A2.3 Hungary PPP contract index

The draft of the Hungarian PPP contract is the following:

Agreement amongst

- Abasár local authority
- Domoszló local authority
- Halmajugra local authority
- Karácsond local authority
- Kiscsána local authority
- Markaz local authority
- Visonta local authority
(hereinafter: partner local authorities), item
- Mátrai Erőmű Co..
(hereinafter together: agreed partners) to utilise the wastes from agricultural origin in territory of partner local authorities by conversion to energy.

1. Aims and legal form: The agreed partners are ready to establish a company or co-operative (hereinafter: joint venture) which will utilize the wastes from agricultural origin in territory of partner local authorities by conversion to energy according to the Hungarian legal frame and to the thereinafter determined principles. The agreed partners will determine the legal form of the joint venture accordingly to their non-profit aim concerning the utilization of the wastes from agricultural origin which arising from private agricultural activity in territory of partner local authorities.

2. Headquarters: The agreed partners determine Abasár as the headquarters of joint venture.

3. Legal status of partners: The agreed partners will own same legal status in the Board of joint venture independently from their assets.

4. Objects of company: The objects of joint venture include the following activities: handling of agricultural wastes (TEÁOR 38.21), transportation (TEÁOR 49.41.) storage and buffering (TEÁOR 52.10).

5. Assets to establish company: The partner local authorities also can provide assets to the joint venture by infrastructure, its actuation and human resources. The Mátrai Erőmű Zrt. also can provide assets to the joint venture in cash and equipments to the handling of raw materials.

6. Detailed activities: The partner local authorities will care the suitability of industrial park, its infrastructure and activity including the collection, temporary buffering, and preparation to energy conversion and
transportation of wastes from agricultural origin in territory of partner local authorities according to the determined timing of Mátrai Erőmű Zrt., as energy utilizer. The private agricultural producer or - according to separate contract – the joint venture will care the transportation of the agricultural wastes to the industrial park.

7. **Transport**: The joint venture will care the transportation of agricultural waste after the primary preparation to the energy conversion in Mátrai Erőmű Zrt. with trucks (own or rental).

8. **Energy conversion and prices**: The Mátrai Erőmű Zrt. as energy utilizer will qualify the transported bulk on the basis of its energy value which will basis in the calculation of the price of transportation unit. The Mátrai Erőmű Rrt. over the basic price to the third supplier will pass 50 % of the subvention related to the green energy arising from the transported raw material.

9. **Payment terms, undertaking to obligation towards suppliers**: The agreed partners guarantee to the suppliers that their payment will base also on the energy value and premium from green energy. The Mátrai Erőmű as energy utilizer will assume that they will remit the price to the joint venture according to the point 8. within 15 days and the joint venture will transfer its proportional part within 15th days according to the energy value of the supplied raw material.

10. **Duration and validity**: The agreed partners declare that this agreement has indeterminate validity and open to joining any legal entities which ready and able to contribute to the aims as point 1., by emergence of determined principles. The agreed partners will determine detailed legal rules of joint venture at latest till ............... and the joint venture will care its registration in the court. The agreed partners accept that from this contract- force agreement is allowed to leave before the establishment of joint venture without any legal consequence immediate effect, and from the joint venture at the and of year with 6 months renunciation.

“ December 2010 in Abasár
A2.4 *Portugal PPP contract index*

With the aim of promoting local development and for environmental reasons, the Public Body (Municipality of ALVITO) will support the Union of Cooperatives who owns the biomass, UCASUL, to implement in the Municipality a solution to produce electric power from this Biomass. This Biomass is a byproduct of the activity of UCASUL.

UCASUL must have a technological and financial partner to implement the solution, with experience in construction and management of plants of renewable energy. The contact scheme details the agreement between the partners who will be involved in the consortium to build and manage the plant, UCASUL and the technological partner. The second contact will be signed between the Consortium and the Distributor of the electricity. The Contract scheme is approved by the DGE of the Ministry of Economy

**Contract Schemes**

**A. Consortium**

Agreement between:
UCASUL – União de Cooperativas do Sul, CRL, located in the Municipality of Alvito, with VAT ____________, in the person of ______________, as ____________ designated as UCASUL,

And

……………designated as technological partner (TP)

Section 1 -

1. UCASUL will make all necessary efforts to obtain a license to supply the electric grid, for Alvito area network or to another area of the network that could be technically, economically and financially feasible.

2. UCASUL and TP will produce together the technical design of industrial, economical and environmental studies necessary for achieving the objective stated of electricity production from biomass.

3. UCASUL and TP, together, will make all the effort to obtain the necessary licenses and permits for the purposes mentioned in point 2

4. UCASUL, will supply all the biomass available to the unit of energy production, with the quality required by the installed technology.
5. Obtained the license to supply the grid, the PT bound:
   a) to formalize the establishment of a commercial company that has the aim of exploration and commercialization of renewable energy
   b) to "deliver" on terms to be agreed, the UCASUL a ...........% share capital of the new company.
   c) to develop the technical and industrial project for the installation of the unit to produce energy from biomass by UCASUL; UCASUL must provide all the necessary information and collaboration.
   e) to develop the study of economic viability.
   f) to negotiate the "financial plan” with the bank in order to obtain the necessary financing for the project.

6. Obtained the license to supply the grid, the UCASUL bound:
   a) to provide assistance at all levels to the PT for the successful implementation of the project concerned.
   b) to celebrate an agreement with the PT or the company to be established, to supply the raw material, in quality and quantity (pomace extracted)
   c) to lease out the conditions to be agreed, for a minimum of 20 years the land identified on the attached map or to sale surface rights for that minimum period.
   d) the rental terms of the land shall be agreed upon delivery of the project implementation of the unit. The assignment of space may take any other legal form to be agreed.
   e) to provide all technical and scientific information about the raw material (pomace, or other).

7. The validation of this agreement is subject to the economic and financial viability, technical studies and engineering, as well as the issuance of all licenses and official permits, environmental, political and administrative provisions necessary to implement the project.

B. CONTRACT FOR PURCHASE OF ELECTRICITY IN SPECIAL SCHEMES

Between
EDP Serviço Universal, S.A., located in Rua Camilo Castelo Branco, 43, in Lisboa, ………………, represented by………., in the quality of ……………. ………., designated as EDP

And

………………designated as Producer

Art 1

EDP agrees to purchase from the producer all the energy power generated in Central … … …., located in………. … …. …, in accordance with the rules contained in the Establishment License issued by the General Service for Energy and Geology, in … … …. …., which is in Annex 4 to this contract and it is an integral part of it.

Art 2 Definitions
Art 3 Object of the agreement
Art 4: Dues of the parties
Art 5: Obligations of the producer
Art.6: Electrical energy measures;
Art.7: Electrical energy equipment for measurement;
Art 8: Measuring instrumentation calibration;
Art.9: The invoice
Art.10: Payment of the invoice;
Art.11: Failure to pay;
Art.12: Measurement errors;
Art.13: Reading errors;
Art.14: Changes in the parts involved in the contract;
Art.15: Transfer of third parties;
Art.16: Change in circumstances;
Art.17: Beginning date;
Art.18: Termination date;
Art.19: Termination in case of non compliance;
Art. 20: Litigation between parties;
A2.5 Spain PPP contract index

SECTION I: OBJECT AND DURATION OF THE CONCESSION

Concession EPCM for a AD biomass plant and cogeneration between: Diputación Provincial de Castellón in the person of the responsible of the Territorial and Technical Service ..... And Biogás Castellón in the person of the official representative .......

Section 1 Object and duration of the concession
Art.1 Object of the concession
Art.2 Responsible of the procedure
Art.3 Agreement duration

Section 2 work
Art. 4 Please check the Annexes
Art.5 Project documentation and attachments
Art.6 Integrative parts of the contract
Art.7 Executive project revision and relative authorizations
Art.8 Area delivery and beginning of the work
Art.9 Work execution
Art. 10 Legislation and regulation observance
Art. 11 Project Management and work director, responsible of work and security coordinator in execution phase.
Art.12 Particular dues of the concessionaire
Art. 13 Responsibility of the project and work
Art.14 Variations to the project and contingencies
Art.15 Invariability of the economical and financial plan
Art.16 Work completion deadline
Art.17 Delay penalty
Art.18 Resolving clause for the execution of the work

Section 3 functional and economical management
Art. 19 Object of the management
Art.20 Incomes from management and tariff

IV end of the contract
Art. 21 Economical accounting
Art. 22 Contract decay
Art.23 Disagreement between the documents
Art.24 Competent forum
Annex 3

Memorandum of Understanding: the Greece example

MEMORANDUM OF UNDERSTANDING

for the development of an agro-energy district in the boundaries of the Municipality of Evropos, Kilkis

In Thessaloniki today the 4th of October 2010,

- the Tobacco Cooperative of Toumpa Kilkis (hereinafter “Cooperative”) based in Toumpa Paionias Kilkis, Zip Code 61400 Axioupoli, legally represented by its President Mr. Stergios Peltekiadis, and

- the Municipality of Evropos (hereinafter “Municipality”) based in Evropos Kilkis, ZIP 61007, based in Evropos Kilkis, Zip Code 61007, legally represented by its major Mr. Efthimios Kourtzanidis,

which will be hereinafter referred to as “the Parties” or “the Contracting Parties”,

in cooperation with the signatories of this Memorandum, which will be hereinafter referred to as the “third Parties”,

bearing in mind,

- The aims and content of the project RuralE.Evolution, funded by the European Commission under the programme “Intelligent Energy for Europe” (IEE), which aims to promote the development of agro-energy districts in Europe by establishing Public Private Partnerships (PPPs).

- The guide to the successful implementation of PPPs for the energy generation in rural areas that was developed under the above referenced programme.
• The Law 3389/2005 (Government Gazette A’ 232) on Public Private Partnerships.

• The Law 3483/2006 (Government Gazette A’ 169) regarding the modification and supplement of the provisions of the lease, provisions on governmental revenues and other provisions - Article 16, paragraph 1.

• The Green Paper on Public Private Partnerships and the Community law on public contracts and concessions.

• The communication of the Commission to the European Parliament, to the Council and to the Economic and Social Committee and to the Committee of Regions on “Public Private Partnerships and to the Community law on public contracts and concessions, 15.11.2005.

• The European Union directives on the coordination of the public procurement procedures and specifically the Directives 2004/17/EC and 2004/18/EC.

• The Presidential Decree 59 on the adaptation of the Greek legislation to the provisions of the Directive 2004/17/EC “coordinating the procurement procedures of entities operating in the water, energy, transport and postal services sectors”, as modified and supplemented (Government Gazette A’ 63).


• The Law 3851/2010 on accelerating the uptake of renewable sources of energy in tackling climate change (Government Gazette 85),

1. Jointly recognize that:
a. Finding new economic opportunities for farmers in the region is essential for the maintenance of employment and for the prosperity of the region of Kilkis in general.

b. The sector of renewable energy is an important productive factor and a tool for promoting employment, for the sustainable development and for the competitiveness of the region of Kilkis in general.

c. The climate protection through the promotion of the production of electricity from renewable energy is an environmental and energy high priority for the country and defends the public interest.

d. In PPPs it is recognized that each contracting party has an advantage over the other in carrying out certain tasks under the contract, so by assigning to each party the tasks that this party performs better, what is achieved is the provision of public services and infrastructure at the best economically acceptable way.

e. An agroenergy district has been defined as follows: “Territorial area hosting one or more Bio-energy chains, technologically, organizationally and economically tailored to the production and use of energy from agricultural origin, normally through (but not necessarily limited to) the use of the local and regional energy supply”.

f. The sources used for the production of energy in the agro-energy district are related to agricultural activities and usually come from local and regional level, but not necessarily limited to this.

2. **Agree to cooperate towards:**

   The creation of an agro-energy district in Evropos, Kilkis, through the preparation and implementation of a Public Private Partnership (PPP).

3. **Agree on a common framework that includes:**

   a. The calculation of the amount of biomass that could be provided for exploitation in the agro-energy district of interest and the preparation of a feasibility study for this purpose. This study will be completed in 2010 and presented to the bodies of interest in the first quarter of 2011.
b. The preparation of an indicative PPP contract plan which includes the basic parameters of the participation of each party. The plan will be prepared in 2010 and presented to the bodies of interest in the first quarter of 2011.

4. Specifically, the Parties adopt the following:

a. The Cooperative will take actions to raise awareness among its members about the supply of biomass for the production of electricity and heat. For this purpose the Cooperative will organize at least two information events and will invite its members to also sign this Memorandum of Understanding.

b. The Cooperative will initiate procedures to sign a contract with the company Rodonas SA which will be asked to supply the land for the establishment of the electricity generation plant and the the biomass from the processing of pomegranates to be utilised in the operation of the plant producing electricity and heat. Rodonas SA will be also asked to sign this Memorandum of Understanding.

c. The Cooperative will initiate procedures to sign a contract with the company FILIPPOPOULOS ENERGY SA which will be asked to undertake the technical implementation of the electricity and heat production plant. FILIPPOPOULOS ENERGY SA will be also asked to sign this Memorandum of Understanding.

d. The Cooperative will seek the support of the Department of Agricultural Economics of the Aristotle University of Thessaloniki, which will be called upon to provide expertise on the implementation of the PPP and to support the Cooperative in its communication needs. A representative from the University will be also asked to sign this Memorandum of Understanding.

e. The Municipality of Evropos will examine the possibility to use the generated energy to meet energy needs of its buildings.

f. The Municipality will further promote and publish its intention to participate in this effort and will inform its residents inviting them to take part and actively intervene in its implementation.
5. For the duration of the MoU the Parties will cooperate in integrating new third parties, such as:

   a. Farmers
   b. Small and medium-sized farms and agricultural cooperatives
   c. Local public bodies
   d. Banks, financial bodies and credit institutions
   e. Local small and medium-sized enterprises
   f. Consumer associations
   g. Regional Bodies and Bodies of the local authorities dealing with energy and environmental issues.

6. For the purpose of fulfilling their obligations under this Memorandum as above, both Parties undertake to establish a **Coordination and Monitoring Committee**, which will undertake the monitoring of actions for the implementation of this Memorandum and the submission of annual progress reports to the Parties. The first report is required to be delivered on 31-10-2011.

7. This Memorandum **shall enter into force upon its signature of the representatives of both Parties**. Its duration is defined to be three years and it is subject to annual review by the Parties, as defined in paragraph 6 hereof.

8. The **third parties** signing the Memorandum state that they fully accept all its articles and are committed to assist the Parties in its successful implementation. New third parties may sign at any time after acceptance by the Parties (the Association and the Municipality).

**The Parties**

For the Tobacco Cooperative of Toumpa Kilkis

For the Municipality of Evropos

Toumpa Kilkis

(signed)
Guidelines for successful application of PPP to RES Agro-energy districts

Stergios Peltekiadis  
President  

Efthimios Kourtzanidis  
Mayor

Rodonas SA  
(signed)

The third parties

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<tr>
<th>Full name</th>
<th>Affiliation / organisation</th>
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<th>Signature</th>
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<tr>
<td>For Fillipopoulos Energy SA, Dimitrios Kamidis</td>
<td>Vice president</td>
<td>4-10-2010</td>
<td>(signed)</td>
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<tr>
<td>For the Aristotle University of Thessaloniki, Dr. Basil Manos</td>
<td>Professor</td>
<td>4-10-2010</td>
<td>(signed)</td>
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<tr>
<td>Nikolaos Kafetzis</td>
<td>Farmer</td>
<td>4-10-2010</td>
<td>(signed)</td>
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<tr>
<td>Argyropoulos Kyriazis</td>
<td>Farmer</td>
<td>4-10-2010</td>
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<td>Doulkeridis Giorgos</td>
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<tr>
<td>Bournaris Thomas</td>
<td>Agriculturalist</td>
<td>4-10-2010</td>
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</tr>
<tr>
<td>Efstratios Arampatzis</td>
<td>Environmentalist</td>
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<td>(signed)</td>
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The Third Parties

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144