

Project Infinite Solutions

INnovative FINancing for Local SusTainable Energy Solutions

Grant agreement no.: IEE/13/392.SI2.675530

TASK 3.1

Local Study and Action Plan

Date: June 2015



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FINANCING FOR ENERGY EFFICIENCY

European and National framework

A key objective of the European Union is the improvement of the energy efficiency of buildings, considering that the residential and tertiary sector accounts for more than 40 % of final energy consumption in the Community. For this reason the EU has issued specific Directives aimed to reduce the energy consumptions and CO₂ emissions of buildings and promote the development of the necessary policies and measures to comply with the Kyoto Protocol. The first Directive on the Energy Performance of Buildings (Directive 2002/91/EC, EPBD), was issued in 2002. In 2012 the Directive on the Energy Performance of Building was re-casted (Directive 2010/31/EU). The main challenge for the Member States is to move towards new and retrofitted nearly-zero energy buildings by 2020 (2018 in the case of Public buildings) and also the application of a cost-optimal methodology for setting minimum requirements for both the envelope and the technical systems.

Following the EPBDs directives, the EU member States have fixed mandatory energy performance requirements and implemented an energy certification process. The requirements concern the primary energy consumption for heating and domestic hot water, the energy needs for heating and cooling, the minimum U value for the building envelope, etc.

Each state has also defined the reference calculation methods to carry out the energy performance assessment. Usually the calculation methods are described in national technical standards based on CEN directives.

Public authorities are recognized as a key actor to move the building sector towards a better sustainability. They can implement policies to boost the construction of high performance buildings.

The main important public actors of the building sector in the case of Italy are: Ministries, Regions and Cities.

Since 2005 new regulations on sustainable building, mainly at regional scale, have been issued to promote an approach to high performance buildings beyond the energy aspects, taking in account other environmental, social and economic issues. At urban level, many cities are adopting energy plans to improve the performance at urban scale. Sustainability issues are taking more and more importance in urban plans and in urban renovation processes. New financial instruments to drive the change of the construction sector toward nZEB and sustainable building are proposed by public authorities and some financial private institutions are beginning to move also in this field.

In Italy the Ministry for the Economic Development is the responsible of the implementations of the EU EPBDs (Energy Performance of Buildings Directive).

The first regulation, issued in 2005, to set the general framework for the transposition of the first EPBD (2002/91/EC) at national level is the Legislative Decree 192. By means of this decree, the minimum requirements for the Energy Performance (EP) of buildings were identified and also the reference U values for the building envelope (walls, roofs, floors, windows) in case of new construction and major renovations.

In 2009, with the Presidential Decree n. 59, minimum requirements were defined for the Energy Performance in summer (cooling and lighting systems). This new decree updated also the minimum Energy Performance requirements of buildings and heating systems.

In 2011 the Legislative Decree n.28 transposed the EU RES (Renewable Energy Services) Directive. The requirements regarding the use of renewable energy for new buildings and major renovations were increased with the objective to enlarge the renewable quota for DHW (Domestic Hot Water), heating and cooling energy demand. By January 2017 a 50% renewable quota for all building permits will be mandatory.

The compliance check of the EP requirements is performed by municipal authorities.

The issue of a building permit is bound to the compliance of the building to the minimum requested performance. A mandatory final technical report has to be produced, signed by an architect or engineer, confirming the compliance with the urban plan rules, the building code and the EP requirements. The Decree 28/2011, for in sale and rental contracts of buildings and single units (e.g. apartments), states that the buyer or manager has to receive an Energy Performance Certificate (EPC). The EPC administration system is organized on a regional base with distinct registries and databases.

The EPC format foresees the expression of the EP in terms of primary energy in kWh/m² year for residential buildings and in kWh/m³ year for non-residential with performance labels ranging from A+ to G. The energy performance is expressed for the whole use and for the single end uses (heating, DHW). All calculations are performed on the basis of the UNI/TS 11300 national standards.

The management of a quality assessment systems for EPC falls into the competence of regions. According to the Italian Constitution, energy – related topics are a shared competence between the State, the 21 Regions and the Autonomous Provinces. The consequence is that a regional authority has the possibility to implement autonomous transpositions of the EPBDs as long as they don't are in conflict with the general principles and requirements provided at

national and European level. At the moment 11 Regions and Autonomous Provinces have acted a local transposition of the EPBD.

In 2013 the Legislative Decree 63/2013, concerning the adoption of the EU EPBD 2012/31 (Energy Performance of Buildings Directive re-cast) is in force. This Legislative Decree has modified the former Legislative Decree 192 and introduced the nZEB (nearly Zero Energy Buildings). Starting from December 2018 all the new public buildings have to be nZEB and starting from January 2021 all the new buildings will have to be nZEB. New calculation methods for the EP have been introduced and the EP requirements will be updated every 5 years. By December 2014, through a Legislative Decree issued by the Ministry for the Economic Development, an Action Plan will be established to support the nZEB diffusion.

Finally, in 2014 Legislative Decree 102/2014 has adopted the Directive 2012/27/UE which establishes a set of binding measures to help the EU reach its 20% energy efficiency target by 2020. Under the Directive, all EU countries are required to use energy more efficiently at all stages of the energy chain from its production to its final consumption.

Italian energy efficiency policy

In the last years the energy measures to achieve the targets of energy savings and renewable energy sources were market-based and fiscal types. The market-based measures are mainly the white certificates for energy savings and green certificates to promote the renewable energy sources. The fiscal measures are preferential feed-in tariffs for renewable energy sources and fiscal incentives for energy efficient refurbishment for buildings.

We will talk about:

- fiscal incentives of 65% and 50%;
- white certificates system (TEE);
- incentives for renewable energy sources;
- heat account.

Fiscal incentives

From 2007 a national law allowed owners of residential buildings, but also commercial and industrial ones, to deduct from their income taxes up to 65% of the expenses incurred to implement certain types of energy efficiency renovations or source of renewable energy in existing buildings.

These include the replacement of the heating system, attic and wall insulation, window and door replacement, the entire building envelope, and solar panels to be used for heating water (photovoltaic are specifically excluded because they are addressed by other laws and

programs). Applications for the tax credits must be accompanied by a professional engineer's certification.

Tax credit is applicable to a maximum investment of €100,000 per unit apply, depending on the type of renovation and the number of years over which the tax deductions can be spread is 10.

Another deduction up to 50% is active for purchasing electronic appliances with high energy class (A+) in buildings that has been refurbished.

Tax credit is applicable to a maximum investment of €10,000 and the number of years over which the tax deductions can be spread is 10.

White certificates system (TEE)

The incentive system known as "White Certificates" (whose technical name is "Titles of Energy Efficiency", TEE) has been operating since 2005.

White certificates represent energy not consumed and are provided to companies operating in the energy services sector to certify reductions of energy consumptions obtained through energy efficiency projects. For each CO₂ ton of oil equivalent reduction of primary energy, one certificate is issued over a lifetime of 5 years.

Incentives for renewable energy sources

From 2007 to 2013, there has been specific incentives for photovoltaic plants, separately from other renewable sources.

The law guaranteed a feed-in tariff (electricity price+incentivation) for PV-installations larger than 1 kilowatt. The owner, being a person or a company, receives some amount of Euros/kW. This is a fixed tariff, guaranteed for 20 years. Additionally, the owner can choose to sell the electricity, or to opt for the net metering service only for small installations.

In 2013 several changes to the law affected the photovoltaic business in particular and the overall renewable energy industry in Italy. The system of incentives for energy generated from renewable sources (introduced by the Ministerial Decree of 5 July 2012 – the "FER Decree") was abolished and, as a result, several energy incentives expired at the end of 2013.

In particular, the FER Decree introduced:

- the Fifth Energy Incentives Plan revising the system of incentives for the production of electricity from photovoltaic plants;

- new procedures supporting the production of electricity from other renewable energy sources at plants with a capacity of at least 1 kW.

The FER Decree applies to plants already operating by 31 December 2013.

For RES, other than PV, law has established a new feed-in tariff system for small renewable plants. Small plants can decide to sell energy and take the green certificates or a feed-in tariff, different for each renewable source and released for 15 years.

In addition to the subsidies available for specific RES, there are the Green certificates, representing the environmental value of the renewable energy generated.

Heat account

From 2013, the Decree on heating renewables, "Heating Account", provides incentives for energy refurbishment and production of heat energy from renewable sources by public administration and private subjects. The private subjects can have access to incentives only for some of the eligible expenditures.

Are eligible for incentives expenditure for

- a) Thermal insulation of opaque surfaces;
- b) Replacement of closures including transparent window frames;
- c) Replacement of existing heating systems with generators of condensing heat, heat pumps, heat generator powered by biomass;
- d) Installation of shielding systems and/or shadowing;
- e) Installation of solar thermal collectors, even combined with systems of solar cooling;
- f) Replacement of electric water heaters with heat pump water heaters.

1 DESIGNING UDINE'S CLIMATE FUND

Local Framework

Municipality of Udine is active in promoting actions for energy savings and use of renewable energies.

For this reason the municipality has joined the European initiative "Covenant of mayors" in 2009 and elaborated its own Local Action Plan for Sustainable Energy.

The Plan contains all the short and long time actions to reduce of 20% the greenhouse gas emissions of municipality and its territory within the 2020.

Among the actions we find main commitments and goals to take action on the municipal buildings in order to address:

- reduction of energy consumptions;
- enhance of energy management by regular and in depth analysis of energy consumptions;
- facilitate the understanding of energy saving in building among municipal workers and citizens, through appropriate communication campaigns.

In order to obtain these goals, the municipality is working also in collaboration with its public utility company AMGA "Azienda Multiservizi Spa", which manages gas and public lighting.

From 2010 AMGA has made energy efficiency interventions on 9 public buildings (schools, offices, sport facilities). The interventions regard:

- installation of thermostatic radiator valves,
- Replacement of old heating systems with more efficient ones,
- optimisation of working hours and temperatures,
- energy certifications for all public buildings owned by the municipality and a general energy management system.

Moreover, in the last 7 years the municipality has refurbished 20 schools based on low energy concepts, to improve the energy performances through replacement of windows and glasses, walls and roof insulation, floor heating system, installation of solar panels.

On the side of new constructions, in 2013 has been finished a new nursery school designed with use of ground heat pumps with heat recovery systems; less water consumption by using rainwater for irrigation; use of recycled building materials.

Other investments municipality made regard:

- substitution of about 85% of fluorescent (o mercury vapour lamps) of public light system with low energy consumption (sodium vapour lamps);
- replacement of all old traffic lights with LED Lights;
- replacement of old tomb light s with LED lights;

- installation of PV plants on 3 urban cemeteries.

Another major action is the implementation of the “green electricity” contract from 2011, thanks to which the municipal public buildings use only green energy for electric devices.

On the side of private sector buildings, from 2009 it is compulsory for all new residential buildings the “Climahouse” energy certification.

Climate fund

Revolving fund within the city of Udine should be a right tool for realization of projects and activities focused on increasing energy efficiency of the existing buildings and infrastructures.

Decision making within this fund has been based, on first phase, on identifying already planned interventions from a financial point of view, foreseen in the Financial Balance Sheet 2014-16, and on short payback periods of selected investments, as important elements for starting and sustainability of the fund.

From the very beginning there has been a strong cooperation between Finance department and technical department. Lots of contacts has been activated among municipal offices, political representatives, and external actors which has been involved since the real beginning for the success of the initiative.

The situation is the following: to start, we have identified an investment action already planned by the municipality, which regards the Energy efficiency of public lighting in two city areas. The two interventions foresee the replacement of old lamps with new LED lamps. The seed investment is about 100.000 €.

Further actions has been identified in the Action Plan.

The Fund City council has the role to approve the establishment of the revolving fund.

Draft Fund Scheme

The fund will be managed by the Service “Public Works, Energy and Environment” (technical department).

Head of department of Finance will take a role of supervision of financial aspects of the Fund, in constant dialogue with technical Department, for setting up and improving the mechanism of the Fund.

For this reason a management team has been (informally) constituted and it is composed by:

- Financial expert and (or) head of Department of Finance;
- 2 Technical experts;
- 1 political representative;
- some external technical advisors.

The fund will be supported by a budget line which identifies and internalizes the compensation of the previous' year municipal CO2 emissions.

The first seed, as we said before, comes from budget line dedicated to general maintenance of public lighting. In the future, once the Fund will be formally constituted, we will identify an autonomous budget line for the fund.

Some criteria has been already identified to decide if one action can be financed by the fund.

They are:

1. Lifetime / Return of Investment > 1
2. The action has to lead to a certain and measurable energy saving (and CO2 saving);
3. An intervention of general maintenance which add an EE action is preferred.

The Procedure Rules start with internal offices (mainly from technical Department) that can suggest measures to be done; these proposals are evaluated with an energy audit, cost benefit analysis – CO2, kWh, €, by internal (or external) experts (like APE).

Investment, expected savings, ROI and the annual fixed share on the Fund budget line are defined

The managing Service agrees on measure implementation with proponent office and the investment is approved in the Financial General Budget, with an annual monitoring of measure.

2 STAKEHOLDERS ENGAGEMENT

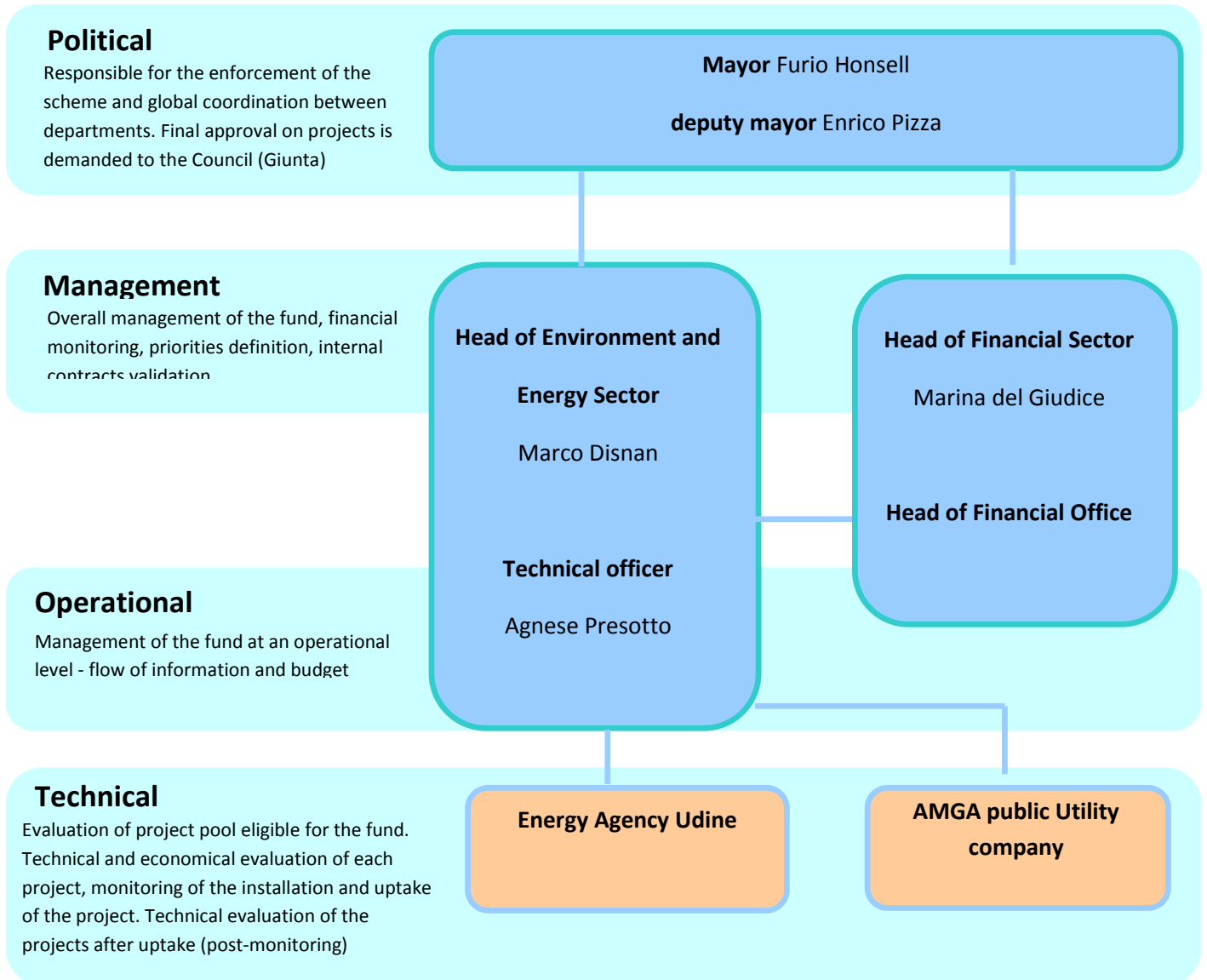
Department most responsible for energy efficiency related activities is Department of Spatial Planning, Public Construction and Environmental Protection. The other department that provides support and carry out some of the activities is Department of Finance.

City cooperated with several different organizations in implementation of energy efficiency measures. Some organization are owned or established by the city while some have different owners or founders. These organizations are:





- AMGA - public utility company AMGA “Azienda Multiservizi Spa”, which manages water, gas and public lighting.
- SAF – partial public owned company which manages local public transport system;
- NET - public utility company which manages the city waste collection;
- Regional Energy Agency – APE
- Legambiente - Environmental no profit association

As well there is a strong collaboration with other levels of governance, first of all the Regional Government. The municipality is currently discussing a closer collaboration in the definition of shared objectives inside the Regional Energy Action Plan.

3 ORGANIZATIONAL CHART



4 ACTION PLAN

	image	title	action	investment	Savings Kwh/y	Savings €/y	Payback time
1		green area: replacement of old lamps	Replacement of 24 lamps with LED	24.000 €	5102	1860	10 years
2		Secondary school: roof insulation	Insulation of 1280 mq roof with xps 4 cm panels (0,035 W/mK) and U = 0,20 W/mqK	81.000 €	85197	8500	7 years
3		school gym: roof insulation	Insulation of 590 mq roof with polyurethane foam 16 cm panels	21.100 €	4206	378	20 years
4		kindergarten: replacement of old windows	Replacement of 160 mq (U < 1,5 W/mqK)	60.500 €	9710	872	20 Years

