

**Deliverable D06**

**Sustainable energy management in AEA's**

**Sustainable Energy Investment Projects for Local Economic Development –  
SEIPLED – Contract EIE/05/134/SI2 . 419988**

**(from 01/01/06 till 31/12/07)**

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## Local conditions

Some statistic data of the EMILIA ROMAGNA REGION

Inhabitants: 01/01/2005 4.151.355 (7,10% on national total)

Regional GDP year 2002 110.659,2 million of € (8,7% of national total)

GDP/ Inhabitants PIL year 2000 25.733 € (Italian average: 20195,7)

Annual increase export 2005 + 7,7% (Italy 4%)

Export value 2005 37,129 milliard of € (12,7% of national total)

Most important industrial sectors in the region: industrial machinery, mechanical devices and car and motorcycle industry.

The less developed area is the southern part, characterised by elevation from 500 to 2000 m asl, mostly belonging to the Objective 2 in 2000-2006. The Provinces have strategies for this area more addressed to tourism, typical food and non-food products, and services, reducing the role of industry. Therefore the industrial areas expansions are mainly in the northern plain area, and usually only expansions of existing areas are foreseen.



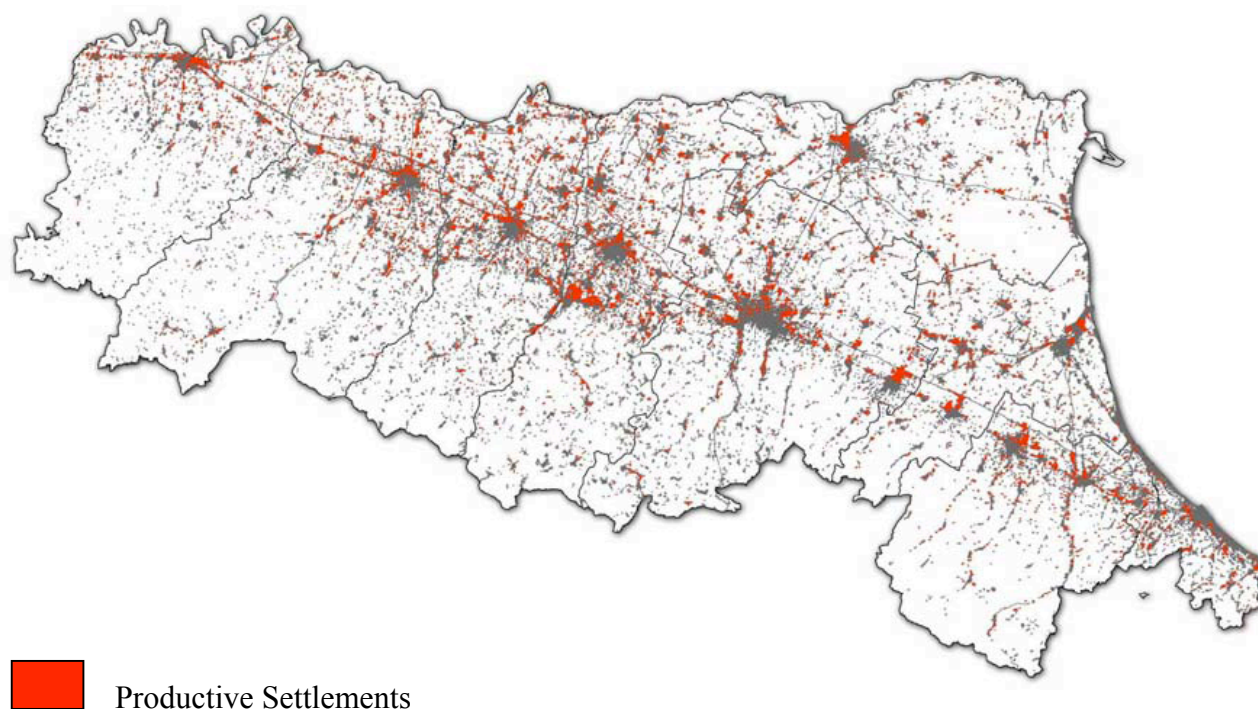
The energy balance of the Region is characterised by a strong deficit of electric energy production: only 50% of the consumed energy is produced in the region territory. The draft Energy Regional Plan (now in the final phase of its political development) foresees to go in 10 years from 50 to 100% electricity production in the region. This will be mainly achieved by an improvement of the energy efficiency of the existing power stations (from oil steam cycles or turbo-gas to combined gas cycles), and by two new combined cycle gas fired power stations are also foreseen in the former petrol-chemical sites of Ravenna and Ferrara. A large development of decentralised production in co-generation schemes (Combined Heat and Power – CHP) is expected, together with energy from wastes and renewable energy (mostly biomass).

Table 1: E/R region macro-economical indicators.

Socio-economical indicators	Emilia Romagna	Italy	UE	
			15	25
<b>a) Macro-economical indicators</b>				
Gross Domestic Product (G.D.P. in €/per capita, Source: ISTAT 2003)	29.059	23.448	23.720	21.741
Labour productivity per employee (all sectors, in thousands of €, 2003)				
G.D.P. Increase (% variation 1998-2003)	15,2%	15,0%	22,8	23,3
Increase of industrial added value (source: ISTAT, % Variation 1998-2003)	17,2	13,2	n.d	n.d
Employed per productive sector (in%, in 2004)				
Agriculture	4,8	4,9	n.d.	5,4
Industry	28,2	23,6	n.d.	20,9
Tertiary sector	59,0	63,3	n.d.	66,9
<b>b) Environment</b>				
Economic energy intensity: Gross internal energy consumption/ GPD at constant prices (1995=100) in 2001	160,7	184,0	212,9	14,4
Carriage of goods (tons per km/1.000€ GDP)	241	225	n.d.	221
Road haulage (% of goods transported by land)	81	89	75	78
% of R.E.S. production /total energy production (in 2003)	8	13,9	13	14

Source: Eurostat data managed by Ervet

Figure 1: productive settlements distribution in the E/R region.



## **Overall environmental situation**

The environmental situation of the plain is very delicate, as during the wintertime (from October to March) the atmosphere is characterised by thermal inversions, trapping all the pollutants in the first layers. The very industrialised Po river valley is considered as one of the most polluted areas of Europe and of the world. The region is developing new regulations for air quality, including traffic restrictions, cleaner fuels for electric production and vehicles, control on heating plants, but the effectiveness is still very low.

The new regional law on land planning (n.20/2000) introduces the concept of APEA, but without a clear definition. In a following regional act, the Directive on impact assessment, a list of requirements is added, still in general terms.

Now three Provinces have taken the responsibility of testing this approach for new APEAs. Guidelines (Modena) and Requirement Lists (Bologna) are under development, and energy is always one of the most important topics. The implementation of an APEA according to these indications requires higher investment costs, therefore imposing challenges to the regional, province and municipal authorities, which have to negotiate with the private companies developing (and selling) the areas.

The Operational programme 2007-2013 is in advanced state of preparation. The Department has made already public presentations of the main strategic lines. SEIPLED can support the policy for enterprise innovation and environmental performance improvement.

## **Energy and environment**

Energy plays an important role in companies competitiveness and in their budget. In spite of that energy prices are rising every year more and more when the energy supply system is highly dependent from energy import. Beside that industry has the highest share in the productive sectors energy consumption. All those data attract the attention mainly on big industries and productive settlements so the “Aree Ecologicamente Attrezzate”-A.E.A.- (Ecological Structured Areas) and their energy retrofit becomes a big issue to deal with in next years.

Table 2: energy consumption distribution between productive sectors.

<b>End use energy consumption (in T.O.E.)</b>		
Agriculture	467.000	3%
Industry	4.533.000	33%
Transports	3.969.000	29%
Residential	2.971.000	22%
Tertiary	1.761.000	13%
TOTAL:	13.701.000	100%

Source: Regional Energy Plan, 2007

## ***Present situation, specific objectives and strategies of intervention***

### **SWOT analysis**

#### Strength

The long time experience of different national incentive systems may be considered as a strength. Italy has already experienced different approaches for RES incentives: grants on the capital cost contributions, favourable feed-in tariffs, and Green Certificates. Having experienced the complexity and time consuming procedures for capital cost grants, needing a national or regional open call with ranking of projects, intermittence in the market due to the pauses between following calls, and the poor rate of well maintained projects, the State choose the premium tariff as a way to have a simplified procedure, a quicker selection and a continuous market. Unfortunately, not only RES were allowed, but also the so-called “assimilated energies”, and among them also the large size industrial cogeneration and the tar gasification in oil refineries. The result was that 80% of funds were spent by the latter two typologies, leaving the true RES technologies without funding.

From this disappointing result the third solution came out: the Green Certificates (for RES and energy from waste only). After the RES definition in the EC Directive 2001/77/EC, the biological part of wastes only was allowed for Green Certificates. The system took several years to become operative, and since 2006 is finally working, with prices which are actually strongly controlled by the public manager of the system. The mechanism was completed by the White Certificates system, to support energy efficiency projects (reduction of electricity or gas consumption).

As PV systems were too small and not suitable for this scheme, a premium tariff was created again, but only for PV.

#### Weaknesses

The bureaucratic system is slow, both at central and regional level. There is still a lack of real active involvement and collaboration from and among the stakeholders (government, region, associations, bank institutions, beneficiaries). The financial banking system is not able to respond to the requests of the energy field, as there is not enough skill and confidence in the evaluation of project quality, therefore solid guarantees are mostly required.

The complexity of the system that constitutes the incentive mechanism has considerably delayed its application and its actual benefits. Only today the Green Certificates are starting as a mechanism to boost RES and their wide diffusion and application, while White Certificates are still in the infant period.

#### Opportunities and threats

It goes without saying that the realisation of a new AEA or the conversion of an existing Industrial Park into an AEA, requires complex project planning and substantial costs to sustain, but these measures guarantee the increase of economic development and a major environmental protection.

As neither the National nor the Regional Energy Programme have clearly allocated specific funds for the AEA, in order to develop AEA's energy projects, one needs to compose a sort of ‘puzzle’.

- To use SF on public investments and/or the incentives on RES and CHP for the infrastructures in the area;
- To use SF on enterprise support or the use of RES incentives, for private enterprise initiatives inside the AEA;

Additionally, providing services at competitive price through a Centralised Energy Manager (CEM) - (managing Energy, Water and Waste). The CEM will be selected by a Call for tender.

This methodology won't be easy to put into effect, but its application will give the means to verify and point out the successful / unsuccessful elements. The SEIPLED analysis could be used to propose changes for a more efficient system to replicate on regional and national level.

## The AEA concept

### ***AEAs local planning documents***

The AEAs were firstly mentioned by the national law nr.112/98, as a matter to be disciplined by the Regional Authority. The Emilia Romagna Region delegated each Province to legislate and regulate specific development criteria. Indications for the AEAs institution are therefore described in the Co-ordinated Provincial Territorial Plan of the Province of Bologna. Article 9.1 of the Technical Enforcing Regulations establishes that the AEAs are:

- *“All productive settlements and manufactories which have a significant effect on two or plus municipalities, having a so called “inter-municipality” dimension, must meet the “AEA” requirements and environmental performances, according the regulations of Article 9.3.”*

Productive settlements are considered to be AEAs if the following conditions are satisfied:

- to have an Area manager for managing the common infrastructures and utility services;
- to plan and implement urban/territorial quality contents;
- to set the conditions for a qualitative environmental protection.

It is possible distinguish two kinds of AEA:

- the new one, that can be planned from the beginning, since the area is free from any building feature, as AEA;
- the existing one, that must be converted to reach AEA standard performances, so it is usually foreseen an extension of the area to include the necessary new infrastructures and services.

For example, the Consortium of Productive Areas (CAP) in Modena, a public organisation owned by a group of Municipalities which acts as developer of industrial areas, has produced Guidelines for planning and implementing AEAs. The document sets the rules to realize the new AEAs on the Territory of the participating Municipalities in the Modena Province. This document will find its application in a pilot area in Modena, affording technical and planning aspects at different levels and scales, managerial aspects, and environmental monitoring.

Among the afforded topic we find the following energy-related subjects:

- Integrated energy management,
- Energy network planning
- Elements that influence economic cost – benefit balance;
- Possible enlargement of district heating to other users;
- Combined energy production, heating/cooling;
- Generator choice: methane, biomass, waste;
- Remote management and control;
- Participated energy supply;
- Financial evaluation of the investments.

The envisaged financing solutions are: Third party Financing, Project Financing, public concession schemes.

## ***Guidelines of the Bologna Province***

### **Objectives**

Bologna Province defined 40 performance's objectives, sub-divided in 10 items, to be taken into account in the AEAs planning, retrofit and managing. The objectives fulfilment constitute the productive area quality warranty and the acknowledgement of the AEA status.

These guidelines have become official only recently and were drawn up by the Province together with external experts.

The energy issues establish many objectives – quantitative and qualitative:

- Need of an energy balance of the AEA;
- Indications on centralised CHP plants;
- Contribution of RES (at least 30 %)
- Installation of PV (at least 10 %)

### **AEA planning, retrofit and management**

Each one of the 10 items has its own objectives checklist record linked to an operational action list aimed at reaching the objective itself. The items are the followings:

1. Settlement system;
2. Mobility and transport;
3. Water;
4. Soil and subsoil;
5. Habitat and landscape;
6. Air;
7. Electromagnetism;
8. Energy;
9. Waste;
10. Noise.

### **Urban process**

For the inter-municipality productive areas that are asked to become AEA, the urban acknowledgement instrument is the Territorial Agreement. The Territorial Agreement represents the Municipality operative program and it concerns main AEA settlement and development policy.

### **Subject Responsible**

The presence of the AEA Subject Responsible is an essential requirement to become AEA and he must be chosen by mutual consent of the Steering Committee and the private companies located in the area. He has the responsibility to manage the Environmental Programme, in accordance with the Steering Committee, and to carry out in particular all the infrastructures and common services foreseen. He can provide for common energy contracts and services and he can also undertake to

achieve common environmental authorisations. He collects all environmental and management data about the AEA performances and he can also sub-contract professionals for specific functions, energy management, waste management, water treatment and public lighting.

### First Environmental Report

The First Environmental Report represent the basic planning and management instrument of an AEA. The report has the purpose to give a the first picture of the environmental status of the area, make clear methods and criteria used to its drawing up. This is the first planning document to develop all further quality implementation strategies for the AEA.

### Environmental Programme

The Environmental Programme starts from the results of the First Environmental Report and fixes the objectives to reach, in terms of priorities, retrofit and management actions for the whole productive system improvement. It is the document of reference for all the subject responsible tasks and commitments.

## **The procedures to define an AEA**

- 1) The E/R Region issues a Policy deed with a line of actions and procedures to be taken by all Provinces;
- 2) The E/R Region contracts all the Provinces to provide an AEA's (or productive areas with AEA requirements) Census;
- 3) Identification of the area suitable to become AEA;
- 4) The Region contracts a Local Public Body to take on the task of policy and control of the AEA development criteria, through the institution of a Steering Committee;
- 5) The E/R Region signs a Territorial Agreement with all the Provinces to formally declare the institution of the AEA and to commit themselves for the re-qualification of the single productive areas to become AEA;
- 6) Identification of the subject responsible of AEA management (necessary condition for the AEA approval);
- 7) Local Public Body and the Companies located in the AEA define the environmental programme and main interventions to carry out;
- 8) Implementation programme and monitoring system.

## **The E/R Region Policy deed**

Implemented with Law 20/2000 and the Directive on environmental impact assessment has been approved, in its final version, the 2nd of July 2007 and published in the Regional Official Bulletin nr.92/2007. It outlines the rules of conduct per each subject involved in AEA, the urban development criteria, the list of documents and authorisations to be admitted, concessions and economical benefits.

### ***The Steering Committee***

The Steering Committee has to represent both public and private interests in the accomplishment and management of the AEA and it must warrant its independent role in the task of policy and control of the implementation programme and the monitoring system.

### ***The Territorial Agreement***

The E/R Region signs a Territorial Agreement with the Provinces for re-qualification of the single productive areas. Actually some Territorial Agreement have been produced, officially 8 out 87, but additional agreements are in progress.

### ***AEA Census***

Census objective is to report the already identified AEAs, the productive settlements that have the requirement to become in the next future “AEA” and the highest number of such areas allowed by the Regional Planning provisions.

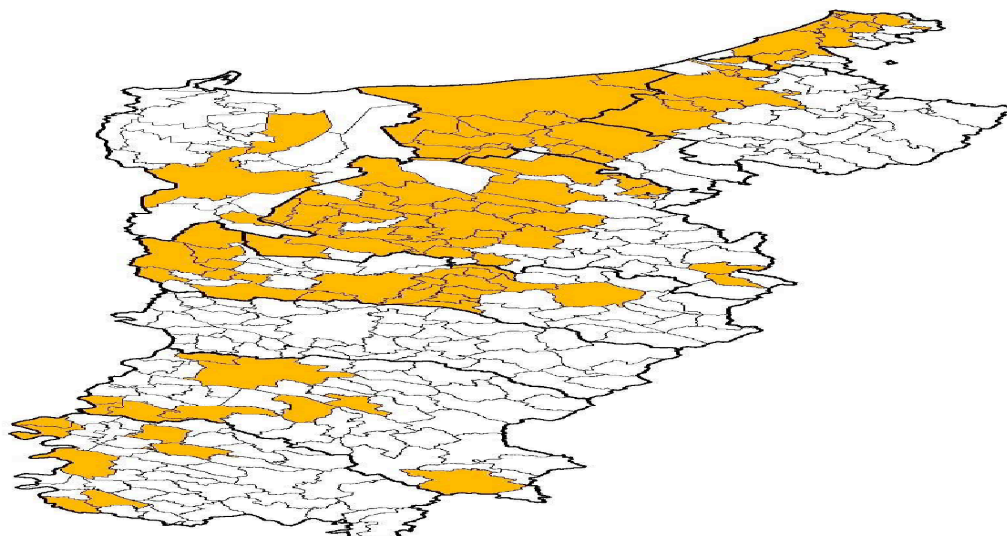
The real amount of the AEA is still uncertain because of the Emilia Romagna Region has not yet concluded the overall survey in all the Provinces, which will probably will be carried out by September 2007, according to the due-dates foreseen in the “Agreed Protocol by the Provinces for productive areas” contracted by the Region and each Province. Nevertheless, it has been possible to collect the following provisional data from all the approved Territorial Provincial Plans, made available by the “Ervet” Census 2005.

Table 3: Upper limit of AEA’s number in Emilia Romagna region

<b>Province</b>	<b>Inter-municipality productive areas</b>	<b>Productive areas with the requirements to be considered as Inter-municipality (Potentials)</b>	<b>Maximum additional number of Inter-municipality areas foreseen by Provincial Plans</b>
Bologna	34	0	0
Ferrara	0	3	0
Forlì Cesena	2	1	0
Modena	9	0	0
Parma	6	0	15
Piacenza	4	1	0
Ravenna	24	0	0
Reggio Emilia	n.d.	n.d.	n.d.
Rimini	3	0	5
<b>TOTAL:</b>	<b>82</b>	<b>5</b>	<b>20</b>

Source: Ervet 2005 (“Land environmental sustainability, monitoring and evaluation of regional environmental policies”)

**Figure 2: Regional distribution of Municipalities interested by inter-municipality “Ecologically Structured Areas (AEA)”**



Source: Ervet 2005 (“Land environmental sustainability, monitoring and evaluation of regional environmental policies”)

The amount of municipalities interested by an inter-municipality dimension are 107, which constitute, under a total number of 341 Emilia-Romagna municipalities, the 31,4%.

The total AEA finalised surface, given by data included in the Provincial Plans as inter-municipal areas, is of 11.880 hectares, where those represented by still available surface to build in are 3.677 hectares. The total surface amount of industrial areas in general, at regional level, is 24.500 hectares, with a free surface value of 7.500 hectares.

Table 4: extension of productive areas in Emilia Romagna Region.

Province	Total productive areas		Areas with inter-municipal relevance		Index	
	Total surface (hectares)	Free surface (hectares)	Total surface (hectares)	Free surface (hectares)	Inter-municipal Surface/ Total industrial surface	Inter-municipal FREE Surface/Total industrial free surface
<b>Bologna</b>	5.187	1.411	3.413	1.008	0,66	0,71
<b>Ferrara</b>	3.185	1.262	1.098	288	0,34	0,23
<b>Forlì Cesena</b>	2.251	697	1.000	200	0,44	0,29
<b>Modena</b>	n.a.*	n.a.*	866	166	-	-
<b>Parma</b>	2.788	481	300	205	0,11	0,43
<b>Piacenza</b>	2.442	905	1.369	523	0,56	0,58
<b>Ravenna</b>	3.811	1.418	3.429	1.043	0,90	0,74

<b>Reggio Emilia</b>	3.902	1.044	-	-	-	-
<b>Rimini</b>	1.087	267	405	244	0,37	0,91
<b>TOTAL:</b>	<b>24.653</b>	<b>7.485</b>	<b>11.880</b>	<b>3.677</b>	<b>0,48</b>	<b>0,49</b>

Source: Ervet 2005 (“Land environmental sustainability, monitoring and evaluation of regional environmental policies”)  
(n.a.\*: not available)

### ***SEIPLD Advisory Committee with representatives of E/R Region***

Two Advisory Committee (AG) meetings have grouped the local actors of the Bologna, Modena and Ferrara provinces, involved in the elaboration of pilot AEAs. Afterwards, the following AG meetings have involved representatives of the Regione Emilia Romagna (RER).

- 1) The third Advisory Committee has been held the 21st of May, with the following regional authorities representation: Morena Diazzi, general director of the Productive Activities Regional Department, Massimo Cenerini, head of Regional Energy Policy Service, Donato Pulacchini, (European Funds regional expert) and Andrea Pappacena (AEAs regional expert). The aim was to:
  - speed up AEAs data acquisition procedures to define useful financial parameters (volume of overall available investments,...);
  - design a coherent allocation scheme for regional, national and European funds;
  - fix grant financial procedures for each stakeholder.
  
- 2) The fourth Advisory Committee has been held the 11<sup>th</sup> of July with Alessandro Bosso (ERVET), Enrico Cancila (ERVET), Glauco Lazzari (Director of RER Enterprise Service), Donato Pulacchini (European Funds RER expert) and Andrea Pappacena (AEAs RER expert). The topics discussed were the following:
  - The subjects allowed to be financed by the contribution of the Emilia Romagna Region can only be Public Bodies, due to internal constraints;
  - The Operational Program is mainly addressed to energy efficiency, energy management and R.E.S., and may be addressed also to private company financing (the co-financing is from a national source);
  - Percentages of contribution on eligible expenses, per each type of subject were described;
  - The state of advancement of the AEA regional census was presented, based on the available data and regarding possible funds allocation.

## **Legislation and regulations**

### ***Regional Law n. 20/2000 “General Regulations on spatial planning”***

Article 14 of this Law foresees that “specialised productive districts shall constitute AEAs if they are provided with infrastructure, utility services and the necessary systems that safeguard public health, public safety and protect the environment” and establishes that the new productive areas of a Super Municipal structure will adopt the specific characteristics of the AEAs.

The Law foresees the issue of a “specific act of technical co-ordination in order to define the characteristics of the AEAs”, but this “specific act” has not yet been delivered. The Region is likely to wait for the results of the experiments in three pilot areas (Ponte Rizzoli near Ozzano (Bologna), Modena City, San Giovanni di Ostellato in Ferrara province).

As the development of productive areas infrastructure is usually covered by SF plans, the content of the decree has an indirect link with SF.

The normative instrument is of a super-ordinate kind; therefore it constitutes an important reference for all the other measures, which will be adopted thereafter.

### ***Regional Directive no. 1238 / 2002***

The directive concerned the more general topic of the Environmental Impact Assessment procedures in the region, but a specific articles was included providing the sustainability topics to be afforded in AEAs:

- Healthy working environment;
- Prevention and reduction of air, water and soil pollution;
- Waste disposal and recycling;
- Water management;
- Energy consumption control;
- Prevention, control and management of the risk of accidents;
- Mobility.

Even if the article is still too general, it has an indirect link with energy in SF, as it first introduces the energy management topic in AEAs.

### ***Regional Law nr. 9/99***

The Regional Law nr. 9/99 regulates the procedures in matters of environmental impact and establishes specific dispositions according the AEAs.

### ***Other regional legislation on energy***

The Emilia-Romagna region was the first Italian Region producing a regional Energy Law, after the constitutional change giving priority power to regions in the energy policy.

The regional law covers a lot of aspects, but the most relevant for AEA are the possible aids provided by the Region in form of grants to project plans of innovative character – technical, managerial or organisation innovation – that utilize RES or assimilated (including CHP) sources, coherent with the objectives of the Regional Energy Plan. The role of Municipalities is essential, as the presentation of joint public-private proposals is delegated to them.

## ***Regional Law nr. 26/04 – Regulations of Territorial Energy Planning and Energy Issues***

The Emilia Romagna Region has taken the decision to give priority to the land planning instruments for the implementation of its energy policy.

Particularly sub-section 5 declare: Local Public Bodies use the instrument of planning to decrease energy consumption in urban areas, to promote the use of Renewable Energy Sources and to improve local energy services, particularly for the energy retrofit of its own existing buildings.

### ***The Regional Energy Plan (PER)***

The Emilia Romagna Region is finalising the approval of the Regional Energy Plan (PER) that should be finally approved by the end 2007.

The PER document describes the regional strategy to improve Energy Efficiency and develop RES, establishing the priorities on medium-and long terms.

In an anticipation of the general objectives and strategies of the PER, the Region sets out the methods and procedures for taking effect: the AEA will be amongst the issues that are set out under the principle lines of intervention. The PER foresees funds by a tri-annual schedule, including the resources for energy coming from other programmes (structural funds, enterprise policy, ...).

### ***Structural Funds in the Emilia Romagna Region***

During the period 2000-2006, about 25% of the Italian regions (equalling 130 Municipalities and 387.000 people) have been the beneficiaries of the financial resources put at disposal by the Objective 2 programme, consisting of 101.9 M€ on Enterprises (Axis 1) and 154.1 M€ on public organisations (project for local development through Negotiated Planning - Axis 2).

The Emilia Romagna Region has respected the awarding criteria of the EU, and in reference to this demonstrated capability in putting into effect the Objective 2 Programme, has received an additional 4.9 M€ from Brussels, to which another award of 5.7 M€ of National resources can be added.

Unfortunately, no specific action exists concerning Energy Efficiency or the use of RES, even if they are mentioned and referred to both in Axis 1 (measure 1.1 “Development of Productive Activities”) and Axis 2 (measure 2.3 action 1: “Interventions on the qualification of the productive system and promoting technological innovation”).

#### **SF 2007-2013**

The recently presented Community orientations in cohesion matters repeat the necessity to reinforce the synergy between environmental protection and economic development and the Cohesion Programmes should establish the reduction of the use of energy from conventional sources, together with promoting the RES as a priority. The latest Programming documents of the Emilia Romagna Region contemplate the promotion of a major environmentally sustainable development and add it to the list of objectives of the Regional Strategy Plan 2007 – 2013, through the utilisation of energy generated from environmentally low impact sources, from RES or CHP.

## ***ERVET Document – Procedures for APEA regulation enforcement***

The Region committed to the regional development agency (ERVET) the supply of a document defining the methodology on APEA enforcement, through the indications of the Provincial Co-ordinated Territorial Programme regarding new Productive Area settlements;

- Territorial agreement between the public entities;
- Environmental regulations;
- Procedures to choose and relevant tasks of the Area Energy Manager;
- The planning of the APEA;
- Water and energy supply by utilities;
- Procedures for the transformation of existing industrial areas into APEAs.

The identified criteria in this document are of methodological character and never define the performance requirements. The document has not been agreed with the SME's associations.

## ***Financial opportunities***

The main incentives to RES are the Green Certificates, deriving from the obligation to produce RES electricity imposed to power producers (now a new RES production per year of 2.75% respect to the total produced energy). For energy efficiency a similar tool is now established (White Certificates) based on a gradually increasing obligation imposed to the electricity and gas distributors.

CHP benefits of a fiscal exemption (electricity production excise on gas consumption) which is very interesting for civil applications, but negligible for industries, having already a low excise duty for gas. CHP has a priority in dispatch. The White Certificate for CHP, stated by the Energy Authority, is also very small.

The Emilia Romagna region has assigned a preliminary amount of 50,000 euros per each of the 9 Provinces, to develop an analysis of the most suitable planned productive areas, able to be transformed in AEAs. The Provinces will acquire data on all the candidate areas and organise a selection of 1-2 areas/province, under objective criteria.

The financial support for investments related to the development of the new AEAs and for the transformation of existing ones are still not well defined. At present there are several programmes which could contribute to the objective:

- An initial budget of 8 M€ have been allocated by the Emilia-Romagna Region in 2007, for a first set of interventions in the AEAs selected by the 9 Provinces. These resources come from a regional fund for SME support, but are for environmental interventions, not restricted to energy only. A contribution has been committed to the Provinces for the initial identification and planning phase.
- The Regional Programme for air quality, whose content has been specified by the single Provinces, where AEAs have been mentioned (for example Modena and Bologna); this programme is financed by various resources (National Ministry for Environment and Land Protection, Regional Environmental Department, ...)
- The Regional Energy Plan, under responsibility of the Department for Productive Activities, where all resources for energy interventions should converge (from the SF Single Programming Document, the contributions of the national Ministries for Productive Activities and Environment and Land Protection, the specific regional resources for the

Regional Energy Plan,...). As the Regional Energy Plan is now (April 2007) under the final phase of approval, the full details of these financial schemes are not yet available.

- The Operational Programme of the Emilia Romagna Region belong fully to the Innovation and Employment Objective, and is composed of 5 Axis. The Axis 3 concerns Sustainability in the productive sector and includes sustainable mobility and energy efficiency/renewable energy sources. The AEA are mentioned as a priority in the energy efficiency section.
- The three-year Productive Activities Plan (2007-2009) will provide grants and other incentives for innovation in SMEs. Energy could be part of these contributions.

## Efficiency analysis

### *Financial indicators*

Financial indicators have the purpose to show and explain what are the financial money lines that, actually or in the future, will support AEAs development in the Emilia Romagna Region. The following statement lists all the Plans which have a reference to AEAs and reports the corresponding budget figures.

Summary of all the available resources, irrespective of destination.

	<b>Total Public Contribution</b>	Amount (in mil.€)
<b>1)</b>	<b>Operational Program (2007-2013)</b>	<b>350</b>
<b>2)</b>	<b>E/R Regional Energy Plan (2007-2009)</b>	<b>86,5</b>
<b>3)</b>	<b>Agreed Protocol by the Provinces (2007)</b>	<b>0,55</b>
<b>4)</b>	<b>Agreed Protocol by the Provinces (2007-2009)</b>	<b>16</b>
<b>5)</b>	<b>Three-year Productive Activities Plan (2007-2009)</b>	<b>72</b>
<b>6)</b>	<b>Air quality Plan</b>	<b>9</b>
	<b>TOTAL:</b>	<b>534,05</b>

Explanation of the above items:

- 1) The Emilia Romagna Operational Program (2007-2013) foresees 350 mil € as a whole. The Structural Funds allow the European Union to grant financial assistance to resolve structural and economic problems, but in particular the one that interests the most AEA financing is the ERDF Fund. Axis 3, devoted to sustainability in the productive sector, includes two sub-axes, one on energy and one on mobility, for a total budgeted amount of almost 80 M€.

- 2) E/R Regional Energy Plan (2007-2009) is carried out by three-year plans and foreseen a global budget of 86,5 mil € coming from local, regional and European funds. The exact amount of funding targeted to AEA will be yearly approved in the Intervention Plan.
- 3) Agreed Protocol by the Provinces allocates 0.55 mil € for the AEA census 2007, with major aims to identify their exact number and to provide feasibility studies for those ready to start.
- 4) Agreed Protocol by the Provinces (2007-2009) allocates 8 mil € as contribution to AEA settlements, possibly doubling (8+8 mil €), once they have been selected from the AEA census as the most significant;
- 5) Three-year Productive Activities Plan (2007-2009) foresees 72 mil € to create material and immaterial networks to strengthen productive system competitiveness.
- 6) Each Province has its own Air Quality Plan and it is a common willingness to allocate 1 mil € to support investments contributing to air pollution reduction, specially those located in big industrial areas. Actually it is still uncertain if all Provinces will decide in favour of the proposal, but they will likely accept in three.

Previous figures are afterward reported to the same three-year period 2007-2009, to have a common reference and are managed to establish in particular what is the share for energy investments between all the eligible items.

Table 5: possible financial resources targeted to energy.

**Net contributions (in M€)**

	<b>Total amount for Energy measures (in M€)</b>	<b>% of fund allocation to AEAs</b>	<b>Net contribution (in M€)</b>
<b>O.P. - ERDF (2007-2009) Axis 3: targeted to the Regional Energy Plan</b>	<b>15<sup>1</sup></b>	<b>66,6%</b>	<b>10</b>
<b>Regional Energy Plan E/R (2007-2009)</b>	<b>25<sup>2</sup></b>	<b>15,0%</b>	<b>3,75</b>

<sup>1</sup> The figure derives from table 9.1 of the draft Regional Energy Plan, regarding the assumed available funds for energy in the first three years of implementation of the Axis 3 of the Operational Programme. The six-year amount of the Axis 3 (80 M€) is shared with sustainable mobility.

<sup>2</sup> The figure derives from table 9.1 of the draft Regional Energy Plan, regarding the Regional Energy Fund for the implementation of the Regional Energy plan, according to the regional Law 26/2004.

<b>Agreed Protocol by the Province (Contribution to APEA settlements)</b>	<b>16<sup>3</sup></b>	<b>100,0%</b>	<b>16</b>
<b>Three year Productive Activities Plan (2007-2009)</b>	<b>72<sup>4</sup></b>	<b>15,0%</b>	<b>10,8</b>
<b>Air Quality Plan</b>	<b>6<sup>5</sup></b>	<b>50,0%</b>	<b>3</b>
<b>TOTAL:</b>	<b>153</b>		<b>43,55</b>

Excerpt from the O.P. 2007-2013:

Here it is described the O.P. energy item as it is the most probable and specific for energy in AEA's.

### **O.P. Axis 3: “Energy and environmental qualification and sustainable development”**

- 1) Sub-section 1: “Promote energy competitiveness, R.E.S. sources and sources treated as renewable energies, as CHP generation in connection with District Heating network, for SMEs organized in a logic of “Ecologically Structured Productive Areas (APEA)”
- 2) Beneficiaries are:
  - Public Bodies and “Partially Public Associations”
  - SMEs and SMEs Associations
  - Sole administrator of “Ecologically Structured Productive Areas”

### ***Rules for Operational Program***

It is opportune to bring into focus the particular rules to obey when applying for a O.P. funding:

- 1) Contribution can be requested for a “service development”, not for pure “service management”;
- 2) O.P. allows contributions to private companies; the new Charter of Aids will limit the rate of contribution to 20%, except for some specific purposes (see next point).
- 3) O.P. allows a 30-35% maximum contribution rate to SMEs for 6 environmental purposes, three of which concern energy: R.E.S., Energy efficiency, Combined Heat & Power generation.

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<sup>3</sup> In the hypothesis that the supplementary 8 M€ are approved.

<sup>4</sup> Not yet approved. The allocation to energy is only a preliminary guess.

<sup>5</sup> The estimate comes from a possible investment of 1 M€ per province in energy-related issue, for 6 Provinces out of 9.

- 4) O.P. Axis 3 (except sustainable mobility) is addressed only to “pure” energy investments, or energy aspects in waste management and water treatment;
- 5) O.P. allows contributions to private bodies, with no specifications about percentages, but only at net from discounted revenues; for public bodies the maximum rate is 30-35%.
- 6) The O.P. co-financing is national, not regional;
- 7) It is allowed, as eligible expense, land purchase in a measure of 10% of total investment;
- 8) O.P. funds must obey the European rule “N + 2”, so European funds approved in budget have to be made available and spent within 2 years from the year of approval, otherwise they are lost.

### **Rule for Regional funds**

According to the Italian Financial Law 2006 Region can get into debt, to grant a financial support, only if the beneficiary is a Public Body. As the regional budget usually requires a credit to distribute money, this means private companies are not directly admitted as beneficiaries. Once municipalities have received funds, they can issue a call for tender, and private companies can at that stage receive a contribution.

Table 6: Financial allocation

	Source of contribution	BENEFICIARY	Total investment (in M€) for public	Total investment (in M€) for private and public
<b>O.P. - ERDF (2007-2009) Axis 3: targeted to the Regional Energy Plan</b>	<b>EUROPEAN AND NATIONAL</b>	<b>PRIVATE and PUBLIC</b>		<b>10</b>
<b>Regional Energy Plan E/R (2007-2009)</b>	<b>REGIONAL</b>	<b>ONLY PUBLIC</b>	<b>3,75</b>	
<b>Agreed Protocol by the Province</b>	<b>REGIONAL</b>	<b>ONLY PUBLIC</b>	<b>16</b>	
<b>Three year Productive Activities Plan (2007-2009)</b>	<b>NATIONAL FUNDING</b>	<b>PRIVATE and PUBLIC</b>		<b>10,8</b>
<b>Air Quality Plan</b>	<b>REGIONAL</b>	<b>ONLY PUBLIC</b>	<b>3</b>	
<b>TOTAL:</b>			<b>22,75</b>	<b>20,8</b>

## **Physical indicators**

To derive preliminary physical indicators, information was gathered by a questionnaire and interviews with local enterprises.

The interest on these data is relevant for both the supply and demand side, to the Regional Administration and to Private Companies. In fact the main Regional interest is to understand what energy investments will private companies apply for, while private companies would be aware about funds and procedures made available by the Region.

In this connection a questionnaire has been prepared by the Modena Energy Agency, to collect useful firsthand data from some of the private companies who already asked to settle in the future “PIP 9” and “PIP 10” industrial areas, to be urbanised by the public “Consorzio Attività Produttive” in Modena. The questionnaire was aimed at understanding possible private companies investments in energy technologies and services, so the topics were the followings: average energy consumptions, needs of energy manager tasks, interest in remote control, Combined Heat & Power generation chances, District Heating use and PV use.

## ***Methodology***

### **Indicators description**

Main physical indicators used in so far for analysis and calculations are:

- 1) Percentage of AEA free surface available on regional industrial free surface;
- 2) Total AEA useful area for future energy retrofits (in he);
- 3) TOE savings (per he) taking into account a full application of all energy technologies and efficiency measures in Total AEA useful area for future energy retrofits;
- 4) Regional investment efficacy: share of Regional funds allocated to AEA's out of AEA's funds needs for total energy retrofit;
- 5) Annual contribution to regional energy saving target (fixed by the energy saving Kyoto target at 2020) once all AEA's will be retrofitted;

### **Motivation of assumptions made in calculations**

The base taken for all physical indicators related to AEA's performances (TOE savings, CO2 equivalent tons cut emissions, et cetera) is 2475 hectares, as useful area for future energy retrofits. The figure is calculated assuming: the total free AEA surface area supposed to entirely be built (ex novo) and therefore likely supplied by CHP and PV, applying the enforced max index suitable for building (given by case studies) plus 10% percentage of new connection per enterprises located in existing AEA's. The low percentage is justified by the possible lack of motivation in modifying existing energy plants and a consequential low foreseeable interest.

Table 7: determination of total AEAs useful area for future energy retrofits (in he)

<b>Free AEA surface area</b>	<b>3677</b>
<b>Enforced max Index suitable for building</b>	<b>0,35</b>
<b>Max area suitable for building (in He) = Area supposed to entirely be built (ex novo) and therefore likely supplied by CHP, PV, LAW 311 STANDARDS</b>	<b>1287</b>
<b>% of new connection per Enterprises located in existing AEAs - (10% of 11.880 he)</b>	<b>1188</b>
<b>TOTAL AEAs useful area for future energy retrofits (in he)</b>	<b>2475</b>

### **APEA’s statistical survey (Ozzano)**

Ecuba has carried out a statistical survey about the energy consumption of 70 companies located in the Ozzano existing industrial area, in 2006. Data collected were managed to define a baseline of energy consumption and average company size index. The survey constitute a significant reference to be compared with in the following calculations.

<b>Values</b>	<b>Index</b>
20.152	M3 gas consumption /year
98.738	kWhe consumption /year
1.289	Average company size in m2
291	Average Office area size in m2
23%	% office area

### **Case study for “Ponte Rizzoli” using the standards enforced by Decree n. 311/2006**

Under contract of Ozzano Municipality, a feasibility study has been performed for the new ecological industrial area designed in the site called “Ponte Rizzoli”, having 8.8 hectares useful surface.

The results of this case study have been used to derive energy indicators, applied then to the base useful surface assumed for the regional impact (2,475 hectares of useful surface).

The calculations of the Ponte Rizzoli case study are based on the following assumptions:

- The Decree 311/2006, the Italian transposition of directive 2002/91/CE related to building energy performance, has been used for the heating load. In particular table 2.2 of enclosed C of Decree 311/2006, gives the energy performance coefficient limit values for winter air-conditioning, to be applied from the 1<sup>st</sup> of January 2008. A comparison between the heating

load according to the new legislation and the one derived from the statistical survey performed in the nearby existing Ozzano industrial area shows a reduction of the energy demand of 40%, due to the better thermal insulation of buildings and the more efficient systems.

- Cooling of all offices and 10% of the factory buildings has been considered.
- The supply of electric energy, heat and cooling considers:
  - Combined heat, cooling and power generation in a central site, distributed by a district heating network to the whole AEA, sized to cover 52% of the total yearly thermal load (heating and cooling).
  - Photovoltaic system capable of supplying yearly 10% of the electric load.
  - Biomass auxiliary boiler, sized to cover 49% of the winter thermal load.
  - Auxiliary gas boilers are used for peak load conditions, and supply 10% of the total thermal load (heating and cooling).

## TOE savings

To standardize the calculation all data have been reported to 1 hectare surface to be served. The 3 case values therefore decreased in the 2 steps of technology application and multiplied by total AEAs useful area for future energy retrofits already obtained (2475 hectares). Final values gives an idea of what will it be the yearly AEA contribution to CO2 eq. tons cut emissions once all energy measures are completely applied.

Table 8: forecast TOE savings from the application all saving measures

	Index year MWhe/he	Index year MWht/he	Baseline Consumption	Progressive effect of TOE saving due to measures application on consumption		
			TOE/he	CHP plant (30 % savings)	PV use (10% savings)	TOE saved in TOTAL APEA useful areas for energy retrofits
Ozzano's case study	766	1.139	274	204	188	212.490

## AEAs Energy Saving Efficiency

Comparing the Regional Energy Plan energy saving target value, to be yearly reached to meet Kyoto target at 2020, with the energy saving contribution given by all the AEA in the Region, once they will be completely retrofitted with all energy measures foreseen and running regularly, the AEAs Energy Saving contribution is 10%.

<b>AEAs Energy Saving Efficiency</b>	Annual contribution to regional energy saving target (fixed by the energy saving Kyoto target at 2020), once all AEAs will be retrofitted	<b>10%</b>
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## CO2 eq. tons cut emissions

The CO2 equivalent tons cut emission values are drawn making a comparison between baseline emissions and the progressive energy measures application, as CHP generation, biomass use and PV use. The baseline emission figure comes from the contribution of CO2 emissions due both to electric generation and heat generation, reported to one hectare surface supply. Baseline values therefore decrease in proportion to single measure appliance and are finally extended to all AEA useful area suitable for energy retrofit (2475 hectares).

Table 9: forecast CO2 eq. tons cut emission from the application all saving measures

	Baseline CO2 eq. Ton emissions			Progressive effect of CO2 eq. cut emissions due to measures application			
	CO2 eq. Tons emitted per year in 1 he area from electric generation	CO2 eq. Tons emitted per year in 1 he area from heat generation	CO2 eq. tons/he	CO2 eq. ton saving due to CHP plant	Biomass use (30% average use)	PV use (10% average use)	CO2 eq. tons saved in TOTAL AEA useful area for energy retrofits
<b>Ozzano's case study</b>	<b>407</b>	<b>271</b>	<b>678</b>	<b>468</b>	<b>365</b>	<b>324</b>	<b>876.584</b>

## Efficacy analysis

In relation to the about 44 mil. € that will probably be likely approved in Regional budget for energy measures into the AEAs, assuming an average fund contribution rate of 25% per request and an estimate of 844 mil. € necessary to apply all energy measures in all envisaged AEAs, the financial investment, leveraged by the Regional budget contribution, covers 21% of the total demand.

<b>Regional investment efficacy</b>	Regional investment efficacy: share of investment generated by Regional funds allocated to AEAs on AEAs funds needed for total energy retrofit	<b>21%</b>
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## **Internal coherence (with other parts of the same sub-programme and programme)**

The six programmes indicated in the efficiency analysis interact positively, as some of them is addressed to public bodies only, therefore more suitable to the realisation of district heating and cooling networks proposed by the Municipalities, others are also available to private companies, therefore more suitable for energy management programmes.

The inquiry assigned to the Provinces is coherent with the need of identifying the most suitable AEA for future funding.

## **External coherence**

### ***Connection with EU policies and actions***

The action is coherent with the latest EU Directives:

- Directive on cogeneration
- Directive on RES electricity
- Directive on energy performance of buildings.

### ***Connection with national, regional, and local policies***

The action is directly connected with the D. Lgs. 192/2005 and 311/2006, which have transposed the EU Directive on energy performance of buildings, as the new industrial buildings have to comply with the minimum requirements specified in these acts.

The Regional law 26/2004 foresees the AEA as a priority tool in the energy policy for the productive sector. The AEA have been defined and regulated by several regional acts, mentioned in the introductory chapters.

### ***External economic environment***

The Emilia-Romagna region, as explained in the introductory part, has one of the most developed SME sector, distributed in several decentralised productive areas.

The Operational Program has all the premise to be a financial tool addressed to the APEA development, in fact it is a support both to local integration and to local economical development.

The Po Plain area, that is the main spreading industrial area of the region, suffer of high atmosphere concentration and pollution persistence in the air. It is recognized to be one of the most air polluted areas in the EU so air quality has become an absolute priority for all regional and local environmental authorities. That is the reason why it is necessary decrease regional polluting emissions acting both on reducing energy consumption and increasing industrial energy efficiency. Regional authorities resolved to fund specific energy measures, targeted to face this urge, through the Air Quality Provincial Plans, the Regional Energy Plan and Three-year Business Action Plan.

## Implementation tools and procedures

### **Partnership**

The Advisory Group includes functionaries at the different administrative levels, local stakeholders and representatives of the Structural Funds planning at regional and province level.

Members of advisory group:

Stakeholders	Competences
Mr. Gabriele Bollini, Province of Bologna, Department of Environment	Responsible for the implementation of the APEA concept in Bologna Province.
Mr. Andrea Casagrande, President of the Modena Consortium for Industrial Areas.	Organisation in charge for the development of new productive areas in Modena Province.
Mrs. Caterina Brancaloni, Director of SIPRO, the Development Agency of Ferrara	Organisation in charge for the development of new productive areas in Ferrara Province.
Mrs. Pamela Meier, Bologna Province, Councillor for Productive Activities	Political responsible for Bologna Province policies for enterprises.
Mr. Eriuccio Nora, Director of the Planning Dept. Modena Province	Department in charge for the revision of the land planning policy in Modena Province.
Mr. Simone Spataro	Representative of a new ESCO
Morena Diazzi	Emilia Romagna Region, Dept. Productive Activities General Director
Glauco Lazzari	Director of RER Enterprise Service
Donato Pulacchini	Emilia Romagna Region, Structural Funds
Andrea Pappacena	Emilia Romagna Region, AEA expert
Alessandro Bosso	ERVET SpA
Enrico Cancila	ERVET SpA

## **Financing**

### ***Considerations to tackle with Structural Fund EC code n.1260/1999***

Financial investments can be, in relation to the EU additionality principle, increased by the contribution of Structural Funds under its proper rules. About the matter the article of law 55 of the EC code n.1260/1999 on “General regulation concerning ERDF seems to exclude any possibility of investment for electric and/or heat generation plant. This occur because electric and/or heat generation plant are included in the definition of “Income Generators Project” in sub-section 1. Eligible expenditure for “Income Generators Project”, in sub-section 2, do not exceed present value of the investment cost, curtailed of investment net revenues in a certain amount of years.

A deepen analysis on AEA’s case studies has revealed an opposite conclusion. The investment concerning the realisation of a Combined Heat Power generator, powered by a biomass thermal plant or producing biogas from local harvests, connected with District Heating network, needs a public support to be sustainable in a reasonable span of time. The related business plans shows a low economic sustainability, prospecting the intervention of supplementary funds. In fact, in the reasonable amount of year (10-15) usually considered to be acceptable and competitive for market investors, the investment is not able to generate revenues to repay itself and to cover the running costs, without at least a 30% public funding. So a 30% Structural Fund contribution act as a structural resource to strengthen the investment sustainability helping the reaching, at least within the period mentioned above, the break event point. In that way the Structural Fund pursue its own natural purpose to support the investment and it is not a generator of income.

### ***Type of financing: grants for public investments***

An example of procedure for the allocation of a grant to a public body is in phase of testing at Ozzano. In this case the Municipality assumes the CHP-fed district heating as a public investment (investment of public priority according to the Italian law), develops the feasibility study and the preliminary design, and launches a call for final design, construction, operation and transfer at the end of the contracting period.

### ***Grants or low interest loans to SMEs or LE***

Procedures for grants or low interest loans for SMEs and LEs are still in phase of development. They can be subdivided in two typologies, according to Axis 3 of the O.P.:

- Actions relating to the whole AEA
- Actions pertaining to single companies or groups of them.

Criteria for identifying the first type of action are the following:

- District heating networks covering the full area
- Energy management projects including at least three phases: i) an ICT network capable of connecting all enterprises for at least gathering energy consumption data; ii) an energy efficiency investment project involving at least 50% of the local enterprises; iii) a monitoring action to verify the achieved results.

### ***Support to mixed consortia***

According to the regional administrative department, the mixed consortia, where a private partner is involved, have to be assimilated to a private body. Therefore they have to participate in open calls and can not receive grants destined to public bodies.

### **Other synergies: Feed-in tariff, National Financial Law incentives**

Photovoltaic plants are financed by a feed-in tariff for 20 years since their activation. This allows a payback in 12-14 years at the actual rates. Under 20 kWp the connection to the grid is totally free if an electricity on site exchange is established (allowing up to a complete zeroing of the electricity bill, based on a yearly balancing, but excluding a sale of energy to the grid). Alternatively, the PV plant has to be registered as an electric company and the non-consumed part has to be sold to the grid at a fixed rate.

Private investments in four types of energy efficiency and renewable energy investments benefit of a 55% tax reduction. The concerned investment types are: condensing boilers, solar thermal systems, thermal insulation of walls and windows at least at the same level as the minimum requirements for new buildings, overall building performance at a level lower than 30% of the minimum requirement for new buildings.

The Green Certificates are operative for wind, hydro or biomass fed electricity production for eight years since project activation (plus other 4 with a 30% reduction). The value of the certificate is presently quite high (about 0.09 euro/kWhe), making the business plans quite interesting, until the end of the certificate allocation. Very often the investment loses its interest afterwards, even if already totally depreciated.

<b>Type of financing, Grants for</b>				
<b>Source</b>	<b>Contribution to public investments</b>	<b>Grants or low interest loans to SMEs or LE</b>	<b>Support to mixed (public and private) consortia</b>	<b>Responsible subject of the APEA</b>
<b>P.O.R. (2007-2013)</b>	Allowed (through trading procedures)	Allowed for SMEs or SME associations (through call for tenders)	Assimilated to private bodies.	Allowed (through call for tenders)
<b>Regional Energy Plan E/R</b>		Targeted to RES, energy efficiency and productive areas. Low interest loans, capital accounts and guarantee reserves	Assimilated to private bodies.	Targeted to RES, energy efficiency and productive areas. Low interest loans, capital accounts and guarantee reserves
<b>Protocollo d'intesa con le Province (Statistical data reporting of all the APEA in the Region and</b>	Allowed (surveys in all the Provinces)		Allowed (through the Provinces)	

<b>feasibility studies 2007)</b>				
<b>Agreed Protocol by the Province</b>	Allowed		Allowed	Partially allowed
<b>Three-year Productive Activities Action Plan (2007-2009)</b>	Allowed “Support to competitiveness”	SMEs can be subcontractors	Allowed “Support to competitiveness” but assimilated to private bodies.	Allowed “Support to competitiveness”
<b>Air Quality Plan</b>	Allowed			
<b>Photovoltaic “Feed-in law” tariff</b>	Allowed	Allowed	Allowed	Allowed
<b>National Financial Law 2007: “Support for better construction standards of the buildings”</b>	excluded	55% tax deduction on energy retrofitting expenses for buildings	55% tax deduction on energy retrofitting expenses for buildings	55% tax deduction on energy retrofitting expenses for buildings
<b>Green Certificates as incentives to RES</b>	Allowed	Allowed	Allowed	Allowed

### **Financing of existing AEA**

The Emilia Romagna program for AEA includes not only District Heating networks but also any type of energy efficiency interventions: a possible scheme for energy management projects at the level of a whole AEA has been identified by ECUBA.

This type of intervention for the whole industrial area, may foresee an energy management project, composed of:

1. a remotely controlled ICT network to gather energy consumption data;
2. the design and implementation of a set of energy efficiency measures in at least 50% of the located enterprises (here the idea of the Saxon Energy Certificate could be replicated);
3. the monitoring of the measures results through the network.

This proposed scheme can be suitable for several types of funding types designated to AEA. In particular, the OP 2007-2013 regards two types of interventions:

- the first type concerns interventions for the whole industrial area,
- the second type of intervention is for energy projects, concerning single enterprises or groups of them.

In both cases the proposed scheme could be adopted and launched in calls for proposals. As the Region will start the elaboration of the calls in the fall 2007, a contribution from ECUBA is foreseen in the frame of SEIPLED.

