EEAP 2014

Italian Energy Efficiency Action Plan

July 2014

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Executive summary

The NEAAP 2014 sets out the energy efficiency targets established by Italy for 2020, the policy measures implemented for achieving them and the progress made as at 2012.

Specifically, in line with the Guidelines for its drafting provided by the European Commission and with the contents of the National Energy Strategy (NES), Chapter Two of the Plan sets out the national targets for the reduction of primary and end-use energy consumption and specifies the savings in end-uses of energy expected in 2020 by economic sector and by main energy efficiency promotion scheme, which are all described in detail in Chapter Three.

Table ES.1 - Final energy savings (Mtoe/y) expected in 2020 by sector

Sector	PLANNED MEASURES FOR 2011-2020					CONVENTIONAL ENERGY DEMAND*	PRIMARY
	Regulatory standards	Measures and investments for mobility	Thermal account	Tax deductions	White certificates	SAVINGS EXPECTED by 2020	SAVINGS EXPECTED by 2020
Residential	1.60		0.54	1.38	0.15	**3.67**	**5.14**
Services	0.20		0.93		0.10	**1.23**	**1.72**
Public authorities	0.10		0.43		0.04	0.57	0.80
Private	0.10		0.50		0.06	0.66	0.92
Industry					5.10	**5.10**	**7.14**
Transport	3.43	1.97			0.10	**5.50**	**6.05**
TOTAL	**5.23**	**1.97**	**1.47**	**1.38**	**5.45**	**15.50**	**20.05**

(Source: data processed by the Ministry of Economic Development and ENEA)

Chapter Two also sets out the values of the savings achieved by 31 December 2012 thanks to the policy measures already in place in Italy, by reference both to the 2016 targets established by NEAAP 2011, and to the NES targets for the period 2011- 2020.

Table ES. 2 - Energy savings achieved in the period 2005-2012 and expected by 2016 under the Energy Efficiency Action Plan (EEAP) 2011 (final energy, Mtoe/y)

	Legislative Decree No 192/05	White certificates	55% tax deduction	Eco-incentives and Regulation No 443/2009	Savings achieved* 2005-2012	Savings expected by 2016	Target achieved (%)
Residential	2.10	1.31	0.71	-	3.79	5.16	73.5%
Services	0.06	0.11	0.02	-	0.19	2.11	9.0%
Industry	0.15	1.57	0.04	-	1.76	1.73	101.8%
Transport	-	-	-	0.63	0.63	1.87	33.6%
TOTAL	**2.32**	**2.99**	**0.77**	**0.63**	**6.38**	**10.88**	**58.6%**

* Net of duplications and considering for industry the incentives for motors and inverters paid out in the period 2007-2010, not described in detail owing to the small amount of energy savings achieved. (Source: data processed by ENEA)

Table ES.3 - Annual energy savings achieved in the period 2011-2012 and expected by 2020 under the NES (final energy. Mtoe/y)

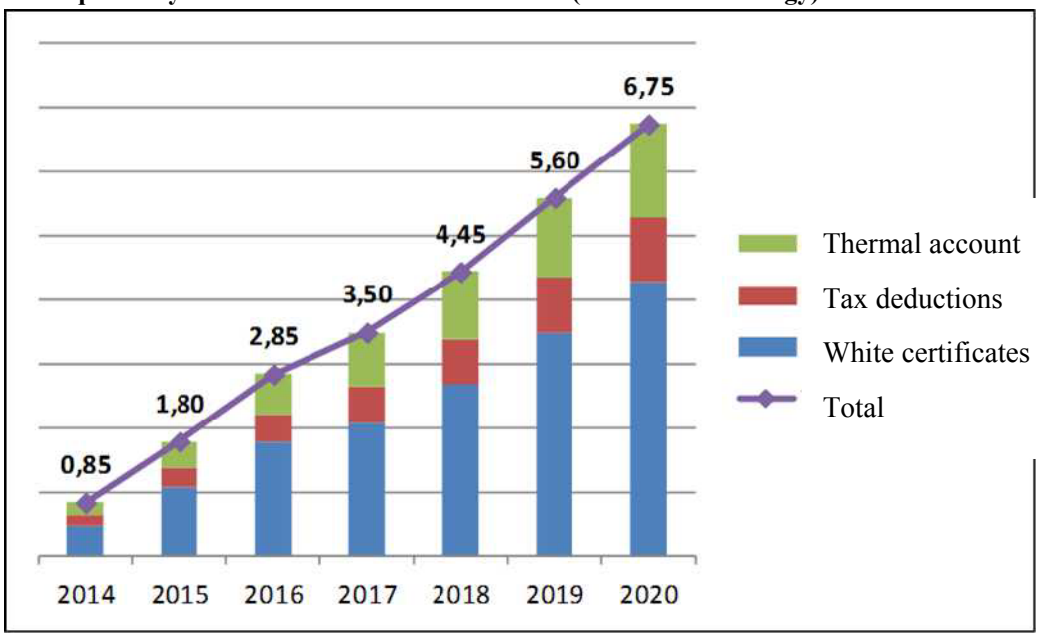
Sector	MEASURES				Savings achieved 2011-2012	Expected savings by 2020	Target achieved (%)
	Legislative Decree No 192/05	White certificates	55% tax deduction	Council Regulation (EC) No 443/2009			
Residential	0.62	0.14	0.21	-	0.96	3.67	26.2%
Services	0.02	0.03	0.01	-	0.05	1.23	4.1%
Industry	0.05	1.04	0.01	-	1.09	5.10	21.4%
Transport	-	-	-	0.22	0.22	5.50	4.0%
TOTAL	**0.68**	**1.20**	**0.23**	**0.22**	**2.33**	**15.50**	**15.0%**

Source: data processed by ENEA

Chapter Three, besides describing in greater detail the policy measures already in place and the recent steps taken to strengthen them, provides a detailed overview of the new measures introduced by the Decree which transposed Directive 2012/27/EU, and where possible provides an estimate of the expected impact in terms of expected savings broken down by economic sector.

Specifically, Paragraph 3.1 sets out cross-cutting measures such as the white certificate (WC) energy efficiency obligation scheme, tax relief for energy upgrading of the built stock and the thermal account. According to the estimates set out in the paragraph, these measures should achieve the compulsory cumulative end-use energy savings target for 2020, established by the calculation method laid down in Article 7 of Directive 2012/27/EU.

Figure ES.1 - Estimate of the contribution of the main efficiency measures to attainment of the savings target required by Article 7 of Directive 2012/27/EU (Mtoe of final energy)



(Source: data processed by the Ministry of Economic Development - ENEA)

These savings are a share of the fixed targets established by Italy in its National Energy Strategy (NES) and notified to the Commission in April 2013. Attainment of the national target set out in the NES will be aided by application of the rules introduced by the EU Directives (EPBD and Ecodesign) and by the measures introduced following transposition of Directive 2012/27/EU.

Lastly, paragraph 3.1 provides updated information on the state of the art and the planned new measures for the energy services and metering and billing sectors, for energy audits and management, for the qualification and accreditation of experts, and for consumer information and training programmes. As concerns the estimate of the contribution to attainment of the NES targets from the increase in energy audits, these are predicted to deliver 5% annual savings on primary energy consumption by the approximately 3 500 large companies subject to the obligation, which are equivalent to 1.4 Mtoe and are included in the estimates for the white certificate scheme. This estimate is certainly conservative, also in view of the plan to launch an audit promotion scheme for SMEs too.

Paragraph 3.2 addresses energy efficiency in the public and private built stock. This paragraph provides an overall snapshot, comprising both regulatory measures and incentive schemes to promote energy efficiency. The paragraph describes the aims of the forthcoming National Energy Efficiency Fund established by the national Decree which transposed Directive 2012/27/EU: the Fund will support energy efficiency projects implemented by Public authorities, ESCOs and businesses, increasing the energy efficiency of their buildings, industrial installations and production processes. This paragraph also provides an overview of the national built stock, to estimate the potential for energy upgrading in the civil sector.

The building sector's contribution to the national targets is estimated at 4.9 Mtoe/y (including 3.67 Mtoe/y from the residential sector and 1.23 Mtoe/y from the services sector, Table ES.1). This estimate is based on consideration of the following factors:

- application of the new standards required by the EPBD for buildings and by the Ecodesign Directive for space heating and cooling: the contribution to the total figure is estimated to be in the order of 1.6 Mtoe/y for residential buildings and 0.2 Mtoe/y for non-residential buildings;
- tax deduction mechanism: this is estimated to yield a savings of 1.38 Mtoe/y of final energy in the residential sector;
- thermal account: this is estimated to save 1.47 Mtoe/y of final energy use, including 0.54 Mtoe/y in the residential sector and 0.93 Mtoe in the services sector, both public and private;
- white certificates: while this scheme was designed with the industrial sector in mind, based on historical data white certificates are estimated to generate savings in the civil sector of 0.25 Mtoe/y of final energy, including 0.15 Mtoe/y in the residential sector and 0.1 Mtoe/y in the services sector.

Paragraph 3.2 also summarises the result of the study on potential savings in the civil sector, meaning the savings which would be achieved if, in the period 2014-2020, all energy efficiency improvement actions having a favourable cost/benefit ratio and not yet implemented were set in hand, irrespective of the spending capacity of executing parties and of the financial resources available under the energy efficiency promotion schemes. The study has been completed by careful analysis of the main barriers which might hinder correct implementation of the forthcoming building upgrading plan.

The theme of the promotion of energy efficiency in buildings of the public authorities, in particular central government, is covered in paragraph 3.3. Specifically, it describes the method used to establish the population of central government authorities' buildings to be covered by energy efficiency projects; the estimated cumulative savings to be achieved by 2020 and the tools put in place to achieve the target.

Table ES.6 - Energy savings from upgrading works and savings targets by 2020

Year	Floor area subject to the obligation to improve energy efficiency (m^2)	Total Consumption (GWh/y)	Savings (GWh/y)							Total savings by 2020 (GWh/y)
			2014	2015	2016	2017	2018	2019	2020	
2014	412,919	**62.8**	17.0	17.0	17.0	17.0	17.0	17.0	17.0	**119.1**
2015	407,090	**61.9**		16.8	16.8	16.8	16.8	16.8	16.8	**100.7**
2016	401,633	**61.1**			16.6	16.6	16.6	16.6	16.6	**82.8**
2017	389,977	**59.3**				16.1	16.1	16.1	16.1	**64.3**
2018	378,671	**57.6**					15.6	15.6	15.6	**46.8**
2019	367,705	**55.9**						15.2	15.2	**30.3**
2020	357,067	**54.3**							14.7	**14.7**
Total	**2,715,061**	**413.0**	**17.0**	**33.8**	**50.4**	**66.4**	**82.0**	**97.2**	**111.9**	**458.7**

Source: ENEA using data from the Public Domain Agency

The cumulative savings by 2020, obtained by adding up the annual savings lasting over time (from

2014 to 2020) according to the year of works execution, total about 458.7 GWh, or 0.039 Mtoe. Lastly, the paragraph focuses specifically on the state of the art in the field of *Green Public Procurement* (GPP) and Environmental Minimum Requirements (EMR) in purchases by public bodies.

Paragraph 3.4 sets out the measures for the promotion of energy efficiency in industry and transport. As to industry, it briefly recalls the white certificate scheme, which is the key tool for achieving the energy efficiency target for the sector, which has been set at 5.1 Mtoe. As to the transport sector, the paragraph describes the expected savings to be delivered by the main measures/programmes, which comprise actions to renew the road vehicle fleet, promote sustainable mobility and develop the railway infrastructure and advanced logistics management systems. In particular, the improved energy performance of the new cars and light commercial vehicles imposed on car manufacturers by Regulation (EC) No 443/2009 and by Regulation (EU) No 510/2011 and implementation of the measures to encourage the uptake of low-emission and electric vehicles should, taken together, save about 3.43 Mtoe of energy by 2020 (Table ES.1). The measures for sustainable mobility will contribute by some 1.97 Mtoe, broken down into the following sectors: local public transport and renewal of the bus fleet (0.9 Mtoe), railway infrastructure (0.45 Mtoe), services of the National Logistics Platform (0.5 Mtoe), and the 2009 incentives for renewing the national car fleet 2009 (0.12 Mtoe).

Paragraph 3.5 provides an overview of the status of cogeneration (combined heat and power, CHP) in Italy as at 2012 and describes the methodology for assessing the national potential for high-efficiency cogeneration, efficient district heating and cooling and other efficient heating and cooling systems. The main measures designed to promote energy efficiency in cogeneration are also discussed.

Lastly, paragraph 3.6, covers the topic of energy efficiency in the transformation, transmission and distribution of energy. The paragraph outlines the energy efficiency criteria to be introduced or strengthened in the structure of energy and grid tariffs and in regulation of the electricity sector, the actions to promote effective demand-side participation in the energy market and the new forms of clustering and supply of system services.

The drop in energy consumption caused by the new measures introduced by the Decree transposing Directive 2012/27/EU and which can be assessed after the issue of the associated implementing measures, coupled with the impacts of the already active tools will make it possible to deliver the 2020 energy efficiency targets set by Italy.

1. Preamble

The economic crisis which has hit the western economies has had a severe impact on Italy as well. In the present historical circumstances, sustainable growth is the main objective of the Government and the Country; it can only be achieved by improving significantly the competitiveness of the production system.

Among the main factors which can improve Italy's competitiveness vis-à-vis international competition, the energy sector plays a key role, despite being affected by several structural weaknesses.

Firstly, Italy's energy prices are on an average higher than those of its European competitors; the difference is even greater when compared with other countries such as the United States. There are several reasons for this. The energy mix, in particular for electricity generation, relies heavily on gas - whose prices have only recently started to align themselves with those of the European markets - in marked contrast with the EU average, where nuclear and coal are major sources. Other factors pushing up the final price of electricity in Italy are the incentives to electricity production from renewable sources and other costs stemming from public policies supported by the tariffs (costs of dismantling nuclear power plants, system research, special tariff schemes) and support for certain types of production and certain user categories.

Secondly, Italy's situation with regards to security of supply and energy independence is rather dire. In 2012, 82% of Italy's energy demand (163.2 Mtoe, -5% compared to 2011, source: EUROSTAT[1]) was covered by net imports, with the national production of renewables, gas and crude oil accounting respectively for just 11.1%, 4.3% and 3.5% of national demand[2]
Italy's energy imports are substantially higher than the EU-28 average net imports, which are about 55%. This dependency on imports has a strong macro-economic impact on Italy, which in 2012 spent EUR 57.9 billion in oil and gas imports.

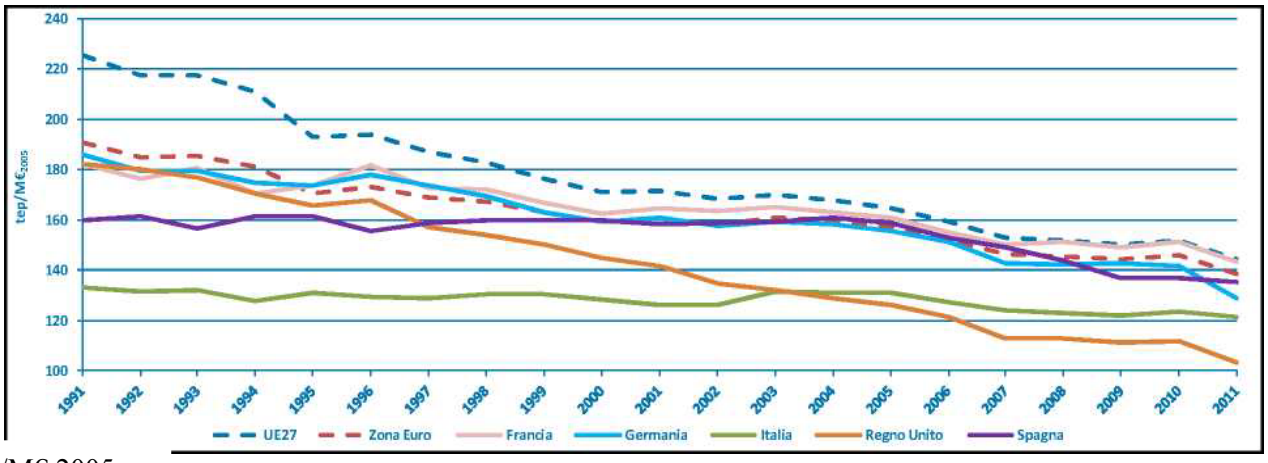
On the other hand, Italy's energy system can rely on some important strengths. Today, Italy ranks

[1] There are differences in the accounting treatment of energy consumption between the procedures of the NEB (National Energy Balance) and those of EUROSTAT, leading to differences in end values:

- the electricity generated from geothermal, wind, photovoltaic and hydro sources is calculated in the NEB as primary energy (2 200 kcal/kWh) and in EUROSTAT as final energy (860 kcal/kWh). The same coefficient, 2 200 kcal/kWh, is used in the NEB to measure imported and exported electricity;
- production of electricity and heat: the NEB considers only that fuel used for electricity generation, while EUROSTAT considers the fuels feeding energy generation installations (electricity only and combined heat and power);
- conversion into heat: in the NEB the passage is from sources stated in quantities to sources expressed in kcal (with factor 10E9) using the lower heating values (set at 2 500 kcal/kg for biomass and waste, be they vegetable oils, wet wood chips, plastic and paper residues); for electricity from biomass and waste, the same conversion is applied, using the datum of actually generated electricity;
- heat: EUROSTAT reports the consumption of heat in final uses not present in the NEB;
- natural gas: the consumption of natural gas in the NEB, mainly in industry, is higher than that reported by Eurostat since it includes the consumption of natural gas for heat generation used in the production process and not reported elsewhere.

[2] The sum of net imports and domestic production does not necessarily total 100%, since part of the domestic production (0.9% in 2012) might be intended for export.

as a top country in terms of energy efficiency (-19% of primary energy intensity[3] compared with the EU average and - 14% compared with the Eurozone average in 2011, Figure 1.1); furthermore final energy consumption has been declining in recent years (119 Mtoe in 2012, excluding non-energy uses, hence -2% compared with 2011), as a consequence not only of the economic crisis, but also of the drop in energy intensity (- 5% from 2005), contributory factors to which have been the improvement in the efficiency of electricity generation and the energy savings achieved by the measures under the plan for energy efficiency in final uses, including: tax deductions, white certificates, minimum requirements for buildings and electrical appliances, etc.. In 2011 the *American Council for an Energy-Efficient Economy* (ACEEE) ranked Italy third, after the United Kingdom and Germany, in terms of national effort to improve energy efficiency levels.



Toe/M€ 2005

EU27 Euro zone France Germany Italy United Kingdom Spain

Source: ENEA using data supplied by the Ministry for Economic Development and ISTAT

Figure 1.1- Primary energy intensity in EU-27 (toe/M€$_{2005}$), years1991-2011[4]

Italy can also boast a good technological level, with some areas of excellence: it is the world's leading country in the spread of smart-metering systems[5] which, as known, are an essential component for the management/reduction of energy demand *(demand-side management)* and it has some of the most efficient CCGT power plants in operation.

Lastly, the energy sector is a major segment of the national production system, employing some 470 000 workers (one of the few sectors experiencing a growth trend, with 36 000 new jobs in 2011). The sector has developed significant areas of competitiveness at international level, both in the sectors of 'clean' technologies (e.g. concentrated solar power, thermal renewables and several energy efficiency sectors) and in more traditional ones (e.g. hydrocarbon exploration and production).

[3] Primary energy intensity is the ratio of energy demand (in ktoe) to GDP (in EUR million at 2005 prices).

[4]Energy intensity is calculated as units of energy per unit of gross domestic product (GDP); M€$_{2005}$ is the unit of measurement of GDP, i.e. EUR billion and its % changes from 2005.

[5] Smart metering is a remote metering system based on a network of sensors (wireless, Plc, RS485) for real-time monitoring of electricity, gas and water consumption.

2. Overview of national energy efficiency and energy saving targets

The following table summarises Italy's main energy consumption indicators (source: EUROSTAT, see footnote 1) in 2012, as required by Annex XIV to Directive 2012/27/EU.

	2011	**2012**
Primary energy consumption	171.78 Mtoe	163.05 Mtoe
Total final energy consumption (excluding non-energy uses)	121.3 Mtoe	119.01 Mtoe
Energy consumption by sector		
• *industry*	30.13 Mtoe	29.31 Mtoe
• *transport*	41.82 Mtoe	39.45 Mtoe
• *residential*	31.32 Mtoe	31.33 Mtoe
• *services*	15.75 Mtoe	15.93 Mtoe
• *agriculture*	2.70 Mtoe	2.63 Mtoe
• *bunkering*	0.15 Mtoe	0.16 Mtoe
Value added at base prices by sector		
• industry	€ 318 112 million Values linked to reference year 2005	€ 275 994 million Values linked to reference year 2005
• services	€ 942 899 million Values linked to reference year 2005	€ 982 306 million Values linked to reference year 2005
Disposable income of households	€ 1 092.242 million (total) € 17 979 (per capita)	€ 1 069.697 million (total) € 17 922 (per capita)
Gross domestic product (GDP)	€ 1 425 792 million Values linked to reference year 2005	€ 1 389 043 million Values linked to reference year 2005
Electricity generation from thermal power generation (gross generation)	227 700.2 GWh	216 810.6 GWh
of which: *Electricity generation from combined heat and power (gross production)*	81 906 GWh	63 070 GWh
Heat output from thermal generation	59 944.0 GWh	56 447.0 GWh
Heat produced including industrial waste heat (gross generation from fossil fuels)	40 798.0 GWh	33 281 GWh
Fuel consumption for thermal power generation	41 830 Mtoe	40 300 Mtoe
Number of passengers-kilometres (pkm)	915 663 Ml pax-km (2010)	885 718 Ml pax-km (2011)
	882 777 Ml pax-m (2011)**	796 201 Ml pax-m (2012)**
Tonne kilometres (tkm)*	207 181 million tkm (2010) 190 983 million tkm (2011)**	189 401 million tonne-km (2011) 155 448 million ton-km (2012) **
Population	59 394 207 (at 1 January 2012)	59 685 227 (at 1 January 2012)

* Excluding oil pipelines
**Provisional data from the Infrastructure and Transport National Account

2.1 2020 National energy efficiency targets

The National Energy Strategy (NES), approved by the Interministerial Decree of 8 March 2013, directs Italy's efforts towards making a substantial improvement in the competitiveness of the energy system together with environmental sustainability. In particular, the NES aims to achieve four main targets by 2020:

- reducing energy costs by aligning prices with EU levels (national savings on electricity and gas estimated at approximately EUR 9 million per year);
- exceeding the European targets set out in the 2020 European Climate-Energy package (reducing GHG emissions by 21% compared with 2005, reducing primary energy consumption by 24% compared with the business as usual scenario, and achieving a 19-20% share of renewable energy in gross final consumption);
- improving the security of supply, reducing dependency on energy imports by about EUR 14 billion per year;
- boosting growth and employment by mobilising investments of EUR 170-180 billion by 2020, both in traditional sectors and in the green economy.

The measures set out in the Energy Strategy form part of Italy's decarbonisation roadmap to 2050, in accordance with the Roadmap 2050 scenario analysed by the Commission's DG Energy.

This Strategy identifies seven priority action areas to achieve these objectives, each supported by specific concrete measures. Top of the list is energy efficiency, which also contributes to achieving all four energy policy objectives in the NES. This is because energy efficiency is the most cost-effective way to reduce CO_2 emissions, with a positive return on investment for the country; it also creates demand in a market served by a number of Italian enterprises, increases energy security and helps reduce the trade deficit.

The quantitative targets pursued by the programme for the promotion of energy efficiency to 2020 are to:

- save by 2020 15.5 Mtoe of final energy per annum (20 Mtoe of primary energy) reaching consumption some 24% lower than the levels projected at European level under the "business as usual" scenario (Primes 2008 model).
- avoid the emission of some 55 million tonnes of CO_2 per year;
- avoid about EUR 8 billion per annum of fossil fuel imports.

Table 2.1[6] shows expected savings of final and primary energy by 2020, by sector and by policy measure.

[6] Thermal account, incentive schemes set up by Ministerial Decree No 12/2012, operational since April 2013, see paragraph 3.1.1.2 (full text of the MD available on: http://www.gazzettaufficiale.biz/atti/2013/20130001/12A13721.htm)

Table 2.1 – Energy efficiency targets for 2020 (final and primary energy, Mtoe/year)

Sector	PLANNED MEASURES FOR 2011-20					Conventional Energy Demand*	PRIMARY
	Regulatory Standard	Measures and investments for mobility	Thermal Account	Tax deductions	White Certificates	EXPECTED SAVINGS by 2020	EXPECTED SAVINGS by 2020
Residential	1.60		0.54	1.38	0.15	**3.67**	**5.14**
Services	0.20		0.93		0.10	**1.23**	**1.72**
Public authorities	0.10		0.43		0.04	0.57	0.80
Private	0.10		0.50		0.06	0.66	0.92
Industry					5.10	**5.10**	**7.14**
Transport	3.43	1.97			0.10	**5.50**	**6.05**
TOTAL	**5.23**	**1.97**	**1.47**	**1.38**	**5.45**	**15.50**	**20.05**

* FEC: Final Energy Consumption

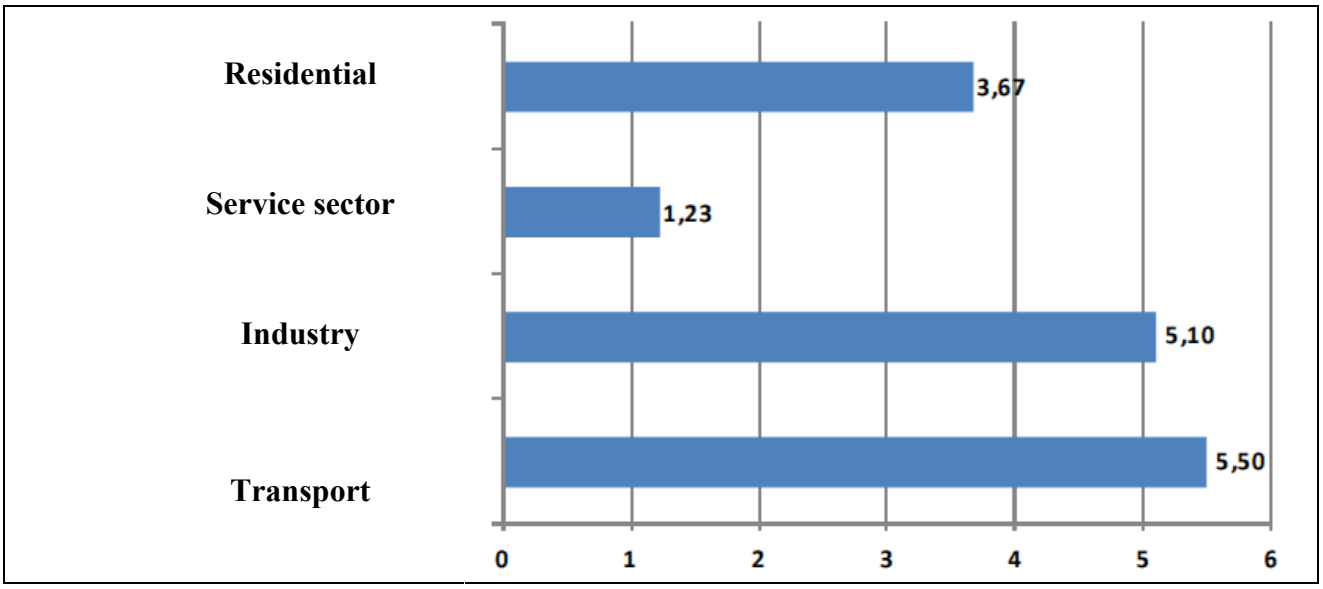


Figure 2.1 - Final energy savings (Mtoe/y) expected in 2020 by sector ***(source: data processed by the Ministry for Economic Development and ENEA)***

Compared with the forecasts contained in the Annual Energy Efficiency Report for 2013, the estimates of expected savings by economic sector have been revised and show a reduction in the contribution of the services sector, offset by the savings achievable by the industrial sector.
The following table shows the estimates of electricity consumption and production to 2020.

Table 2.2 Estimates of energy consumption and production to 2020

	Unit	2020
Total primary energy consumption	Mtoe	158
Primary energy production	TWh	320
Thermoelectric power	*TWh*	*221*
Total final energy consumption	Mtoe	124
Industry	*Mtoe*	*32.4*
Transport	*Mtoe*	*41.5*
Residential	*Mtoe*	*30.2*
Services	*Mtoe*	*19.6*

2.2 Primary energy savings

The National Energy Efficiency Action Plan 2011 set a final energy consumption reduction target of 10.88 Mtoe/y to 2016, equivalent to a reduction of about 9.6% compared with the average consumption recorded over the period 2001-2005 in non-ETS sectors. To this end, the Plan sets out a number of measures and incentive schemes designed to achieve energy savings in all energy-using sectors.

These measures may be summarised as follows:

- minimum energy performance standards for buildings;
- tax deductions for improving the energy efficiency of buildings;
- the energy efficiency certificates scheme ("white certificates");
- incentives for the renewal of the fleet of cars and lorries up to 3.5 tonnes.

The savings achieved at 2012 through these measures amounted to some 6.3 Mtoe/y in terms of final energy, or 8.3 Mtoe/y in primary sources. The breakdown of savings achieved by scheme and the calculation method used are set out in the next paragraph.

To calculate the primary energy savings by sector, set out here, the following assumptions were made:

- for the residential, services and industry sector, the overall savings were estimated to be: electricity for more than one fifth, and heat for the rest (assumption supported by the monitoring performed on the incentive instruments);
- in the transport sector, the entire savings were assumed to have been made in the form of oil products;
- the primary/final energy conversion factors are some 1.1 for oil products and natural gas;
- for electricity, the transformation coefficient as at 2012 was set at 1.86: this figure takes into account the average performance of the national stock of thermal power plants (about 46% as at 2012) and the share of electricity from renewable sources (27% at 2012).

With regard to the contribution of the different energy sectors, almost 60% of the savings made in 2012 came from the residential sector; industry contributed about 30%, while the contribution of transport and services was limited (respectively 7% and 3%).

In terms of emission savings, the measures described above are estimated to have prevented the emission of about 20 Mt CO_2/y as at 2012 (considering an average emission factor from power plants of about 385 g CO_2/kWhe).

While in the NEAAP 2011 the reduction target had been set on the basis of a minimum percentage of savings compared with the reference consumption value (average in the period 2001-2005 non ETS), in the NES the target is calculated as the difference between two possible evolution scenarios of the national energy system:

- the first, known as *No-measure scenario,* maps the evolution of the system in the event that all the energy efficiency support measures are suspended (this evolution includes none of the savings expected under the NEAAP after 2011);
- the second or *NES Scenario* instead charts the system's evolution under a package of energy efficiency measures (part of which are already included in the NEAAP).

It should be noted that up to 2010 the two scenarios coincide (Figure 2.2), as they are both influenced by the effects of the measures planned in the NEAAP up to that date.

The new energy consumption reduction target for 2020, about 20 Mtoe in primary energy terms, is based on strengthening of the measures and instruments already in place and on the introduction of new mechanisms to address the difficulties experienced in some sectors, as detected by monitoring activity. The subsequent paragraph describes the measures adopted one by one, specifying the savings expected from each.

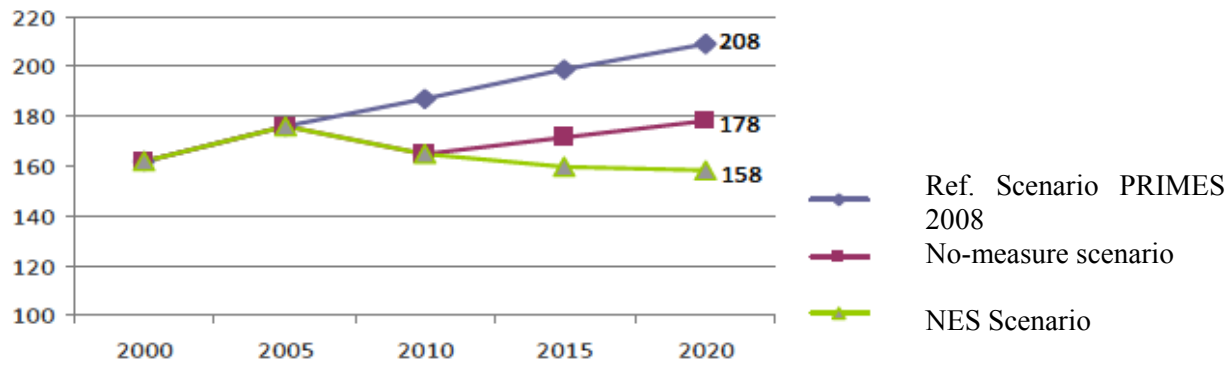
The expected primary energy savings by use sector in 2020 are: 5.14 Mtoe/y from the residential sector, 1.72 Mtoe/y from services, 7.14 Mtoe/y from industry and 6.05Mtep/a from transport.

The assumptions made to calculate primary energy savings are the same as those already described for 2012. The only exception is the primary/final energy transformation coefficient used for the stock of electrical power plants, which has been set at a slightly lower value of 1.76, since a slight improvement in the average performance of thermal power plants has been predicated).

In terms of saved CO_2 emissions, the estimated effect to 2020 of the package of measures prepared is 50-55 Mt/y, considering an average emission factor of the national stock of power plants of about 350 g CO_2/kWhe al 2020).

Target: private consumption 2020

Primary energy consumption for non-energy related uses, Mtoe



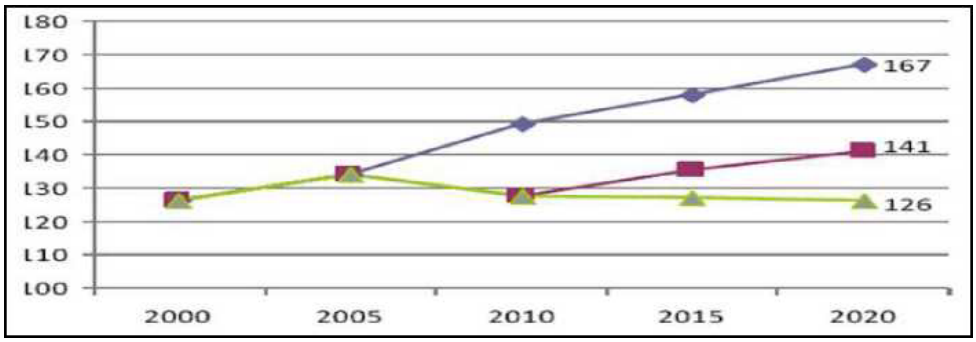


Figure 2.1 - Evolution of primary energy consumption in Italy under the Reference Scenario Primes2008, the No-measure Scenario and the NES Scenario (source: Ministry of Economic Development and ENEA)

2.3 Final energy savings

The quantitative assessment of the savings achieved by 2012 was made with reference to the targets set out in the NEAAP 2011, for the assessment period 2007-2016.

In particular, the following energy efficiency improvement measures were analysed:

- **Transposition of Directive 2002/91/EC and implementation of Legislative Decree No 192/05** with regard to the requirement of minimum energy performance standards for buildings (MEPS): the total savings are about 2.3 Mtoe/y, mainly deriving from the replacement of heating installations in the residential sector.
- **Granting of tax deductions (55%)** for improvements in the energy efficiency of existing buildings: the total energy savings is about 0.8 Mtoe/y.
- **Energy efficiency certificates or white certificate scheme**: this scheme delivered as at 2012 energy savings of some 3 Mtoe/y, with growing contribution from projects implemented in the industrial sector.
- **Measures to encourage the environmentally sustainable renewal of the fleet of cars and commercial vehicles up to 3.5 tonnes** (implemented in the period 2007-2009) and implementation of **Regulation (EC) No 443/2009**: the aggregate energy savings from these two measures exceeds 0.6 Mtoe/y.
- With reference to the provisions of NEAAP 2011, the total energy savings from the measures in question is about 6.4 Mtoe/y, exceeding by 58% the target for 2016. The largest contributors to this result are the residential sector and industry: the latter has exceeded the target four years ahead of schedule (Table 2.3).

Table 2.3 - Energy savings achieved in the period 2005-2012 and expected by 2016 under the Energy Efficiency Action Plan (EEAP) 2011 (final energy, Mtoe/y)

Category	Leg. Decr. 192/05	White certificates	Fiscal deductions 55%	Incentives pursuant to Regulation 443/2009	Savings achieved * 2005-2012	Savings expected by 2016	Targets met(%)
Residential	2.10	1.31	0.71	-	3.79	5.16	73.5%
Services	0.06	0.11	0.02	-	0.19	2.11	9.0%
Industry	0.15	1.57	0.04	-	1.76	1.73	101.8%

Transport	-	-	-	0.63	0.63	1.87	33.6%
TOTAL	**2.32**	**2.99**	**0.77**	**0.63**	**6.38**	**10.88**	**58.6%**

* Net of duplications and considering for industry the incentives for motors and inverters paid out in the period 2007-2010, not described in detail owing to the small amount of energy savings achieved. Source: data processed by ENEA.

Table 2.3 highlights the effects of the Energy efficiency certificates scheme, which accounts for 45% of total savings achieved, and of Legislative Decree No 192/05, which has produced about 35% of the savings.

Narrowing analysis of the above instruments down to the period 2011-2012 alone, comparison with the targets for 2020 shown in Table 2.1 reveals that the residential and industry sectors have exceeded respectively one fourth and one fifth of the target for 2020, producing total savings of more than 2.3 Mtoe/y (Table 2.3).

Table 2.3 - Annual energy savings achieved in the period 2011-2012 and expected by 2020 under the NES (final energy. Mtoe/y)

Category	Leg. Decree 192/05	White Certificates	Fiscal deductions 55%	Incentives pursuant to 443/2009	Savings achieved 2011-2012	Savings expected by 2020	Targets met (%)
Residential	0.62	0.14	0.21	-	0.96	3.67	26.2%
Services	0.02	0.03	0.01	-	0.05	1.23	4.1%
Industry	0.05	1.04	0.01	-	1.09	5.10	21.4%
Transport	-	-	-	0.22	0.22	5.50	4.0%
TOTAL	**0.68**	**1.20**	**0.23**	**0.22**	**2.33**	**15.50**	**15.0%**

Source: data processed by ENEA

In these years of crisis, the building sector has managed to remain afloat thanks to the positive contribution of building maintenance (ordinary and, especially, extraordinary), which has partly offset the sector's steep drop which started in 2008. Nowadays, two thirds of investments in the building sector relate to renovations of existing buildings, showing a by now well-settled trend towards the recovery of the building stock.

In 2012, applications for tax deductions on building renovation projects totalled 571 200; of these, 265 000 targeted energy efficiency. The estimated total volume of investments which benefited from the tax deduction was some EUR 14 billion in 2012; of these, about EUR 3 billion concerned energy efficiency improvement projects. These investments account for an estimated 207 000 direct jobs and 311 000 total jobs; of these, the share attributable to energy efficiency improvements is 44 000 direct jobs and 67 000 total jobs. These are significant figures, considering that in the same year the building sector lost about 200 000 jobs.

The details on calculation methodology for monitoring are supplied in Annex A.

3. Policy measures implementing the Energy Efficiency Directive

3.1 Horizontal measures

3.1.1 Energy efficiency obligation schemes and alternative policy measures

Italy complies with Article 7 of the EED through the white certificate scheme (also known as Energy Efficiency Certificates - EEC). Initially in force in the five-year period 2005-2009, this incentive mechanism involved the setting up of a market in Energy Performance Certificates or White Certificates, attesting to the reduction primary energy consumption via energy efficiency measures and actions, on the basis of the Ministerial Decrees of 20 July 2004 and of the Ministerial Decree of 28 December 2012.

At the present time, the scheme has the following key features:

1. GSE (Energy Service Operator) is in charge of implementing, assessing and certifying the savings;
2. The energy efficiency improvement must be achieved *at the point of use*;
3. The Minister for Economic Development, in agreement with the Minister for the Environment, *sets* periodically *the national energy efficiency targets to be achieved by the obligated parties*;
4. Natural gas and electricity distributors with more than 50 000 end-user customers are the obligated parties in respect of those targets;
5. Obligated parties and voluntary participants (distributors with less than 50 000 customers, energy services companies, entities required to appoint an energy manager, entities which have voluntarily appointed an energy manager, entities that have implemented an energy management system conforming with ISO 50001) can act in end uses by implementing measures generating efficiency certificates;
6. The applications for the EECs undergo technical and administrative assessment by ENEA or RSE;
7. GME (the energy markets' operator) issues the certificates after completing the assessment;
8. A market for these certificates is active, with bilateral negotiations and access to exchange;
9. On 31 May of each year GSE verifies whether the obligated parties have achieved their target;
10. A *tariff contribution* is granted to obligated distribution companies to cover part of the costs incurred to achieve the objectives;
11. *Penalties* are imposed on the obligated parties in cases of non-compliance.

Figure 3.1 shows the annual savings achieved since inception of the scheme, and those forecast up to 2020.

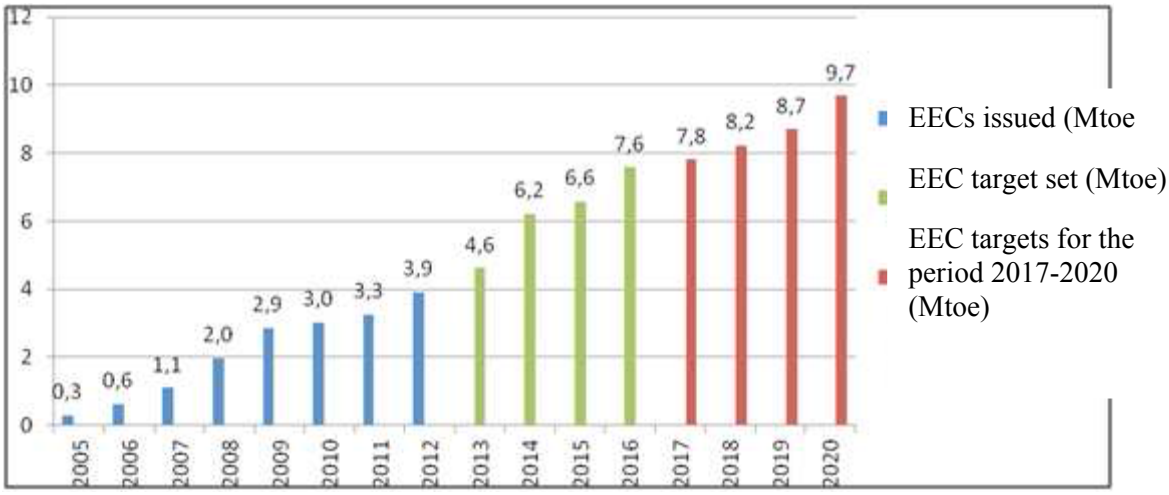


Figure 3.1 - Energy Efficiency Certificates, both already issued and planned

In order to estimate the contribution of the white certificate scheme to the saving targets set out in Article 7(1) of Directive 2012/27/EU it is necessary to extrapolate the final energy savings expected to be achieved by the new projects installed starting from 1 January 2014 and which are expected to continue to yield benefits at least up to 31 December 2020. Figure 3.2 shows the predicted annual savings, yielding a cumulative value of about 16.03 Mtoe of final energy.

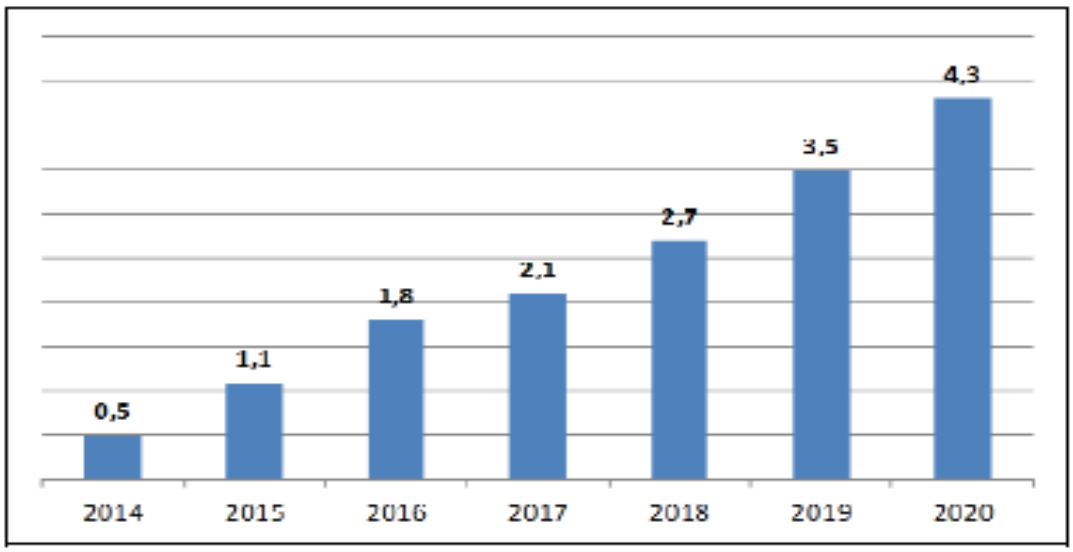


Figure 3.2 Expected annual final energy savings under the white certificates mechanism (Mtoe)

The 4.3 Mtoe/y achievable by 2020 through projects implemented in the period 2014-2020 are increased by the sum of 1.2 Mtoe/y savings from the projects implemented over the period 2011-

2013[7]. Thus, the total expected savings by 2020 from actions over the period 2011-2020 comes to 5.45 Mtoe/y.

The targets set out in the Ministerial Decrees of 20 July 2004 as amended and supplemented, for the period 2005-2012, were those reported in Table 3.1. As at 31 December 2012 the system should have produced 22.4 toe of additional energy savings.

Table 3.1 - Annual national targets 2005-12

Year	Gas [Mtoe/y]	Electricity [Mtoe/y]	Total [Mtoe/y]
2005	0.1	0.1	0.2
2006	0.2	0.2	0.4
2007	0.4	0.4	0.8
2008	1.0	1.2	2.2
2009	1.4	1.8	3.2
2010	1.9	2.4	4.3
2011	2.2	3.1	5.3
2012	2.5	3.5	6.0
Totals (Mtoe)	**9.7**	**12.7**	**22.4**

The chart in Figure 3.3 shows the actual figures as at 31 December 2012 in terms of EECs issued (source: GME).

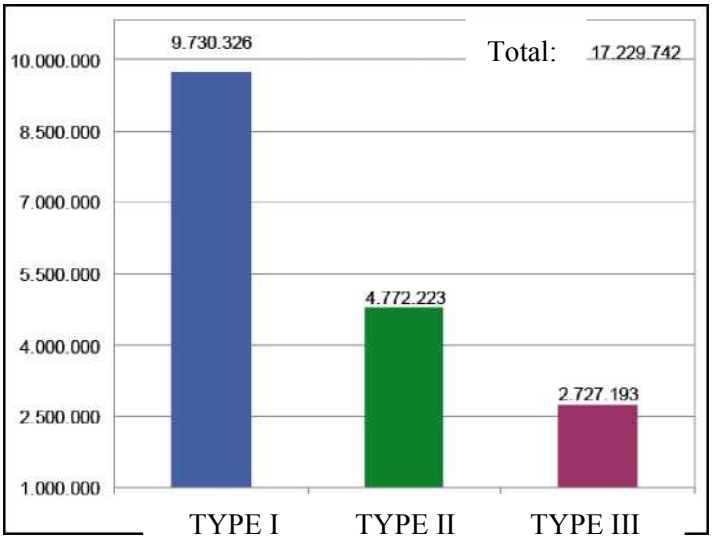


Figure 3.3 - EECs issued from the launch of the scheme to the end of December 2012 (cumulative data). (Source: GME).

[7] The savings in 2013 on a conservative estimate based on the initial aggregate data for 2013 published by GME: http://www.mercatoelettrico.org/It/MenuBiblioteca/Documenti/20140130RapportoSemestreII 2013 TEE.pdf.

The difference between the national target and the final figure is due to the flexibility mechanism which allows the obligated parties to comply with their required targets within the two years following the year of obligation. As to the relationship between certificates issued, certificates cancelled and certificates still in circulation, the AEEG has reported that as at 1 June 2013 and after completing the cancellation operations, 725 953 certificates were still present in the ownership accounts. Of these, 254 462 were held by GSE following the withdrawals performed under the rules on High-efficiency cogeneration (HEC), while the certificates still useful for attaining the targets numbered 471 491, equivalent to 7.86% of the overall target for 2012 (see Table 3.2).
Table 3.2 provides a breakdown of Energy Efficiency Certificates (EECs) 2012 by type of title and holder (source: AEEG)

Table 3.2 - Breakdown of Energy Efficiency Certificates (EECs) 2012 by type of title and holder (source: AEEG)

Type of EEC:	**I**	**II**	**III**	**II-HEC**	**TOT**	Category
EECs present as at 31 May 2013 on all ownership accounts, including those:	**1 858 913**	**2 399 973**	**1 625 703**	**374 134**	**6 258 723**	A
owned by obligated distributors only	1 742 295	2 150 562	1 573 539	116 721	5 583 117	A1
owned by GSE only	0	0	0	254 462	254 462	A2
owned by other parties	116 618	249 411	52 164	2 951	421 144	A3
EECs cancelled by the obligated distributors	**1 735 158**	**2 107 640**	**1 573 252**	**116 720**	**5 532 770**	B
EEC present on all the ownership accounts after cancellation	**123 755**	**292 333**	**52 451**	**257 414**	**725 953**	C = A - B
owned by obligated distributors only	7 137	42 922	287	1	50 347	C = A1 - B
owned by GSE only	0	0	0	254 462	254 462	C2 = A2
owned by other parties	116 618	249 411	52 164	2 951	421 144	C3 = A3

For completeness, the chart in Figure 3.4 provides the general summary of the effects of the scheme under which about 24 million EECs have been issued since January 2005 corresponding to a value of some EUR 2.4 billion.

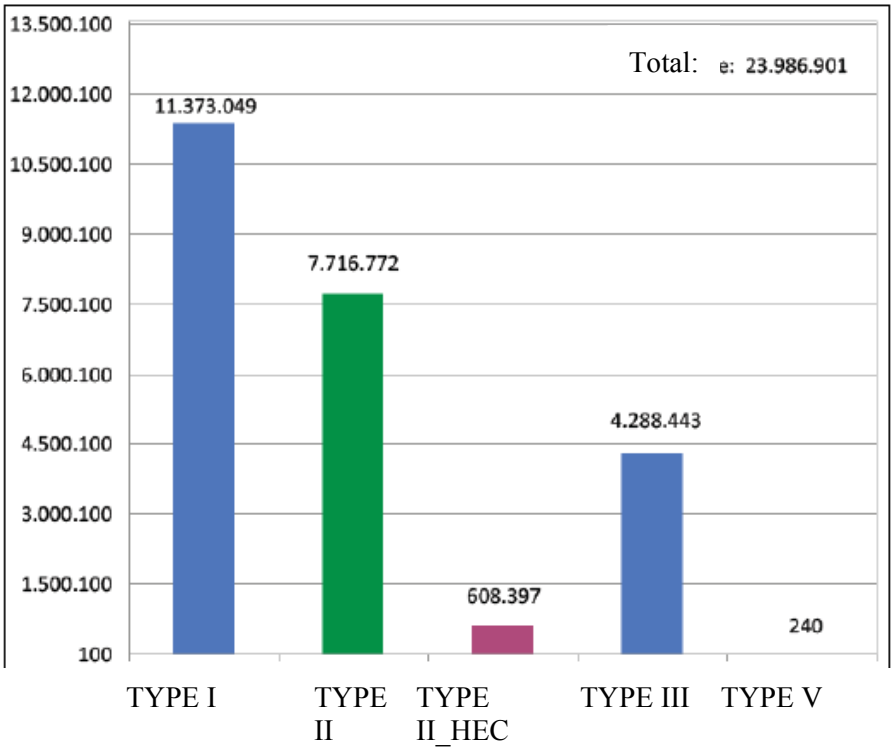


Figure 3.4 - EECs issued from the launch of the scheme to the end of December 2013 (cumulative data). Source: GME.

As to the type of energy saved, the white certificates provide for:

- electricity savings;
- natural gas savings;
- savings on other fuels (transport fuels and others).

- From 2005 to the first half of 2012, monitoring data show that 60% of the savings achieved concerned electricity, 26% natural gas and 14% other fuels. These actions covered all sectors of the economy, including civil, industry, transport and services. Figure 3.5 shows the composition of the savings generated between 2005 and the first half of 2012.

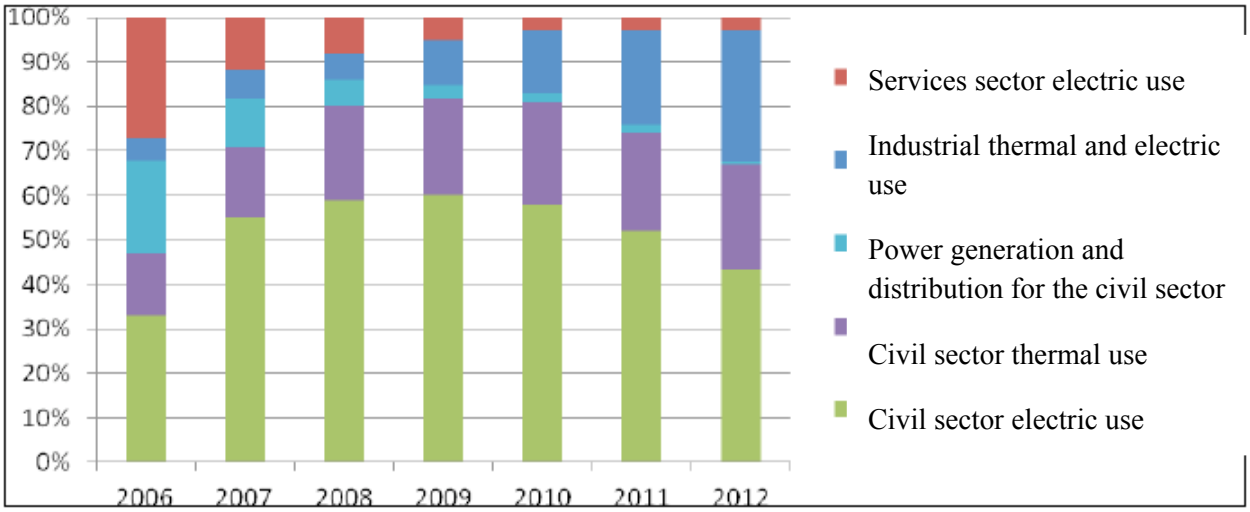


Figure 3.5 – Evolution of the generation of certificates in the various sectors

Table 3.3 shows that the actual savings in toe as recorded by analytical and standard data sheets[8] produced as at 2012 overall savings in the region of 35 000 GWh/a, or 3 Mtoe/y.

[8] By analogy with the standard and analytical data sheets, the savings predicted by the approved Project Proposals and Metering Programmes (*Proposte di Progetto e Programma di Misura* - PPPM) exclude the impact of the economic crisis from assessment of the energy savings.

Table 3.3 - Annual energy savings from the White Certificates, 2007-2012

Type of project	Cumulated to 2008 (toe/year)	Cumulated to 2009 (toe/year)	Annual 2010 (toe/year)	Annual 2011 (toe/year)	Annual 2012 (toe/year)	Cumulated to 2012 (toe/year) Primary Energy	Cumulated to 2012 (GWh/year) Final Energy
1-Standard and analytical data sheets	1 13 ,074	2 046 252	89 957	79 937	87 811	2 303,957	16 218
2-Actual data sheets	88 966	270 650	384 779	396 442	924 108	1 975,979	18 582
2.1-GEN-IND	0	34 256	13 131	36 178	21 373	10 938	759
2.2-E-IND	88 966	166 314	58 945	132 385	211 078	568 722	2 970
2.3-T-CIV	0	13 203	4 090	4 618	3 140	25 051	291
2.4-T-IND	0	55 777	306 443	211 331	652 299	1 225 851	14 254
2.5-GEN-CIV	0	0	0	6 490	0	6 490	55
2.6-IP	0	333	120	3 641	0	4 094	22
2.7-E-CIV	0	768	2 050	599	28 285	31 702	170
2.8-CIV-ITC				1 200	0	1 200	6
2.9-IND-FF					7,932	7,932	55
TOTAL (1+2)	**1 221 040**	**2 316 902**	**474 736**	**476 379**	**1 011 919**	**4 279 936**	**34 800**

Analysing the trends in the composition of the EECs issued by type of action and taking into account the guidelines of the NES, according to which the main sector to benefit from this incentive scheme is industry, the overall target to 2020 of 5.45 Mtoe/y can be broken down as follows (see Table 2.1):

- Industry: 5.1 Mtoe/y
- Residential: 0.15 Mtoe/y.
- Services: 0.1 Mtoe/y
- Transport: 0.1 Mtoe/y

Under the national white certificate system the following energy lower heating values by type of fuel apply.

Table 3.4 - Lower Heating Values (LHV) of fuels

Fuel:	**Unit of measurement**	**LHV [a]**
Primary sources		
Hard coal for coke ovens	kcal/kg	7 400
Steam coal	kcal/kg	6 300
Coal for other uses	kcal/kg	7 400
Lignite	kcal/kg	2,500
Natural gas	kcal/Sm^3	8,250
Crude and semi-refined petroleum	kcal/kg	10 000
Municipal solid waste	kcal/kg	2 500
Secondary sources		
Charcoal	kcal/kg	7 500
Coke-oven coke	kcal/kg	7 000
Petroleum coke	kcal/kg	8 300
Coke oven gas	kcal/Sm^3	4 300
Gaswork gas	kcal/Sm^3	4 300
Blast furnace gas	kcal/Sm^3	900
LPG	kcal/kg	11 000
Refinery residue gas[(b)]	kcal/kg	12 000
Light distillates	kcal/kg	10 400
Petrol	kcal/kg	10 500
Petroleum	kcal/kg	10 300
Diesel	kcal/kg	10,200
High-sulphur fuel oil	kcal/kg	9 800
Low-sulphur fuel oil	kcal/kg	9 800

Notes:

(a) The LHV stated in the Table are taken from the National Energy Balance 2000 published by the Ministry for Production Activities, Directorate-General for energy sources and mining resources. Where the fuel considered does not belong to any of the above types, the LHV applied to measure the energy savings achieved must be certified by a qualified laboratory pursuant to Article 6(1)(e) of the Ministerial Decrees of 20 July 2004. The solid, liquid and gaseous fuels classified as "energy from renewable sources" within the meaning of Legislative Decree No 28/2011 are conventionally assigned a calorific value of 0.

(b) Including the residue gases from chemical processes.

For the electricity saved in final uses the following conversion was applied (AEEG Decision EEN 3/08): 1 kWh = 0.187 10^{-3} toe

In the white certificate system, each eligible measure must be associated with a specific action

category. Each action category is assigned a technical life, i.e. “the number of years after implementation of the project during which the installed equipment or devices are expected to operate and produce measurable effects on energy consumption” (AAEEG Decision EEN 9/11). For each eligible measure, the savings are produced over the course of the technical life. Table 3.5 lists the action categories and their respective technical life.

Since savings are recognised for the duration of the useful life (typically 5 years), account is taken of the savings generated up to the end of the technical life by multiplying the annual savings (in toe) by a durability coefficient ‘tau’ given by:

$$\tau = 1 + \frac{\sum_{i=U}^{T-1} (1-\delta)^i}{U}$$

where:

U = Useful life

T = Technical life (Table 3.5)

δ = savings decrease rate (2% per annum).

Table 3.5 - Action Categories and values of useful life (U), technical life (T), and durability coefficient (τ)

	U	T	τ
IND-T) Industrial processes: heat generation or recovery for cooling, drying, firing, casting etc.	5	20	3.36
IND-GEN) Industrial processes: generation of electricity from recovery or from renewable sources or cogeneration[1]	5	20	3.36
IND-E) Industrial processes: efficient drive systems (motors, inverters etc.), automation and power factor correction actions	5	15	2.65
IND-FF) Industrial processes: actions other than the above, for the energy optimisation of production processes and equipment layout to achieve measurable, lasting reductions in final energy demand without affecting the quantity and quality of production	5	20	3.36
CIV-T) Residential, agricultural and services sectors: heating and cooling systems for space conditioning and water heating	5	15	2.65
CIV-GEN) Residential, agricultural and services sectors: small-size electricity generation and cogeneration systems[1]	5	20	3.36
CIV-FI) Residential, agricultural and services sectors: actions on building envelopes to reduce the need for artificial lighting	5	30	4.58
CIV-FC) Residential, agricultural and services sectors: passive building design and actions on the building envelope to reduce space cooling and heating requirements	8	30	2.91
CIV-ICT) Residential and services sectors: consumer electronics (high-efficiency entertainment systems and consumer ICT equipment)	5	5	1.00
CIV-ELECT) Residential and services/commercial sector: washing machines and food preservation appliances	5	15	2.65
CIV-FA) Residential, agricultural and services sectors: reduction in hot water demand	5	10	1.87
CIV-INF) Residential, agricultural and services sector: reduction of energy demand by and for ICT applications	5	10	1.87
PUB-LIGHT NEW) Street lighting: installation of new efficient systems or complete renovation of existing systems	5	15	2.65
PUB-LIGHT NETW) Street lighting: retrofitting of existing street lighting systems to improve energy efficiency	5	10	1.87
PRIV-LIGHT NEW) Private lighting: installation of new efficient equipment or complete redesign of existing equipment	5	15	2.65
PRIV-LIGHT NETW) Private lighting: retrofitting of existing equipment	5	10	1.87
TRANSP) Transport systems: improvement in vehicle energy efficiency	5	10	1.87
NETW) Actions to improve the efficiency of electricity and natural gas networks	5	20	3.36

3.1.1.1 Tax deductions for improving the energy efficiency of buildings

Tax deductions for the energy upgrading of buildings were introduced in Italy by the Budget Law for 2007 and are still in force. These deductions have been key drivers of energy efficiency improvements in the housing sector. The total number of actions implemented (approximately 1.5 million as at 31 December 2012), have helped to generate final energy savings currently in excess of 0.86 Mtoe/year, corresponding to more than 2 million tonne/year of CO_2 emissions avoided.

The tax deductions can be claimed by all taxpayers, including natural persons, professionals, companies and undertakings incurring costs for implementing the actions in existing buildings. The deduction can also be claimed by the family members[9] living with the owner or possessor of the property and tenants holding a regular letting agreement.

The tax deductions (which are granted for both residential and commercial buildings) consist of reductions of IRPEF (personal income tax) and IRES (corporate income tax) in respect of actions to improve the energy efficiency of existing buildings, in particular for expenses incurred to:

- reduce heating demand by means of overall upgrading of the building's energy performance;
- improve the building's thermal insulation (replacement of windows, including blinds or shutters, and insulation of roofs, walls and floors);
- install solar thermal panels;
- replace winter heating systems (with condensing boilers or heat pumps);
- replace electrical water heaters with heat pump water heaters.

The energy savings may be calculated directly by the engineer/technician chosen by the beneficiary or can be derived from calculation algorithms provided by ENEA. Moreover, for actions targeting the overall upgrading of the building or property unit or for actions on the opaque parts of the building envelope, the energy performance certificate must be submitted; therefore the value of the energy saving generated by the action can be derived easily.

Monitoring of the tax deduction scheme includes:

- initial selection of the parameters capturing the results of the fiscal scheme;
- subsequent verification of the reliability of the technical data supplied by beneficiaries;
- removal from the database of the files showing significant technical issues;
- verification - on a national scale and in detail - on the statistical sample extracted;
- final interpolation of the filtered data.

The savings reported in the application for tax deductions are checked for congruity by ENEA. On its part, the Revenue Agency performs tax spot-checks to verify the correctness of the tax deductions claimed against invoiced expenses.

The Government and Parliament have extended the action through 2015 (up to June 2016 for actions on the common parts of buildings) and have raised the tax deduction rate to 65% but have already decided to revise the scheme, with a view to rationalising expenditure, so as to transform the scheme into a structural incentive.

[9] Identified pursuant to Article 5(5) of the Consolidated Law on Income Tax (Presidential Decree No 917 of 1986)

The results so far delivered by the scheme are substantial and allow us to estimate its saving potential in the coming years up to 2020. Figure 3.6 plots actual final energy savings recorded from the start of the scheme to 2012 and the estimated annual savings up to 2020.

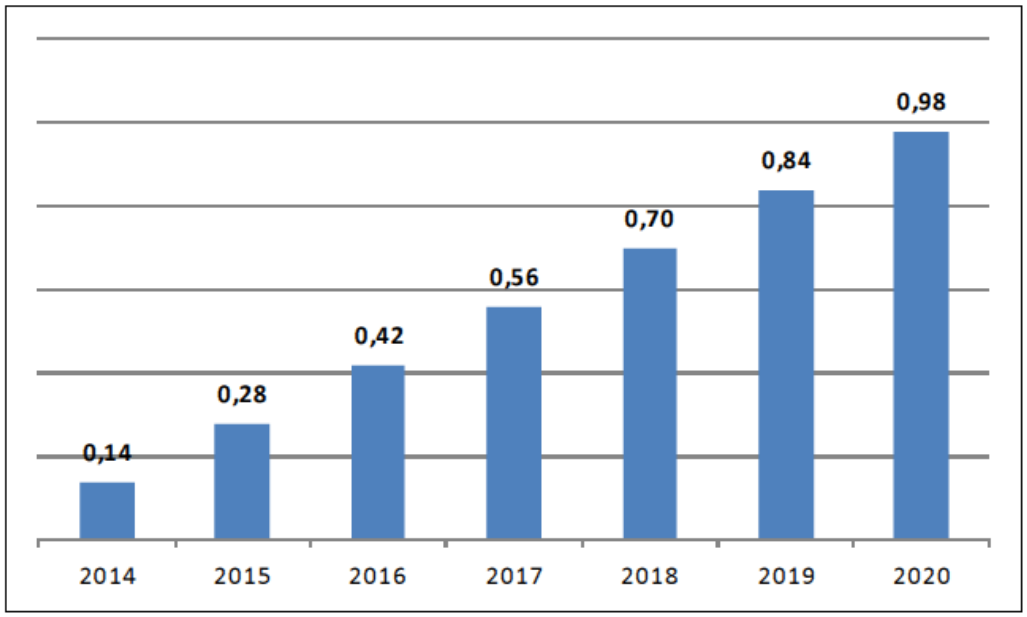


Figure 3.6 - Final energy savings achieved since the launch of the scheme and expected savings (Mtoe)

3.1.1.2 The Thermal Account

The Thermal Account, introduced by the Ministerial Decree of 28 December 2012, is the first nationwide direct incentive scheme for the generation of renewable thermal energy, as well as being the first scheme encouraging public authorities to implement energy efficiency actions in buildings and technical installations. The Thermal Account became operational in July 2013.

The scheme is addressed to public authorities and to private parties i.e. individuals, condominiums, businesses and farms.

These beneficiaries may implement the actions via an ESCO, by means of a third-party financing contract, an energy service contract or an energy performance contract.

GSE (Energy Service Operator) is in charge of implementing and managing the scheme. It also awards, disburses and revokes incentives and it is in charge of monitoring and checks.

ENEA assists GSE in preparing the technical rules for implementing the decree and takes part in the verifications and checks. It also provides specialist assistance to GSE in monitoring activities and, again in cooperation with GSE, draws up an annual report.

The Authority for Electricity and Gas prepares the model contract between GSE and the beneficiary and defines the manner whereby the funding for the incentives will be drawn from the income from natural gas tariffs. The Authority also covers the costs incurred for GSE's and ENEA's activities.

The Thermal Account supports the following energy efficiency actions implemented by public authorities:

- thermal insulation of walls;

- replacement of transparent vertical structures (windows);
- installation of screening and shading systems;
- replacement of heating systems with condensing boilers;

As to the generation of heat from renewable sources, one or more of the following actions carried out by public administrations or private parties are eligible:

- replacement of heat generators with electrical and gas heat pumps, including heat pumps for the production of sanitary hot water;
- replacement of heat generators with biomass-fed heat generators, heating fireplaces and stoves;
- installation of solar thermal collectors and solar cooling systems.

The maximum power limit in order to qualify for the incentive is 1 000 thermal kW or 1 000 gross m^2 of surface area for thermal solar systems. In the case of energy efficiency actions, an expenditure ceiling has been set for each type of action.

The incentive is calculated; a) on the basis of the type of action; b) with reference to the increase in energy efficiency achievable by improving the energy performance of the building; c) with reference to the energy that can be generated by systems fired by renewable sources. The incentive covers part of the costs incurred and is paid out in annual instalments for a period from 2 to 5 years according to the actions implemented.

Since the Thermal Account was rolled out in July 2013, we do not yet have sufficient monitoring data to estimate expected savings based on past performance. Several simulations have however been carried out to measure the contribution of the Thermal Account to the saving targets laid down in Article 7(1) EED. Figure 3.7 shows the expected savings, yielding a cumulative value of about 5.88 Mtoe of end-use energy over the period 2014-2020.

In greater detail, the 1.47 Mtoe/y total savings to 2020 will come mainly from the services sector (0.93 Mtoe/y), while the remaining 0.54 Mtoe/y will come from the residential sector. These impact estimates may however be revised on the basis of actual data which, as was to be expected for the initial period of application, appear to suffer the consequences of the novelty of the scheme and the parallel extension of the tax deduction scheme, which is a far better-known and tried and tested measure.

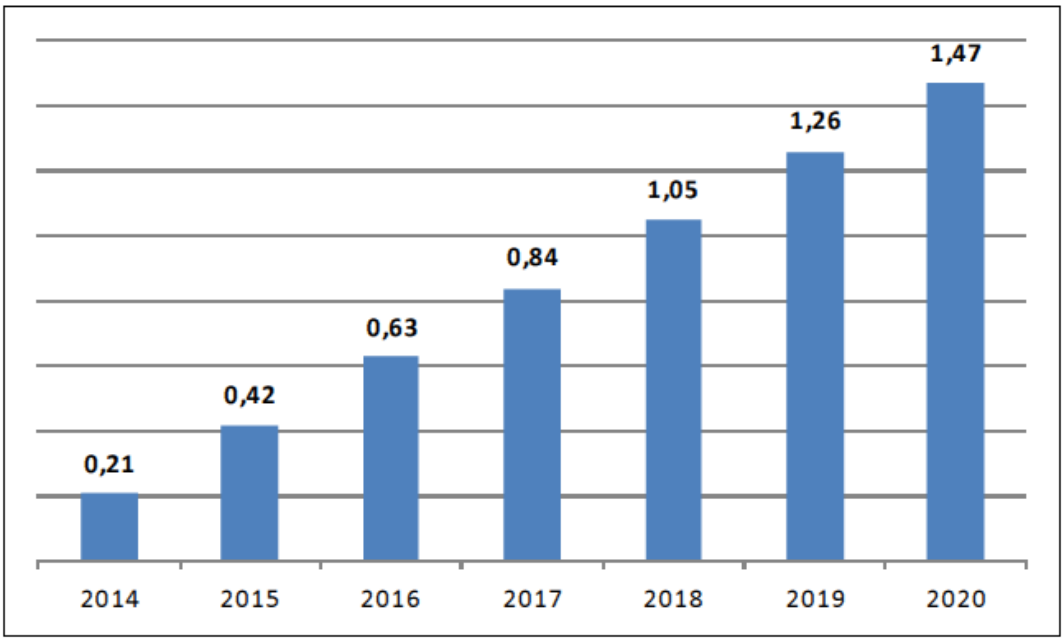


Figure 3.7 - Expected annual final energy savings from the Thermal Account (Mtoe)

3.1.1.3 Summary of the incentive schemes

Figure 3.8 summarises the saving targets assigned to each scheme. Against the minimum overall saving target of 25.5 Mtoe of final energy, the proposed schemes should generate cumulative savings of 25.83 Mtoe, approximately 62% of which should result from the white certificate obligation scheme. Tracking of the annual results supplied by the tried and tested monitoring instruments associated with the three schemes will make it possible to take prompt action if savings performance is found to fall short of the targets.

Lastly, it should be noted that these binding final energy saving targets are a share of the targets laid down in the National Energy Strategy which Italy notified to the Commission in April 2013, as provided for by Article 3 of Directive 2012/27/EU. In evaluating the savings, no account was taken of the effects of implementing the rules under EU Directives (EPBD and Ecodesign) or of the measures that will be introduced after transposition of Directive 2012/27/EU. Lastly, the expected savings do not include the contribution of energy efficiency policy measures promoted at local level, some of which are funded from structural funds.

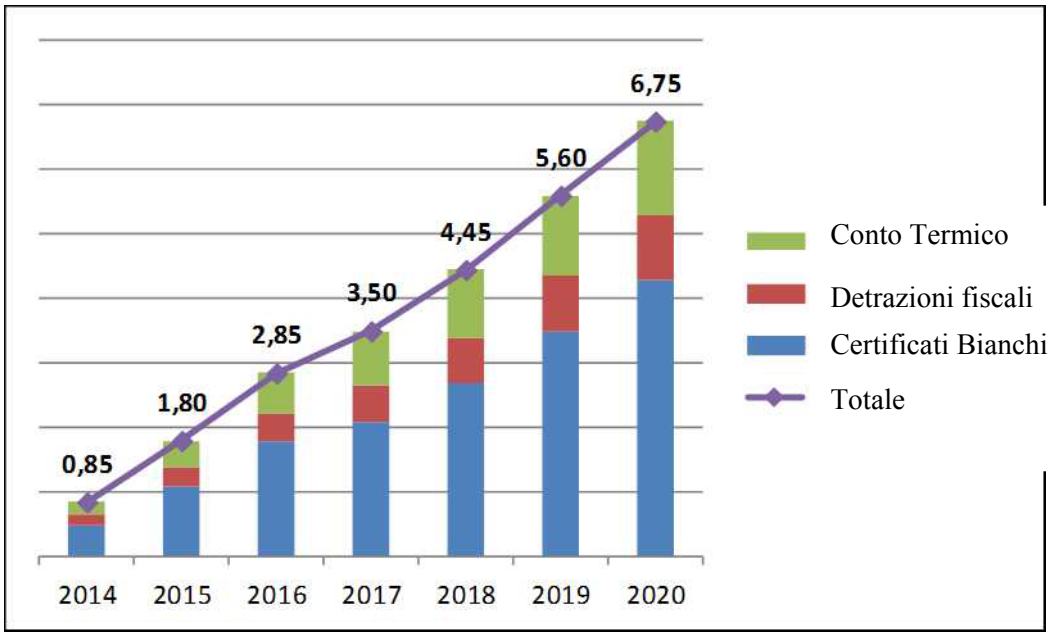


Figure 3.8 - Summary of expected savings (Mtoe of final energy)

3.1.2 Energy audits and energy management systems

Italy began to make significant headway in energy audits in the industrial sector in the early 1990s. In the years 1989-1991, European Funds were used to implement a wide-ranging energy audit campaign in central and southern Italy. The campaign covered more than 500 SMEs from a range of sectors and identified energy saving measures for a total of some 260 ktoe. In recent years, the most noteworthy initiative was carried out by the Lombardy Region with the TREND[10] programme, designed to promote and deliver high-quality energy audit, carried out by qualified experts, at manufacturing SMEs in the Region. This programme, which is still under way, covered 500 small and medium-sized enterprises which received the energy audits leading to the planning of 150 energy improvement projects, 90 of which have so far been completed. The overall project, which incurred a cost of EUR 8.5 million, produced energy efficiency actions which led to savings of some 4 000 toe.

Following transposition of the Directive, large companies with production sites in the national territory will be required to undergo a quality energy audit by 5 December 2015. According to ISTAT's report "Structure and competitiveness of enterprises", published on 13 December 2013, in Italy there are some 3 500 enterprises with more than 250 workers and an annual turnover of over EUR 50 million (see Table 3.6).

[10] (Technology and Innovation for Energy Savings and Widespread Energy Efficiency, http://trend.finlombarda.it/home).

Table 3.6 - Main indicators for industrial and services enterprises (2011)

Number of workers	Enterprises	Workers	Employees	Average size	Turnover (EUR million)	Added value (EUR million)
0-9	4 146 060	7 681 141	2 871 111	1.9	785 350	226 470
10-19	135 963	1 779 373	1 561 982	13.1	311 737	72 044
20-49	53 673	1 595 353	1 510 212	29.7	346 387	75 456
50-249	21 526	2 065 736	2 034 227	96.0	605 016	122 085
250 and above	3 429	3 152 732	3 147 329	919.4	955 158	224 887
Total	**4 360 651**	**16 274 335**	**11 124 861**	**3.7**	**3 003 649**	**720 943**

In the light of Article 8(6) of the EED, as at 1 January 2014 183 organisations and 220 production sites had been certified in Italy under standard ISO 50001[11]. If the ISO 50001 management system they adopted includes expressly the performance of quality audits, these companies are exempted from the obligation.

The national Decree transposing the Directive extends the obligation to those energy-intensive enterprises covered by Article 39(1) of Decree-Law No 83 of 22 June 2012, regardless of their size. Recourse to periodic energy audits is optional for those energy-intensive enterprises which have adopted energy management systems under ISO 50001. The effectiveness of this provision is ensured by an IT register containing the list of enterprises subject to the obligation, associated with a programme of checks on a random, statistically significant selection of audits performed.

From the professional viewpoint, to increase the quality of the energy services supplied in this sector, Italy has established that 24 months after the transposition of Directive 2012/27/EU, the parties intending to perform energy audits must be certified under standards UNI 11352 and UNI 11339 or the forthcoming energy auditor certification standards.

The same Decree provides that by 31 December 2014 the Ministry of Economic Development, in agreement with the Ministry of the Environment and Protection of Natural Resources and the Sea shall publish a call for the selection and co-financing of programmes submitted by the Regions designed to support the performance of energy audits at SMEs. To implement the programme, the Decree has allocated EUR 15 million per year over the period 2014-2020. In the event that 50% of the costs incurred by the Regions are co-financed to grant a subsidy of 50% of the expenditure incurred by SMEs to carry out the energy audit, about 15 000 enterprises per year could be covered by the initiative.

ENEA will support the programme by training auditors, publishing technical guidelines and supporting the Regions in preparation of the programmes, setting up a database of the audits performed, monitoring execution of the activities and checking the quality of the diagnoses performed by means of sample-based checks. UNI-CEI, in cooperation with CTI and ENEA, will draw up technical standards for the voluntary certification of auditors.

As to the estimated savings from the energy audit obligation applying to the about 3 500 large enterprises operating in Italy, savings are estimated to be in the region of 5% of their primary energy consumption, which totals about 28Mtoe (corresponding to the overall added value of those

[11] Source: http://www.fire-italia.it/2014_aziende_certificate_ISO_50001.pdf

enterprises multiplied by the value of Italy's average energy intensity). The predicted total savings amount therefore amounts to 1.4 Mtoe. This is a conservative estimate, considering that the Decree transposing Directive 2012/27/EC also imposes the audit obligation on "energy-intensive" enterprises and, most importantly, provides for a programme to encourage the performance of audits at SMEs too.

3.1.3 Metering and billing

Electronic meters are installed at the electricity supply points to consumers. Their location makes it possible to add functions that can help distributors and sellers improve the services they deliver and users to use supply data to improve management of offtakes. However, to fully exploit this potential and involve consumers in the smart grid paradigm, a two-way communication channel must be established between the electronic meter and the meter control centre. Two-way communication means that on the one hand offtakes and significant grid parameters can be monitored and, on the other, consumers can receive the distinctive signals of smart grids, i.e. market signals (electric tariffs) system signals (mandatory electric parameters).

In Italy, replacement of the traditional electricity meters with a smart metering infrastructure started between 2001 and 2002. This metering infrastructure enabled the opening up of the energy market, which took place in July 2007; it allows consumers to change their energy supplier by means of a simple phone call, and makes it possible to bill energy by tariff bands (e.g. F1, F2, F3). While in Italy the process of integrating consumers into the smart grid is now directed at expanding the potential of the current electronic meter control system, at EU level, the focus is still on how to spread the electronic meter technologies in those Member States which have not yet adopted them. The target set by the European Commission is to cover at least 80% of European consumers by 2020. In recent years, the EU authorities have taken action on several fronts: updating the legislation, assigning tasks to standard-setting bodies and promoting projects to support pre-legislative activities.

Italy is seen as a ground breaker, since it embarked ahead of the EED on the path of smart electricity metering and is currently creating an infrastructure to manage smart gas metering groups. In actual fact, the EED goes even beyond the smart metering of electricity and gas, as it also calls for the smart metering of heat for space hearing and for hot water production.

3.1.3.1 Evolution of the regulatory framework

The use of electronic metering systems is expressly mentioned in Article 13 of Directive 2006/32/EC of the European Parliament and of the Council on energy end-use efficiency and energy services and in Article 5 of Directive 2005/89/EC of the European Parliament and of the Council concerning measures to safeguard the security of electricity supply and infrastructure investment. This need was subsequently confirmed by the European Commission in its Communication of January 2007 to the Council and to the European Parliament (COM (2006) 841 final), which stressed that the widespread adoption of smart meters was expected to increase competition in the European energy market. In 2009 this policy adopted by the EU bodies became even more pronounced. The Directorate-General for Enterprise and Industry, through

standardisation mandate M/441 requested the European standard-setting bodies CEN, CENELEC and ETSI to establish a standard for the interoperability of electronic utility meter systems for electricity, gas, heat and water. In the future electricity market, these systems should help to increase consumers' awareness of their actual use of energy resources, and favour the adjustment of demand over time. The DG's standardisation mandate highlighted that the lack of standards was the main barrier preventing the large-scale application of electronic utility meters, and requested standard-setting bodies to devote greater resources to this sector. In the light of the urgency imposed by the European Directives, the DG required the mandate to be executed in just 30 months starting from autumn 2009, i.e. from the moment of acceptance of the mandate by the standard-setting bodies. Together with mandate M/441, the European Commission also issued Communication (COM (2009) 111 final) to the Council, the European Economic and Social Committee and the Committee of the Regions. The Communication called on Member States to agree on EU-wide "minimum functional specifications" for smart metering, to be installed in the 27 Member States. These specifications, compatible with the above-mentioned mandate M/441 should enable network operators, suppliers and notably also consumers to effectively manage their individual energy needs and to use ICT solutions for energy management. The Communication (COM (2009) 111 Final), also adds that smart metering is just a first step on the path to smart electricity grids, which should facilitate better management of energy consumption and the integration of alternative and renewable energy sources on a far greater scale than is possible today, with positive impacts for energy security and for the environment.

Subsequently, the European Commission approved the "Third Energy Package", a set of five pieces of legislations published on 14 August 2009, requiring EU Member States to take steps to strengthen the rights of consumers-users of the electricity grid (Directive 2009/72/EC) and of the gas grid (Directive 2009/73/EC), opening up increasingly to the market and to competition. The legislation in the package also addresses the transparency and clarity of utility bills, the itemisation of actual consumption, assistance and compensation in the event of inefficient service (e.g. an unjustified item in the bill). Furthermore, thanks to meter interoperability, consumers must be free to switch their energy suppliers easily and without additional costs, i.e. without having to replace the meter.

The Third Energy Package also recommends the separation or "unbundling" between transmission system operators and energy producers and suppliers, to encourage the entry into the market of new companies able to use the existing networks. The Third Energy Package too sees electronic meters as the first and decisive step in transforming the current distribution networks into smart grid: the Commission has set the target for 80% of utility meters to be smart meters by 2020. In its "Position Paper on Smart Grids" of 10 December 2009, the European Regulators' Group for Electricity and Gas (ERGEG) summarised the role of smart meters in the smart grid scenario. The cost-benefit analysis (CBA) carried out by major universities and the Italian experience in the use of smart electricity metering have shown that benefits far outweigh infrastructure installation and operation costs. However, several industry associations have voiced concerns with regard to smart gas metering.

Electricity meters

Italy transposed the EU Directives by Legislative Decree No 115 of 30 May 2008 (Article 17). The Italian Regulatory Authority (AEEG), also acting ahead of the European Directive and of the subsequent primary Italian legislation, issued decisions favouring the installation of electronic electricity meters (Decision No 292/06) and on the installation of banks of gas meters (deadline 2016), with remote reading and remote control functions (Decision ARG/gas 155/08).

Italy launched the adoption of smart metering in the electricity sector on a voluntary basis, driven by the initiative of DSOs, in particular ENEL Distribuzione; this later became a mandatory roll-out under a Decision of the Electricity, Gas and Water Authority (AEEG). The Automated Meter Reading (AMR) infrastructure was completed on the initiative of ENEL which implemented a plan for the installation of some 36.7 million meters between 2001 and 2011, well in advance of the mandatory regime.

Only in Italy, Denmark and Sweden was a significant portion of implementation in the electricity sector launched by DSOs using their own resources, with remuneration from network tariffs introduced at a later stage. In Italy the tariff system for metering (introduced in 2004) has enabled full recovery of investments, while in the case of Denmark and Sweden part of the investments was also recovered through the grid tariff.

In the case of Member States which have already completed roll-out for electricity metering, i.e. Italy, Finland and Sweden, some actual data are available, but not a comprehensive report. Implementation of the smart metering of electricity in Italy was originally driven by significant operating savings (EUR 500 000 000 per year for some 30 million meters), while the focus is now shifting towards involving customers also for energy-saving purposes. This approach also underlies transposition of Article 9 of the EED.

The following table shows the current situation in the electricity sector.

Member States rolling out smart meters	CBA Outcome	Deployment Strategy	Metering Market	Responsible party - implementation and ownership	Responsible party – access to metering data	Financing of roll-out
Austria	positive	No action	Regulated	DSO	DSO	Network tariffs
France	positive	Mandatory	Competitive	DSO	DSO	Network tariffs
Ireland	positive	Mandatory	Regulated	DSO	DSO	Network tariffs
Italy	positive	Mandatory	Regulated	DSO	DSO	Metering tariff
Luxembourg	positive	Mandatory	Regulated	DSO	DSO	Network tariffs
Netherlands	Positive	Mandatory (opt-out option)	Regulated	DSO		Network tariffs
UK - Great Britain	positive	Mandatory	Competitive	Supply companies	Central Data Hub	Private funds

In 2013 Italy contributed to the Report "BENCHMARKING SMART METERING DEPLOYMENT IN THE EU-27 WITH A FOCUS ON ELECTRICITY" prepared by the European Commission and soon to be published. Directives 2009/72 and 2009/73 (Third Energy Package) require Member States to ensure the deployment of smart metering systems for the long-term benefit of consumers. According to the Third Package, implementation may be subject to the successful outcome of a cost-benefit analysis to be completed by 3 September 2012. Specifically for electricity, the target is to connect by 2020 at least 80% of the cases which pass the cost-benefit analysis.

In keeping with the vision of the Third Package, and adding to its provisions, the Energy Efficiency Directive supports the development of energy services on the basis of the data coming from smart meters, from demand response and from price trends, all seen as crucial elements for achieving a truly consumer-centred retail market.

The purpose of the Report is to set out the result of a comparative assessment of the cost-benefit analyses and of the associated smart metering plans for electricity and gas adopted by Member States in accordance with Annex I.2 to the Third Energy Package. The analysis was also performed in line with the key issues laid down in Recommendation 2012/148/EU to support Member States in preparing for smart metering. Particular attention is paid to implementation of smart metering functionalities which should enable the active participation of consumers in the electricity supply

market.

While technology solutions are available in Italy to supply consumers with data every 10 minutes and large-scale projects have already been rolled out, not all consumers are as yet covered. The current smart metering system enables readings at 15-minute intervals at the back office. To enable customers and their authorised agents to access these data directly, ENEL has developed a metering interface (Smart Info ®) currently applied by several pilot projects for on-the-spot verification of its actual benefits. The Commission has recommended informally that, as the technique is already available, after the pilot experiences the possibility of offering metering interfaces to end-customers on demand should be considered, to encourage energy savings and promote consumer empowerment.

The following table sets out the initial results of the cost-benefit analysis in countries which have already completed the roll-out of electric meters.

MS already completed roll-out	**Metering points in the Country**		**Roll-out period Start Date**	**Roll-out period End Date**	**Penetration rate by 2020 (%)**	**SM lifetime (years)**
Finland	3 300 000		2009	2013	97%	15 - 25
Italy	36 700 000		2001	2011	99%	15
Sweden	5 200 000		2003	2009	100%	10
MS already completed roll-out	**Investment (CAPEX + OPEX, € mn)**	**Total Benefit (€ mn)**	**Consumers' benefit (%)**	**Energy savings**	**Peak Load shifting**	**Discount rate used**
Finland	692	NA	NA	1-2%	2.0%	NA
Italy	3359	6398	NA	NA	NA	4.5%
Sweden	1500*	1677	19.7%	1 - 3%	NA	NA

The cost-benefit analysis (CBA) carried out by major universities and the Italian experience in the use of smart electricity metering have shown that benefits far outweigh infrastructure installation and operation costs.

As to the choice of communication technology, Italy has adopted a system halfway between meter and Data Management System (DMS), based on a PLC/GSM-GPRS Data Concentrator (DC). In greater detail, the Power Line Carrier (PLC) together with GPRS (General Packet Radio Service) seems to be the most widespread technology for meter - DC communication.

Gas meters

Italy is ahead of the other Member States also as to the regulatory framework for gas meters. The Italian Gas Committee (Comitato Italiano Gas - CIG) acting under the mandate given it by the Electricity and Gas Authority (AEEG) by Decision No 155/08 on "directives for commissioning gas meter banks, meeting minimum operating requirements and having remote reading and remote control functions, at the supply points of natural gas distribution networks", completed the set of UNI/TS 11291 standards "Gas measurement systems. Hourly-based gas metering devices" [UNI/TS 11291 Gas measurement systems - Hourly-based gas metering devices, Italian Gas Committee]. In this area, an *ad hoc* working group covered safety procedures and the description of the functional

requirements of the gas electronic meter, having particular regard to physical safety and data security. Use scenarios for installation, operation, maintenance and change of concession were covered, with a focus on wireless data exchange and encrypted protocols in the solutions chosen, to ensure appropriate autonomy of the meter bank even where battery-powered. The phase concerning large-size meters G40 (capacity over 65 m^3/h) has now been completed and followed by installation. The focus is now on gas meter banks for household users, which will also be equipped with an electrical valve for remote flow shut-off (for contract activation and deactivation), i.e. meter banks with a capacity of less than 10 m^3/h. By Decision 393/2013/R/gas on "Pilot Projects on multi-service smart metering" the Electricity and Gas Authority defined the procedure and selection criteria for piloting multi-service solutions in these meters. This measure sets out the submission methods and selection criteria for pilot projects on multi-service smart metering systems - i.e. meters whose remote control includes not only gas-service metering but also other utility services - and the incentive to be granted to the selected projects. The results of the pilot scheme will be key for the purposes of implementing Article 9(2) EED, as they will make it possible to define the specifications of new-generation individual meters delivering to consumers all the benefits envisaged by the Directive.

Directive 2009/73 sets no specific target for the deployment of smart gas meters; in any case, a reasonable time span for their distribution should be allowed for, as also pointed out in the Commission's interpretative note. Nevertheless, for gas it would seem more difficult to demonstrate a corporate success story. Proof of this are the CBAs conducted to date which do not justify the introduction of smart meters in most Member States.

Five Member States (Ireland, Italy, Luxembourg, the Netherlands and the United Kingdom) have planned to roll-out gas smart metering by 2020. According to preliminary estimates, this will involve the installation of about 40 million smart meters by 2020, with a cumulative investment of EUR 10 billion. In Italy a CBA was carried out in 2008 and the regulator (AEEG) planned the roll-out of smart meters according to a schedule by type of users. In 2012, Italy updated its deployment targets setting them at 60% of households by end 2018, instead of 80% by 2017. The following table summarises the gas smart metering roll-out plan in some Member States (including Italy) which have decided to make the system compulsory or have performed a cost-benefit assessment (CBA) with positive outcome.

Member State	Meter points	Roll-out period	Uptake rate in households (%)	Technical lifetime of the smart meter (years)
Austria	1 470 000	2011-2017	95%	12
France	11 000 000	2014-2020	100%	20
Ireland	600 000	2015-2019	100%	17
Italy	22 200 000	2010-2018	60%	15
Luxembourg	80 000	2015-2020	95%	
Netherlands	6 900 000	2014-2020	80%	
United Kingdom	26 600 000	2012-2019	97%	15

Interoperability: key for the development of a new generation of electronic meters

The electronic meters installed up to some years ago can be *de facto* considered to be the first generation. These systems allow the smart metering of electricity and in some cases also the multi-metering of gas, heat and water, but lack interoperability with systems having similar functionalities produced by other manufacturers. Indeed, manufacturers have long preferred to deliver complete solutions, developing in-house all the functionalities requested by their clients, but also making it difficult for any other manufacturers to connect to their systems. Italy is an exception in that the distributor takes responsibility along the whole process: research, development and product maintenance. The lack of open communication standards enabling the interoperability of devices produced by competing manufacturers has been identified by the European Commission as being the main barrier to adoption of electronic measurement systems by most energy distributors in Member States. This led to issue of Mandate M/441 EN of the European Commission to standard-setting bodies CEN, CENELEC and ETSI which focused, precisely, on promoting open standards supported by several manufacturers. The standardisation work has now been completed. Italy's electricity metering system, now in the last decade of its life, is able to detect load curves (i.e. to supply information on "actual time of use") only to customers with installed capacity in excess of 55 kW (TIS "Consolidated text on Settlement", ARG/elt 107/09 and later updates). However, this type of information too cannot be supplied with the promptness required by the EED. Therefore, the new smart metering systems must conform to international standards ensuring interoperability between the systems of different manufacturers (such as standard IEC 62056 updated in the wake of mandate M/441 given by the European Commission to standard-setting bodies CEN, CENELEC and ETSI). This will ensure return on investment over time and scalability of the metering system, thus limiting costs. In transposing the EED, the Italian Government has taken all these aspects into account and has tasked the AEEG with drawing up the specifications for the next smart metering systems to include functions useful to users and energy suppliers, ensuring data safety and protection and useful for distributed generation.

Multi-user heat meters

Transposition of the EED provides clarifications on metering of heating, cooling and domestic hot water consumption in apartment buildings and in multi-purpose buildings which are supplied with those utilities by a district-heating district-cooling system, by a central source supplying several buildings or by a common heating/cooling plant for a single building. For the purpose of individual metering of heat consumption in apartment buildings and in multi-purpose buildings, the utility companies must install individual meters in each apartment or unit of these buildings by 31 December 2016, where this is technically feasible and cost-effective. If installing individual heat meters is not technically feasible or cost-effective, individual heat-regulation and metering devices must be installed at each radiator. Only where it is demonstrated that neither of the above options is cost-effective, should transparent rules for calculating individual consumption be adopted. Several Italian Regions have acted ahead of this legislation, by placing obligations on condominiums (apartment-owner associations) by 2013 or 2014; e.g. the Lombardy Region by Decision No 3522 of 23 May 2012 and Piedmont by Decision of the Regional Executive[12] No 85-3795 of 27 April 2012 which extended the deadline for installing heat control and metering systems,

[12] The Piedmont Region also drew up and approved in March 2013 the "Guidelines for adopting hear control and metering systems" (www.regione.piemonte/ambiente/aria).

initially set at 1 September 2012, to 1 September 2014.

3.1.3.2 Transparent billing methods

In Italy, where no electronic meter is installed and the final customer fails to supply a meter reading for any billing period, the bill will be based on estimated consumption or on a lump-sum amount. In Italy, reporting by consumers of electricity and gas readings is governed by Decision ARG/com 164/08 "Consolidated Text on the quality of electricity and natural gas sales services". Transposition of the EED provides that, where smart meters are installed, final customers must have access to complementary information on historical consumption, i.e.:

- cumulative data for at least the three previous years or on the period from the start of the supply contract if shorter. The data shall correspond to the intervals for which the bills are issued;
- detailed data according to the time of use for any day, month and year. These data are made available to the final customer via the internet or the meter interface for the period of at least the previous 24 months or the time since the start of the supply contract if this is shorter.

Some energy suppliers, on their own initiative, are already providing online as well the billing data present on the paper bills. The current metering technology in Italy is unable to supply detailed data according to the time of use for any day (including the preceding day), either via a website connected to the meter central control system or via the display on the smart meter. However, the current metering technology could already support a communication interface to show consumption data to end-users, thus empowering them to manage their energy use and to create a database of their consumption, as provided for by the EED.

Useful information to increase energy efficiency

As to the new energy services, at present Italian final customers cannot ask their energy suppliers to disclose their billing data to a third-party service provider designated by the final customer, unless the supply contract is made in the service provider's name. This state of things might constitute a barrier to the entry into the electricity-energy market of new players offering innovative studies or services, in particular the ESCOs. In practice, in line with the EED's requirements, the current electricity and gas bills already contain explanations on billing and on the various tariff components and provide for submission in electronic format. Furthermore, the Authority's website already has additional explanations on the bills and a system to compare the offers of competing electricity and gas suppliers. To ensure compliance with the EED's requirement to strengthen measures, the national transposing rules provide that the available information on the final customer's energy bill and historical consumption be provided on the final customer's formal request to an energy services supplier designated by the customer.

3.1.3.3 Billing and information costs

The EED provides that these costs should not be itemised separately but should be included in the other items. Currently, a consideration for metering and sending the paper bill is charged. Some energy suppliers give the "paperless" option of sending the bill electronically, thus eliminating postage costs. The national measure transposing the EED instructs AEEG to ensure that final customers are not charged a cost for receiving bills and billing information and for accessing their

consumption data.

3.1.4 Consumer Information and Training programmes

The main instruments adopted in Italy over the past three years to encourage final customers to change their habits have been: incentives, grants or subsidies, the provision of information, flagship/exemplary projects, workplace activities and energy saving education.

The success of the tax deduction scheme (55% and 65%), as proved by the savings achieved in our country, is also due to the liaising role played by the Ministry of Economic Development between the Government and the public in delivering information and raising awareness of the scheme; other agencies which have helped disseminate information were the Revenue Agency, the Regional and Provincial energy agencies and the municipal authorities. This incentive has also been a driver of energy efficiency. Figure 3.9 shows the trend (recorded with Google Trend) in the demand for information on the Internet by end-users and the trend of internet searches using certain keywords. The terms analysed were: "55% Deduction", "Energy Efficiency"[13].

The results show that web searches on Energy Efficiency increased considerably after the incentive was introduced, and continued subsequently, even after the searches on the 55% deduction began declining.

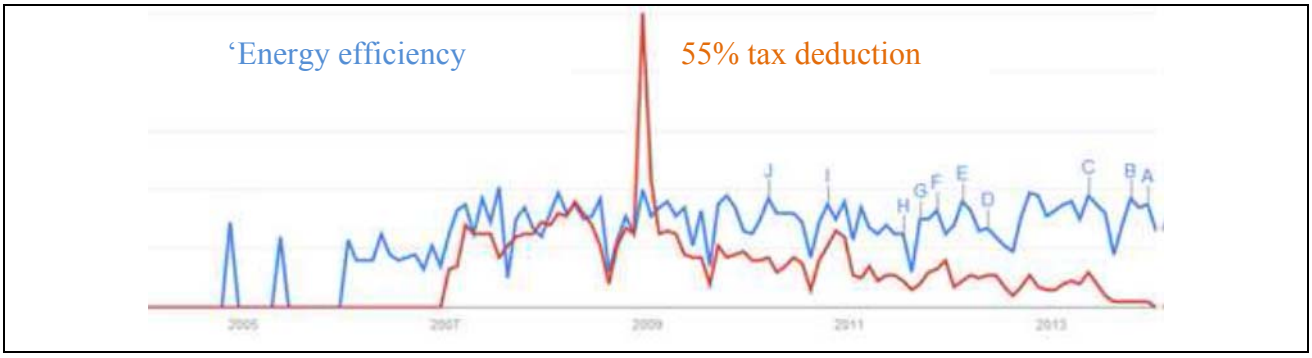


Figure 3.9 - Internet search trends on the themes of 55% tax deductions and energy efficiency

At national level, the main entities providing information on energy savings and energy efficiency to SMEs and households are ENEA, GSE and the Regulatory Authority for Electricity Gas and Water. The Office of the Prime Minister and the Competent Ministries organise periodically dedicated information campaigns. At regional and local level, information is provided by the Regions, the Provinces, the Municipal authorities, the local Energy Agencies and the Chambers of Commerce.

The media used include radio, TV, web, newspapers and integrated projects. Appendix B lists some

[13] **Google Trends** is a public web service supplied by Google. The service provides a graph showing the trend in the search for specific keywords over time. By entering a keyword, you can see how many people searched it over a five-year period. More than one search can be performed at one time on the same graph. In this case, each keyword is represented by a different colour. Besides showing the volume of searches performed on the Google search engine (search volume) the **Google Trends** service makes it possible to analyse the volume of news published on the topic over time. The searches can be performed both globally and by country. This makes it possible to determine whether a given issue is losing or gaining popularity.

flagship initiatives.

3.1.4.1 Integrated Plan for the Uptake of Energy efficiency (*Piano Integrato di Diffusione dell'Efficienza Energetica* - PIDEE)

While confirming the effectiveness of the measures already implemented and of the information models applied to date in Italy, to transpose Article 12, 16 and 17 of Directive 2012/27/EU, ensuring an integrated uptake strategy designed to help attain the targets and ensure success of the actions set out in the NEAAP 2014-2016 and to disseminate at national, regional and local level transparent information on Energy Efficiency, an Integrated Energy Efficiency Uptake Plan ("*Piano Integrato di Diffusione dell'Efficienza Energetica* - PIDEE) will be designed, for national and interregional implementation in close coordination with the Regions and the leading industry associations.

The Plan addresses the provision of information and training on energy efficiency; in greater detail, it sets out the targets, beneficiaries, strategies and contents of the information and training actions, the budget, the implementing agencies and the provisions for *post-hoc* assessment of the activities.

In accordance with the provisions of Directive 2012/27/EU, the energy efficiency uptake strategy will include the following actions:

- The dissemination among public authorities, SMEs and consumers of information on good practices implemented under the energy efficiency measures;
- Strengthening of communication on energy efficiency to improve the user-friendliness and transparency of information; initiatives promoting energy-awareness in daily behaviours targeting specific groups (e.g. home-makers' associations, high school students, universities);
- Drafting of check lists and guidelines for local authorities and market operators for assessing and monitoring the results of EE promotion actions;
- Design, implementation and testing, in cooperation with sector operators (system operators, distributors, associations etc.), of instruments to ensure the dissemination to all relevant market players of information on energy efficiency schemes and the financial frameworks via direct means (information from computers or smart meters combined with home-installed displays) and indirect means (smart bills containing historical and comparative energy consumption data).
- Promotion of energy audits as a useful instrument to provide the information needed to take energy efficiency measures, and assessment of the impact of the communication campaign.
- Awareness-raising in the building trade, with a focus on the real estate market; cooperation on actions to raise end-users' awareness of the energy performance of buildings.
- Cooperation with research institutes, universities and companies to assess the costs of EE systems and components, compare the different technologies available for a given energy service and examine the applicability of innovative technologies in the home;
- Planning and delivery of awareness-raising initiatives on the workplace and of training of the Energy Manager within public authorities;

The initial target groups of information and training actions include: public sector employees, in particular in schools; banks and financial institutes; SMEs and the general public.

The following dissemination methods will be used to influence consumption patterns:

- **Communication and engagement**. Traditional communication actions will be accompanied by a system-wide approach to maximise their impacts, using different media according to target group.
- **Feedback (direct and indirect)**. Consumers need some benchmarks to determine whether they are consuming too much energy. A mix of direct and indirect feedback in the supply of energy has been so far the most successful in steering consumer behaviour, achieving significant energy savings.
- **Education**. The provision of training on energy issues (including distance learning mode)[14] will be promoted, together with guidelines on teaching methods and standards on training quality.

Most pilot studies have proven that even small information actions can bring about measurable reductions in energy consumption. Table 3.7 shows the energy savings achievable via individual or combined actions

Table 3.7 - Potential energy savings achievable via individual or combined actions

Action	Savings percentage
Feedback	5-15%
Direct feedback (smart meter)	5-15%
Indirect feedback (enhanced billing)	2-10%
Energy audits	5-20%
EU-based measures	5-20%
Combined measures	5-20%

Source: EEA10

From the viewpoint of the plan's cost-effectiveness, recent studies by the American Council for Energy-Efficient Economy (ACEEE)[15] and by the Lawrence Berkeley National Laboratory (LBNL)[16] confirm the notion that energy efficiency is an excellent investment and can also be achieved by information and training programmes targeting end users.

The studies, which examined energy efficiency programmes implemented in the US over the 4-year period 2009-2012, show on average a cost-effectiveness of 2.8 USD cents per kWh of electricity saved and about 10 USD cent per m^3 of natural gas.

The results published by LBNL and ACEEE demonstrate that the cost of energy efficiency is significantly lower than the cost of supplying electricity and natural gas, and strengthen the idea that energy efficiency is a low-cost source of energy.

In view of the importance of this theme, the national Information and Training Programme will provide an opportunity to test methods for the correct qualitative and quantitative measurement of savings.

[14] The ENEA platform accessible through the following link will be used: www.formazione.enea.it

15 ACEE, The Best Value for America's Energy Dollar: A National Review of the Cost of Utility Energy Efficiency Programs, 2014.

[16] LBNL, The Program Administrator Cost of Saved Energy for Utility Customer-Funded Energy Efficiency Programs, 2014.

Appendix B describes some flagship initiatives under way and in the planning stage.

3.1.5 Availability of qualification, accreditation and certification schemes

Italy already has a number of certification schemes for operators and services in the field of energy efficiency, specifically for Energy Management Experts (EMGs) and ESCOs.. The details are provided in the next paragraph.

The "BUILD UP skills" initiative promoted by EACI (Executive Agency for Competitiveness & Innovation) highlighted the importance of creating a qualification/certification system for all professional profiles in the buildings energy performance sector to ensure the effectiveness of energy upgrading projects and hence build public trust. The initiative, which involved 30 European countries including Italy, aimed to align the Vocational training system to the skills and qualifications required in the fields of energy efficiency and renewable energy sources.

In January 2013 two major acts were approved, introducing significant changes into the national framework:

- LAW No 4 of 14 January 2013. Provisions on non-organised professions.
- LEGISLATIVE DECREE No 13 of 16 January 2013 Definition of the general rules and essential levels of services for identifying and validating non-formal and informal learning and the minimum service standards of the national system for certification of competences, pursuant to Article 4(58) and (68) of Law No 92 of 28 June 2012. (13G00043).

Law No 4 refers expressly to the drawing up of UNI standards identifying, for every professional profile not previously covered by a standard, the knowledge, skills and competences the professional must have in order to operate correctly. Definition of these standards is absolutely necessary to establish a system for the certification of the competences gained by workers in formal and informal settings, as provided for by Legislative Decree No 13.

Implementation of an advanced process for the identification, validation and certification of competences is a key tool in a pro-active policy against unemployment and non-employment and for worker re-training. The process was launched on20 December 2012 when the agreement on the national framework for qualifications was signed by the parties to the Interdepartmental Conference and the "First Italian Report" was adopted "relating National Qualifications to the European Qualification Framework for lifelong learning" (EQF). The Report classifies the Italian educational and professional certificates within the eight levels of the EQF.

The "BUILD UP skills" project produced *inter alia* a roadmap setting out the key actions to be taken to qualify all the workers operating in the building renovation industry, estimated to be more than 1.5 million, in order to align them with the highest EU standards. These targets will be pursued through the following actions:

- update the national qualification framework by including the professional profiles needed to upgrade the existing building stock and to construct nearly zero-energy buildings;
- develop a reference model for the training paths relating to the different professional profiles;
- develop UNI standards for the different professions as provided for by Law No 4 of January 2013;

- on the basis of the above-mentioned standards establish a system for the recognition of training credits, on a national and/or EU scale, to validate, via a third-party managed certification system, the competences already gained by workers in non-formal and informal settings, and not based on the duration of their educational courses or of their work experience;
- use of the different measures of the ESF to train trainers, update teaching materials introducing all the new technologies, and make provisions for the use of vouchers and/or training at the building site;
- draw on the Structural Funds and Regional Funds to set up an appropriate number of workshops for practical training in each Italian Region/Province, also via public/private partnerships to optimise resources and reduce implementation time;
- incentives for the hiring of qualified workers.

The role of the Energy manager

Directives 2002/91/EC and 2006/32/EC, respectively on the energy performance of buildings and energy services, required Member States to put in place schemes to ensure the qualification and possibly the certification of professionals in the energy sector.

To this end, several international technical standards have been issued, which provide for the role of the energy manager; they include European standard EN 16001 on energy management systems (EMS) - replaced in 2001 by international standard ISO 50001 - and EN 15900 on energy efficiency services. In Italy the following standards have been issued: UNI CEI 11339 on Energy Management Experts (EGE), UNI CEI 11352 on ESCOs and UNI CEI/RT 11428 on energy audits. In particular, UNI CEI 11339 makes it possible to certify the competences of energy management experts and to exploit the opportunities offered by Law No 4 of 14 January 2013 on the professional figures not organised in registers and councils.

The Ministerial Decree of 28 December 2012 provides that only certified Energy Management Experts and ESCOs shall have access to the energy efficiency certificate scheme. This provision has clearly boosted the drive for certification.

At the end of October 2013 Accredia's website (www.accredia.org) listed 135 certified experts in energy management; the actual number of certificates is certainly higher, on account both of delays in publication of the list and of the fact that the certification bodies currently undergoing accreditation are not yet included in the Accredia database.

To meet the requirements of the EU Directives and the developments in the energy market FIRE[17] has set up an energy manager certification system, SECEM (www.secem.eu[18]) modelled on the technical standard.

[17] FIRE: Italian Federation for the Rational Use of Energy.

18 SECEM was accredited in early 2012, and is the first body to have obtained this recognition in respect of standard UNI CEI 11339.

Courses for the inspectors of building heating/cooling systems pursuant to Legislative Decree No 192/05 as amended and supplemented

The new legislation (Legislative Decree No 192/05 as amended and supplemented) redefined the concept of heating/cooling system[19]; the scope of the check, renamed an "inspection" now also includes a consultancy on possible cost-effective projects to improve the system's performance.

The new Presidential Decree No 74/2013 implementing Article 4(1)(a) and (c) of Legislative Decree No 192, has confirmed ENEA's mandate. Article 9(6) provides that "ENEA (ENEA-UTEE) shall provide the Regions and the Autonomous Provinces of Trento and Bolzano and, on request, any other competent authorities or external bodies, with support in the training and qualification of the staff tasked with performing checks and inspections on heating/cooling systems".

The requirements for external bodies and inspectors are listed in Annex C to Presidential Decree No 74/2013. In greater detail, inspectors must possess "baseline technical and vocational training meeting at least the requirements of Article 4(1)(a) and (b) of Ministerial Decree No 37/08" i.e. a university technical degree or a high school technical diploma plus two years' relevant work experience.

Point 11 of Annex C also provides that "the Regions and the Autonomous Provinces may, after retraining them where necessary entrust the checks and inspections on heating/cooling systems to personnel with significant prior experience, working directly for them or for delegated entities and bodies, in performing energy efficiency checks on heating/cooling systems under the prior legislation."

Accordingly, a training course for new inspectors of heating/cooling systems has been designed, as well as an updating course for inspectors with experience working for the competent authorities or their delegated external bodies.

Best Practices

We provide below a list of projects implemented in several Regions.

1. COLOR Project (Competency Learning Outcomes Recognition for migrants) promoting application of the ECVET system (validation of formal, non-formal and informal learning) in Italy.
2. "Quality Vocational Training in the restoration of heritage buildings" a project funded by the Leonardo da Vinci programme for quality restoration of buildings of historical and architectural value.
3. REE-TROFIT: "Toward an EQF scheme in the building sector: a training model supported by Chambers of Commerce" is a project promoting the identification of good practices and their national mainstreaming in the vocational training of energy efficiency operators and installers of renewable energy systems. Compener: a project funded by the Leonardo Da Vinci Programme, coordinated by ENEA which designed the detailed qualification framework, in accordance with the European qualification framework, for different roles in the energy field, including the energy manager and the energy certifier.

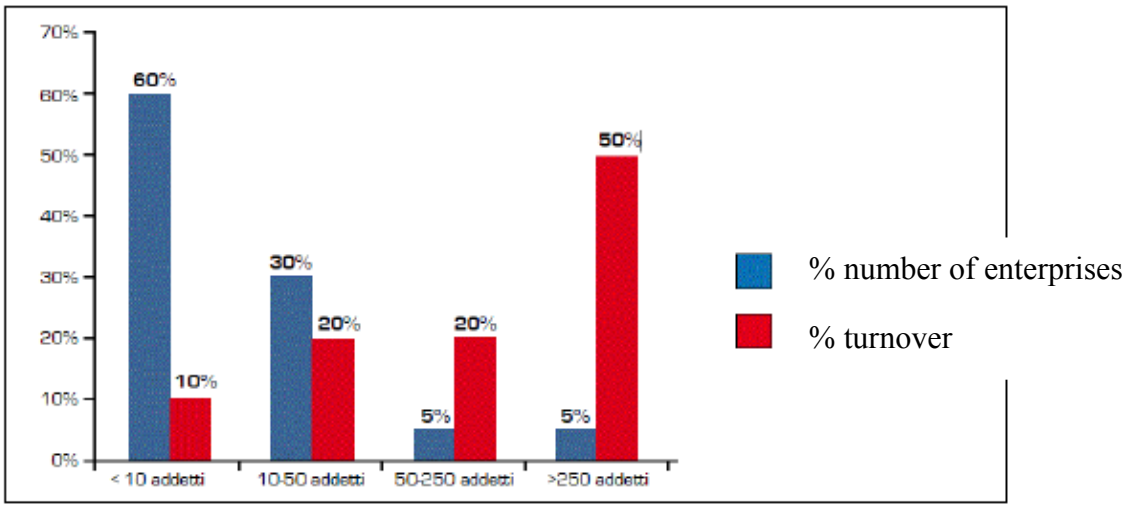
19 As provided for by Presidential Decree No 412/93, ENEA has provided for about 20 years now the competent local authorities requesting it, assistance for the qualification and verification of the technical competence of the personnel tasked with checking the heating/cooling systems of buildings.

3.1.6 Energy Services

The ESCO sector in Italy is quite diverse, with 1 900 units registered with AEEG in 2011; in actual fact, the companies operating routinely in the sector (in particular within the white certificate scheme) are just 15%[20] of the total (about 390 operators).

The companies on this list belong to a wide range of sectors in terms of activities and target sectors: generation/distribution companies, technology manufacturers for utilities, special purpose-vehicles of manufacturing industries, industries which implement energy efficiency projects and apply for the EEC directly, engineering design companies, energy consultants, system installers, district network managers, renewable energy operators, producers of cogeneration systems who to boost sales upgrade efficiency on the electricity and heat generation side in certain industrial and services sectors, waste processing companies, manufacturers of street lighting technologies, fully-fledged energy services companies (ESCOs), companies engaged in energy efficiency in public buildings (office buildings, schools, health facilities, infrastructure) and in private buildings - mostly medium-sized enterprises in the industrial and services sectors.

Similar lack of uniformity is found in company size: the turnover (Figure 3.10) is fairly evenly divided between a 5% of large ESCOs (more than 250 workers) belonging to large multi-national groups and the remaining 95% of enterprises of smaller size (60% with less than 10 workers).



IT "addetti" = **EN** "workers"

Source: Energy Strategy Group

Figure 3.10 - Breakdown of the number and turnover of ESCOs in Italy (2010)

A study currently in progress[21] has found that not many ESCOs couple energy services with other functions: nevertheless 50% of ESCOs report that in addition to energy services they provide other services, such as repair, installation and rental.

Figure 3.12 shows the position of ESCOs within the different technology areas of the energy efficiency sector, excluding clearly "energy services".

[20] Energy Efficiency report 2011- Energy Strategy Group

[21] Activities in progress under a Memorandum of Understanding between ENEA and Confindustria.

The three most occupied areas are: “technologies for the generation and use of thermal energy”; “CHP and CCHP systems” and “efficient buildings”, in which one third of the businesses interviewed operate. The group of businesses engaged in the “lighting technologies” area is also sizeable (22.2%).

Within the “energy services” area (Figure 3.13), the most commonly offered service is the “energy audit”, provided by more than 80% of the ESCOs surveyed, followed by “handling of administrative relations with sector entities” to obtain qualifications, certificates and incentives (more than 65% of the enterprises). Lastly, about 60% of the interviewed businesses actually concluded EPC contracts.

The main sectors covered by these businesses are residential, commercial and services, which generate 76.7% of their total turnover (Figure 3.11); the remaining share comes from the industrial sector (23.2%), and a negligible portion from the agricultural sector.

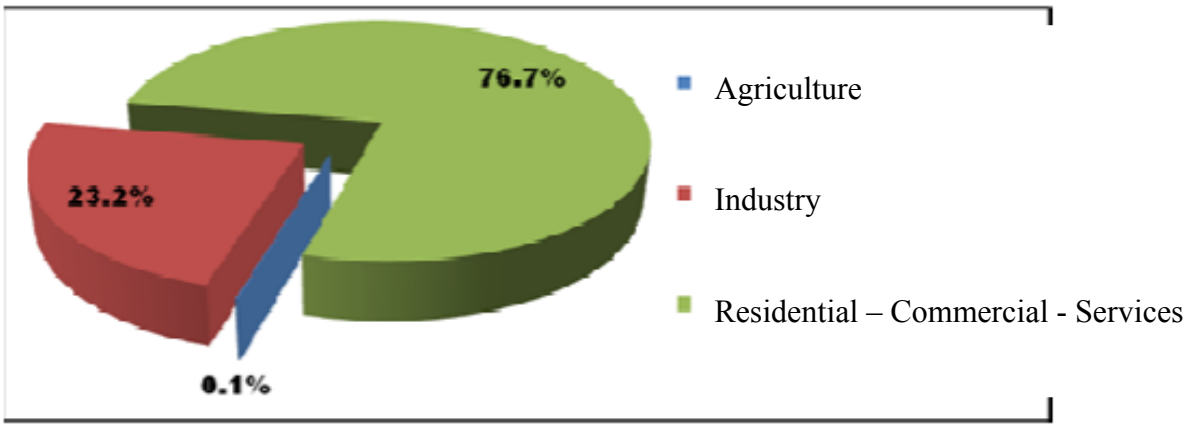


Figure 3.11 - Turnover by customer sector

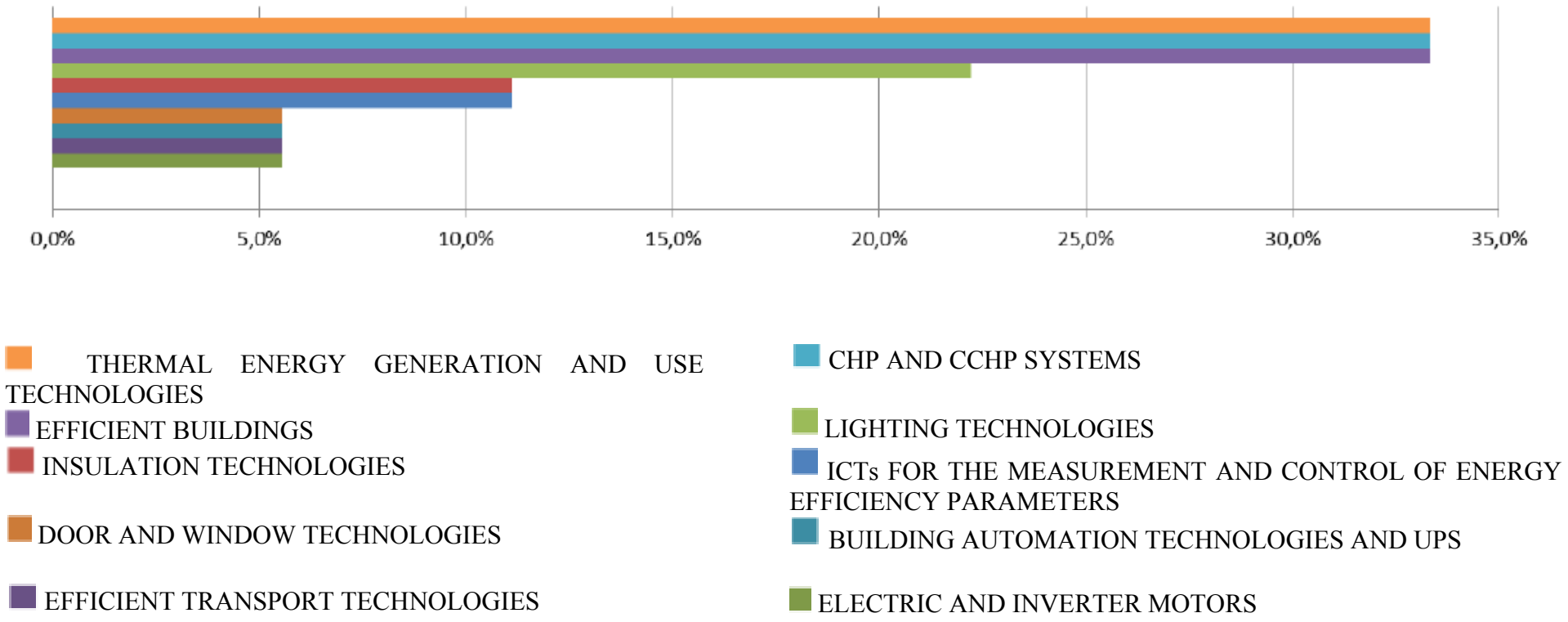


Figure 3.12: Breakdown of ESCOs by technology area

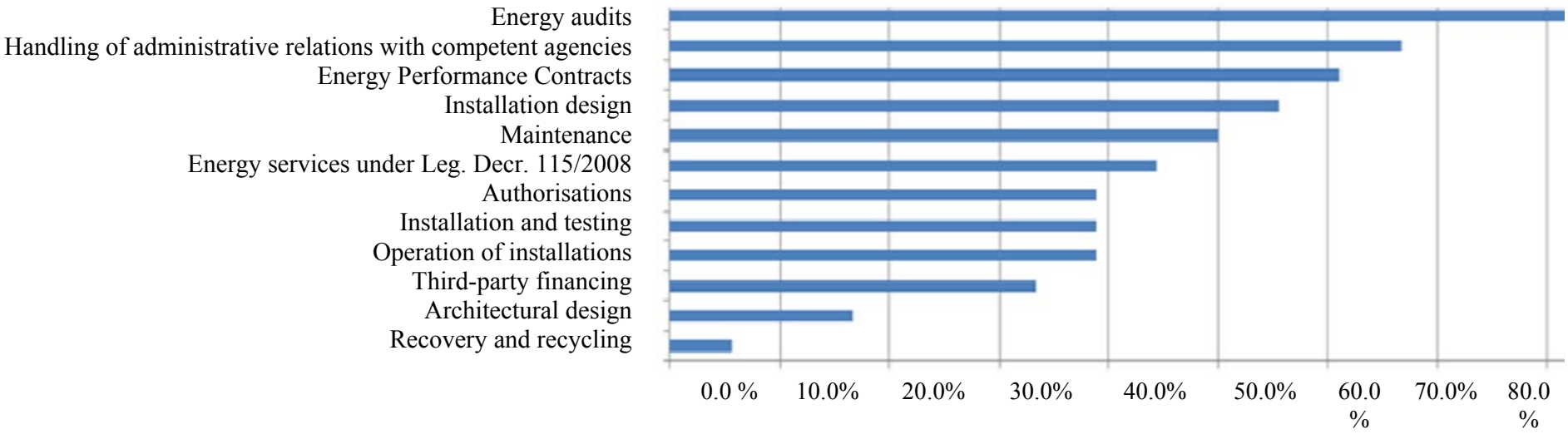


Figure 3.13: Categories of energy services

With regard to turnover breakdown (Figure 3.14), transport has the lion's share (35.5%), followed by the mechanical sector (26.1%) and the food sector (23.2%).

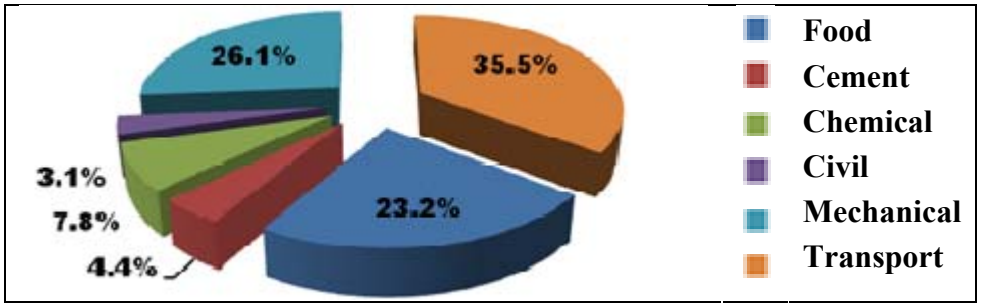


Figure 3.14: Turnover by industrial sector

The answers to the question on the industrial sectors in which ESCO customers operate (Figure **3.15**) highlight the strong prevalence of the mechanical sector (93.3%), followed by the chemical and food sectors, to which 86.7% and 80% of the customers in the sample belong respectively.

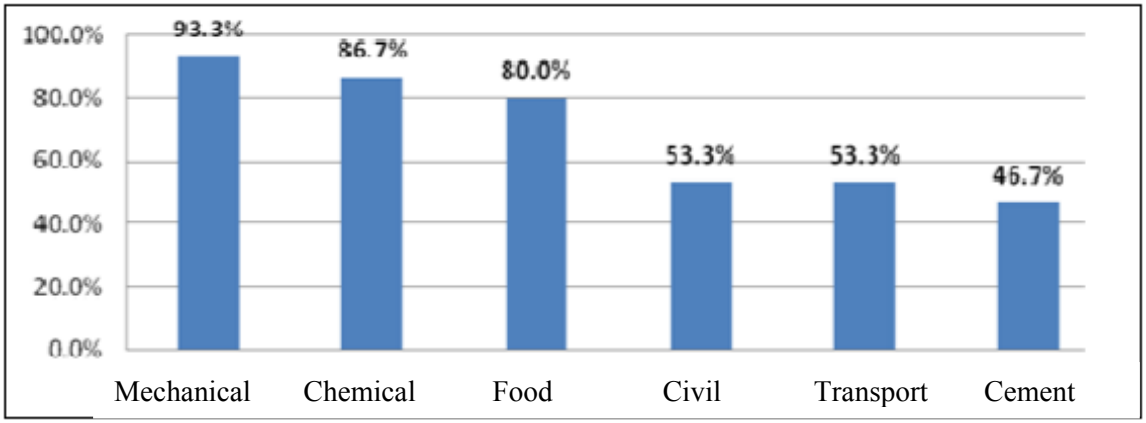


Figure 3.15: Percentage distribution of ESCOs by industrial sector

As regards sectoral investment plans, the ESCOs have reported great interest in investments to increase professional skills, but also to increase production capacity and for process innovation. Moreover, most of the companies interviewed reported plans to increase their investments over the next three years, while only 11.8% planned to reduce investment (Figure 3.16).

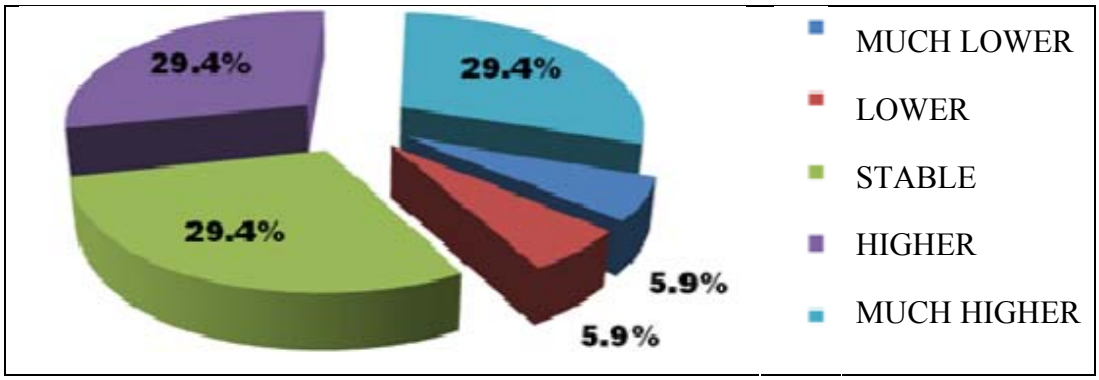


Figure 3.16: Planned investments over the next three years

Almost 45% of respondent companies have reported (Figure 3.17) as a key competitiveness driver

the ability to provide integrated services, followed by the quality of service supplied.

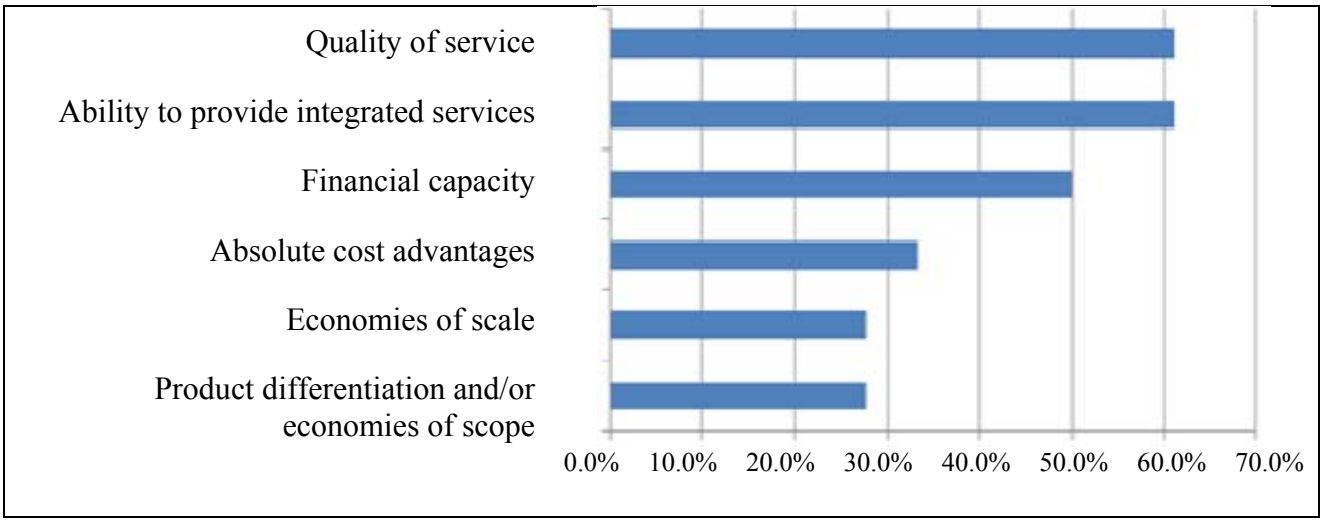


Figure 3.17: Competition factors in the energy services sector

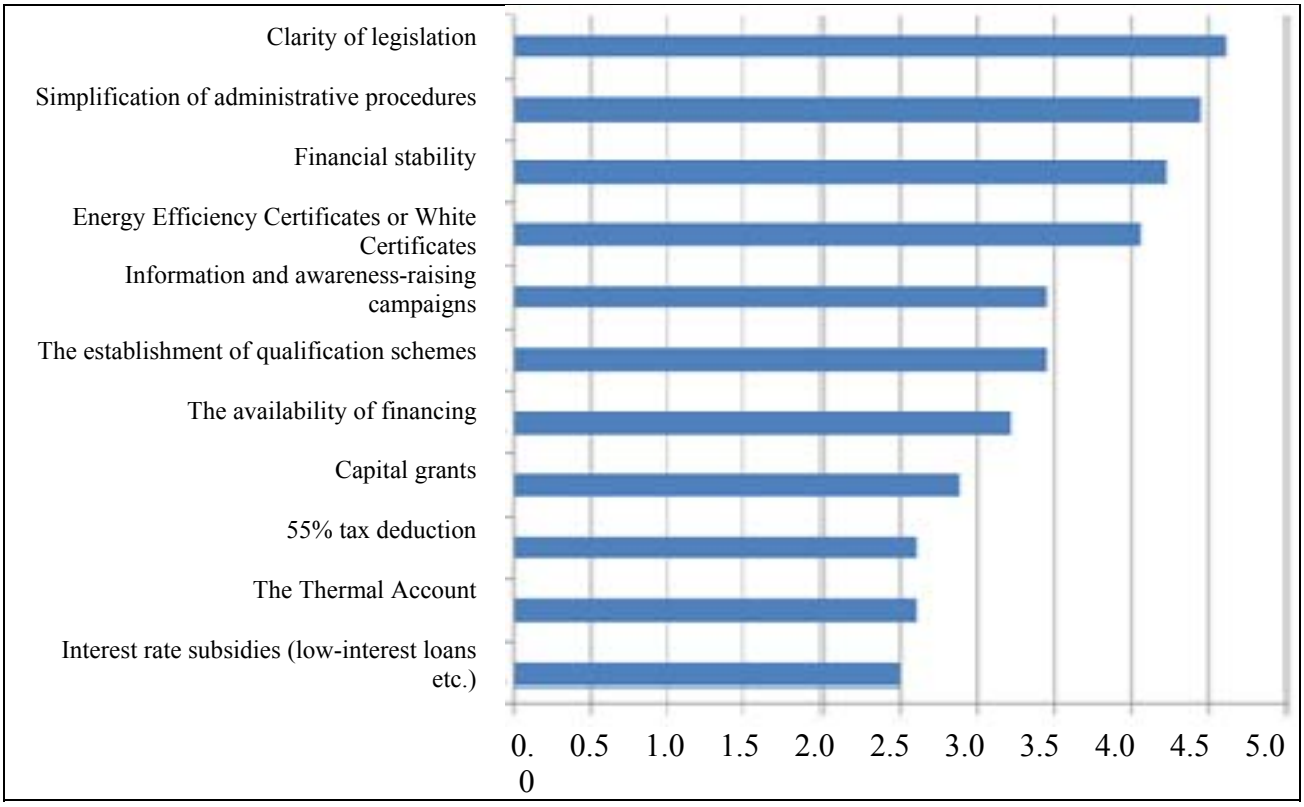


Figure 3.18: Effectiveness of public policies

Last, among policy actions those that have attracted the greater interest and that are considered to be most useful by businesses are: the clarity of legislations, the simplification of administrative procedures, financial stability and the White Certificate scheme.

The certified ESCOs, i.e. those meeting the requirements of standard UNI CAEI 11352:2010 which account for just 18% of the total, are distinguished by integrated offer of services, the application of advanced types of contracts and the availability of significant financial resources to fund their projects.

Analyses produced by ASSISTAL[22] show that the total turnover of its member ESCOs for renovations/services in the energy sector amounts to some EUR 3.5-4 billion per annum and that the energy managed, generated and distributed to final customers amounts to some 16 000 000 MWh/y (including about 10-15% electricity).

Under the legislation, the ESCO's organisational chart must include a manager with appropriate skill in the management of energy and the energy markets and a technician with appropriate design competence in the project areas. Consequently, it is advisable for ESCOs to have one or more managers fulfilling the profile of the Energy Manager and at least one certified EME (Energy Management Expert). We provide hereunder the results of an analysis carried out by FIRE - *Federazione Italiana per l'uso Razionale dell'Energia* (Italian Federation for the Rational use of Energy) on the role of Energy Manager in organizing and implementing projects. This analysis covers certain key parameters, such as the presence of a corporate energy efficiency policy, the existence of an EMS and the use of a monitoring system.

The study confirms the growing interest towards Energy Managers and energy efficiency. Unfortunately, the number of enterprises which have put in place a clear and measurable energy efficiency policy remains small; the uptake of EMSs is also insufficient, especially since half of those reported are not certified under standard ISO 50001. The progress in the adoption of monitoring systems and EnPI (Energy Performance Indicators) and the impact of the energy manager role are both satisfactory. The survey found a broad range of projects, which also include the building envelope and industrial processes, although their number is small.

The state of play concerning energy managers operating in Italy is summarised in Table 3.8.

Table 3.8 - Responsible parties appointed in 2013 by the obligated parties

SECTORS	SUBSECTORS AND NOTES	EM
Agriculture *(including 35 consorzi di bonifica - water management bodies)*		**41**
Industry		**587**
	Extraction of ores from quarries and mines	*5*
	Manufacturing activities	*406*
	Supply of electricity, gas, steam and air conditioning	*94*
	Supply of water, sewer networks, waste management and clean-up activities	*78*
	Construction	*4*
Transport *(including 70 publicly owned)*		**324**
PUBLIC AUTHORITIES *(Ministries, Government bodies, Regions, local authorities, etc.)*		**144**
Other Public Bodies		**143**
	Health services	*110*
	Universities	*19*
	Research	*9*
	Local public agencies	*5*
Private services sector		**223**

[22] ASSISTAL – National Association of Installation Builders and Energy Efficiency Services (E.S.Co.) and Facility Management (www.assistal.it) is the industry body representing at national, EU and international level via the EFIEES, several large companies operating in the Facility & Energy Management/Energy Efficiency services sector (ESCOs).

Energy sector	**69**
TOTAL EMs APPOINTED	**1 531**

Source: FIRE data. For more details: www.fire-italia.org.
Note: the table only shows the data concerning obligated parties who appointed the energy manager by the statutory deadline; it does not include any local energy managers of multi-site companies (399 local EMs), EMs appointed after expiry of the deadline (143 primary EMs + 17 local EMs) and those appointed by non-obligated parties (530 primary EMs + 102 local EMs).

(source: FIRE)

3.1.7 Other horizontal energy efficiency measures

3.1.7.1 Kyoto Fund

This is a revolving fund for the subsidised financing of GHG emission reduction projects, set up at the *Cassa Depositi e Prestiti* (Deposit and Loan Fund) having a total budget of some EUR 600 million, to be paid out in three one-year cycles of EUR 200 million each[23].

The actions funded under the first programming cycle[24] concerned 7 national or regional measures (Table 3.9): the subsidised projects obtained loans with a duration of 3 to 6 years (3 to 15 for Public authorities) with six-monthly instalments at a fixed annual interest rate of 0.5%.

Table 3.9 - Kyoto Fund: projects funded in the First Programming Cycle, year 2012

Geographical scope	Measure	Description
National	Local micro-cogeneration	New installations, with a rated power of up to 50 kWe using the following energy sources: natural gas, solid vegetable biomass, liquid biofuel from vegetable matter, biogas and combined natural gas-biomass.
	Renewables	New small-scale power plants using a single renewable source: • wind turbines with installed rated output between 1 kWp and 200 kWp; • hydropower installations with installed rated output between 1 kWp and 200 kWp; • solar thermal installations with solar collection area not exceeding 200 m^2; • thermal installations using solid plant biomass (pellets or wood chips) having a thermal rated output between 50 kWt and 450 kWt; • photovoltaic installations integrated or partly integrated into buildings having a rated output between 1 kWp and 40 kWp.
	Final uses	The following investments are eligible per project: • on the envelope of existing buildings;

[23]For an overview of the reference legislation and to download all the measures relating to the Kyoto Fund see website:http://portalecdp.cassaddpp.it/cdp/Areagenerale/FondoKyoto/Riferimentinormativi/index.htm.

[24]The Fund was rolled out in February 2012 by an Application Circular issued by the Ministry for the Environment, the Protection of Natural Resources and the Sea (see previous note); applications were received from 16 March to 14 July 2012. Note that actual project implementation must not have started before the entry into force of the Kyoto Decree (22 April 2009). The Circular issued in 2013 setting out the new rules is available on: http://www.minambiente.it/sites/default/files/archivio/allegati/Fund_Kyoto/00._Circolare.pdf.

		• for direct heating/cooling via district heating from CHP plants having rated output up to 500 kWe; • for the heating/cooling of buildings by low-enthalpy geothermal installations up to 1 MWt, • CHP plants with rated output up to 5 MW of electricity.
	Integrated system	Investment projects integrating several actions, howsoever combined, implemented at the same site. These projects may only combine the following measures: local micro-cogeneration, renewables and final uses.
Regional	Electric motors	Replacement of motors having rated output over 90 kWe with high-efficiency equipment.
	Nitrogen protoxide	Support is granted to production-cycle investments by producers of adipic acid or by agroforestry enterprises.
	Research	Pre-competitive research for the development of innovative technologies for renewable energy production, for hydrogen production, separation and storage, and for the development of innovative fuel cell materials, components and designs.
	Sustainable forestry management	Regional projects to identify actions for reducing forest and soil carbon depletion.

Source: Cassa Depositi e Prestiti - Kyoto Fund Guide

The three energy efficiency measures have a total budget of EUR 170 million broken down as follows:

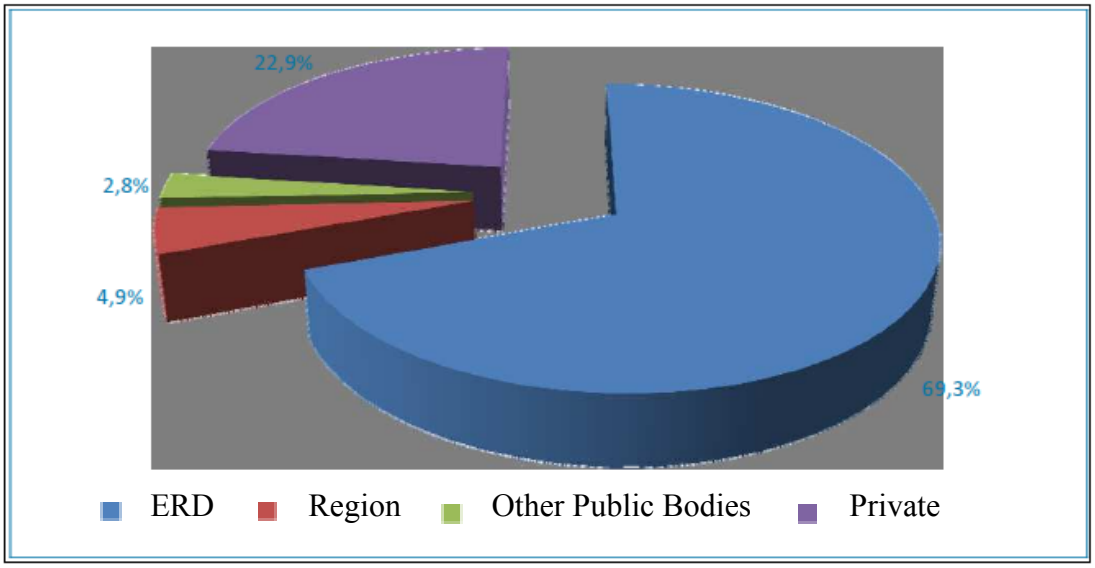
- Local micro-cogeneration: EUR 25 million.
- Electric motors: EUR 15 million.
- Final uses: EUR 130 million.

However, the demand for these measures has been very limited, especially for local micro-cogeneration and electric motors.

3.1.7.2 Structural funds programming period 2007-2013 and next programming period 2014-2020

Under the European Fund programmes, whose main target is to fund projects for job creation and growth, in order to provide the European Parliament with reports on the results achieved by those Funds which go beyond the progress of expenditure, the European Commission must submit an assessment of the impact of projects which also captures the energy and environmental components, including the savings from energy efficiency projects, energy production from renewables and the reduction/increase in climate-changing emissions.

The monitoring data for the Energy Sector (Energy Efficiency and Renewable Sources) show approved costs of some EUR 1.5 billion. The pie chart in Figure 3.19 shows the breakdown of funding sources. The ERDF makes up the largest share by far (about 70%); however, this is significantly influenced by a number of regions, not only in Southern Italy, where funding covers most or 100% of project costs, especially for public-sector projects. The private sector overall accounts for about a quarter of the total.

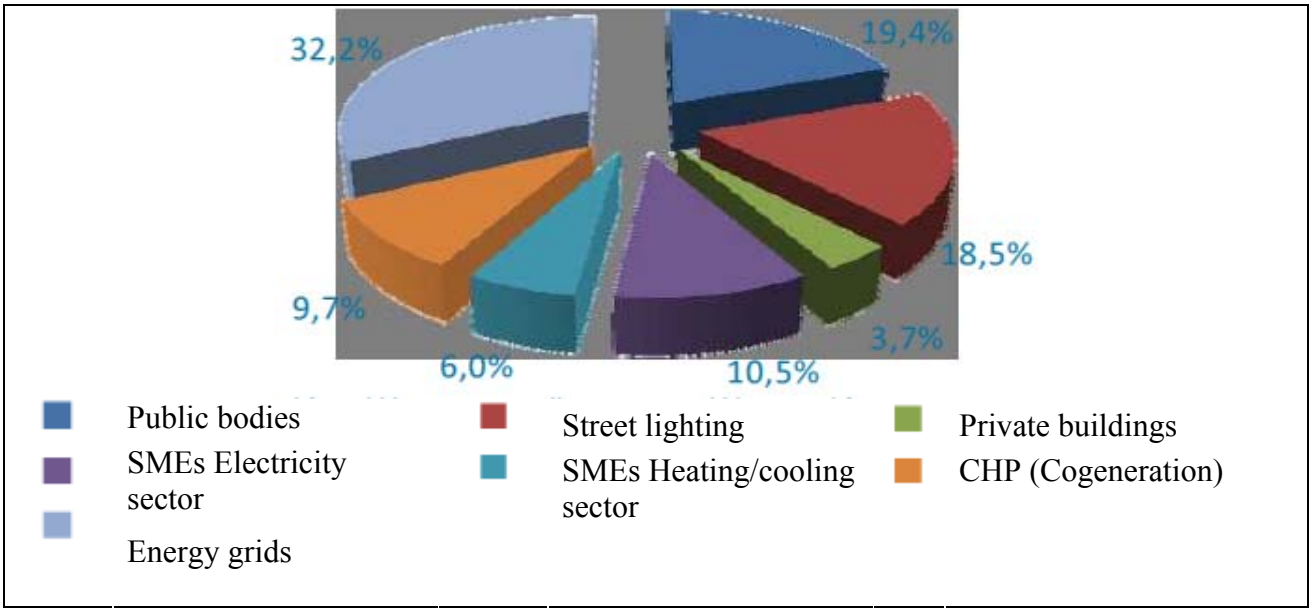


Source: data processed by ENEA, supplied by IGRUE-DPS Unitary Monitoring System (BDU)

Figure 3.19- ERDF energy sector: sources of funding for projects (%)

The information on Energy Sector projects has been analysed, identifying for each project the type of action (e.g. photovoltaic, building renovation, etc.) and funding sources (European Union, State, Revolving Fund, Region, Province, Municipality, Private parties, Other sources).

Figure 3.20 shows the breakdown of projects under the energy efficiency heading. For energy efficiency, the largest share of funding went to the energy-related renovation of public buildings, to street lighting and to energy grids.

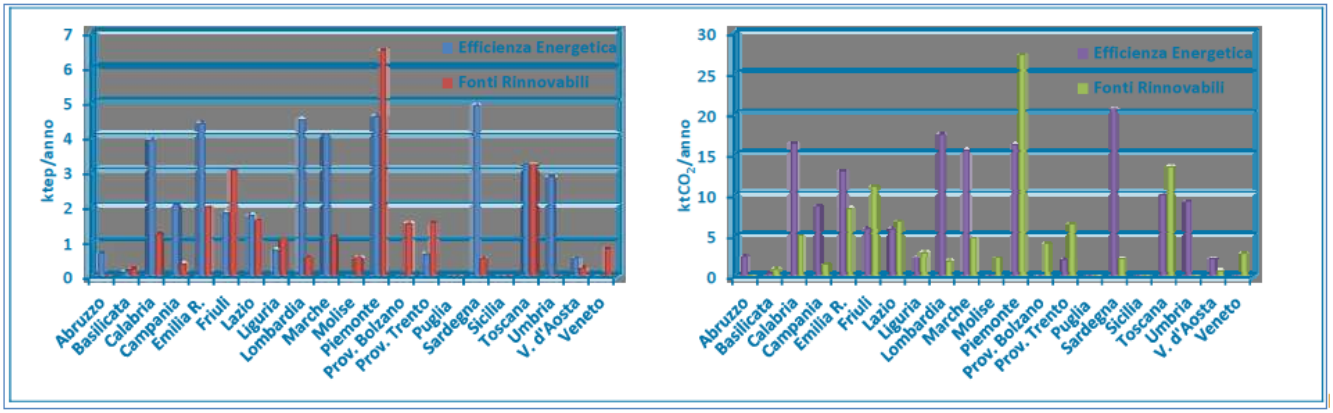


Source: data processed by ENEA, supplied by IGRUE-DPS Unitary Monitoring System (BDU)

Figure 3.20 - Energy sector: energy savings by type of project (%)

The projects listed above generated annual energy savings of more than 50 ktoe, including mixed projects (ES+RES) and renewable energy production of 29 ktoe, for an overall total of 80 ktoe/year. Overall annual CO_2 emissions avoided amounted to 0.3 $MtCO_2$. By projecting these values to 2016, assuming that 100% of projects will be implemented using the entire ERDF budget, the overall energy savings attributable to the ERDF energy sector will amount to 0.3 Mtoe, with avoided emissions of 1 159 $MtCO_2$/year.

Figure 3.21 shows the breakdown by Region of energy saving and renewable energy projects in terms of energy saved (left) and of CO_2 emissions avoided (right).



IT	EN
Efficienza Energetica	Energy Efficiency
Fonti Rinnovabili	Renewable sources
ktep/anno	ktoe/year

$ktCO_2$/anno	$ktCO_2$/year

Source: data processed by ENEA, supplied by IGRUE-DPS Unitary Monitoring System (BDU)

Figure 3.21 - ERDF energy sector: energy savings (ktoe/year) and emission reduction ($ktCO_2$/year)

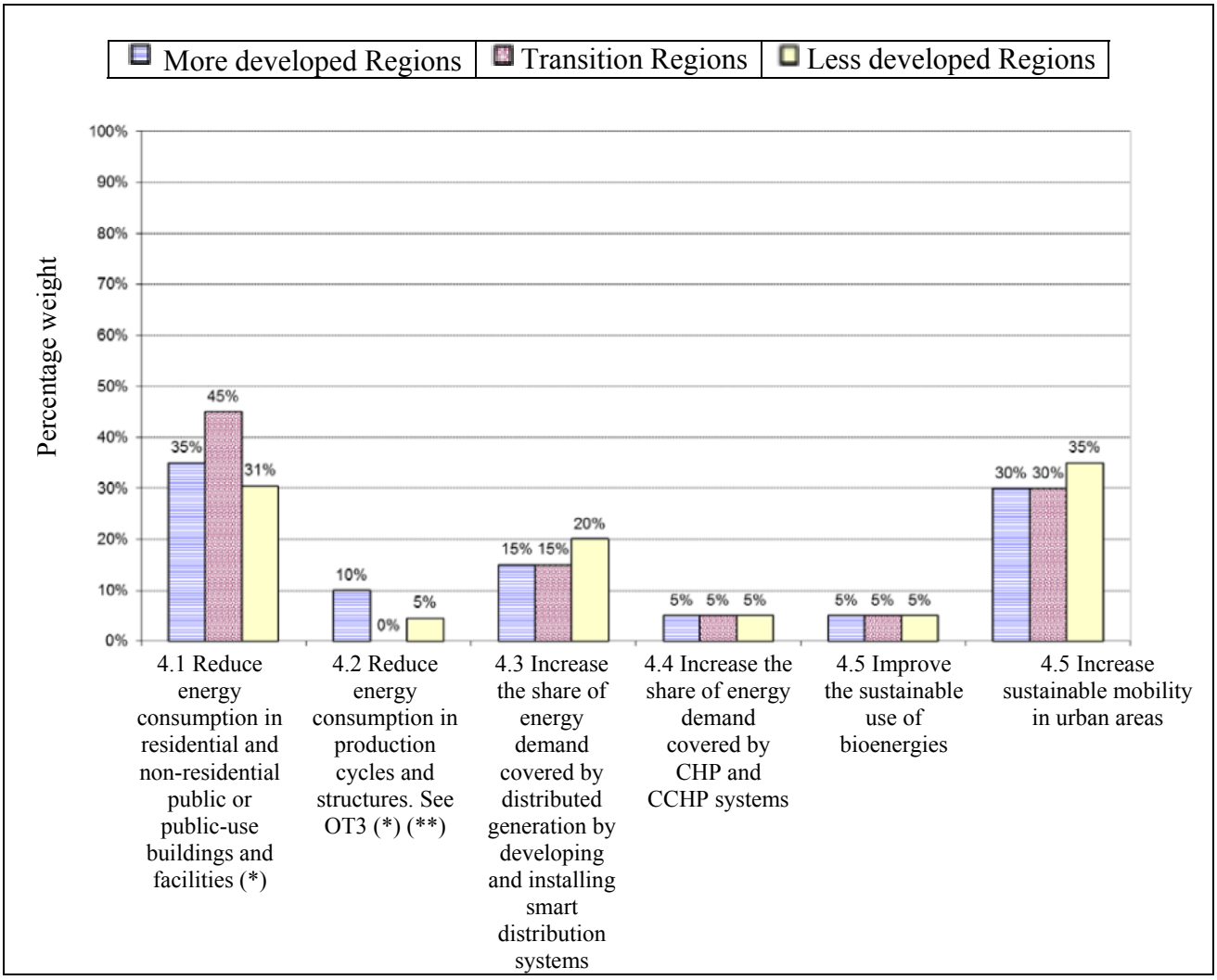


Figure 3.22 - OT 4: Indicative weight by expected result and type of Region (ERDF only)

The EU funds earmarked for Italy under the 2014-2020 programming period total almost EUR 32 billion; of these almost EUR 23 billion will go to the less developed Regions (Campania, Puglia, Calabria, Sicily and Basilicata), 1.1 to transition Regions (Abruzzo, Molise and Sardinia) and the remaining 7.8 to the more developed Regions. These funds will be supplemented by the national co-financing shares, which are the minimum shares set out in the Regulation: 50% for the more developed Regions; 40% for the transition Regions and 20% for the less developed Regions.

The 2014-2020 Structural Funds have been designed with some major conceptual and regulatory innovations, proposed by the Commission to Member States in response to the lessons learnt in the previous programming period. In the Draft Partnership Agreement submitted by the Minister for Territorial Cohesion to the office of the Prime Minister, the theme of energy efficiency falls under thematic objective 4 "Sustainable energy and quality of life (supporting the transition towards a low-carbon economy in all sectors)". The main action lines are four:

1. Energy efficiency and energy saving actions in public or public-use buildings and facilities, for residential or other uses, owned by the central government;
2. Actions on the networks: upgrading of smart networks mainly as part of urban development projects, which may also be associated with sustainable collective

mobility projects and infomobility services;

3. Actions to support the sustainable energy and energy efficiency industry;
4. Outreach, support, training and promotion of employment in the sustainable energy sector.

With particular regard to point 1 above, the national-level target is to design a transferable model covering: selection of the target buildings and of the type of upgrading works; execution of the works; and subsequent management and monitoring.

In greater detail, premises, buildings or groups of buildings owned and occupied by the central Government bodies will be identified, also on the basis of energy audits; priority will be given to renovating the buildings with the lowest energy performance, where this is cost-effective and technically feasible. Priority will also be given to the buildings included in the emergency plan adopted by municipal authorities (under Law No 100 of 12 July 2012) and considered strategic for the response to and management of emergencies caused by natural disasters/earthquakes. Lastly, priority will be given to buildings which for specific energy improvement projects (for instance thermal insulation) allow easy organisation of the occupants' transfers in the course of the works.

Advanced financial models will be applied to the buildings so selected, including capital financing and financing by third parties, also using the energy performance contract (EPC), to carry out works such as:

- Insulation of the building envelope;
- Improvements in the energy efficiency of technical systems (heating, cooling, hot water production and lighting);
- Other works compatible with the climate zones in which the buildings are located.

In each case, the cost/benefit ratio, the timeline for implementation and the transferability of the projects will be assessed. Renewable energy systems may also installed, but only for self-consumption.

The final outcome should be the development of an effective and transferable technical, economic and financial model for selecting and executing energy improvement projects in the existing buildings owned by central Government bodies.

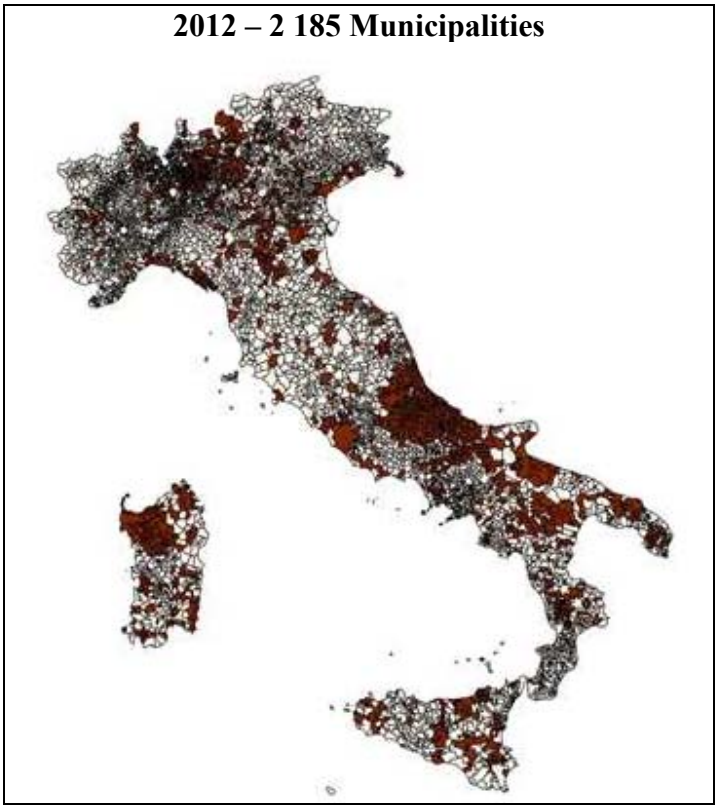
3.1.7.3 SEAP

The Covenant of Mayors, launched in 2008 after the European Commission adopted the Climate and Energy Package, is a unique model of multi-level governance in which local and regional authorities take the lead in increasing energy efficiency and the use of renewable energy sources in their territories.

Italy is the number one country in the covenant as to number of signatories, coordinators and supporters: 2 081 signatories for a total of 2 185 municipalities involved[25]. The largest Italian cities (Rome, Milan, Naples, Turin, Palermo, Bologna, Florence, Bari, Venice and many more) have all signed the pact and 47 Provinces and 5 Regions have become Territorial Coordinators.

[25] Either individually or in association with other municipalities, for instance as members of Mountain Communities or unions of municipalities.

In the light of the long investment horizon in those sectors responsible for the largest share of energy consumption, the Sustainable Energy Action Plan (SEAP) is also a long-term plan for integrating the policies developed by each of these sectors. Indeed, the SEAP it not only an instrument for designing the most appropriate, effective and cost-effective actions to reduce CO_2 emissions, but it is also a means for implementing an energy transition process; as such, it is a key instrument for improving energy efficiency at local level.



Source: data processed by ENEA

Figure 3.23- Geographical distribution of the Italian municipalities members of the Covenant of Mayors

3.1.7.4 Simplification and harmonisation measures

Simplification of procedures is a process launched by the central Government in cooperation with other public authorities via the "FARE" Decree.

This includes a package of measures to speed up harmonisation of the urban planning tools for local-level projects and to harmonise and simplify the issue of permits and the submission of notices to the competent authorities for the performance of works. A key role in this area will be played by the e-government deployment process currently under way.

In line with this process, the Italian Decree transposing Directive 2012/27/CE includes measures to simplify the authorisation process for installing energy efficiency and renewable source systems and devices in the residential and services sectors. In particular, the following will be favoured:

- management of authorisation procedures through websites accessible to citizens and enterprises and providing information on local planning rules and constraints;

- standardisation and streamlining of the supporting documents to be enclosed with applications;
- charging of administrative or processing costs that do not discourage the installation of efficient technologies.

3.2 Energy efficiency in the building sector

The building will be key to achievement of the targets set by Italy to 2020. The National energy strategy (NES) intends to reach its ambitious energy saving targets by strengthening existing instruments and possibly introducing new measures. In particular, the following actions are planned:

- strengthening of the minimum energy standards for constructing new buildings and renovating existing ones, in order to progressively increase the number of nearly zero energy buildings, in line with the provisions of Directive 2010/31/EU (EPBD recast);
- consolidation of tax deductions, especially in the sector of residential-services sector renovations, which must be updated to boost their effectiveness and cost/benefit ratio;
- strengthening of incentives for the renovation of government buildings, which should set the example for the whole sector of energy efficiency in buildings;
- strengthening of the targets of the White Certificates scheme, which is mainly designed for the industrial sector but can play a major role in raising the economic operators' awareness of energy efficiency issues.

This paragraph sets out the national framework of actions to implement the energy efficiency targets in buildings laid down in the NES and in Directives 2010/31/EU and 2012/27/EU.

3.2.1 Legislative framework for improving the energy performance of buildings

Over the past decade, energy policies have evolved significantly: new legislation and methodologies have introduced technical-regulatory measures to promote the rational use of energy and assess the effectiveness of policies. Directive 2002/91/EC, also known as the EPBD (Energy Performance of Buildings Directive), was issued to improve energy performance in the civil sector, which for many years has been the greatest consumer of end-use energy and the largest source of greenhouse gases in Europe and Italy. The Directive was implemented in Italy by Legislative Decree No 192/2005 as amended and supplemented.

Directive 2010/31/EU, also known as "EPBD recast", updated the principles relating to the improvement of energy performance of buildings. The Directive was transposed in Italy by Decree Law No 63/2013, converted by Law No 90/2013.

Among other novelties, the EPBD recast has introduced a comparative methodology framework for calculating cost-optimal levels of minimum energy performance requirements for buildings. Under the Directive, Member States must establish minimum energy performance requirements for buildings or building elements, with a view to achieving optimal cost/benefit ratios.

The national legislative framework for increasing the energy efficiency of buildings is quite varied. The decrees implementing Legislative Decree No 192/2005 and Decree-Law No 63/2013, converted into Law by Decree No 90/2013, are key acts which updated the regulatory framework and established criteria and procedures for nearly zero-energy buildings (NZEB). Other relevance measures are Legislative Decree No 115/08 on energy services and Legislative Decree No 28/2011 on renewable energy sources.

Details are provided below on the key Decrees for the energy efficiency of buildings issued in 2013 and on Legislative Decree No 28/2011 which transposed Directive 2009/28/EC on the promotion of

the use of energy from renewable sources.

Decree Law No 63/2013

On 3 August 2013, Law No 90 was issued, amending and converting Decree Law No 63 of 4 June 2013 "Urgent provisions to implement Directive 2010/31/EU of the European Parliament and of the Council of 19 May 2010, on the energy performance of buildings".

The first 13 articles of the Law introduce several amendments to Legislative Decree No 192/2005 to align it with Directive 2010/31/EU.

Below is a summary of the main novelties introduced by the Law, which will be followed by technical implementing decrees.

1. New concepts

The Law introduces the concepts of nearly zero-energy buildings, system boundary, energy produced on site (energy produced or collected within the boundaries of the system) and cost-optimal level.

2. Methodology for calculating the energy performance of buildings

The energy performance calculation method is updated on the basis of Standard UNI TS 11300, part 1, 2, 3 and 4 and Recommendation 14 of the CTI (Italian Thermotechnical Committee).

3. Minimum energy performance requirements

The requirements will be defined on the basis of the technical and economic assessments deriving from application of the comparative method laid down in Regulation EU No 244/2012 and will be updated every five years on the basis of the following criteria:

- The minimum requirements comply with technical and economic cost-effectiveness assessments, based on the cost/benefit analysis of the economic lifecycle of the buildings;
- For new buildings and major renovations, the requirements are established by using the reference building, on the basis of the type of building and climate zones;
- To assess compliance with energy performance requirements, specific building parameters are established (thermal performance and transmittance indices) as well as overall parameters (overall energy performance indices, expressed both in total primary energy and in non-renewable primary energy).

4. Energy Performance Certificate (EPC)

The Law introduces the requirement when selling or letting a property to enclose the EPC with the sales or letting agreement.

The EPC must include a set of information and indicators including:

- Overall energy performance of the building in terms of total primary energy and non-renewable primary energy using the respective indices;
- Energy rating calculated by means of the building's overall energy performance index expressed in non-renewable primary energy;
- Minimum energy efficiency requirements under the law;
- CO_2 emissions;
- Exported energy;
- Recommendations for improving the building's energy efficiency with proposals for the most effective and cost-effective actions;

- Information such as energy audits and financial incentives.

5. Nearly zero-energy buildings (NZEB)

Starting from 1 January 2019 new buildings owned or occupied by public authorities must be NZEB. All the other new buildings must be NZEB from 1 January 2021.

6. Other eligibility factors

The Decree updates the system of penalties and extends the deadline for the 50% tax deduction on renovations, extending the deduction to furnishings and raising the deduction rate for energy upgrading from 55% to 65%.

Presidential Decree No 74/2013

Presidential Decree No 74 of 16 April 2013 established the new rules concerning the operation, management, control, maintenance and inspection of heating, cooling and hot water systems in buildings.

The Decree lays down a set of obligations and criteria applicable to public and private buildings. They include in particular:

- New ambient temperature limit values for cooling and heating in all buildings;
- Changes in the periods and duration of operation of winter heating systems;
- Revised general criteria, requirements and responsible parties for the operation, management, control and maintenance of heating and cooling systems;
- The procedures and criteria for performing checks and maintenance on the installations, which can only be done by authorised firms in accordance with Ministerial Decree No 37/08;
- The competent Regional authorities in cooperation with the local authorities shall be responsible for performing energy efficiency checks, verifications and inspections on heating/cooling systems, and for establishing the criteria to be used for those checks;
- The Regions in cooperation with local authorities shall set up their registers of technical systems. They will also establish Regional registers of energy performance certificates, favouring their connection with the other Regions' registers;
- Programmes will be implemented for the professional qualification and updating of heating/cooling system inspectors, as well as programmes for the annual conformity check of inspection reports;
- Organisation of information and awareness-raising campaigns aimed at the general public.

Presidential Decree No 75/2013

Presidential Decree No 75 of 16 April 2013 lays down the professional requirements and accreditation criteria to ensure the qualification and independence of the experts and bodies to be tasked with the energy certification of buildings.

The Decree identifies the following approved certifying parties:

- Approved technicians holding the appropriate educational qualification (for details see Article 2 of the Decree) as well as the professional qualification;
- Public entities and bodies governed by public law operating in the energy and building sectors, which run the certification service via one or more qualified in-house technicians;
- Public and private bodies duly authorised to perform inspections the following sector:

building, general civil engineering works and associated technical systems, approved by the Italian National Accreditation Body (ACCREDIA) or other equivalent European body (provided they operate with qualified technicians);

- The energy services companies (ESCOs) operating in accordance with the provisions implementing Directive 2006/32/EU on energy end-use efficiency and energy services, which deliver this service via qualified technicians.

The Decree provides for training courses for the issue of professional qualification to be held at national level by universities, research bodies and agencies and professional bodies and councils authorised by the Ministry of Economic Development and at regional level by the Regions and Autonomous Provinces, or by other regional-level authorised bodies. The Decree also sets out the minimum contents of the courses.

The criteria for checking the quality of service are also established. They include document checks on the Energy Performance Certificates, and assessment of the correspondence of projects data or energy audits with the findings of on-the-spot building inspections.

Lastly, simplification measures are introduced for updating the EPCs when the renovation works concern only the technical systems.

Legislative Decree No 28/2011

Legislative Decree No 28/2011 transposes Directive 2009/28/EC on the promotion of the use of energy from renewable sources.

The Decree contains the following provisions on the energy efficiency of buildings:

- It establishes the obligation to include renewable energy sources in new buildings and buildings undergoing major renovations;
- It requires property sales or letting agreements to include a clause confirming that the purchaser or lessee received the information and documents on the building's energy certification;
- It requires all sales advertisements from 1°January°2012 to state the energy performance index contained in the building's energy performance certificate;
- It provides that new building construction and major renovation projects must include the use of renewable energy sources to cover heat, electricity and cooling requirements in compliance with the minimum integration principles and start dates set out in Annex 3. Failure to comply with the obligation shall lead to denial of the building licence.

Furthermore, the Decree sets out the installer qualification rules for the installation and extraordinary maintenance of renewable power generation systems.

3.2.1.1 The cost/benefit method (EPBD recast – Article 5.2)

The EPBD recast provides that Member States shall calculate cost-optimal levels of the minimum energy performance requirements. To this end, the Directive introduces a comparative analysis methodology in order to establish benchmark requirements for national standards.

The cost-optimal level is defined as "the energy performance level which leads to the lowest cost during the estimated economic lifecycle", where the lowest cost is determined taking into account energy-related investment costs, maintenance and operating costs and disposal costs where applicable. Member States are responsible for establishing the duration of the economic lifecycle of the entire building or of the elements considered in the evaluations.

On 21 March 2012 the Commission published Delegated Regulation (EU) No 244/2012 of 16 January 2012 followed on 19 April 2012 by the Commission Guidelines accompanying the Regulation. These measures laid down the methodological framework for determining the optimal energy requirements of buildings from the technical and economic viewpoint. This framework is the basis for calculations by Member States.

This method determines the minimum energy performance requirements corresponding to the cost-optimal levels for new buildings and for existing buildings undergoing major and non-major renovation of their structural and technical components. Member States shall compare the results of these calculations against the corresponding applicable minimum requirements and report the outcome of this comparison to the Commission.

Italy submitted its final report on 2 August 2013. The work was carried out in accordance with the instructions provided by the Commission (Regulation (EU) N 244/2012 and associated Guidelines) and with the replies to queries submitted by our country. Nevertheless, Italy still has reservations on some of the above-mentioned instructions and on the results of their application. Specifically, our doubts concern:

- the assumption that the technical-economic assessments of energy efficiency projects in existing buildings should be carried out exclusively in presence of a "window of opportunity", that is, in connection with extraordinary maintenance works required to maintain the building's functionality, safety and decoration;
- the fact that the energy performance of buildings is determined as the difference between the primary energy supplied to the building and the energy exported, meaning the surplus electricity produced on-site and not necessary to cover the building's energy demand.

The methodology comprises the following steps:

- definition of the reference buildings;
- definition of the energy efficiency measures considered for the reference buildings;
- calculation of the energy demand of the reference buildings, as modified by each of the energy efficiency measures considered;
- calculation of the overall cost of energy demand;
- sensitivity analysis;
- calculation of the cost-optimal levels.

The planned projects have been defined with a mix of combinations which take into account the climate zone and the building's type and intended use.

Comparison between the regulatory requirements and application of the cost-optimal method yielded the following results.

Table 3.10 - New residential buildings. Comparison of the energy performance indices of the cost-optimal solutions with the current regulatory limit values

CLIMATE ZONE	***BUILDING***	A_{env}/V_l	$EP_{l,ott}$	$EP_{l,lim}$	$\Delta\%$
		$[m^{-1}]$	[kWh/m²]	[kWh/m²]	
B	Large condominium	0.43	10.2	21.0	-52%

	Small condominium	0.6	19.2	28.6	-33%
	Single family house	0.99	40.3	42.0	-4%
E	Large condominium	0.43	32.0	57.7	-45%
	Small condominium	0.6	39.6	72.1	-45%
	Single family house	0.99	72.6	97.5	-26%

For new residential buildings (Table 3.10), comparison between the energy performance for winter heating obtained by applying the comparative method with the current legal limit values shows significant room for improving the limit values.

Without prejudice to our reservations and our call for further assessment, the results confirm the need to adjust the minimum performance requirements. The minimum performance requirements, laid down in the national standards in 2006, while providing for increasing efficiency in 2008 and 2010 could not at the time take into account the technology developments which have occurred since nor the components and systems currently available on the market.

Some results which display conflicting elements (including the single-family building in zone B) will be addressed specifically later.

Table 3.11 - New office buildings. Comparison of the energy performance indices of the cost-optimal solutions with the current regulatory limit values

CLIMATE ZONE	***BUILDING***	A_{env}/V_l	$EP_{l,opt}$	$EP_{l,lim}$	***Δ%***
		$[m^{-1}]$	$[kWh/m^3]$	$[kWh/m^3]$	
E	Office	0.35	16.1	13.8	16%

By contrast, for new office buildings (Table 3.11) application of the comparative method to zone E shows that the legal limits are stricter than the cost-optimal levels.

The values for office buildings in zone B will be analysed further.

Note that Article 4(1)(b) of Legislative Decree No 192/2005, as amended by Decree Law No 63/2013 to transpose Directive 2010/31/EU, establishes new criteria for the minimum requirements for new buildings and for the renovation of existing buildings. In particular, the law requires recourse to the "reference or target building" for new buildings. This will offer an opportunity to establish new requirements which also take account of the results obtained by the comparative method.

As to existing buildings, the thermal transmittance values of the individual components of the building envelope, as obtained by applying the comparative method, are in many cases close to those laid down in the national standards, which are compulsory in the event of renovation of existing buildings.

Exception is made for the transmittance values of roofs in climate zone E and of doors and windows

in climate zone B. These data will undergo further assessment.

Transmittance limit values will also be revised in compliance with the criteria set out in Article 4(1)(b) of Legislative Decree No 192/2005, as amended by Decree Law No 63/2013.

With the exception of some "anomalous" data which as stated will be verified, the overall results from application of the methodology are qualitatively in line with the simulations carried out last year on the same sample of buildings by ENEA on the request of the Ministry of Economic Development.

Table 3.12 - Existing buildings. Comparison of the thermal transmittance values of the cost-optimal solutions with the current regulatory limit values

	U_{wall} $[Wm^{-2}K^{-1}]$	U_{window} $[Wm^{-2}K^{-1}]$	$U_{roof/ceiling}$ $[Wm^{-2}K^{-1}]$	U_{floor} $[Wm^{-2}K^{-1}]$	***CLIMATE ZONE***
U_{ott}	0.45	4.20	0.40	0.45	B
U_{lim}	0.48	3.00	0.38	0.49	
$\Delta\%$	-6.3%	40.0%	4.4%	-7.8%	
U_{ott}	0.29	2.00	0.23	0.29	E
U_{lim}	0.34	2.20	0.30	0.33	
$\Delta\%$	-15.7%	-9.1%	-23.9%	-12.7%	

3.2.1.2 Measures and tools to support energy efficiency targets in buildings

In addition to the White Certificate scheme, tax deductions, thermal account, Kyoto Fund and the structural funds for programming period 2014-2020 already described in paragraph 3.1.1, we provide below an overview of the schemes created to promote the energy upgrading of buildings necessary to achieve the targets.

National Energy Efficiency Fund

The Legislative Decree transposing Directive 2012/27/EU on energy efficiency provides for the creation of the National Energy Efficiency Fund at the Ministry of Economic Development.

The aim of the Fund is to support energy efficiency projects implemented by public authorities, ESCOs and businesses to increase the energy efficiency of their buildings, industrial installations and production processes.

The actions financed by the Fund aim to improve the energy performance of buildings owned by the public authorities, create district heating and/or district cooling networks, improve the efficiency of public services and infrastructure including street lighting, improve the energy efficiency of entire buildings including social housing buildings and reduce energy consumption in industrial processes.

The Fund is a revolving fund and has two sections which operate to:

- issue guarantees on individual operations and/or on a portfolio basis on loans granted to businesses to implement energy efficiency projects;
- grant loans directly or through banks and financial intermediaries, including the European Investment Bank, also by subscribing for units of closed mutual investment funds which

invest in new issues of credit securities or grant new loans in the forms allowed by law, or by investing in securities issued pursuant to Law No 130 of 30 April 1999, in the framework of securitisation transactions concerning the credit claims of private parties towards SMEs and ESCOs for energy efficiency investments.

The Fund should favour the approval of projects and programmes aimed at:

- creating new employment;
- upgrading the energy efficiency of whole buildings;
- promoting new nearly zero-energy buildings;
- introducing earthquake-performance measures in addition to energy performance upgrades.

The Fund shall receive the resources of the Guarantee Fund established pursuant to Article 22 of Legislative Decree No 28 of 3 March 2011, as amended by Article 5 of Decree Law No 63 of 4 June 2013.

The Fund will receive resources amounting to EUR 490 million in the period 2014-2020.

Financial instruments for school buildings, social housing and hotels

To encourage investments in public buildings, in particular in school buildings, Decree Law No 104/2013 and the Economy and Finance Document (DEF) 2014 have introduced some measures in favour of the Regions, to enable them to take out loans with the European Investment Bank (EIB), the Council of Europe Development Bank, the *Cassa Depositi e Prestiti* or other banks, with amortisation costs to be paid by the State. To this end, from 2015 EUR 40 million per year will be allocated; this measure will excluded from the Stability Pact as to the annual amount paid out. The same document (DEF) provides that a share of the Structural Funds 2014-2020 will be earmarked for the renovation and upgrading of school buildings. The National Registry of School Buildings (*Sistema Nazionale delle Anagrafi Edilizia Scolastica* - SNAES) will be established to collect the data and streamline procedures; an observatory will also be set up to verify the projects' effectiveness and proper planning.

Moreover, the *Istituto Nazionale per gli infortuni sul Lavoro* – INAIL (National Workers' Compensation Authority) will budget from 2014 to 2016 EUR 100 million per year for projects to improve the safety and energy efficiency of buildings.

The Ministry of Education, University and Research (MIUR) has allocated EUR 38 million for the design of new schools and will cover up to 25% of their construction costs. As at November 2013 the Ministry of Education had assigned to the Regions EUR 150 million for the renovation and safety upgrading of schools. As at the end of March 2014 462 projects had been funded.

To support social housing projects, the "*Piano Casa*" Decree of 2014 provided for funding for the energy upgrading of social housing; the DEF provides for a EUR 400-million Fund for energy renovations of dwellings plus EUR 67.9 million to renovate 2 300 dwellings for disadvantaged categories.

The Ministry of Cultural Assets, which is also competent for tourism, is setting up a financial instrument to renovate the hotel building stock also with regard to energy performance. The instrument should operate similarly to the tax deduction scheme and should be applied by October 2014 as part of the package of measures in the Economy and Finance Document (DEF).

Fund for home purchase and/or renovation (Plafond casa)

In the framework of the Government's housing policy, Article 6 (1)(a) of the Decree Law of 31 August 2013, converted into Law No 124 of 28 October 2013, allocates EUR 2 billion to support access to home-buying loans.

The Fund finances through mortgage-backed loans the purchase of residential properties, giving priority to the main residence, preferably belonging to energy classes A, B or C, and/or supports renovation and energy efficiency improvement projects, giving priority to young couples, families with one or more disabled person and large families.

The implementing provisions are laid down in an agreement between *Cassa Depositi e Prestiti* and ABI – the Italian Banking Association.

Development and spread of energy performance model agreements

While it is not a financial measure in the strict sense of the word, the EPC model contract [26] is an essential enabling mechanism for promoting energy efficiency projects, with a focus on the public sector.

Under Directive 2012/27/EU, the energy performance contract can help boost demand and hence favour the development of the energy services market. Therefore, the Directive calls on Member States to prepare and disseminate model contracts.

In line with the Directive, pursuant to Article 7(12) of the Thermal Account and to Article 4-ter of Legislative Decree No 192 of 19 August 2005 as amended and supplemented, model energy performance contracts are being drawn up and disseminated to improve the building's energy performance. These contracts are designed so as to identify and measure the elements confirming achievement of the energy saving via the energy efficiency project, to favour the project's eligibility for financial support.

Detailed description

The energy performance contract is an instrument made available to the parties to implement energy improvement plans also in buildings. It is an agreement between a public or private beneficiary and a supplier (which must be an ESCO). The ESCO undertakes to guarantee a certain result through the higher efficiency technical system installed, while the beneficiary undertakes to pay a fee and to comply with certain operating rules to avoid distorting assessment of end-use performance.

Key to delivery of the result is the stage before signing the EPC, which involves design of the system upgrading project and performance of the energy audit, preferably by a certified party (see Directive 2012/27/EU). The audit must take into account all the factors influencing energy performance and the project's technical and financial feasibility.

The system of guarantees, penalties and bonuses is also of key importance for achieving the targets set out in the contract both because EPC is a long-term contract and because the energy renovation of the technical systems/buildings in question is not always easy.

Public authorities have a duty to set an example not only in the delivery of services, in investment and in the maintenance of technical systems/buildings, where they should opt for the practices delivering savings and higher efficiency, but also in the choice of contractor, by selecting those bidders that offer the best guarantees of delivering the results.

[26] This model was introduced by Legislative Decree No 115/2008, Annex II whereof sets out detailed provisions, including 10% reduction in the primary energy index compared with the index shown on the energy performance certificate.

To encourage the use of energy performance contracts, a model contract is being drawn up, similar to the European energy performance contract. To draw up the model EPC, the provisions of Annex XIII (Minimum items to be included in energy performance contracts with the public sector or in the associated tender specifications) to Directive 2012/27/EU are being adopted.

Measures promoted by the Regions

Local authorities have been especially active in promoting the energy efficiency of buildings. By way of example we list below a non-exhaustive list of the current regional schemes.

Campania Region

Programme "Efficient energy – Plan to promote and support energy efficiency in the Campania Region". This scheme has a budget of EUR 115 million which will fund specifically:

- projects to install renewable power plants supplying buildings owned by the Municipalities, local health authorities, hospitals, water management bodies and the regional railway system;
- actions to support technology innovation to strengthen and optimise low, medium and very high voltage networks to achieve energy savings;
- projects to improve the energy efficiency of public buildings.

The beneficiaries of the financing are municipalities, local health authorities, hospitals, water management bodies, industrial development consortia, operating agencies of the Region, subsidiaries and/or transport companies of the Campania Region rail transport system.

Lazio Region

The Lazio Region has launched a "call for expressions of interest" to identify public buildings to be targeted by projects under Activity II.1 "Energy efficiency and energy from renewable sources " of ROP ERDF 2007-2013. The purpose of this initiative is to support projects to develop and spread the use of renewable energy sources, save energy and contain air pollution emissions via actions to improve the energy efficiency of public buildings in the Region.

The funding for the projects selected through the call for proposals is EUR 25 000 000 and is broken down by type of building as identified in Article 4 of the Regional Operational Programme ERDF 2007-2013.

Autonomous Province of Bolzano

Grants for the installation of systems for the individual measurement of energy demand for heating, cooling and domestic hot water. The capital grants cover up to 30% of eligible costs. The minimum cost estimate must be at least EUR 4 000.

Piedmont Region

The Regional Executive has approved Action Plan 2012-2013 which includes a chapter on "Energy efficiency", with five action lines for the development of energy efficiency projects and rationalisation of energy consumption in public buildings and in residential buildings, and actions to reduce energy consumption by businesses also by improving the energy efficiency of production processes. Under these action lines, a number of calls have been approved for granting interest subsidies, capital grants covering part of the investment and co-financing through partner banks. The total budget of these calls is approximately EUR 5 million.

Umbria Region

The Regional Executive has approved a programme for the energy upgrading of regional-interest buildings providing a capital grant of EUR 2 million (covering 100% of costs). Several calls have been approved providing capital grants for municipal level projects for the energy upgrading of buildings, public lighting, district heating networks and the installation of photovoltaic solar panels.

3.2.2 Strategy for the energy upgrading of the national building stock

Article 4 of Directive 2012/27/EU provides that Member States shall establish a long-term strategy for mobilising investments in the renovation of national stock of residential and commercial buildings, both public and private.

To this end, an assessment of the size of the building stock has been carried out to estimate the investment necessary for energy-related renovation. On the basis of the results obtained by applying the comparative methodology (see paragraph 3.2.1.1) an assessment has been made of the potential national energy savings achievable by energy efficiency improvement actions in the residential and non-residential sectors, taking into account the current and planned legislative instruments and incentives, in order to achieve the national savings targets described earlier in this document (Chapter 2).

This assessment will provide lawmakers with useful input as to the need to strengthen the existing instruments to overcome the barriers to the implementation of projects aimed at improving the energy performance of buildings.

3.2.2.1 Assessment of the national building stock

Based on the official data of the latest ISTAT census of 2010 and on the data collected by other bodies (ENEA, ANCE, CRESME, etc.) the size of the national building stock has been established, albeit in a preliminary and non-exhaustive[27] manner.

In the national territory there are about 13.6 million buildings, more than 87% of which for residential use; the rest is for non-residential use (hotels, offices, trade, hospitals, churches, etc.). Approximately 13 million of these dwellings are concentrated in just five regions: Sicily, Lombardy, Veneto, Puglia and Piedmont. Alone, Sicily and Lombardy account for 24.52% of the country's dwellings.

Lastly, there are nationwide about 700 000 buildings not currently in use, either because they are undergoing refurbishment or because they are unsafe.

Residential buildings

As at 2013 buildings for residential use were 11.7 million and comprised more than 29 million dwellings. More than 60% of this building stock is over 45 years old, i.e. it pre-dates Law No 376 of 1976, the first law on energy savings. More than 25% of total buildings are in the consumption band between 160 kWh/(m^2*year) and over 220 kWh/(m^2*year).

The following tables summarise the situation of the residential building stock, broken down by year

[27] The data gathering process is still under way and the results outlined in this paragraph will be updated in the next versions of the EEAP.

of construction (Table 3.13) and by climate zone (Table 3.14); the data capture the situation in 2011, when the last nationwide census was carried out by ISTAT.

Table 3.13 - Residential buildings in 2011 by construction period

Construction period	Number of buildings	%
Before 1919	2 152 583	18.3
from 1919 to 1945	1 388 004	11.7
from 1946 to 1961	1 658 548	14.1
from 1962 to 1971	1 964 379	16.7
from 1972 to 1981	1 987 904	16.9
from 1982 to 1991	1 293 902	11
from 1992 to 2001	788 104	6.7
after 2001	541 086	4.6
Total buildings	11 774 510	100

Table 3.14 - Residential buildings in 2011 by climate zone

Climate zone	Number of buildings	%
Climate zone A	5 100	0.04
Climate zone B	675 545	5.74
Climate zone C	2 618 953	22.24
Climate zone D	2 761 281	23.45
Climate zone E	5 015 756	42.60
Climate zone F	697 875	5.93
Total	11 774 510	100

Non-Residential buildings

This paragraph provides summary data on the stock of the main types of non-residential buildings.

Schools: Nationwide, there are about 51 000 buildings entirely or partly reserved for use as schools. As to location, 30% of school buildings are concentrated in 10 provinces (the top three being Rome, Milan and Naples). More than half (51%) are located in 24 provinces. About 29% of schools are located in very small municipalities (up to 5 000 inhabitants), and roughly the same percentage in medium-small municipalities. The floor area of school buildings is 73.2 million m^2 and their total volume is 256.4 million m^3. The largest share of school buildings (39%) have a floor area between 1 000 and 3 000 m^2, with an average of 1 819 m^2. Some 43% of school buildings can be broken down by floor area as follows: 16% have a floor area between 751 and 1 000 m^2 (average 899 m^2), 14% between 501 and 750 m^2 (average 631 m^2) and 13% between 351 and 500 m^2 (average 435 m^2).

Offices: Nationwide, there are about 65 000 buildings entirely or mainly for office use. As to location, 30% of office buildings are concentrated in 12 provinces (the top three being Milan, Rome and Turin), and 50% is located in 26 province. About half (53%) of schools are located in small and medium-sized municipalities (up to 20 000 000 inhabitants). Office buildings have a total floor area of 56.7 million m^2 and their volume is just short of 200 million m^3. Most buildings are of small size: about half do not exceed 350 m^2. A share of 32% of the total floor space and of volume (about 62 million m^3) is made up of just less than 1 200 large buildings (more than 5 000 m^2), mainly concentrated in Northern Italy.

Shopping centres[28]: they number 1 114 and total a Gross Leasable Area, GLA slightly over 16 million m^2. Gross area is the area unit commonly used and normally accounts for 70% of the building's total area.

As to size, shopping centres are divided into five groups:

- Neighbourhood shopping centres (up to 5 000 m^2 GLA): they account for 15% of buildings and 3% of floor area;
- Small-size shopping centres (from 5 000 m^2 to 20 000 m^2): they make up 60% of buildings and 42% of floor area;
- Medium-sized shopping centres (from 20 000 m^2 to 40 000 m^2): they make up 19% of buildings and 35% of floor area;
- Large shopping centres (from 40 000 m^2 to 80 000 m^2): they make up 5% of buildings and 16% of floor area;
- Regional shopping centres (more than 80 000 m^2): they make up 1% of buildings and 4% of floor area.

Geographical distribution is more scattered than is the case for other non-residential buildings. Slightly over 30% of shopping centres are concentrated in nine provinces, in order: Milan, Turin, Brescia, Rome, Bologna, Naples, Perugia Como and Padua. In terms of floor area, 30% is located in eight provinces: Milan, Turin, Rome, Brescia, Cosenza, Naples, Como and Catania. Currently, 34.7% of buildings are located in North-western Italy, 23.6% in North-eastern Italy, 17.4% in Central Italy and 24.2% in Southern Italy and on the Islands.

The floor area occupied by shopping centres is only part of that occupied by the retail sector, which totals some 63 million m^2 [29].

Hotels: Nationwide, there are about 25 800 buildings entirely or mainly for use as hotels. Of these, 30% are concentrated in six provinces, in order: Rimini, Bolzano, Venice, Naples, Trento and Rome. The top 17 provinces account for 50% of all hotels in Italy. About 30% of hotels are located in municipalities with low population (up to 5 000) and 64% in municipalities with up to 20 000 000 inhabitants.

In the last 8 years, the average annual addition of new hotel buildings has been substantial: about 1.4% of the total hotel stock.

Just over one in five buildings was built before 1919; the past 20 years have seen a decrease in new buildings compared with earlier periods. The buildings have a total floor area of 48.6 million m^2 and their volume is over 140 million m^3. The largest share of buildings is medium-large: almost 60% are over 1 000 m^2. However, 43% of floor areas and of volumes (about 61 million m^3) are made up of the 13% of hotel buildings, i.e. 3 300 large buildings (more than 3 000 m^2). These are mainly concentrated in Northern Italy.

Banks: Italy has 76 banking groups, comprising 33 727 branches across the country. Many of these branches occupy portions of buildings, mostly on the ground floor.
Buildings wholly or mainly for bank use number 1 469. Geographical concentration is fairly high: slightly over 30% of those buildings are concentrated in just four provinces: Milan, Rome, Turin and Florence, while 50% are distributed across the top 14 Provinces. Also in terms of large

[28] 'Shopping centre' means a complex of commercial services under unitary organisation, i.e. a cluster of commercial buildings.
[29] Source: Ministry of Economic Development - *Rapporto sul sistema distributivo anno* 2011

geographical area, distribution is not proportionate to the population: 58.2% of buildings are located in Northern Italy, 22.2% in Central Italy and only 19.6% in Southern Italy and on the Islands.
The buildings have a total floor area of 5.48 million m^2 and their volume is over 18.5 million m^3. About half the buildings are medium-large: 48% are over 1 000 m^2. However, 62% of floor area and volume (about 11.5 million m^3) is made up of just 16% of bank-use buildings, i.e. 236 large buildings (each with floor area over 5 000 m^2), almost exclusively concentrated in Central and Northern Italy.

3.2.2.2 Estimated savings

The following paragraph summarises the results of the study on the potential for savings in the civil sector, analysed in greater detail in the strategy for the energy-related renovation of buildings, drafted pursuant to Article 4 of the Decree transposing Directive 2012/27/EU.
"Potential savings" means the saving which would be achieved if, in the period 2014-2020, all energy efficiency improvement actions having a favourable cost/benefit ratio and not yet implemented were set in hand, irrespective of the spending capacity of executing parties and of the financial resources available under the energy efficiency promotion schemes.
To assess the potential for consumption reduction, the building stock for residential and non-residential uses (offices, schools and hotels) was analysed.
Analysis of these subsets of buildings focused on those having the poorest energy performance.

Residential buildings

For the residential sector, the assessment concerned the existing building stock built between 1946 and 2005 (both single-family and multi-family buildings), and included two types of renovation (complete and partial).
Potential consumption reduction was estimated taking into account performance standards in force, the applicability of energy efficiency schemes, the cost-benefit ratio and the feasibility of the following type of works:

- thermal insulation of the building envelope (roof, floor/ceiling with a non-heated space, dispersing boundary opaque walls and reduction in thermal bridges);
- replacement of windows and doors (high energy performance windows and doors, insulation of roller blind boxes, shading elements);
- upgrading of the heating/cooling system controls (thermostatic valves, etc.);
- replacement of the heat generator (with condensing boilers or heat pumps, including geothermal pumps);
- installation of an home automation system;
- replacement/redoing of the lighting system (high-efficiency luminaries);
- use of renewable sources (thermal solar panels, photovoltaic).

The types of actions considered are:

- complete renovation: this concerns about 3.5% of the buildings built in the period from 1946 to 2005 for single-family buildings and about 3% of multi-dwelling buildings, for an annual floor area of about 51.6 million m^2. The room for energy efficiency improvements in this category of buildings is greater in those built between 1946 and 1980 (as they have the greatest energy issues);
- partial renovation: this concerns mainly flats and works on the common portions and the

technical systems of multi-dwelling buildings. it is estimated that effective action can be taken on about 4% of buildings, for an annual floor area of some 118.5 million m^2. To estimate the achievable savings the various projects have been broken down by single-family and multi-family buildings built between 1946 and 2005, with different consumption reduction percentages according to type of project. The percentages stated for partial renovation projects in Table 3.15 must be considered individually and cannot be added together. Therefore, this analysis does not consider projects combined with each other whose total reduction percentage would be different from their sum.

The evaluations made lead to the potential energy savings by 2020 shown in Table 3.15.

The estimated investments to achieve these potential savings amount to be EUR 13.6 billion per year for complete renovation projects and EUR 10.5 billion for partial renovation projects.

Table 3.15 - Consumption reduction potential by 2020 from works on residential buildings carried out from 2014

Type of building	Renovation scenarios on the building stock		Type of project					Total annual energy savings by 2020	Total annual energy savings by 2020
	Floor area covered	Floor area covered by renovation each year	Roof	External walls	Windows and external doors	Technical systems	Complete renovation		
		m²	GWh/y					GWh/y	Mtoe/y
Single family buildings	Partial renovation	39 407 808	221	132	83	265		4 907	0.42
	Complete renovation	26 551 030					2 230	15 610	1.34
Multi-dwelling buildings	Partial renovation	79 141 300	253	475	253	658		11 473	0.50
	Complete renovation	25 142 222					2 414	16 898	1.45

Non-residential sector

For the non-residential sector, the analysis considered those buildings with specific uses (offices, schools, hotels, banks and shopping centres) whose energy consumption is 50% higher than the benchmark. On this basis the potential savings achievable by 2020 were considered.

The projects considered to assess consumption reduction concern:

- thermal insulation of the roof;
- thermal insulation of stilt floors or floors/ceilings bordering on unheated spaces and of heat-dispersing external walls (portion of wall below the window);
- replacement of existing windows with high-energy performance windows;
- upgrading of the heating/cooling control system (thermostatic valves, etc.);
- replacement of the heat generator (especially of those still using diesel);

- use of high-efficiency heat recovery systems;
- installation of a home automation system or a BEMS (Building Energy Management System);
- replacement/redoing of the lighting system (high-efficiency luminaries);
- external solar screens, especially on south-facing sides of the building.

The actions taken into consideration are matched with a mix of combinations that take into account the climate characteristics at the building's location, intended use and the cost-benefit ratio.

The floor area of the public and private buildings which can be renovated each year effectively has been estimated to be 5.5 million m^2 for office use (about 2000 buildings), 6.0 million m^2 for school use (about 3800 buildings) and 1.5 million m^2 for hotels (about 500 buildings). On this stock of buildings, several actions have been applied, differentiated by climate zone and applicability of the solutions, to achieve energy savings of 60% in the public sector (offices and schools), 45% in the private sector (offices, hotels, schools and banks) and 35% in shopping centres. The difference in energy saving percentages between the public and private sector stems from the fact that public buildings were mainly constructed prior to 1980 and their baseline energy performance is therefore poorer. For shopping centres, the conservative estimates of 35% savings is due to the fact that on account of the type of building shell, upgrading actions are mainly restricted to the technical systems.

The estimated investments for these projects amount to EUR 17.5 billion per annum, and should yield potential energy savings by 2020 of some 17 229 GWh/y, equivalent to 1.49 Mtoe/y.

Table 3.17 - Consumption reduction potential by 2020 from complete renovation of non-residential buildings carried out from 2014

Buildings	Floor area covered by renovation each year	Total energy savings by 2020	Total energy savings by 2020
Type	**m²**	**GWh/y**	**Mtoe/y**
Private offices	2 880 000	2 858	0.25
Public offices	2 640 000	3 881	0.33
Hotels	1 425 000	1 167	0.10
Private schools	1.000 000	617	0.05
Public schools	4 950 000	5 821	0.50
Banks	782811	726	0.06
Shopping centres	2 289 163	2 159	0.19
Total	**15 966 974**	**17 229**	**1.49**

3.2.2.3 Analysis of the economic and financial barriers to projects to improve the energy performance of buildings

Since energy efficiency projects are profitable, in a purely rational scenario one would expect these projects and investments to occur spontaneously, driven by economic and market considerations. However, this positive mechanism is hindered by several barriers to the deployment of energy

efficiency technologies, which vary according to sector. In the civil sector, the high initial investment often discourages small consumers from taking action (residential, offices). This is often compounded by limited awareness of the potential savings and difficulty in accessing the incentives. A list of the main barriers is provided below.

- Difficulties, especially for projects addressing whole buildings, in obtaining loans from private banks, on account of the complex assessment and technical-economic approval of the project, the medium-long timeframe for achieving return on investment, the uncertainties due to the timing of payments, and the interest rates charged, all hinder compliance with financial flows in projects implemented via an ESCO.
- The loan-granting process remains highly conservative: limited experience and a high degree of wariness are experienced in the financing of energy efficiency projects based on cash-flow.
- The small-medium financial size of the projects is not interesting for large banks.
- Banks are unequipped to supply financing tools suitable for innovative schemes.
- Difficulty in accessing dedicated public funding/tax relief for the development of innovative projects in the residential and non-residential public sector.
- Difficulty caused by the separation of interests: the economic benefits and investment costs go to different parties. In the residential sector, this situation typically occurs in the tenant - landlord relationship where on the one hand the landlord could make energy efficiency investments without reaping any direct benefit, other than increasing the value of their property, while the tenants could benefit from smaller utility bills bit have no interest in investing in a property they do not own and which they might leave a few years hence, before having recovered their investment.
- High risk perception, owing to the difficulty in knowing the real costs of advanced/innovative technologies, assessing unforeseen costs, and taking into account the significant fluctuations in energy costs, which alter the return on investment over time.
- The high risk of payment default, in the event of works in public and private multi-owner buildings, which discourages ESCOs in view of the possible problems in collecting their share of receivables from the energy savings achieved.

Overcoming the above-mentioned barriers is thus a priority in order to exploit potential energy savings fully.

3.2.3 Estimate of the energy savings achievable by 2020 under the current legislation

While paragraph 3.2.2.2 assessed the potential savings from energy efficiency projects in residential and non-residential buildings, this paragraph examines the savings which can be attained under the current legislative framework:

- the applicable legislation (discussed in paragraph 3.2.1);
- the incentive schemes (described in paragraph 3.2.1.2);
- other measures favouring the energy performance of buildings (described in paragraph 3.2.3).

As shown in Table 2.1, the civil sector will contribute to the total national target to 2020 with **4.9** Mtoe/y[30] spread between the residential and non-residential sectors.

Legislative Decree No 192/2005 and its implementing Decrees (see paragraph 3.2.1), together with the new standards required by the Ecodesign Directive for space heating/cooling, should yield

[30] More details on how this figure was calculated will be provided in the strategy for the energy-related renovation of buildings, to be drafted pursuant to Article 4 of the Decree transposing Directive 2012/27/EU.

savings of **1.6** Mtoe/y in residential buildings; in non-residential buildings the savings from these legislative standards should be **0.2** Mtoe/y.

Furthermore, in the light of its results in past years, the tax deduction mechanism should yield savings of **1.38** Mtoe/y of final energy in the residential sector (see Table 2.1).

The thermal account is estimated to save **1.47** Mtoe/y of final energy use, comprising 0.54 Mtoe/y in the residential sector and 0.93 Mtoe in the services sector, both public and private (see Table 2.1).

Lastly, although the white certificate scheme has produced its most significant results in the industrial sector, it is estimated to generate sizeable savings in the civil sector too, of 0.25 Mtoe/y of final energy, of which **0.15** Mtoe/y in the residential sector and 0.1 Mtoe/y in the services sector, both public and private (see Table 2.1).

Savings from other measures

The calculation of achievable savings does not include the possible effects of the latest measures, some of which are still being finalised, but which will mobilise significant funding and are therefore expected to play a significant role in the building sector. An example in point is the National Energy Efficiency Fund (see paragraph 3.2.1.2) which will have an annual budget of some EUR 70 million. Assuming that EUR 40 million will go to the civil sector and should be used to provide guarantees on loans for projects to improve the energy performance of buildings, considering a prudential loan multiplier factor of 8.3, this Fund should activate investments of EUR 330 million per year.

3.3 Energy efficiency in public buildings

3.3.1 Central government buildings

Article 5 of Directive 2012/27/EU requires each Member State to ensure that as from 1 January 2014, 3% of the total floor area of heated and/or cooled buildings owned and occupied by its central government is renovated each year to meet energy performance requirements. The 3% rate is calculated on the total floor area of buildings with a total useful floor area over 500 m^2. That threshold shall be lowered to 250 m^2 as of 9 July 2015.

Paragraph 1 of the Directive provides that by 31 December 2013 Member States shall establish and make publicly available an inventory of the above-mentioned buildings, containing at least the floor area in m^2 and the energy performance of each building or relevant energy data.

The present paragraph, as required by Article 5(6) of the EED, sets out Italy's actions to implement the EU requirements, specifically:

- the methodology used to establish the stock of buildings concerned;
- the methodology used to establish their energy performance;
- an estimate of the energy saving target;
- the instruments put in place to achieve such target.

3.3.1.1 Identification of the buildings concerned and their characteristics

Scope of the obligation

For the purpose of transposing the EED into the Member States' legal systems, the European Commission's guidance notes for implementation of Article 5, published on 6 November 2013, specify at point 2 the meaning of "central government". This definition is useful for establishing the scope of the obligation under Article 5. Member States are given the following two options:

- draw on Annex IV of the Public Procurement Directive (2004/18/EC), which includes a list of central government bodies in all Member States;
- draw on the data on public accounts which Eurostat collects on the basis of Council Regulation 479/2009/EC on the application of the Protocol on the excessive deficit procedure annexed to the Treaty establishing the European Community.

Italy decided to define the "central government" subject to the obligation under Article 5 EED by drawing on Annex IV of the Public Procurement Directive (2004/18/EC), transposed into Italian Law by Legislative Decree No 163 of 12 April 2006. Therefore, we refer to Annex IV of that Decree (which transposes Annex IV to Directive 2004/18/EC), which lists the following government bodies:

1. Office of the Prime Minister
2. Ministry of Foreign Affairs
3. Ministry of the Interior
4. Ministry of Justice
5. Ministry of Defence
6. Ministry of the Economy and Finance
7. Ministry of Economic Development
8. Ministry of Agricultural, Food and Forestry Policies
9. Ministry of the Environment, the Protection of Natural Resources and the Sea
10. Ministry of Infrastructure and Transport
11. Ministry of Labour and Social Policies
12. Ministry of Health
13. Ministry of Education, Universities and Research
14. Ministry of Cultural Assets and Activities

Inventory of the buildings

Under a joint effort of the Ministry of Economic Development and the Public Domain Agency, in early 2013 Italy started to draw up an inventory of the buildings owned and occupied by central government bodies meeting the following criteria:

- having a useful floor area (subject to heating and/or cooling) over 500 m^2;
- not being buildings officially protected because of their special architectural or historical merit;
- not being buildings owned by the armed forces or central government and serving national defence purposes, apart from single living quarters or office buildings for the armed forces and other staff employed by national defence authorities;

- not being buildings used as places of worship and for religious activities.

The inventory contains information on the cooled/heated useful floor area in square metres and energy consumption figures (including the energy performance certificate, if existing).

These data are supplied directly by the government bodies concerned via a website managed by the Public Domain Agency. Under Article 12 of Decree Law No 98/2011, converted with amendments by Law No 111/2011, the Public Domain Agency is responsible for allocating the funds for the maintenance of the buildings owned and occupied by central government bodies and is the contracting authority for the award of maintenance contracts.

As at November 2013 the floor area data for all the buildings concerned were available, while the energy data were available for approximately 60% of buildings. Furthermore a detailed assessment was performed of buildings with a floor area between 250 m^2 and 500 m^2 in view of the lowering of the obligation threshold to this group of buildings as of 9 July 2015.

Review of the energy data received has revealed issues of reliability for some of the data. To address these issues, a mechanism for validating the energy data and for collecting missing data has been put in place. This will lead in the short term to the deployment of a system able to supply reliable annual consumption data for all central government buildings.

At the same time based on the reliable data contained in the inventory an analysis - described below - was performed to establish the energy saving targets to be achieved by 2020 via energy-related renovation improving the energy performance of central government building.

Description of the inventory

The inventory, still in the validation stage, currently includes 2 904 buildings[31] occupied by central government bodies with a total gross floor area of 500 m^2, for a total of 13 763 975 m^2 and for which - except for some missing data - information is available on gross floor area, annual fuel and electricity consumption and the associated costs. Furthermore, a detailed assessment was performed on premises having a total gross floor area between 250 and 500 m^2 in view of the lowering of the threshold to include those premises as of 9 July 2015. This group includes a further 1 179 premises for a total useful area of 437 227 m^2, about 3% higher than the floor area of premises having each a useful floor area over 500 m^2.

The following table sets out the floor area of premises divided by central government body.

Table 3.17 - Breakdown by central government body

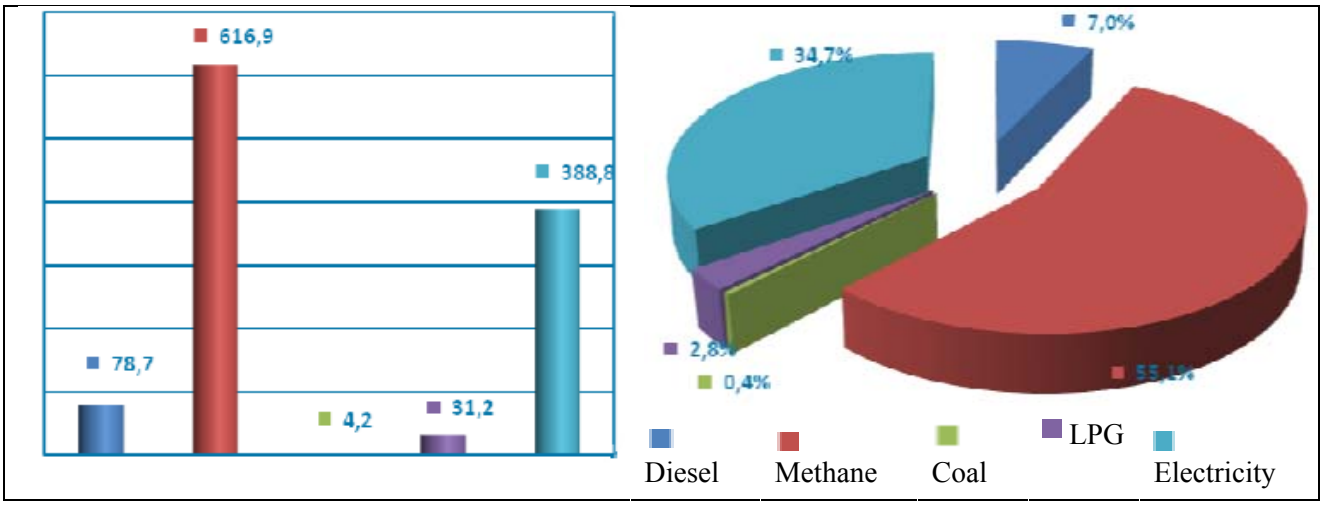
Owner government body	Floor area of premises (m^2)
THE OFFICE OF THE PRIME MINISTER	73 455
MINISTRY OF FOREIGN AFFAIRS	128 600
MINISTRY OF LABOUR AND WELFARE POLICIES	15 619
MINISTRY OF JUSTICE	5 456 924

[31] The generic term "premises" is used to include the cases of parts of buildings allocated to government use.

MINISTRY OF HEALTH	82 662
MINISTER FOR THE ENVIRONMENT AND PROTECTION OF NATURAL RESOURCES AND THE SEA	10 951
MINISTRY OF INFRASTRUCTURE AND TRANSPORT	956 849
MINISTRY OF AGRICULTURAL, FOOD AND FORESTRY POLICIES	645 271
MINISTRY OF THE ECONOMY AND FINANCE	1 499 693
MINISTRY OF THE INTERIOR	3 947 343
MINISTRY OF EDUCATION, UNIVERSITY AND RESEARCH	54 818
MINISTRY OF ECONOMIC DEVELOPMENT	209 681
MINISTRY OF CULTURAL ASSETS AND ACTIVITIES	501 185
Others	180 924
Total	**13 763 975**
Extension of the obligation to buildings having a useful floor area between 250 m^2 and 500 m^2	437 227
Total from 9 July 2015	**14 201 202**

The following types of energy consumption were monitored, where the information was available: electricity; and the types of fuels used (diesel, methane [standard conditions], coal, LPG, electricity).

The breakdown of consumption by source is shown in **figure 3.24**; more than half of the over 1.1 billion of kWh used were obtained from natural gas and just above one third from electricity. In general, energy consumption for heating the buildings (methane, diesel, coal and LPG) amounted to over 730 million kWh, or about two thirds of the total; the aggregate contribution of diesel, coal and LPG is 10%.



Source: ENEA using data from the Public Domain Agency

Figure 3.24 - Breakdown of consumption by source: Absolute values (left) and relative values (right)

3.3.2 Statistical assessment of energy consumption

The statistical assessment of energy consumption based on data taken from the inventory and also validated on the basis of the historical data yields for the buildings occupied by central government bodies selected in accordance with Article 5 of Directive 2012/27/EU an estimated overall consumption of approximately 1 442 GWh/year for heating/cooling consumption and 717.7 GWh/year for electricity, which taken together are equivalent to 0.186 Mtoe (Table 3.18).

Table 3.18 - Estimate of heating/cooling and electricity consumption

Government body concerned	Premises (No)	Gross floor area (m^2)	Heating/cooling consumption (GWh)	Electricity consumption (GWh)
Total buildings with floor area over 500 m²	2 904	13 763 975	1 398.2	695.6
Extension of the obligation to buildings having a useful floor area between 250 m^2 and 500 m^2	1 176	437 227	44.4	22.1

Source: ENEA using data from the Public Domain Agency

Considering a total useful floor area of about 14 million m^2 calculated by the inventory the total share subject to the energy performance upgrading obligation in the period 2014-2020 is of more than 2.7 million m^2, corresponding to an overall energy consumption of about 413 GWh/year (Table 3.19).

Table 3.19 - Floor area subject to energy performance upgrading obligation and respective energy consumption

Year	Total floor area	Floor area subject to the energy performance upgrading obligation (3%)	Heating/cooling consumption	Electricity consumption	Total consumption
	(m^2)	(m^2)	(GWh/y)	(GWh/y)	(GWh/y)
2014	13 763 975	412 919	42.0	20.9	62.8
2015	13 569 669	407 090	41.4	20.6	61.9
2016	13 387 751	401 633	40.8	20.3	61.1
2017	12 999 235	389 977	39.6	19.7	59.3
2018	12 622 375	378 671	38.5	19.1	57.6
2019	12 256 820	367 705	37.4	18.6	55.9
2020	11 902 233	357 067	36.3	18.0	54.3
Total		**2 715 061**	**275.9**	**137.1**	**413.0**

Source: ENEA using data from the Public Domain Agency

3.3.2.1 Establishment of the energy saving target

Table 3.20 lists the types of projects envisaged, the associated percentages of floor area subject to the obligation and calculation of the savings achievable on the basis of a cost-benefit assessment.

Table 3.20 - Energy savings solutions in buildings occupied by central government bodies

Type of project	Floor area concerned	Savings compared with the baseline
Energy related renovation of technical systems (heating, cooling, lighting)	85% of the area subject to the obligation each year	20/25%
Energy related renovation of technical systems and insulation of the building envelopment	13% of the area subject to the obligation each year	30/35%
Major energy-related renovation of	2% of the area subject to the obligation each	50%

the entire building	year	

The greatest part of the projects (85% in terms of floor area) should concern energy-related renovation of technical systems. The works concern efficiency improvement or replacement of existing heating, cooling and hot water production systems with high-efficiency systems, where necessary, the replacement of lighting fixtures and the improvement of the efficiency of the lighting system, the application of Building Energy Management Systems (BEMS) for monitoring and operating technical installations and the use of renewable energy sources.

About 13% of the floor area to be renovated is considered to require more complex works concerning not only the technical systems but also part of the opaque building envelope with replacement of doors and windows, insulation of flat roofs and insulation of the ground floor if it is adjacent to an unheated space.

A marginal share of 2% of the works should be devoted to deep energy-related renovation of the building*(major renovation),* which is able to deliver great energy savings. In this type of projects the works concern the whole system made up of the building and its technical systems, and include insulation of the building envelope, replacement of doors and windows and all the works for improving the efficiency of the heating and cooling, ventilation, lighting and hot water production systems.

Table 3.21 shows an assessment of the results attainable by 2020, applying mean energy-saving values associated with the types of projects described, based on historical analysis of national data.

Table 3.21 - Energy savings from upgrading works and savings targets by 2020

Year	**Floor area subject to the energy performance upgrading obligation** (m^2)	**Total consumption** **(GWh/y)**	**Savings (GWh/y)**							**Total savings by 2020** **(GWh/y)**
			2014	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	
2014	412 919	**62.8**	17.0	17.0	17.0	17.0	17.0	17.0	17.0	**119.1**
2015	407 090	**61.9**		16.8	16.8	16.8	16.8	16.8	16.8	**100.7**
2016	401 633	**61.1**			16.6	16.6	16.6	16.6	16.6	**82.8**
2017	389 977	**59.3**				16.1	16.1	16.1	16.1	**64.3**
2018	378 671	**57.6**					15.6	15.6	15.6	**46.8**
2019	367 705	**55.9**						15.2	15.2	**30.3**
2020	357 067	**54.3**							14.7	**14.7**
Total	**2 715 061**	**413.0**	**17.0**	**33.8**	**50.4**	**66.4**	**82.0**	**97.2**	**111.9**	**458.7**

Source: ENEA using data from the Public Domain Agency

The cumulative savings by 2020, obtained by adding up the annual savings lasting over time (from 2014 to 2020) according to the year works execution, total about 458.7 GWh, or 0.039 Mtoe.

3.3.2.2 Instruments for reaching the savings target

Starting from 2014, the competent authorities shall draw up an annual programme of energy-related renovation projects consistent with the provision of paragraph 1; they shall also deliver any information and technical assistance required by government bodies. The programme shall be prepared on the basis of the project proposals submitted by the central government bodies which can be supported by the interregional public works offices of the Ministry of Infrastructure. In drawing up the programme, account will be taken of the data contained in the inventory set-up pursuant to Article 5(5) of Directive 2012/27/EU, containing information on the floor area and on the energy consumption of the buildings of central government bodies, data on energy consumption recorded in the IT system IPer managed by the Public Domain Agency and the results of energy audits.

To maximise the effectiveness of the actions, the programmes are prepared on the basis of criteria of priority, cost-effectiveness, time to completion and time to recover costs, having regard to the use of the building and its climate zone. To implement the projects, the central government bodies are encouraged to have recourse to third-party financing or energy performance contracts, and may rely on the support of ESCOs. Last, emphasis is placed on monitoring the results obtained and on providing information and technical support to the public authorities concerned. The Government has allocated EUR 380 million to these tasks. Emphasis will be placed on awareness-raising and training addressed to civil servants to encourage energy-saving behaviours.

3.3.3 Buildings of other public bodies

To address the challenge of improving the energy and environmental performance of urban centres, some Italian cities are making efforts to improve their set-up and to encourage application of new technology solutions for sustainable development, by joining the "*Smart Cities & Communities"* initiative. A list of some best practices implemented by the cities of Turin, Trento, Bologna and the province of Chieti is provided below.

Turin has joined the Covenant of Mayors and has drawn up and implemented its own action plan for sustainable energy (TAPE - Turin Action Plan for Energy) to reduce significantly its CO_2 emissions by 2020. The pillars of this strategy are: strong improvement in the energy performance of the existing buildings; the deployment of renewable energy sources; a comprehensive transport plan to reduce the role and impact of private vehicle traffic and promote public transport; and a significant expansion of the urban district heating network based on co-generation which will cover 45% of the city's residential building stock. Turin has also implemented a Plan for the energy upgrading of municipal buildings, which promotes the efficient use of energy resources via the rationalisation and containment of energy consumption. Its aim is to reduce energy demand by about 70%. Awareness of environmental sustainability themes is promoted in schools via the "*Smart School*" plan which aims to engage the education system in the building of a "smart city".

Finally, the City's authorities are working on instruments to promote innovative public procurement focused on sustainable building.

The city of Trento has launched a series of innovative projects to improve the energy and environmental design of its urban areas. Key actions include the creation of a digital platform designed for the smart reduction of energy consumption in public buildings, the optimized management of new smart lighting systems and smart parking services.

The city of Bologna has selected as its main action areas residential buildings, the services and production sector, energy generation, mobility, public buildings and public lighting. The main actions implemented include: improvement of the energy performance of the "PEEP Corticella" social housing neighbourhood, which is served by a district heating network; and the purchase of electric trains Stadler ETR350 for the electrified lines of the regional rail service.

The province of Chieti has participated in the project "Chieti Towards 2020-Elena Programme" and has published tender notices for the energy-related renovation of more than 130 municipal public buildings and for granting concessions for energy upgrading works, including the design, installation, operation and maintenance, safety upgrading and regulatory compliance of public lighting systems (around 22 000 lamps distributed over 20 municipalities) in order to reduce current energy consumption by 25%.

3.3.4 Purchasing by public bodies

The Action Plan for environmental sustainability and reducing energy consumption by public authorities adopted by Interministerial Decree of 11 April 2008[32] is designed to spread among public bodies the practice of *green* procurement practices (GPP) delivering reduced environmental impact, in particular with regard to the consumption of natural resources (energy, water, etc.), dangerous substances content, emission of pollutants and waste production, also taking into account economic aspects and social impacts (ethical and health and safety) of the goods, services and works over their entire lifecycle.

The Action Plan *inter alia*:

- identifies the categories of goods, services and works accounting for large shares of public spending and for which sustainability improvements should be a priority by defining specific criteria to be included in the public procurement procedures on the basis of the guidance provided by the European Commission in the GPP Toolkit. To define these criteria, which are known as Environmental Minimum Requirements (EMRs) but which, as noted above, should rather be seen as sustainability requirements also encompassing economic aspects, and where appropriate, social aspects, the Plan establishes a specific procedure ensuring participation and involvement of all stakeholders (public authorities, producers, sellers, designers, users, etc.). This procedure is coordinated by the Action Plan Management Committee comprising the representatives of four Ministries (the Ministry of the Environment which also chairs it, the Ministry of Economic Development, the Ministry

[32]Official Gazette No 107 of 8 May 2008. This Decree was updated by the Decree of 10 April 2013 (Official Gazette No 102 of 3 May 2013).

of the Economy and Finance and the Ministry of Agricultural, Food and Forestry Policies), experts from some several Regional environmental protection authorities (ARPA) and representatives of the Regions, the public procurement supervisory authorities and ISPRA (Italian National Institute for Environmental Protection and Research), ENEA (National Agency for New Technologies, Energy and Sustainable Economic Development) and CONSIP (Central Purchasing Body). Furthermore, a *Standing Inter-agency Forum* has been established, where the Ministry of the Environment and CONSIP discuss the EMRs with the regional procurement centres before adopting them;

- provides that the central purchasing body (AVCP), in the framework of its tasks under Article 7(8) of Legislative Decree No 163/06[33] shall check the data on public purchases carried against the sustainability requirements (EMRs) adopted by Decree of the Minister for the Environment;
- provides for assessment - on the basis of the monitoring data - of the degree of penetration of sustainable public purchases (those using the EMRs) and for assessment of their impact on sustainability.

To date, EMRs have been adopted by Decree of the Ministry for the Environment for 11 products and services, listed below.

- The Ministerial Decree of 12 October 2009[34] adopted EMRs for photocopy paper and soil improvers.
- The Ministerial Decree of 25 February 2011 adopted EMRs for:
  - Furniture;
  - IT-Equipment;
  - Textiles;
  - Street lighting.
- The Ministerial Decree of 25 July 2011 adopted EMRs for:
  - Collective catering;
  - External doors and windows.
- The Ministerial Decree of 7 March 2012 adopted EMRs for energy services in buildings (lighting and heating/cooling).
- The Ministerial Decree of 8 May 2012 adopted EMRs for the purchase of road vehicles.
- The Ministerial Decree of 24 May 2012 adopted EMRs for cleaning services and products.
- *Moreover, the Ministerial Decree of 6 June 2012 adopted the* Guide for integrating social criteria in public procurement.

Additional sustainability criteria are being defined by the Ministry of the Environment for the following products/services/works:

- garden service and purchase of soil improvers, watering systems and ornamental plants - *update of the part on soil improvers;*
- IT equipment - *update;*

[33] Legislative Decree No 163 of 12 April 2006*, "Code on public works contracts, public supply contracts and public service contracts implementing Directives 2004/17/EC and 2004/18/EC" (Official Gazette* No 100 of 2 May 2006 - Ordinary Supplement No 107).

[34] Updated by Ministerial Decree of 4 April 2013 concerning EMRs for copy paper and graph paper.

- printer cartridges;
- street lighting (purchase of lamps and luminaires and lighting system design service) - *update;*
- street lighting services;
- urban waste management services;
- road construction and maintenance;
- building construction and maintenance;
- urban furniture.

Of all the products and services for which sustainability criteria have been or are being defined, eight require energy for their operation or are otherwise linked to the use of energy:

- purchase of road vehicles;
- IT equipment*(update in progress);*
- energy services for buildings (lighting and heating/cooling).
- street lighting (purchase of lamps and luminaires and lighting system design service) *(update in progress)*
- street lighting service *(in progress);*
- external windows and doors;
- building construction and renovation of buildings *(in progress).*

Except for the EMRs on the purchase of road vehicles, made compulsory by Legislative Decree No 24 of 3 March 2011[35], the use of EMRs in public procurement is currently on a voluntary basis. However at both national and EU level a debate is under way on the need to make the use of environmental requirements in public procurement mandatory in order to maximise their impact and ensure they help to reach the mandatory sustainability targets under international conventions.

At the present time we do not have calculations based on the data collected by AVCP allowing us to assess the uptake of EMRs in Italy. In any case, use of EMRs by all public contracting authorities would certainly help significantly to increase the sustainability of the products, services and works supplied under public contracts and by the same token would help reduce their environmental impacts (energy consumption, especially from non-renewable sources, greenhouse gas emissions, etc.). Blanket application of EMRs would also help rationalize public expenditure, promote innovation and boost the competitiveness of businesses.

The EMRs' contribution to reducing energy consumption and hence saving money has been estimated by several studies[36] only for IT equipment and street lighting. In detail, as concerns IT equipment, a study published in 2008[37] estimated the effect of replacing 1 000 000 desktop PCs used in public offices with "green", i.e. more environmentally friendly PCs (Table 3.22).

Table 3.22 - Estimated contribution of the Environmental Minimum Requirements in the IT

[35] Article 4(1), (2) and (3) of Legislative Decree No 24 of 3 March 2011 *Implementation of Directive 33/2009/EC on the promotion of clean and energy-efficient road transport vehicles* (Official Gazette No 68 of 24 March 2011).

[36] Both in the non-updated version.

[37] Study *Le implicazioni economiche del Piano d'Azione Nazionale sul Green Public Procurement* produced by Green Management Institute in 2008 on behalf of the Ministry of the Environment and Protection of Natural Resources and the Sea.

sector

Indicator (per million of desktop PCs replaced)	Environmental benefits	Economic benefits (€)
Electricity saved p.a.	34 300 MWh	2 560 495
CO_2 emissions avoided	18 899 t	449 992
Total	-	3 010 487

Source: Ministry of the Environment, the Protection of Natural Resources and the Sea

As to street lighting, [38] Table 3.23 shows the estimated savings from application of EMRs in all Italian municipalities with up to 100 000 inhabitants, taken from a recent study; for more details see Appendix C.

Table 3.23 - Estimated contribution of the Environmental Minimum Requirements in the street lighting sector

Indicator	Population of the municipalities				Total
	< 5 000	5 000 - 15 000	15 000 - 50 000	50 000 - 100 000	
TOE saved (t)	-	-	-	-	**430 364**
CO_2 emissions avoided (t)	-	-	-	-	**1 334 820**
Total economic savings (€ ´000) (*)	**212 607**	**119 783**	**121 220**	**78 578**	**532, 88**

(*) The estimated economic savings indicated only include the decrease in electricity purchased and not the reduction in associated indirect costs.

Source: Ministry of the Environment and Protection of Natural Resources and the Sea.

3.4 Other end-use energy efficiency measures, including industry and transport

3.4.1 Other end-use energy efficiency measures, industry

Most of the savings achieved by energy efficiency measures in the industrial sector stem from the white certificate scheme (see paragraph 3.1.1).

The following table provides an overview of the white certificate scheme listing the number of certificates issued for projects in the industrial sector.

Table 3.24 -EECs issued subsequent to successful savings verification by GSE

[38] Updated version, currently submitted for signature to the Minister of the Environment, of the study *Illuminazione pubblica e criteri ambientali minimi - Aggiornamento dei CAM adottati con DM 22 Febbraio 2011,* (Street lighting and environmental minimum requirements - update of the EMRs adopted by Ministerial Decrees of 22 February 2011) prepared by Mr Alessandro Battistini, October 2013.

(Period February - December 2013)

Type of Action	EEC	%
IND-T	2 103 930	53.7%
IND-FF	886501	22.6%
IND-E	223 225	5.7%
IND-GEN	240 956	6.1%
Total industrial sector	**3 454 612**	**88.1%**
CIV-T	260 632	6.6%
CIV-FC	116.377	3.0%
OTHER	33 556	0.9%
CIV-INF	31 466	0.8%
IPRIV-NEW	24 863	0.6%
Overall total	**3 921 505**	**100.0%**

(source: GSE)

Of all the certificates issued in the period February- December 2013, 88% or 3.4 Mtoe came from the industrial sector.

The EECs claimed by the industrial sector and relating to the main category (thermal energy savings, IND-T) are broken down by production sector in the following table.

Table 3.25 - Percentage breakdown of EEC applications by production sector (Source: GSE)

Sector	% of EECs requested
Refining of petroleum products	31%
Glass	15%
Manufacturing	9%
Food	8%
Production of bricks	8%
Metalworking	6%
Ceramics	5%
Paper	5%
Plastic materials	3%
Automotive	2%
Other	8%

Projects implemented under the main category IND-T refer to the following types of industrial plants.

Table 3.26 - Percentage breakdown of EECs requested by main type of IND-T operations (source: GSE)

Type of action	% of EECs requested
Heat recovery from a production process	32%
Revamping of an industrial kiln	26%
Heat recovery from a combustion process	23%
Installation of a biomass boiler/steam generator	7%
Replacement of exchangers	3%
Replacement of burners	3%
Replacement of dryers	3%
Installation of chillers/heat pumps	1

Production line re-layout	1
Other	1
Total	**100%**

White certificates are a successful innovation in the Italian system and, following the evolution of compulsory regulatory standards, have become the top-ranking scheme in terms of energy-saving potential. The scheme has recorded steady growth and has attracted the interest of a growing number of businesses wishing to use it; consequently the estimated savings achievable by 2020 of this scheme amounting to 4.3 Mtoe/y, indicated in Figure 3.2, is considered realistic and achievable.

3.4.2 Other end-use energy efficiency measures, transport

Such is the complexity of the transport systems that quite a number of energy efficiency measures can generate significant energy savings in terms of end-use energy.

3.4.2.1 Measures for the environmentally sustainable renewal of the road vehicle fleet

National infrastructure plan to set up electric vehicle charging points

In 2013 the Ministry of Infrastructure and Transport set up a "National infrastructure plan for installing electric vehicles charging points" (PNIRE) to ensure the uniform spread of electric charging points across the national territory. More specifically, in the short term (1-2 years), an infrastructure network will be set up with charging points in urban and metropolitan areas. In the medium and long term (3-5 years) charging points will also be set up in non-urban areas and along the motorways. The charging points will be both public and private, in a ratio of 1 to 8.

To implement the plan, the Ministry of Infrastructure and Transport has provided for the establishment of an ad-hoc fund[39] with a budget of EUR 20 million for 2013 and EUR 15 million for each of the years 2014 and 2015. In July 2013 the Ministry issued a "Call[40] in favour of the Regions to fund a network of electric vehicle charging points". The call had a budget of EUR 5 000 000 which has been awarded entirely to local authorities for projects to set up a network of electric vehicles charging points in the following areas:

1. Sustainable mobility in urban/metropolitan areas
2. Public and private fleets
3. Petrol stations
4. Two-wheeled vehicles (motorcycles)

Simplification of the authorisation process for biomethane refuelling stations

[39] http://www.mit.gov.it/mit/site.php?p=cm&o=vd&id=2715.

[40] http://www.mit.gov.it/mit/site.php?p=cm&o=vd&id=2717.

In order to promote the use of biomethane in transport, Article 8 of Legislative Decree No 28/2011 provides that the Regions shall issue simplified authorisation measures for the installation of new biomethane refuelling stations and for the upgrading of existing ones.

Government subsidies for the purchase of low-emission vehicles[41]

Law No 134/2012 (Article 17-*decies*) introduced incentives for the purchase of low CO_2 emission vehicles in the period 2013-2015. These incentives are paid out through an ad-hoc fund with a budget of EUR 50 million for 2013 and EUR 45 million respectively for 2014 and 2015, mainly targeting the purchase of company and public-use vehicles. Subsequently "Stability Law 2013" of 24 December 2012 reduced the overall budget for the three-year period to EUR 120 million.

In compliance with this Decree, the Ministry of Economic Development issued an "Implementing Decree concerning the incentives for the purchase of low emission vehicles" (February 2013), which detailed the procedure for requesting the incentives and the allocation of resources for 2013. As at January 2014 2 584 vehicles had been registered, of which 535 electric and 541 hybrid. Most of the vehicles which benefited from the incentives (about1 820) have CO_2 emissions between 50 and 95 gCO_2/km.

Guida al risparmio di carburanti e alle emissioni di CO_2 delle auto (Guide to saving fuel and decreasing CO_2 emission by cars)

Each year, the Ministry of Economic Development publishes an Interministerial document "Guide to saving fuel and decreasing CO_2 emission by cars", an information booklet for consumers and drivers providing clear data on fuel consumption and on the quantities of CO_2 emission produced by each car make and model for sale in Italy. The Guide includes the full list of car makes and models for sale, with the fuel consumption and CO_2 emissions of each. It also provides tips on reducing fuel consumption and CO_2 emissions while driving. The Annexes to the 2013 Guide provide evidence of the significant energy savings achieved over the years by both traditional and alternative technology vehicles[42].

Other measures to promote the deployment of electric vehicles

The Ministry of the Environment, the Protection of Natural Resources and the Sea co-finances projects for the purchase of electric buses, trolley buses, bicycles and cars. Some of the latest actions include:

- National electric car sharing project in cities already offering a car sharing service, to promote the use of electric cars and integrate them into the existing service. The Ministry co-finances the project with EUR 496 800.00 against a total cost of EUR 831 600.00. The pilot project will last three years. The Ministry estimates that the budget provided will enable the pilot use of between 100 and 150 electric cars.

- Design and implementation of a Green Wheel bicycle: An innovative hybrid-electric bicycle which stores and redelivers the energy not entirely used up when pedalling. To promote this

[41] Low-emission vehicles include: electric, hybrid, LPG, methane, biomethane, bio-fuel and hydrogen-powered vehicles emitting not more than 120 g/kmCO^2 and low quantities of other pollutants.

[42] http://www.sviluppoeconomico.gov.it/index.php?option=com_content&view=article&viewType=1&idarea1=593&idarea2=0&idarea3=0&idarea4=0&andor=AND&sectionid=0&andorcat=AND&partebassaType=0&idareaCalendario1=0&MvediT=1&showMenu=1&showCat=1&showArchiveNewsBotton=0&idmenu=2263&id=2028804.

project an MoU has been signed with Ducati Energia for the production and distribution of the first 1 000 bicycles in Italian Municipalities in cooperation with ANCI (Association of Italian municipalities).

It is estimated that together, the improved energy performance of the new cars and vans imposed on car manufacturers by Regulation EC No 443/2009 and Regulation No 510/2011 and the above-mentioned incentives to the purchase of low-emission and electric vehicles should save about 3.43 Mtoe of energy by 2020 (Table ES.1), corresponding to the value shown in the first column of Table 2.1.

3.4.2.2 Measures for sustainable urban mobility

The target of energy efficiency and of reducing polluting emissions to improve air quality is one the pillars of the 2014-2020 Cohesion Policy; within Thematic Area 4 "*Sustainable energy and quality of life*" ("Supporting the shift towards a low-carbon economy in all sectors") the priority areas include an action line to "Increase sustainable mobility in urban areas" for which a budget of about EUR 1 billion is assumed.

Development of the urban and suburban rail infrastructure

Starting with Law No 211/92, the Italian Government has long been engaged in a rail infrastructure development programme for rapid mass transport in urban and suburban areas.

By drawing on several funding sources, by 2016 it is planned to commission about 57 km of underground railways, 20 km of tramways and 20 km of regional railways for a total cost of about EUR 6.0 billion (around 80% of which have already been allocated by Stability Law 2014). By 2020 the total length of completed railways will comprise 130 km of underground railways, 30 km of tramways and 45 km of regional railways for a total cost of about EUR 17 billion.

Some of the major railway development works targeted by the funding include underground Line C in Rome, Lines M1, M2, M3, M4 and M5 in Milan, some section of Lines 1 and 6 in Naples, the Turin underground and the metropolitan railway of Brescia.

Urban mobility plans

The urban mobility plans (UMP) are an instrument adopted by the municipalities on a voluntary basis for the medium-long term planning (10 years) of the urban and metropolitan transport systems. Introduced by Article 22 of Law No 340/2000, UMPs target mainly cities with more than 100 000 inhabitants.

As this instrument is voluntary and involves no penalties for failure to implement the plans, its results have been limited. At the same time, the European Commission, through its Urban Mobility Package is supporting the drafting of Sustainable Urban Mobility Plans (SUMP) which take an integrated and cross-sectorial approach to policies, public participation and social concertation, setting clear and well-defined targets and objectives and including monitoring and assessment activities. In Italy so far only a few cities have drawn up their SUMP (Turin, Reggio Emilia and Parma), but more cities are following suit: they include Rome, Milan and Prato, as well as the 16

municipalities selected by the "Boosting Urban Mobility Plans" project, which supports municipalities[43] in drawing up their own SUMP.

It is estimated that the actions to upgrade local public transport infrastructure and services and to coordinate policies and measures for sustainable urban mobility should generate overall energy savings in the range of 0.85 Mtoe.

Five-year bus fleet renewal plan

The Stability Law 2014 has earmarked EUR 500 million for the purchase of new public transport vehicles, including EUR 200 million for renewing the railway cars and EUR 300 million for renewing the bus fleet. The feasibility of launching a 5-year financing plan to renew the bus fleet (around 50 000 vehicles) is currently being assessed and alternative incentive schemes for the private sector are being considered. The aim is to renew completely over the next five years the national bus fleet which has an average age of 12 years. This should generate energy savings in the region of 0.04 Mtoe.

3.4.2.3 Development of the national rail infrastructure

The next programming period 2014-2020 of the Structural Fund includes a specific thematic area for *"Sustainable movement of people and goods"* whose main aim is to promote sustainable transport systems and to remove bottlenecks in the main network infrastructures; this area has a budget of about EUR 2 billion. In particular, railway projects in progress will be prioritised, specifically the large-scale or major projects already launched in programming period 2007-2013 and the works included in the TEN-T corridors.

By 2016, about 45 km of new railways should become operational on ordinary lines and 57 km on the high-speed/high-capacity network. By 2020, the projects included in the programming documents will have been deployed to a great extent, reaching 140 km of railways on the ordinary lines and 500 km on the high-speed/high-capacity network. This because by 2020 the following new lines should be commissioned: Palermo-Messina- Catania, the high-speed line Tortona/Novi Ligure-Genova and Turin-Venice. The total estimated costs of these works is about EUR 30 billion.

According to estimates made on the basis of the data currently available, completion of these major works and upgrading of passenger and freight railway services should generate savings of some 0.45 Mtoe by 2020.

3.4.2.4 National Logistics Platform and ITS Action Plan

The Ministry of Infrastructure and Transport has reported that the last acceptance test on the six main macroservices of the National Logistics Platform, constructed by UIRNET S.p.A on behalf of the Ministry, was completed successfully in February 2013.

The platform, initially designed mainly for road transport, focuses on:

- optimising road transport by providing fleet management functions to sector operators;
- facilitating the match of demand and supply by focusing on the supply of more efficient transport modes vis-à-vis a road-only transport;

[43] http://www.bump-mobility.eu/it/news/elenco-partecipanti.aspx.

- reducing idle times in logistics thanks to the real-time exchange of information within the logistics chain, facilitating coordination between the different operating phases;

The pilot phase implemented in 2013 involved more than 800 transport companies and around 10 000 trucks.

For creation and pilot roll-out pf the National Logistics Platform the Ministry of Infrastructure and Transport has allocated EUR 27 million, subject to co-financing of EUR 8 295 million. In 2012 the project received additional funding: first EUR 3 million from the "Cresci Italia" Law and then a further EUR 2 million from the "Spending Review" Law .[44]

In January 2014 UIRnet S.p.A. launched a European call in project-financing mode to select an operator for the NLP. The NLP should start operations with a commissioning cost of EUR 14 million and an annual operating budget of EUR 2 million for the first three years. Under the business plan, the operator should recover the investment in 7 years and profitability should be more than 20%. After the start-up phase the NLP should not require any further public funding. Initially, the NLP should have 25 000 users and 8 logistics nodes but UIRNet estimates that in a few years the number of actual users will rise to 250 000 actual users. If these estimates are confirmed, the energy savings achievable in national road transport would be in the range of 0.5 Mtoe.

The Nation Logistics Platform falls under the broader context of the National Action Plan for Intelligent Transport Systems (ITS), launched in February 2014 by the Ministry of Transport in accordance with Directive 2010/40/EU.

The plan identifies four priorities up to 2017:

- optimal use of road, traffic and travel data;
- continuity of ITS traffic and freight management services;
- ITS applications for road safety and transport security;
- Linking the vehicle with the transport infrastructure.

The introduction to the Action Plan reports that operation of the systems implemented to date globally at both urban and extra-urban level has led to effective energy savings through the deployment of ITS in the range of 10-12%.

These benefits are obtained against relatively modest investments which are in any case far lower than those necessary to construct new infrastructure.

3.4.2.5 Summary

The actions described in paragraphs from 3.4.3.2 to 3.4.3.4 will together generate savings to 2020 of 1.97 Mtoe, as set out in the second column of Table 2.1. This value includes the savings of 0.12 Mtoe, produced by the State incentives for renewal of the car fleet in 2009.

3.5 Promotion of efficient heating and cooling

[44] National Action Plan on Intelligent Transport Systems.

3.5.1 Assessment of the national potential of high-performance cogeneration and efficient district heating and district cooling

3.5.1.1 Description of the national potential assessment methodology

Assessment of the national potential of high-performance cogeneration, efficient district heating and district cooling and other efficient heating and cooling systems (hereinafter "efficient Systems") involves two processes:

- **identification of the "technical potential"**, i.e. of the demand for heating and cooling which could be met by "efficient Systems". To identify this value the current and future demand for heating and cooling must be reconstructed together with the potential supply deliverable through efficient systems, factoring in the technical and geographical constraints;
- **identification of the "economic potential"**, by applying a cost-benefit-analysis comparing the current ("reference") scenario and including its likely evolution with one or more alternative scenarios taking into account the “efficient Systems” options.

Based on the results of the assessment of the national potential, Ministerial decrees will identify the measure to be adopted by 2020 and 2030 in order to exploit by means of cost analysis and efficiency criteria the development potential offered by efficient systems.

3.5.1.2 Identification of the "technical potential"

The identification of the "technical potential" includes three phases:

- Identification of the overall heating and cooling demand
- Identification of the supply from efficient Systems
- Identification of the "technical potential"

Identification of the overall heating and cooling demand

The overall heating and cooling demand will be identified by integrating an analytical approach with calculations on the available energy statistics.

The analytical approach is based on the characterisation of clusters of homogeneous users and on the application of appropriate indicators (KPIs) to reconstruct the geographical distribution of consumption.

This process will comprise the following steps:

- taxonomy of users by sector (agricultural, industrial, civil), type (hotels, school, etc.) and climate zone in order to identify clusters of users with homogeneous specific consumption;
- selection of actual users as case studies to determine the typical normalised consumption for each cluster, and analysis of user data (e.g. sector, type, climate zone, floor area, number of workers etc.) to identify the appropriate parameters for estimated heating/cooling demand;
- determination of typical normalised consumption for each cluster;
- acquisition of information on users present in the national territory, classified by sector, type, geographical location and size; if the data on the distribution of some types of users present in the national territory is insufficient, it might be necessary to disaggregate the data known at national level establishing their correlation with appropriate parameters having

known distribution;

- assessment of the global heating/cooling demand on the basis of the various homogeneous clusters so identified;
- validation of the results obtained by comparing them with the available data on aggregated consumption.

The results will then be combined with the analysis of **local energy consumption** taken from official statistics in order to assess the "density" of heating demand. The national territory will then be broken up into relevant energy systems whose level of geographical detail will necessarily be correlated to the amount of data available.

To facilitate this process it might be useful to liaise with trade association, operators, public agencies, research agencies and other parties. On the basis of the evolution of the building and industrial sectors, predictions on the development of heating/cooling demand over the next decade will be made.

Identification of the supply from “Efficient Systems”

The geographical distribution of the existing and potential heating/cooling supply from efficient systems will be defined.

As to the existing supply, information will be collected on the high-efficiency cogeneration plants currently present in the national territory and on the associated district heating and cooling networks taking into account the points of use supplied. The data available on the current national distribution of efficient systems will be used, and as necessary more information will be sought from trade associations, operators, public agencies and other parties.

Identification of the "technical potential"

The technical potential will be identified by comparing global heating and cooling demand against the availability of supply from efficient systems, taking into account geographical constraints and technical feasibility criteria. In particular, the following contributions will be assessed:

- the heating and cooling demand which could be met by high-efficiency cogeneration, including residential micro-cogeneration, and by district heating and district cooling;
- the upgrading of industrial and generation installations or of other installations producing waste heat and the construction of new installations;
- the energy efficiency potential of district heating and district cooling infrastructure.

As to potential supply, the national distribution of possible sources of heating and cooling will be considered, including large power plants and waste incineration plants. This survey will include district heating and district cooling infrastructure currently in the design phase as well as the possible expansion of existing or currently underutilised networks.

3.5.1.3 Identification of the “economic potential”

A cost-benefit-analysis will be carried out to identify the economically sustainable share of the identified technical potential from “Efficient Systems”.

The cost-benefit-analysis will proceed through the following steps:

- definition of an appropriate geographic scope and a system boundary to optimise the scope of the analysis and to capture all the relevant costs and benefits (taking into account the

points of use and installations identified when surveying the potential supply and demand);

- construction of the reference scenario within the system boundary and geographic scope so defined. The reference scenario describes the current situation and its most likely evolution over a given time-frame;
- identification of alternative scenarios contemplating the development of "Efficient Systems", while excluding from the analysis those alternative scenarios which are found to be impractical on account of well-documented technical, financial, regulatory or time reasons;
- identification of the best time-scale for the cost-benefit-analysis, i.e. a time horizon long enough so that no major cost or benefit is excluded from the analysis;
- comparison between the reference scenario and the selected alternative scenarios using the Net Present Value criterion, applying a discount rate complying with the European and national guidelines and taking into account the data supplied by the European Central Bank;
- sensitivity analysis to assess the impact of changes in major factors, including prices of the main productions factors and of energy and discount rates.

3.5.2 Cogeneration in Italy

As stated in the annual Report on cogeneration submitted to the European Commission on 30 April 2014, in production year 2012 generation capacity in Italy was 13 986 MW, more than 85% of which came from large combined-cycle gas power plants.

The combined-cycle gas turbines with heat recovery are indeed the most-used technology in terms of installed power generation capacity. This is confirmed by the fact that the primary energy used for production is mainly gas, which accounts for 88.7% of the total. On the other hand, in terms of number of cogeneration units, the most-used technology is the small-sized internal combustion engine. The limited number of steam turbines (back-pressure or steam condensing) not coupled with gas turbines shows that sector operators have typically selected combined-cycle cogeneration units also by modifying previous layouts of units consisting of steam turbines alone, by installing upstream one or more gas turbines with their heat recovery steam generators.

The gross electricity production totalled 63 070 GWh, of which 43.4% was high-efficiency, while useful heat production was 33 281 GWh. Combined-cycle gas turbines with heat recovery are the most widespread technology in terms of quantity of electricity and useful heat produced and the ratio of gross electricity to useful heat in heat recovery gas turbines and simple steam turbines is significantly lower than that of combined-cycle gas turbines with heat recovery. The high impact of combined cycles in terms of production of electricity and useful heat leads overall to a low value of high-efficiency electricity on the total value.

For production year 2012 the estimated overall savings of primary energy amounted to 1.46 Mtoe (-10.3%) from the combined generation of electricity and heat compared with separate generation.

At regional level, cogeneration is more widespread in terms of both number of units and installed electricity generation capacity in Northern Italy, while higher average capacity values are recorded in the area comprising Southern Italy and the main islands.

The most widespread cogeneration installations in terms of number in all geographical areas are internal combustion engines whereas the most widespread in terms of installed generation capacity

in all geographical areas are combined-cycle plants. The highest performing Regions are found both in Northern Italy (Piedmont, Lombardy) and in Southern Italy (Puglia).

Cogeneration coupled with district heating is found almost exclusively in the north of the country, except for some relatively large networks installed in the regions of Tuscany and Puglia.

The analysis shows that the percentage values of primary energy savings achieved in the different geographical areas match the geographical distribution of installed generation capacity.

3.5.3 Other efficiency measures in heating and cooling

In order to promote energy efficiency in the framework of cogeneration, Legislative Decree No 20/2007, implementing Directive 2004/8/EC, makes provision for financial support to technology projects which meet specific requirements in terms of primary energy savings (PES index) and can therefore be considered to operate in a high-efficiency cogeneration (HEC) mode.

The Ministerial Decree of 4 August 2011 completed transposition of the Directive by laying down the criteria for assessing the HEC condition.

On the basis of the guiding principles of Legislative Decree No 20/2007, the Ministerial Decree of 5 September 2011 introduced access to type-II white certificates (HEC white certificates) for technology projects regarding cogeneration units, according to the following criteria:

a. for newly-built cogeneration units commissioned from 7 March 2007 the entitlement to HEC white certificates applies for a period of 10 calendar years in variable number for each reporting year on the basis of the primary energy savings achieved and of a harmonisation coefficient "K" ranging between 1 and 1.4 according to mean electricity generation capacity in HEC mode. The incentive period is extended to 15 calendar years for units coupled with district heating networks if the new construction project also includes the network;
b. for cogeneration units which from 7 March 2007 undergo "major renovation" (replacement of at least 2 major components with new components in units in operation for at least 12 years), the entitlement to HEC White Certificates applies for 10 calendar years in variable number for each reporting year on the basis of the primary energy savings achieved (the harmonisation coefficient "K" is set at 1). The incentive period is extended to 15 calendar years for units coupled with the district heating network, if the major renovation project included additional transport capacity in the network expressed in toe/y of not less than 30% of the nominal transport capacity prior to the project;
c. for cogeneration units commissioned between 1 April 1999 and 6 March 2007, if recognised to be cogeneration installations under the rules applicable as at their date of commissioning in accordance with Legislative Decree No 28/2011 the entitlement to HEC White Certificates will be for a period of five calendar years and will number 30% of the certificates granted to the units listed in the preceding subparagraphs.

Moreover, the Ministerial Decree of 8 August 2012 supplemented the definition "major renovation" to include the following:

1. projects implemented from 7 March 2007 involving the installation of types of components not included in the unit prior to the renovation and which alter its technical set-up introducing a combined cycle in lieu of the earlier simple cycle (consisting of a steam turbine or a gas turbine with associated recovery boiler) which had been in operation for at

least 12 years, provided the new components comply with specific requirements;

2. projects implemented from 7 March 2007 on cogeneration units in operation for at least 12 years, consisting of a set of components of the same type, operating within the same industrial plant, even if installed in a separate site from the central location of the electricity production unit, involving the replacement of one or more components of the gas turbine or steam turbine with new components, provided that the power output of the new components is 45% or more of the unit's power output prior to renovation.

The white certificates can be used to meet the obligation under Ministerial Decree of 20 July 2004 or may be exchanged and traded. Alternatively, the operator may ask GSE to withdraw the white certificates it is entitled to. The withdrawal price is the price in force at the time of the unit's commissioning and is constant throughout the incentive period. Only for the units commissioned before the Ministerial Decree of 5 September 2011 the withdrawal price is that in force at the date the Decree entered into force.

The electricity produced by the cogeneration units recognised as being HEC units pursuant to the Ministerial Decree of 4 August 2011 is entitled to the following additional benefits:

- ✓ exemption from the obligation to purchase green certificates (GC), which applies to electricity producers and importers whose annual production or imports from non-renewable sources exceed 100 GWh;
- ✓ priority in dispatching the electricity produced "mainly" by HEC units (which means 50% of more of the electricity produced in HEC units out of the total electricity produced) over the electricity from conventional sources;
- ✓ option to use on-site exchange of the electricity generated by HEC plants with power output up to 200 kW;
- ✓ possibility to apply simplified technical and economic conditions for connection to the grid as established by the authority by Decision of 23 July 2008 - ARG/elt 99/08 "Consolidated Text of the technical and economic conditions for connection of electricity generation units to the electrical grids with obligation to connect third parties (Consolidated text of active connections)" as amended and supplemented;
- ✓ exemption from payment of the general system charges, subject to compliance with the other requirements set out in Legislative Decree No 115/2008 as amended by Legislative Decree No 56/2010 and by the recent Decree-Law No 91/2014 for recognition of an efficient system of supply points and equivalent systems (SEU and SEESEU)".

Moreover, the following provisions apply:

- ✓ for the share of net electricity produced by the HEC unit and fed into the grid from plants using biomass, biogas and sustainable bioliquids, an increase - differing according to type of fuel - is granted to the baseline incentive tariff set out in the Ministerial Decree of 6 July 2012;
- ✓ under the Ministerial Decree of 5 December 2013, the net electricity produced by the HEC unit and fed into the grid from biomethane power plants is granted the tariff applying to electricity from biogas under the Ministerial Decree of 6 July 2012.

Lastly, the Ministerial Decree of 24 October 2005 applying Article 14 of Legislative Decree No 20/2007 governs access to the green certificate (District Heating Green Certificates) for units already qualified as "cogeneration plants coupled with a district heating network", recognised as cogeneration plants pursuant to AEEG Decision No 42/02 as amended and supplemented.

The District Heating GCs are granted for a period of eight calendar years in variable number for each reporting year on the basis of the cogenerated heat supplied to the network.

Lastly, Article 14(11) of Directive 2012/27/EU provides that "Member States shall ensure that any available support for cogeneration is subject to the electricity produced originating from high-efficiency cogeneration and the waste heat being effectively used to achieve primary energy savings".

Assessment of the potential of “efficient systems” together with the cost-benefit analysis will be a useful decision-making support tool for designing strategies and policies to develop more efficient heating and cooling systems in terms of resource use and costs.

3.6 Energy transformation, transmission, distribution and demand response

3.6.1 Energy efficiency criteria in grid tariffs and in electricity sector regulation

Removal of tariff elements discouraging energy efficiency

The main tariff distortion found at present is the progressive nature of the household electricity tariffs on the basis of consumption, which is applied by modulating the components remunerating the grid and systems charges. The progressive structure of the household tariff was introduced in the 1970s for social purposes and to contain energy consumption after the energy crisis of 1973. There is furthermore a rebate granted to household customers with a contract demand of 3 kW. These provisions are felt to discourage the use of efficient technology such as heating with heat pumps which - while helping to reduce overall consumption of primary and final energy - involves significantly higher electricity consumption.

Actions to remove these distortions have recently been taken. Article 4(1) of Law No 96 of 6 August 2013 "European Delegation Law" provides that the government shall task the Electricity and Gas Authority (hereinafter the "Authority") with adopting one or more measures to remove the current progressive structure of tariffs. In the same months, in May 2013, by Decision No 204/2013/R/EEL the Authority launched a procedure to reform grid tariffs and system charges for household customers, in order to align tariffs with costs and contribute to energy efficiency, the use of renewable sources and technology innovation, thus sending correct economic signals to customers.

The revision of household tariffs is currently under way. A related measure is contained in the Interministerial Decree of 28 December 2012 on the Thermal Account, which provides for an ad-hoc tariff for heat pumps to facilitate their uptake and remove barriers to their use. This has led to the recent proposal made by the Authority in its consultation Document 52/2014/R/eel to launch a pilot tariff for those domestic customers who use electric heat pumps as the only heating system in their principal home.

Signals in grid tariffs to improve energy efficiency

Price signals sent to consumers via grid tariffs are inherently weak since the grid infrastructure costs remunerated by the tariffs are lower than energy costs or general system charges. The price signals supplied by the energy component are more significant. The two-time period prices for enhanced-protection customers introduced in 2010 were intended to transfer to customers the price signal of

energy in the two time periods established. But the weak match between the time periods and the actual profile of power exchange prices together with the weight of the other tariff components (e.g. system charges) which are not differentiated by time periods has also made the signal on energy price especially weak.

Under the current national framework, transmission and distribution tariffs have been set for each user category in relation to each category's share of the peak load. Peak load is taken as the reference because the grid infrastructure is assumed to have been sized to meet peak demand.

Tariffs stimulating demand response

The stimulus to demand response is the greater the more the electricity bill paid by the consumer in a given time interval reflects the cost of the service. The cost of energy supply is made up of three components:

a) cost of energy;
b) cost of the T& D and metering infrastructure and
c) general system charges.

In a liberalized market the tariffs set by the regulator only cover costs b) and c). On the other hand, the manner whereby the cost of energy is transferred onto the consumer is left to the seller.

Under free market principles, energy prices should be the main driver stimulating demand response and shifts to different time periods. Forcing demand to move from peak to off-peak periods by means of grid tariffs may introduce distortions into the electric system if the tariffs do not reflect the prices of energy in the time periods considered, especially in the current context where the difference between peak and off-peak prices is close to nil or is even reverting.

Any attempt to revise the tariff structure in order to promote energy efficiency in the use of electricity should also take into the account the principle of efficient allocation, according to which grid tariffs should be defined having regard to cost reflectiveness. Moreover, the frequency of tariff revisions should be such as to follow the changes in price and consumption profiles introduced in the electric system by generation from non-programmable renewable sources and by new electricity uses which modify the position/width of the peak and the share of any given user category in that peak.

3.6.2 Facilitating and promoting demand management

Removing demand discrimination in participation in energy and services markets

Currently in Italy demand already participates in the energy market. But this is not the case for the dispatching and balancing services. The current rules on dispatching (see Decision No 111/06 and Article 6 of Decision No 289/06) provide that 'authorised consumption units' may also participate in dispatching services markets but does not define their characteristics. Similarly, the current framework provides for the conclusion of forward contracts for the dispatching market (Article 60(5) of Decision No 111/06). However Terna's Grid Code defines all consumption units as "irrelevant" and thereby excludes them *de facto* from the dispatching services markets (irrelevant units are not authorised).

The current regulatory framework could be amended/extended to make possible participation of customers in the dispatching and balancing services market. To do so, the technical requirements governing participation of demand in the services market must be defined. For instance, it is necessary to establish the minimum aggregate capacity participating in the services market, the baseline measurement methodology, the maximum duration of activation of demand management, the timing of activation of demand management, the notice time for activation, the frequency of activation of demand management, the applicable penalties, etc. The demand side could also be allowed to participate to the capacity market. Furthermore, the demand side may participate both in real-time or near-to real time markets (for instance the day-ahead market) and in longer-term deals.

Provisions for connecting HEC units to the grid

The Italian law already contains specific provisions for connecting HEC units to the grid (technical rules, timing, costs). The Consolidated Text on active connections introduced by the Authority by decision ARG/elt 99/08, is the reference standard for this purpose. However, the Italian rules do not include an ”install and notify” procedure for small-size units and in particular for micro-CHP units, even though Directive 2012/27/EU contemplates this option to simplify and shorten the authorisation process.

Participation of aggregators in the services market

The current national framework for the electricity market makes no mention of aggregators for dispatching services. Aggregators only have a role in submitting purchase offers in the day-ahead market and in sales offers by non-relevant production units using renewable energy sources, for the propose of the proper allocation of imbalance costs.

The main barrier to introducing the aggregator in the dispatching services market lies in the fact that under the current market structure the resources available to Terna are all of “node” type (i.e. linked to the grid node) and are moreover traded in near real-time (forward contracts are not in practice used in the dispatching services market) while consumption units are currently grouped into zone dispatching points.

Furthermore, if the aggregator is different from and independent of the retailer, the relationship between these two parties must be also defined (e.g. the retailer must not be penalized for imbalances caused by changes requested by the aggregator).

The introduction of aggregators selling flexibility services in the services market in addition to the aggregators currently operating in the energy market will necessarily require major changes in the current market structure, in the management of dispatching by Terna and in settlement procedures. The services supplied by distributed resources will be addressed not only to TSOs but also to distributors who in turn could play a role in the supply of dispatching services to

Terna. A tentative proposal on possible models for the supply of dispatching services by distributed resources (including demand) and on the role of distributors and Terna is set out in Consultation Document DCO 354/2013/R/eel which the Authority published in August 2013 to launch a discussion on this issue.

With regard to the service provided by the demand side, it will be necessary to define the location of demand with respect to the grid (e.g. macro-zone, zone, national transmission grid node, connection to the distribution grid) and the aggregator's role with respect to the TSO and the DSO.

3.6.3 Energy efficiency in grid design and regulation

Services made available by grid operators to users to permit them to implement energy efficiency improvement measures

These are services introducing greater flexibility into the electric system. They include the possibility of managing distributed generation and demand (active grids), dynamic determination of the capacity of transmission grid lines, flow regulation in grid sections, second-generation smart meters for interaction with users and storage systems. Currently these smart technologies are being explored by pilot projects promoted by the Authority and implemented by the grid operators; their objectives include *inter alia* assessment of the cost-benefit profile of the smart technologies tested. The investments in pilot projects benefit from additional incentives.

The monitoring and assessment of these pilot projects is an excellent opportunity to study possible regulation mechanisms based on results, i.e. on the effects of developing the grid structures for the purposes of a specific service in order to promote measurable output-based regulation.

In order to design an output-based regulatory framework for the smart grids it is firstly necessary to identify and define a limited number of measurable performance indicators. These indicators must summarise effectively the system's behaviour and highlight the added benefits for end-users and the capacity to achieve system objectives by the actions for which an economic incentive is sought, which must demonstrate a positive cost-benefit ratio. Once the positive impacts expected from the smart grids have been defined, the criteria for output-based regulation can be established to identify the technology solution and investments best able to achieve positive impacts and the set targets.

Encourage grid operators to improve infrastructure efficiency

The current regulatory framework (see Consolidated Text on transmission, issued by the Authority by decision No ARG/elt 199/11 of 31 December 2011) already includes mechanisms to encourage grid operators to improve the efficiency of their infrastructure (for instance over-remuneration for the installation of low-loss transformers). Moreover, the application of standard coefficients for grid losses encourages distributors to lower losses with respect to the benchmark values. Schemes to improve the energy efficiency of grids are also being introduced under the White Certificate Scheme. They consist of a reduction in the share of obligation equal to the saving achieved, granted to distributors who implement works to reduce losses on their grids (e.g. raising the voltage of medium-voltage grids or increasing the cross-section of conductors).

Further stimuli to improve the efficiency of the electric grids might come from more frequent updates of the grids' standard loss coefficients; this together with the maintenance/strengthening of current support measures (e.g. white certificates, additional incentives to DSOs for using efficient components) would encourage distributors to keep improving the efficiency of their grids.

Promoting the siting of HEC plants close to demand, reducing connection costs and use of the system

The costs of using the electricity grid are paid by costumers through the transmission and distribution tariffs. The electricity grid use tariffs are of the "postage stamp" type, i.e. they depend neither on the geographical location of the off-take point nor on the distance between the feeding point and the off-take point, but only on the type of the off-take point. The siting signals for consumers come only from loss coefficients, which in turn are defined on the basis of the voltage level of the off-take.

For power generation, on the other hand, the main siting signal is the zone price of the energy sold on the power exchange. A further siting signal is the cost of connecting the generator to the grid. Furthermore, distributed generation connected to the low and medium voltage grids receives a remuneration which is proportional to the power fed in and to the connection voltage (loss reduction coefficient), to reward the lower grid losses when energy is fed into the grid close to the consumption centres (which are generally connected to the medium and low-voltage grid).

Considering that generation is exempt from grid use tariffs, support to HEC could come from a measure acting on loss-reduction coefficients (currently only set on the basis of voltage level) for the power fed into the grid by HEC plants, to ensure that these coefficients take into account the 'proximity' of the HEC plant to the load in order to make the transfer of energy from the plant to the grid even more profitable.

Priority of dispatch classification and publication

The current framework of the Italian electricity market defines unequivocally the order of priority of the offers submitted by power generation units. The current system (Authority Decision No 111/06) provides that when several offers with the same price are submitted, priority is given to the offers from programmable and non-programmable renewable energy plants over those from cogeneration plants (whether or not high-efficiency). Under Article 15(5) of Directive 2012/27/EU, grid operators shall provide priority access to the grid to electricity from HEC without hindering however the priority dispatching from various types of renewable energy plants. To resolve this obvious ambiguity, the Directive specifies that "When providing priority access or dispatch for high-efficiency cogeneration, Member States may set rankings as between, and within different types of, renewable energy and high-efficiency cogeneration".

A way to achieve compliance with the Directive would be to change the current priority ranking of offers having the same price by giving priority to energy from non-programmable renewable sources, other renewable sources and high-efficiency cogeneration plants.

APPENDIX A - Calculation methods for monitoring measures

A.1 Transposition of Directive 2002/91/EC and implementation of Legislative Decree No 192/05

Legislative Decree No 192/05 has introduced changes to the previous legal framework, in particular as to design methodologies, minimum energy performance standard (MEPS), the inspection of technical systems and the introduction of the energy performance certification of buildings. The standards establish the minimum energy efficiency levels to be met by products.

Taking as the baseline the new legislation, for new buildings and extensions the difference was estimated between the lower consumption of high energy efficiency buildings and those that simply meet the minimum requirements set out in the Decree.

In the residential sector, the useful floor area (of new residential buildings of extensions of residential buildings) for which the building licence was issued[45] has been divided into three consumption categories; a unit energy saving with respect to the baseline has been associated with each category, making it possible to measure the overall energy savings.

Table A.1 - Building licences: new residential buildings and extensions, years 2005-2012

Year	New buildings		Extensions with dwellings	
	Dwellings (number)	Useful floor area (m^2)	Dwellings (number)	Useful floor area (m^2)
2005	278 602	20 479 027	27 104	2 169 149
2006	261 455	19 143 787	28 436	2 272 912
2007	250 271	18 383 339	26 431	2 086 441
2008	191 783	14 268 787	23 263	1 859 979
2009	141 587	10 703 097	18 867	1 540 195
2010	119 409	9 366 218	9 298	781 441
2011	112 570	9 163 218	8 908	712 970
2012	84307	6 831 21/	-	-

* Provisional data. Source: ISTAT

[45] The ISTAT data on building licences are released monthly and have nationwide coverage; ISTAT collects data on new residential and non-residential buildings and on extensions to existing buildings for which the municipal offices have issued a building permit. Conversions and renovations of existing buildings which do not involve changes in volume are not included in the ISTAT survey.

Overall, more than 100 million m^2 of useful floor area: assuming a high level of savings (60 kWh/m^2) for 6% of the total area, medium (35 kWh/m^2) for 9% and minimum (20 kWh/m^2) for the remaining 85%, the overall energy savings amount to 2 431 GWh/a over the monitoring period.

Similarly, in the services sector the volume of new buildings and extensions, taken from ISTAT statistics on building licences (table A.2) has been assigned unity energy savings of 2.3 kWh/m^3 for the period 2006-2007, 5 kWh/m^3 for the period 2008-2009, and 7 kWh/m^3 for the period 2010-2012.

Table A.2 - Building licences: new non-residential buildings and extensions, years 2006-2012

Year	New buildings			Extensions	
	Number	Volume (m^3 s/v)	Floor area (m^2)	Volume (m^3 s/v)	Floor area (m^2)
2006	19 351	111 995 040	18 654 669	33 145 370	5 503 600
2007	16 198	117 839 214	19 165 421	29 839 066	4 964 234
2008	15 235	112 957 187	17 724 225	32 379 093	5 192 081
2009	12 658	85 132 207	13 662 473	24 117 110	3 798 887
2010	13 255	79 747 435	12 999 846	18 808 561	2 987 773
2011	12 186	67 388 239	11 042 694	18 169 047	2 941 271
2012	-	-	12 141 030	-	-

* Provisional data.

** Provisional data inclusive of extensions.

Source: ISTAT

As to the use of efficient heating systems in the residential sector, the conservative choice was made to distribute the total number of replaced systems (based on market data over the past ten years both for existing buildings and new buildings) over the national territory in a uniform manner by construction period and type of building (single-family, single-family terraced house, multifamily building, apartment building); for each type of building a benchmark consumption[46](C_i) was considered. Assuming efficiency values for the old and new system based on construction period and type of building, the overall savings *R* were calculated by using the following synthetic indicator[47]:

$$R = \sum_t \left(\frac{1}{\eta_0} - \frac{1}{\eta_1}\right) * C_t * S_t$$

[46] For more details see the TABULA project, financed under *'Intelligent Energy Europe* and implemented for Italy by the Turin Polytechnic:

http://episcope.eu/fileadmin/tabula/public/docs/brochure/IT TABULA TypologyBrochure POLITO.pdf.

[47] http://www.energy-community.org/pls/portal/docs/906182.PDF, indicator 2.4.

[kWh/year];

where:

η_0 = energy efficiency of the old technical system;

η_1 = energy efficiency of the new technical system;

C_t = energy demand for heating[kWh/m^2/year] by type of building (single-family, single-family terraced house, multi-dwelling building, apartment building);

S_t = average heated floor area [m^2] by type of building (single-family, single-family terraced house, multi-dwelling building, apartment building).

Application of this methodology has yielded estimated energy savings of more than 22 000 GWh/year.

A.2 Tax deductions (55%)

Article 1(344)(345)(346) and (347) of Law No 296 of 27 December 2006 as supplemented and amended, provides for the possibility for natural persons and companies to obtain deduction from the personal income tax (IRPEF) or corporate income tax (IRES) of 55% of the expenditure incurred to implement energy saving projects in the existing building stock. In detail:

- paragraph 344: overall energy upgrading of the building;
- paragraph 345: works on the horizontal and vertical opaque structures and on windows, inclusive of frame;
- paragraph 346: installation of solar panels for the production of hot water;
- paragraph 347: replacement of winter heating systems with systems equipped with condensing boilers or, alternatively, with high-efficiency heat pumps or low-enthalpy geothermal systems.

According to the different types of energy upgrading projects and the different applicable paragraphs calculating methods vary significantly and are summarised in Table A.3 below:

Table A.3 - Calculation procedures for the different types of projects eligible for tax deductions

Applicable paragraph	CALCULATION OF ENERGY SAVING	CALCULATION PROCEDURE
Paragraph 344	BY THE TECHNICIAN	National guidelines for the energy certification of buildings (Ministerial Decree of 26 September 2009) in accordance with UNI TS 11300

Paragraph 345a (opaque building envelope)	BY THE TECHNICIAN	National guidelines for the energy certification of buildings (Ministerial Decree of 26 September 2009) in accordance with UNI TS 11300
Paragraph 345b (replacement of windows and doors)	AUTOMATED - ENEA ALGORITHM	$E = \frac{(U1 - U2) * S * GG * 24 * k}{\eta * 1000}$
Paragraph 346	AUTOMATED - ENEA ALGORITHM	E = S * RSL
Paragraph 347:	BY THE TECHNICIAN	National guidelines for the energy certification of buildings (Ministerial Decree of 26 September 2009) in accordance with UNI TS 11300
Paragraph 347 (condensing boilers)	TO BE ESTIMATED BY THE BENEFICIARY	Gross specific savings obtained from the benchmarks (faq No 56 efficienzaenergetica.acs.enea.it /faq.pdf)

For all projects, the declared energy savings must also be referred to the primary energy to be supplied to the building's technical installation system; as to the technical life of each action, the reference parameters are shown in Table 3.5 in the following chapter.

The tax deductions cannot be combined with other national incentives (white certificates, thermal account); this ensures that the savings are not counted twice.

A3 The energy efficiency certificates or white certificates scheme

The energy savings generated by projects which are awarded white certificates (or energy efficiency certificates: ECC) are assessed using three different methods:

1) Standardised evaluation
2) Analytical evaluation
3) Post-hoc evaluation.

The EECs are usually granted to applicants for five years (useful live). To take into account the fact that the project will generate savings beyond the useful life and for the duration of its technical lifetime, the savings calculated in terms of toe/year for each year of useful life are multiplied by a factor 'tau', which is a function of the technical lifetime associated with the type of project

submitted; this factor typically has a value of 2.65 (technical life =15 years) or 3.36 (technical life = 20 years).

1) The **standardised** assessment is performed on the basis of **technical sheets**. The savings associated with the specific action are determined exclusively by reference to the number of RPUs covered by the elementary action (for instance, the number of electrical motors or external air intake air conditioners, the number of square metres of solar panels etc.). This is an immediate and simple method, as the applicant is not required to produce measurements or surveys during the works to certify the savings. Currently, the white certificate system uses 34 *technical sheets for standardised assessment* as shown in Table A.4.

The "model" standard sheet associates with each reference physical unit (RPU) a precise gross specific saving which multiplied by the number of reference physical units yields the final gross savings[48]. The ***net savings*** are then extracted from the gross savings and are translated into energy efficiency certificates. The net savings are based on the concept of "additionality" and are defined as follows (AEEG decision EEN 9/11):

"the gross savings net of non-additional energy savings, i.e. those energy savings which would have been achieved even without the action or project, as a consequence of technology, regulatory and market developments". In practice, net savings are calculated as gross savings multiplied by an ***additionality coefficient (≤1).***

Net savings in term of EEC/year ***continue for the same number of years as the project's useful life***: usually 5 years, which can be extended to 8 for projects on the buildings' envelope.

Table A.4 - Standardised technical sheets

No	Title	*tau*
02T	Replacement of electric water heaters with gas water heaters	2.65
03T	Installation of single-family 4-star efficiency boiler fired with natural gas with rated output not exceeding 35 kW	2.65
04T	Replacement of gas water heaters with more efficient gas water heaters	2.65
05T	Replacement of single-glazed with double-glazed windows	2.91
06T	Insulation of walls and roofs	2.91
07T	Use of photovoltaic systems with power output < 20 kW	3.36
08T	Use of solar collectors for the production of domestic hot water	2.65
09T	Installation of electronic frequency inverters on electric motors used for pumping having a power rating of less than 22 kW	2.65

[48] For instance in the case of an elementary project covered by technical sheet No 2: Replacement of electric water heaters with gas water heaters; the specific gross saving is calculated as 0.073 toe/year per water heater installed. If the applicant installs in the territory 1 000 gas water heaters replacing the same number of electric water heaters, the gross savings will be: GS = GSSx N° RPU = 0.073 x 1 000 = 73 toe/year.

15T	Installation of external air intake heat pumps in place of boilers in new or renovated residential buildings	2.65
17T	Installation of light flow regulators for high pressure mercury vapour lamps and sodium vapour lamps in outdoor lighting systems	1.87 or 2.65 (*)
19T	Installation of high-efficiency external air intake conditioners with cooling capacity of less than 12 kWf	2.65
20T	Thermal insulation of walls and roofs for summer cooling in the housing and commercial sectors	2.91
27T	Installation of electric heat pump for the production of hot water in new and existing domestic systems	2.65
28T	Installation of high-efficiency lighting systems for installation in motorway and highway tunnels	1.87 or 2.65 (*)
29Ta	Installation of new high-efficiency lighting systems in roads intended for vehicle traffic	2.65
29Tb	Installation of high-efficiency luminaires in existing lighting systems in roads intended for vehicle traffic	1.87
30E	Installation of higher efficiency electric motors	2.65
33E	Power-factor correction of distributed-type electric motors at the users' premises	2.65
36E	Installation of high-efficiency uninterruptible power supply equipment (UPS)	1.87
37E	New installation of single-family heating system fuelled by woody biomass with thermal power output < 35 kW .	2.65
38E	Installation of heating automation and control systems in residential buildings (Building Automation and Control System - BACS) in accordance with standard UNI EN 15232	1.87
39E	Installation of internal thermal screens for the thermal insulation of greenhouses.	2.91
40E	Installation of heating equipment fuelled by woody biomass in greenhouse agriculture	2.65
42E	Spread of electric vehicles for private passenger transport.	1.87
43E	Spread of hybrid thermoelectric vehicles for private passenger transport.	1.87

44E	Spread of methane-fuelled vehicles for passenger transport.	1.87
45E	Spread of LPG-fuelled vehicles for passenger transport.	1.87
46E	LED street lighting in pedestrian areas: LED technology systems replacing mercury vapour lamp systems	2.65

(*) 2.65 for new installations, 1.87 for retrofits

2) The **analytical** assessment sheets include a saving-calculation algorithm is fed by a few parameters characterising the operating and energy consumption status of the equipment covered by the action. To obtain the EECs, the applicant must undertake to install a measuring device and to report the measured data at least once a year for the duration of the useful life of the system.

As at the beginning of 2014 ten analytical technical assessment sheets were available; they are listed in Table A.5.

Table A.5 - Analytical technical sheets

No	Title	*tau*
10T	Electricity recovery from natural gas decompression	3.36
16T	Installation of electronic frequency inverters on electric motors used for pumping having a power rating of 22 kW or higher	2.65
21T	Application in the civil sector of small cogeneration (CHP) systems for space heating and cooling and domestic hot water production	3.36
22T	Application in the civil sector of district heating systems for space heating and domestic hot water production	3.36
26T	Installation of centralised systems for the heating/cooling of civil-use buildings	2.65 1.87 (*)
31E	Installation of electronic frequency inverters in electric motors operating on compressed air production systems having a power rating of 11 kW or higher	2.65
32E	Installation of electronic frequency inverters in electric motors operating on ventilation systems	2.65
34E	Mechanical Vapour Recompression (MVR) for concentrating solutions	3.36
35E	Installation of air and water condensing refrigerators for industrial applications	3.36

41E	Use of biomethane (BM) in public transport in place of methane (NG)	1.87

(*) In the cases where only zone-based metering and temperature regulation systems are installed

3) The **post-hoc** assessment method is applied only to applications for which no technical sheets are available. On account of its "open" nature, the post-hoc assessment requires a far deeper and more complex assessment than the standardised and analytical methods. The applicant must submit a *project proposal* and a *measurement plan* consisting of a proposal structured in a series of fields defining the project from all the viewpoints covered by the assessment. The continued delivery of energy savings by the project throughout its useful life is not taken for granted: the EECs are only issued after verification of the system's operating data.

Applicants must submit the following minimum information with each application to enable its overall assessment:

- Description of the actions, structures/technical systems concerned, time-frame and expected results
- Description of the proposed measuring plan
- Pre-installation conditions (baseline)
- Adjustments
- Additionality
- Evaluation algorithms to calculate savings
- Measurement instruments and methods
- Periodical checks on the functioning of the measuring instruments
- Documents to be submitted
- Documents to be kept

The key features of the post-hoc method are:

a) the **measuring plan** which must be based on physical measures of the quantities of energy consumed before and after the projects;

b) identification of the **baseline**, i.e. the technological benchmarks for evaluation of the additional savings. The baseline is defined as the situation of the technical system before the project, provided it is representative of a "current practice" or of a "market average" in the reference market. To this end the applicant may carry out statistical surveys to identify the current practice for describing the "baseline situation";

c) **adjustments**: the applicant must refer the calculated energy savings to the same flow of products/services *ex ante* and *ex post*, to prevent any *post hoc* decline in production or technical system performance from triggering non-eligible savings (some examples of adjustment factors are the decrease in organic load in the event of waste-water treatment, the lighting conditions of the working surface in the case of lighting systems, degree-days and volume in the case of space heating/cooling, production for industrial plants, etc.);

d) **additionality**: energy efficiency certificates are only granted in respect of additional savings, i.e. the share of savings above that which would have been achieved even without the project as a consequence of technological, regulatory and market developments.

e) savings evaluation **algorithm**: the measuring plan referred to in paragraph a) measures a series of energy parameters in the course of the monitoring period; these parameters must then be fed into the algorithm which yields the number of EECs that can be issued to the applicant;

f) **instruments**: the applicant must ensure that every element of the measurement chain is as reliable as possible, including: sensor quality; data treatment and storage; instrument calibration and checks; and procedures for the recovery of lost data in the event of malfunctioning or breakdowns.

A.4 Measurements on transport

Estimates have been produced of the energy savings achieved in 2012 and expected by 2016 by the two measures under IIAP 2011:

- TRA-1 State incentives 2007, 2007, 2008, 2009 for the car fleet renewal scheme
- TRA-2 Application of Regulation (EC) No 443/2009 (target average emissions of sold cars of 130 g CO_2/km in 2015 and of 95g CO_2/km by 2020).

The reduction in annual consumption has been assessed by multiplying the number of vehicles sold in the year by the difference in specific consumption expected from application of the measures vis-à-vis the trend values (business as usual scenario) and by annual mileage.

The annual vehicle registrations broken down by type of fuel are published in various official statistics (ACI, UNRAE, CE) up to 2013. For the subsequent years, up to 2016, assumptions have been produced, taking into account the likely developments of the current economic crisis and its impact on the automotive market, and the national and international strategies to improve the technology of new vehicles, in particular the increasing use of other fuels than petrol and diesel (LPG, methane, batteries). Under these conservative scenarios, the car market should recoup only part of the losses suffered in the past few years and should return to growth from 2014 and come to a sales volume of 1.65 million unit in 2016. Thus the estimated sales of *efficient* vehicles from 2007 to 2016 number 17.7 million; they comprise 87% powered by petrol and diesel, 13% using gas and 0.65% using batteries.

The current and expected consumption trends have been estimated with reference to specific CO_2 emissions, which are the only certified data as they have been monitored by the EC since the late 1990s in order to draft and revise Regulation (EC) No 443/2009. The passage from CO_2 emission data to consumption data was made using the transformation coefficients for the various fuels. The reference value of the average specific fuel consumption of vehicles sold has been estimated using EC data up to 2006. For the period 2007-2012 EC data were used broken down by fuel, while for 2013 since no EC data were available the UNRAE statistics were used. For the years from 2014 to 2016 technology improvements have been assumed for every type of fuel; this, together with the greater penetration of alternative fuels should enable achievement of the obligations under the Regulation in terms of annual mean level. The calculated energy saving has been raised by 10% to take into account real road driving conditions vis-à-vis the driving cycles for vehicle homologation.

Annual mileage during the vehicle's useful live has been obtained from the data in the ISPRA national emission inventory, broken down by EURO standard. The mileage of the vehicle fleet has been estimated using ACI's annual data on the vehicle fleet. For 2012 the mileage so estimated was reduced by 5% to factor in the drop in fuel consumption which was partly due to the improved

efficiency of the vehicle fleet and partly to the reduction in car use as a consequence of the economic crisis. By 2016 the average annual mileage of cars should return to 2007 levels.

APPENDIX B - Information campaigns

Table B.1 -Main information and training initiatives in progress and planned (P) with their target groups and implementing parties.

	- National Website on Energy Efficiency www.efficienzaenergetica.enea.it	X		X			X	X	ENEA	in progress
	- ENEA Blog on White Certificates				X	X		X	ENEA	in progress
	- Brochures - "Obiettivo Efficienza Energetica" (Target: Energy Efficiency)	X		X	X		X	X	ENEA	in progress
	- Web TV - Videos on Energy Efficiency for the general public	X		X			X	X	ENEA	in progress
	- Website www.gse.it	X			X	X			GSE	in progress
	- Project Lumiere	X							ENEA	in progress
	- Series "Ogni kWh conta" (Every kWh counts)			X			X		ENEA	in progress
	- Consumer info desk			X			X		AEEG	in progress
	- Atlas of consumer rights						X		AEEG	in progress
	- Communication Campaign "Il risparmio energetico è un guadagno per tutti" (Energy Saving is profitable for all)			X	X		X		Ministry of Economic Development - Ministry of the Environment	in progress
	- Communication Campaign "Rimetti la casa al centro del tuo mondo" (Place the home at the centre of your world)				X		X		Government	in progress

	- Energy Project :"Diritti a viva voce" (Speak up for rights)						X		CNCU AEEG	in progress
	- National Competition "Energia da Vedere" (Energy to be seen)		X	X			X		ENEA	in progress
	- "Il risparmio energetico in ufficio. Le azioni quotidiane che fanno bene all'ambiente" (Energy Saving in the office. The daily actions that are good for the environment)	X	X						Region Veneto	in progress
	- Se queste mura potessero parlare...di energia (If only these walls could speak...about energy) Use of 3D architectural mapping to raise user awareness on energy saving	X		X			X		ENEA Universities	P
	- Donne di classe A+ (Class A+ women) Awareness raising program for homemakers.						X		ENEA Federcasalinghe	
	- Project Elih-Med www.elih-med.eu	X			X	X	X	X	ENEA	in progress
Direct feedback	- Pilot projects to promote the uptake of multi-service smart metering and network innovation (Decision 393/2013/R/gas).	X				X	X	X	AEEG	P
Indirect feedback	- "La bolletta spiegata" (Explaining the energy bill)						X		AEEG	in progress
	- "Trova offerte" (Find offers)						X		AEEG	in progress
	- Pilot implementation of a simplified bill	X				X	X		ENEA Ministry of Economic Development Distributors	P
Energy audits	- National dissemination program EPC				X		X		Ministry of Economic Development ENEA	P
	- Pilot implementation of a				X				Ministry of Economic	

	dynamic EPC model								Development: ENEA	
	- Campaign for EPC dissemination in the network of real estate agencies				X		X		Ministry of Economic Development ENEA FIAIP	P
Actions at EU level	- Pilot implementation of local level social marketing methodologies	X					X		Ministry of Economic Development: ENEA Regions	P
	- Local initiatives within the SEAP	X			X	X	X	X	Ministry of Economic Development ENEA Regions	P
Education	- Project "Facciamo di più con meno. La PA che risparmia energia" ((Let's do more with less. The Public Authority saves energy)	X	X						ENEA Ministry of Economic Development	in progress
	- Educational campaign for energy efficiency in public buildings			X					ENEA Ministry of Economic Development Giunti ed.	
	- "Do you speak ENERGIA?" (Do you speak ENERGY?) Project for including the themes of energy efficiency and energy savings in the English language classroom			X			X		ENEA British Council	P
	- Corso di Sopravvivenza Energetica per studenti fuori sede (Energy survival course for students living away from home)			X			X		ENEA Universities	in progress
	- Project "No lift Days: giornate senza Ascensore" (No lift Days: days without taking the lift)	X	X						ENEA	in progress
	- "Portati il risparmio a casa" (Make savings at home) Take Away Course on energy saving	X	X						ENEA	in

	and efficiency.								ISPRA	progress
	- "Il risparmio energetico comincia da scuola" (Energy saving starts at school)			X					Piedmont Region	in progress
	- Project: A scuola di Risparmio energetico e sviluppo delle fonti rinnovabili (Learning about energy saving and the development of renewable sources)- "Le nuove idee crescono tra i banchi" (New ideas in the classroom)			X					Regions	in progress

A brief description of some best practice information campaigns listed in table B.1 is provided below.

Website on Energy Efficiency (ENEA)	The website www.efficienzaenergetica.enea.it is conceived as a dynamic tool rich in pages a services, providing citizens with comprehensive and detailed information on energy efficiency The website has two main sections: the first is arranged by target users (general pub businesses, and authorities), the second is broken down by sectors (building, industry, transpo agriculture and distributed generation). Every section has subsections and pages with m detailed information. There are also pages listing publications, pages on training and use links. The homepage has a selection of news on energy efficiency which is updated regularly. Some these news items are highlighted with a short headline and summary. Currently, interaction with users is only via a dedicated e-mail addr efficienzaenergetica@enea.it, through which periodically warnings on news and produ present on the website are sent to two mailing-lists with about 6 000 contacts (authorities a sector operators). Users can interact with replies etc. The website has about 2 000 contacts per day.

Brochures– Target: Energy Efficiency	A series of information brochures on energy saving published since 2003 and addressed to general public. Some titles: Saving energy with the washing machine, Saving energy with dishwasher, Saving energy with the fridge and the freezer, Saving energy with heati installations, The energy label, Air conditioning systems: cooling equipment and heat pumps.  
ENEA Web TV – Videos on Energy efficiency for the general public	ENEA's official Web TV producing scientific educational videos for the general public. Th include a number of videos on energy saving and efficiency targeting the general public. T videos are also disseminated via the social networks.
Every kWh counts (ENEA)	
GSE portal	The GSE portal (www.gse.it) provides information on access to incentives (Thermal Accou Energy Account, EEC) and also has a section devoted to consumers entitled "Energia Faci (Energy made easy). The section includes Guidance, Good Practices, Sustainability Ti Regulation and FAQ.
The electricity and gas authority	The Authority for Electricity, Gas and the Water system has an information website with section devoted to consumers (www.autorita.energia.it) .This section has the following tools: ***Lo Sportello per il consumatore (The consumer Info Desk)*** This section provides information, assistance and protection to end users and consume producers of electricity and gas. It provides a direct communication channel respondi promptly to complaints and requests for information. The Info Desk operates via a call centre which has been upgraded and staffed with professio operators on the free phone number 800.166.654 and includes a specialised task force managing and replying to complaints. ***Atlante dei diritti del consumatore (Atlas of consumers' rights)*** The Atlas of Consumers' Rights is a handy guide to the safeguards and guarantees establish by the Energy Authority for the benefit of end users in the sectors of electricity and gas. T guide is a list of questions and answers in simple communicative language, which can consulted by means of a search engine. ***La bolletta spiegata (Explaining the energy bill)*** Explaining the energy bill is a section of the AEEG's website explaining in detail the contents

	the energy bill (gas/electricity): the cost of electricity effectively used, taxes and system charg i.e. incentives for renewables and for the decommissioning of nuclear power plants. ***Trova offerte (Find offers)*** A service to help domestic customers find and compare different offers for the suppliers electricity and gas to find those best suited to their consumption profile. The service is entir free and available on line.
National campaigns	***Communication campaign "Il risparmio energetico è un guadagno per tutti" (Energy savi*** ***is profitable for all)*** The Ministry of Economic Development and the Ministry of the Environment and Protection Natural Resources and the Sea organise every year an awareness raising campaign on ener savings. The purpose of the campaign is to raise public awareness on the need to char personal habits to help decrease polluting emissions. The slogan of the campaign "Energy saving is profitable for all" stresses the fact that individ daily choices can go to increase common collective welfare. In 2013 the campaign was plann on the RAI TV channels in February 2013. www.governo.it/GovernoInforma/Multimedia/dettaglio.asp?d=71414 ***Communication campaign "Rimetti la casa al centro del tuo mondo" (Place the home at t*** ***centre of your world)*** Campaigned organised by the Office of the Prime Minister. This campaign consists of TV a radio public announcements to inform the public of tax relief measures, promote use of incentives by the general public and help improve the country's energy performance. The cla of the campaign is "Rimetti la casa al centro del tuo mondo" (Place the home at the centre your world). The TV and radio public announcements on tax relief were broadcast on the R TV and radio channels. The campaign was also broadcast on some national and local TV a radio stations, on the websites of the main daily newspapers and disseminated on the web. http://www.palazzochigi.it/GovernoInforma/campagne_comunicazione/agevola zioni_fiscali_casa/index.html
Exemplary projects	***Energy Project: "Diritti a viva voce" (Speak up for rights)*** The Project "Energy: Speak up for rights" is a set of face-to-face and electronic services for protection of consumers and users of energy services in Italy. Its aim is to inform consumers, ra their awareness and support them in all energy-related issues. The project has been promoted by 18 Consumer Associations members of CNCU, the National Consumer and User Council with support of the Electricity and Gas Authority. To date, since the start of the Project, more than 15 000 users have received assistance from project's 45 info desks. www.energiadirittiavivavoce.it ***National Competition "Energia da Vedere" (Energy to be seen).*** ENEA has promoted, in cooperation with Isnova (Institute for the promotion of technologi innovation) a competition of ideas for young people under 35 to submit multimedia contents on theme of energy efficiency, the smart and sustainable use of energy and energy saving. The competition had 4 sections: short films, audio ads, video ads and apps.

	http://www.youtube.com/user/eneautee?feature=results_main
	 ***Project 'DINAMO'*** The project DINAMO has been promoted by the Pact of the Presidents of the Chambers commerce who have opened the Energy info Desks "DINAMO" to support SMEs by means awareness raising, dissemination and information campaigns on the opportunities linked sustainable use of energy and on the main technologies for energy saving and efficiency and for generation of energy from renewable sources. The DINAMO info desks provide a comprehensive set of documents and tools including surve on the manner of consumption of electricity and on the costs of electricity paid by business http://www.av.camcom.gov.it/files/AmbienteAgricoltura/Auto_audit_tool_rev01_OPERATIVA. documents constantly updated which analyse the key benchmarks for improving energy efficien of the building where activities are performed. ***Project: "A scuola di Risparmio energetico e sviluppo delle fonti rinnovabili - Le nuove id crescono tra i banchi" (Learning about energy saving and the development of renewable sour -New ideas in the classroom)"*** Project promoted for the second year running by Consumer Groups "Movimento Consumatori" a "Movimento Difesa del Cittadino" together with GSE SpA – Gestore dei Servizi Elettrici (Ener Service Operator). The project involved 147 middle schools (children aged 11-13). The project included a survey to collect information on any initiatives implemented in Ital secondary schools for energy saving and the development of new energy sources. It also include competition of ideas "Raccontami la tua Energia" (Tell me about your energy). The competiti was entered by some 1 600 school middle school children, who submitted essays on this theme.
Workplace activities	The main activities are being implemented at national level by piloting educational and informati models targeting civil servants. The final aim is to repeat these models on a national scale producing courses, videos and publications to be used in future awareness raising campaig reducing greatly costs and increasing the community effect. Additionally, specific initiati targeting workers have been implemented at regional and local level. ***Project "Facciamo di più con meno. La PA che risparmia energia" (Let's do more with less. T Public Authority saves energy)***

	The aim of the project implemented by ENEA was to influence the habits of civil servants so as reduce consumption without structural actions (15-20%). The initiative consisted in the creati and distribution to ENEA staff of a company diary focused on energy saving and a set of stickers be posted in the office and in the laboratories acting as reminders of the tips provided in the diary ***Project "No lift Days: giornate senza Ascensore" (No lift Days: days without taking the lift)*** Project promoted and delivered by ENEA together with Foundation Santa Lucia IRCSS of Ror The project's aim was to pilot awareness raising actions targeting the services sector, in particu the Italian public authorities to encourage a more appropriate use of lifts and of energy providing ad hoc information on the health benefits of using the lift less and using the stairs more The first monitoring six months after the end of the Campaign has shown that the fi consumption of energy linked to use of the lifts at the Agency's Headquarters (Running phase) l decreased between 35 and 40%, from 10 kWh/day per lift to 6.5 kWh/day. This figure is very interesting especially with regards to assessment of awareness raising actions energy saving. In this regard the literature estimates an effectiveness potential of 15-20% but data from empirical measurements are very limited.  ***"Portati il risparmio a casa. Corso Take Away di risparmio ed efficienza energetica" (Ma savings at home. Take Away Course on energy saving and efficiency).*** Course on energy saving and efficiency organised by ENEA targeting public sector employees provide a series of tips to reduce daily energy consumption. The course is designed with continuing education approach addressed to an adult public and focused on energy savings a efficiency both in the office and at home.

	
Training	**Scuola delle Energie (School of Energy)** A centre for the advanced vocational training of energy sector technicians and operators hous within ENEA's Casaccia Centre in Rome. The School, set up in October 2012, has the follow functions: Workshop for implementing educational and training projects in the energy sector; Training hub providing a permanent and comprehensive package of advanced courses to tr specialist technicians promptly and effectively; Centre for the spread of technical and scientific culture and for the transfer of innovat technologies linked to the R&D projects implemented by ENEA in partnership with sec companies; A permanent centre providing guidance to young people towards the technical professions.  The School has a broad range of training paths and relies on the competences of ENE researchers and technicians. In June 2012, at the School of Energy, the first edition of the Sumn School in Energy Efficiency was held addressed to young graduates in technical-econon subjects. All course participants, after attending the course, were engaged in paid internships partner companies. **Corso di Sopravvivenza energetica (Energy Survival Course)** As part of its energy savings education activities, ENEA has organised, in cooperation with University La Sapienza in Rome and with the student association "Sapienza in movimento", a pi course entitled "Energy survival course for students".
	The aim of the action is to experiment with social marketing techniques to raise awareness on themes of energy saving in public and private buildings.

	The course, addressed to all university students, provided information on how to reduce energy consumption and the energy bill, improving efficiency. Starting in October 2012 two editions of the course were held and about 200 students participated. Course participants were given one training credit. 
Regional experiences	The Veneto Region's Environmental Agency (www.arpa.veneto.it), supported by the Ministry the Environment, implemented in 2012 a regional campaign addressed to public authorities promote energy savings in the office. The campaign was delivered via a handbook entitled "*Il risparmio energetico in ufficio. Le azi quotidiane che fanno bene all'ambiente" (Energy savings in the office. The daily actions which good for the environment)* which explained in a simple manner some of the key concepts of ener policies and consumption at international and local level. The handbook describes good practi implemented for the benefit or with the participation of public agencies and simple fact sheets w information and tips on how to save energy when using printers, copy machines, PCs, monito lifts, heating systems, lighting fixtures, etc.

APPENDIX C - Environmental Minimum Requirements (EMRs) in energy services for buildings and in public lighting

Among the sustainability requirements for public procurement currently in force or being developed, those on energy services for buildings and on public lighting have a major impact on the Public Authorities' energy consumption.

The idea underlying the EMRs is that, in order to effectively upgrade the energy and environmental performance of lighting fixtures and/or energy uses in public buildings, the role of the contracting authorities is not limited to awarding contracts but must include the collection of information on the operation of the technical installations and/or the building-installation system in order to participate actively in the choice of the types of projects to be implemented. Furthermore, high-level design must play a key role in the projects. In short, contrary to widespread practice , the contracting authorities should be aware of the actual state of the technical systems and buildings, the actual upgrading possibilities and achievable benefits and must have the tools for assessing the most appropriate projects and monitor their outcomes.

While there is no lack of technical standards, energy consumption remains very high and presumably the share of waste as well. To remedy these shortcomings and promote the uptake of energy and environmental upgrading projects by well-informed contracting authorities, the EMRs require that technical systems and buildings should firstly undergo analysis and audits and their performance should be managed in automated mode and monitored continuously. This information should be the basis for renovation projects but also for operation and ordinary maintenance and scheduled extraordinary maintenance.

The procurement authorities should use in their procurement procedures EMRs on energy services for buildings (lighting and heating/cooling) adopted by Ministerial Decree of 7 March 2012. In this regard besides procuring the supply of electricity and/or fuels having low environmental impact, the contracting authority will obtain information and works designs on the building technical installation system and will ensure that energy and environmental upgrading works are jointly assessed and approved and yield financial savings.

In particular, the basic requirements (or "selective" requirements) to be complied with by all tenderers include:

- Supply of electricity having the following characteristics:
  - not generated using solid or liquid fossil fuels;
  - annual supply consisting for at least 30% of energy from renewables and at least a further 15% of energy from renewables or high efficiency cogeneration;
  - the renewable energy sources, if consisting of biomass or biogas, must have been produced within a radius of 70 km from the installations that use them to generate electricity.
- Supply of fuels with the following characteristics:
  - must not be solid or liquid fossil fuels, except for LPG in places not served by gas pipelines.
- Implementation of projects to achieve regulatory compliance.
- Installation of automatic operation and monitoring systems.

- Certification and energy audit of the installation-building system.
- Outline and detailed project for the energy environmental upgrading of technical installation and buildings.
- Drafting of periodical reports on the service in particular on the performance of the building-technical installation system and on maintenance works carried out.
- Awareness raising of the staff using the buildings.
- Information to the public.

If the contracting authority already has the necessary information on the building-technical installation system, only another requirement must be added, on:

- Implementation of energy-environmental upgrading projects.

The EMRs on public lighting, adopted by Ministerial Decree of 25 February 2011, cover the purchase of high-intensity discharge lamps (HID) and LED modules, the purchase of light fixtures and the contracting of the lighting system design service. These requirements will soon be replaced by new requirements currently being drafted. The update is required to ensure compliance with Regulation (EU) No 347/2010 and in view of the availability on the market of products with significantly higher energy performance than the levels stated in the EMRs currently in force. The updated EMRs include the following basic requirements (or "selective" requirements) to be met by all prospective tenderers:

- For lamps and/or LED modules:
  - luminous efficiency
  - lamp lumen maintenance factor
  - survival factor
  - performance and breakdown rate of ballasts
  - mercury content.
- For luminaires:
  - lighting performance
  - energy performance
  - lamp lumen emitted towards the upper hemisphere
  - lamp lumen maintenance factor and breakdown rate
  - lamp lumen control system and breakdown rate.
- For lighting systems:
  - energy performance of the system;
  - lamp lumen regulation system and breakdown rate;
  - remote controlled system.

Finally, the updated EMRs on public lighting for electricity pay great attention to the warranties on lamps and luminaires, compliance with the CE marking requirements and compliance with technical requirements and the designer's qualification.

The EMRs on the street lighting system currently being drafted, besides referring to the requirements already set out in the EMRs on street lighting for lamps, luminaires and the design of lighting systems, have the same requirements for electricity and their format is similar to that of the EMRs on energy services for buildings described above.

APPENDIX D – Funding schemes adopted by the Regions for energy efficiency improvement projects

In order to increase the share of energy from renewables and improve energy efficiency and energy saving, the Regions have put in place a number of funding schemes, which are summarised below and involve significant outlay of financial resources.

PIEDMONT

Actions implemented in 2013:

Title of the scheme	Funding source	Resources earmarked	Resources awarded	Resources paid out*
Support to the uptake in Piedmont of systems for the use of thermal energy from forestry biomass under Action Line I.1 of Action Plan 2012-13.	ROP ERDF 2007/2013 Axis II	€ 1 527 324.83	€ 1 527 324.83	0.00
Support to the uptake in Piedmont of thermal systems using renewable sources under Action Line I.2 of Action Plan 2012-13.	ROP ERDF 2007/2013 Axis II	€ 1 110 695.21	€ 1 110 695.21	0.00
Promotion of the design and construction of very high energy performance buildings, with very low energy demand mostly covered by energy from renewables under Action Line II.1 of Action Plan 2012-13.	Regional Law No 23/2002	€ 402 604.50	€ 402 604.50	0.00
Promote the rational use of energy in existing public buildings via the energy upgrading of existing buildings and technical installations of local authorities for non-residential public use under Action Line II.3 of Action Plan 2012-13.	ROP ERDF 2007/2013 Axis II	€ 6 937 990.80	€ 6 937 990.80	0.00
Subsidies for energy efficiency and the use of renewable sources by businesses under Action Line II.4 of Action Plan 2012-13.	ROP ERDF 2007/2013 Axis II	€ 11 120 745.99	€ 11 120 745.99	0.00
Promote rational energy use in existing public school buildings consistently with other regional actions under Action Line II.5 of Action Plan 2012-13.	Regional Law No 23/2002	€ 397 000.00	€ 397 000.00	0.00
Implementing small-scale prototype activities to demonstrate how Smart Grids can support and promote use of charging points by setting up a smart grid of interoperable recharge points**.	ROP ERDF 2007/2013 Axis II	€ 1 429 840.00	0,00**	0.00
	TOTAL	€ 22 926 201.33	€ 21 496 361.33	

*The resources will be paid out on receipt of reports of expenditure.

**Under assessment

AXIS III, Activities Al and B1, Design and management of the Energy communication campaign 'Umbria+'	€ 42 868.30	€ 56 640.30	€ 0.00	€ 0.00
AXIS III, Activities Al and B1, Energy communication campaign 'Umbria+', Multimedia Services	€ 25 493.49	€ 33 683.59	€ 0.00	€ 0.00
AXIS III, Activities Al and B1, Energy communication campaign 'Umbria+' Organisation and participation in events	€ 54 960.00	€ 72 616.60	€ 0.00	€ 0,00
AXIS III, Activities Al and B1 - Creation of IT platforms	€ 45 250.66	€ 59 788.02	€ 0.00	€ 0,00
AXIS III, Activities Al and B1- Education and information projects	€ 43 069.60	€ 56 906.26	€ 0.00	€ 0,00
AXIS III Activity A3: call for the use of solar energy in municipal buildings	€ 1 496 958.19	€ 1 977 875.11	€ 3 925 884.86	€ 0,00
AXIS III Activity B3: Call for energy efficiency projects in street lighting	€ 2 410 805.32	€ 3 185 307.31	€ 4 051 349.33	€ 0,00
AXIS III Activity B3: Second call for energy efficiency projects in street lighting	€ 649 389.13	€ 858 013.68	€ 856 557.34	€ 0,00
AXIS III Activities A3 and B3: call for energy upgrade in projects in municipal public buildings	€ 2 382 773.94	€ 3 148 270.48	€ 453 530.35	€ 470 181.58
AXIS III Activity B3: call for setting up district heating networks owned by Municipal Authorities linked to renewable energy plants	€ 236 940.00	€ 313 060.00	€ 0,00	€ 350 000.00

VALLE D'AOSTA

Main projects funded under the ERDF by source of funding

Municipality	Territory	European Union €	National co-financing €	Region €
Funding of energy audits on buildings owned by local authorities, with a view to projects for improving energy efficiency and using renewable energy sources				
Municipality of Aosta	Aosta	**19 992**	**20 992**	**8 996**
Association of mountain municipalities Mount Emilius (Lead authority)	Quart	**19 030**	**19 982**	**8 563**
Municipality of Chatillon	Chatillon	**11 681**	**12 265**	**5 256**
Municipality of Valtournenche	Valtournenche	**8 985**	**9 434**	**4 043**
Municipality of Verrès	Verrès	**7 987**	**8 386**	**3 594**
Municipality of Montjovet	Montjovet	**7 987**	**8 386**	**3 594**
Municipality of Valsavarenche	Valsavarenche	**5 990**	**6 289**	**2 695**
Municipality of Saint Pierre	Saint Pierre	**5 520**	**5 796**	**2 484**
Municipality of Issime	Issime	**4 992**	**5 241**	**2 246**
Municipality of Verrayes	Verrayes	**4 992**	**5 241**	**2 246**
Municipality of Introd	Introd	**4 800**	**5 040**	**2 160**
Municipality of Saint Nicolas	Saint Nicolas	**4 000**	**4 200**	**1 800**
Municipality of Aymavilles	Aymavilles	**3 993**	**4 193**	**1 797**
Municipality of Saint Denis	Saint Denis	**3 993**	**4 193**	**1 797**
Municipality of Valgrisenche	Valsavarenche	**3 840**	**4 032**	**1 728**
Municipality of Rhemes Notre Dame	Rhemes Notre Dame	**3 840**	**4 032**	**1 728**
Municipality of Quart	Quart	**3 792**	**3 981**	**1 706**
Municipality of Cogne	Cogne	**3 696**	**3 880**	**1 663**
Funding of energy audits on buildings owned by local authorities, with a view to projects for improving energy efficiency and using renewable energy sources (second edition)				

Municipality of Pont Saint Martin	Pont Saint Martin	**19 795**	**20 785**	**8 908**
Municipality of Aosta	Aosta	**17 214**	**18 075**	**7 746**
Municipality of Aosta	Brusson	**17 214**	**18 075**	**7 746**
Municipality of Chambave	Chambave	**13 083**	**13 737**	**5 887**
Municipality of Etroubles	Etroubles	**12 080**	**12 684**	**5 436**
Municipality of Doues	Doues	**12 080**	**12 684**	**5 436**
Municipality of Villeneuve	Villeneuve	**10 988**	**11 537**	**4 944**
Association of mountain municipalities Emilius	Quart	**10 643**	**11 175**	**4 789**
Municipality of Donnas	Donnas	**10 067**	**10 570**	**4 530**
Municipality of Gressoney Saint Jean	Gressoney - Saint Jean	**9 060**	**9 513**	**4 077**
Municipality of Gressoney - La Trinità	Gressoney-La Trinità	**8 712**	**9 147**	**3 920**
Municipality of Champdepraz	Champdepraz	**8 557**	**8 984**	**3 850**
Municipality of Bionaz	Bionaz	**7 687**	**8 072**	**3 459**
Municipality of Valtournenche	Valtournenche	**7 550**	**7 927**	**3 397**
Municipality of Ayas	Ayas	**7 449**	**7 822**	**3 352**
Municipality of Ollomont	Ollomont	**7 424**	**7 795**	**3 341**
Municipality of Allein	Allein	**7 281**	**7 645**	**3 276**
Municipality of Gignod	Gignod	**7 047**	**7 399**	**3 171**
Municipality of Prè Saint Didier	Prè Saint Didier	**7 047**	**7 399**	**3 171**
Municipality of Valpelline	Valpelline	**6 518**	**6 844**	**2,933**
Municipality of Issogne	Issogne	**6 292**	**6 606**	**2 831**
Municipality of Avise	Avise	**6 165**	**6 473**	**2 774**
Municipality of La Thuile	La Thuile	**5 914**	**6 210**	**2 661**
Municipality of Saint Anseime	Challand Saint Anseime	**5 788**	**6 078**	**2 604**

Municipality of Bard	Bard	**5 285**	**5 549**	**2 378**
Municipality of Torgnon	Torgnon	**5 033**	**5 285**	**2 265**
Municipality of Roisan	Roisan	**5 033**	**5 285**	**2 265**
Municipality of Saint Georges	Rhemes Saint Georges	**5 033**	**5 285**	**2 265**
Municipality of Arvier	Arvier	**5 033**	**5 285**	**2 265**
Association of mountain municipalities Mont Rose	Association of mountain municipalities Mont Rose	**5 033**	**5 285**	**2 265**
Municipality of Arnad	Arnad	**5 033**	**5 285**	**2 265**
Municipality of Saint Vincent	Saint Vincent	**4 907**	**5 153**	**2 208**
Municipality of Chamois	Chamois	**4 840**	**5 082**	**2 178**
Association of mountain municipalities Grand Combin	Association of mountain municipalities Grand Combin	**4 732**	**4 969**	**2 129**
Municipality of Oyace	Oyace	**4 538**	**4 765**	**2 042**
Municipality of Lillianes	Lillianes	**4 459**	**4 682**	**2 006**
Municipality of Champorcher	Champorcher	**2 718**	**2 854**	**1 223**
Municipality of Pontboset	Pontboset	**2 315**	**2 431**	**1 041**
Municipality of Rhemes Notre Dame	Rhemes Notre Dame	**2 265**	**2 378**	**1 019**
Municipality of Gaby	Gaby	**1 936**	**2 032**	**871**
Municipality of Saint Denis	Saint Denis	**1 006**	**1 056**	**452**

Source: Opencoesione

Projects funded under Regional Law No 26/2012

	Measure	Funding source	Savings achieved 2011 MWhcomb	Savings achieved 2012 MWhcomb	Savings achieved 2011 Toe	Savings achieved 2012 Toe
1 A	Title III - Chapter 1 "Financial incentives in the residential building sector" - 1. Article 23[49].	Regional Law No 26/2012 repealing from 1 January 2013 Regional Law No 3/2006	416.08	1 240.18	35.78	106.66
The savings are calculated as the difference between the minimum performance required by the national law and actual performance exceeding this requirement.						
1 B	Title III - Chapter 1 "Financial incentives in the residential building sector" - 1 Article 23[50].	Regional Law No 26/2012 repealing from 1 January 2013 Regional Law No 3/2006	2 846.8	3 689.1	244.82	317.26
To calculate achieved savings the following works are considered: heat pumps for heating and domestic hot water and heat pumps for domestic hot water only; insulation of vertical structures and horizontal structures (roofs); replacement of windows and doors.						
1 C	Title III - Chapter 1 "Financial incentives in the residential building sector" - 1. Article 23[51].	Regional Law No 26/2012 repealing from 1 January 2013 Regional Law No 3/2006	11 449	11 023	984.58	948.00
Eligible projects: thermal solar plants; biomass installations; photovoltaic solar installations; hydro-electric installations.						

[49] The Region grants financial incentives for initiatives in the residential building sector (new or entirely reconstructed buildings reaching specific energy performance levels).

[50] The Region grants financial incentives for initiatives in the residential building sector (existing buildings undergoing major building and technical system renovations leading to improved energy efficiency).

[51] The Region grants financial incentives for initiatives in the residential building sector (residential buildings undergoing transformation works involving the use of renewable energy sources).

2	Article 17. 1 - The incentives under Article 16 are granted to projects for fitting, installing, enlarging and upgrading tangible and intangible assets intended for business activities[52].	Regional Law No 6/2003 "Regional measures for the development of industrial and craft sector enterprises"	4 928.46	1 235.68	423.85	106.27
Installation of photovoltaic plants.						
3	Measure 311 - Diversification into non-agricultural activities. Action d) installation of small photovoltaic power plants eligible for aid under the Development Programme.	RDP 2007/2013	1 618.92	2 427.51	139.23	208.77
Installation of photovoltaic plants.						
4	Implementation of a pilot project to convert the "Galleria delle botteghe artigiane" into an "almost zero energy building" in the airport area of Pollein - Brissogne.	Operational Programme "Regional Competitiveness 2007/2013" of the Autonomous Region of Valle d'Aosta, co-funded by the ERDF, adopted by the EC by Decision No C/2007/3867 of 7 August 2007 – Axis 2 "Promotion of sustainable development"	Not currently available	Not currently available	Not currently available	Not currently available
The savings data are not available as the works are in progress.						

Source: Valle d'Aosta Region

[52] The Regional Executive identifies eligible expenditure for implementing the initiatives referred to in paragraph 1 among: environmental protection measures; measures for the rational use of energy; installation of PV plants.

LOMBARDY

Main projects funded by the ERDF by source of funding

Project	Municipality	European Union (€)	State (€)	Region (€)
Combined heat and power plant connected to a district heating network distributing heat to public and private users in the Municipality of Cinisello Balsamo	Cinisello Balsamo (Milan)	**297 300**	**451 200**	**1 500**
Installation of heat pump systems for the production of heating and refrigeration to produce hot water and to provide winter heating and summer cooling to a municipal sports facility	Corsico (Milan)	**178 693**	**271 195**	**901**
Project to improve energy performance by means of a heat pump thermal energy system in the school building "Scuola elementare di Governolo"	Roncoferraro (Mantova)	**28 497**	**43 249**	**143**
Project to improve energy performance by installing a heat pump thermal energy system in the municipal library building "Biblioteca Comunale"	Roncoferraro (Mantova)			
Project to improve energy performance by means of a heat pump thermal energy system in the school building "Scuola elementare di Barbasso"	Roncoferraro (Mantova)			
Project to improve energy performance by means of a heat pump thermal energy system in the building "Teatro Di Capi in Barbasso"	Roncoferraro (Mantova)			
Project to improve energy performance by means of a heat pump thermal energy system in the building "Sala Civica Casoni" in Governolo	Roncoferraro (Mantova)			
TREND project - Technology and innovation for Scattered Energy Saving and Efficiency to promote and support energy saving and the generation of energy from renewable sources in small and medium-sized enterprises of Lombardy. (ROP 2007-2013)		1 982 000	3 008 000	10 000
Call –"Incentives to the installation of heating and cooling systems to meet the thermal requirements of public buildings using heat pumps" (ROP 2007-2013).		9 156 840	13 896 960	46 200
Call - "Improving the energy performance of street lighting systems". (ROP 2007-2013)		10 623 520	16 122 880	53 600

Two calls to promote the installation of solar thermal systems on public or public-use buildings (Framework Programme Agreement Region of Lombardy - Ministry of the Environment)			8 973 691	
Two calls for energy savings in public buildings (Framework Programme Agreement Region of Lombardy - Ministry of the Environment)				5 691 441
Call - "Incentives for the uptake of district heating systems" (ROP 2007-2013)		5 739 597	8 710 750	28 959

Source: Opencoesione

TRENTINO ALTO ADIGE

Main projects funded under the ERDF by source of funding

Project	Territory	European Union €	National co-financing €	Region €	Municipality €	Type (%)
Installation of a photovoltaic plant on the roof of the school building "Scuola Media Steiner" in Lavis connected to the grid, producing electricity from renewable sources (14 - grid connected PV plants)	**Lavis (Trento)**	**7 912**	**10 549**	**7 912**	**461 608**	**A**
Installation of a photovoltaic plant producing electricity and serving the primary school of Fiavè (14 - grid connected PV plants)	Fiavè (Trento)	**8 200**	**10 934**	**8 200**	**144 974**	A
Installation of a photovoltaic plant producing electricity for the municipal gymnasium in CC. Fiavè (14 - grid connected PV plants)	Fiavè (Trento)	**7 840**	**10 454**	**7 840**	**146 174**	A
Installation of a photovoltaic plant producing electricity on the roof of the town hall of CC. Fiavè (14 - grid	Fiavè (Trento)	**4 827**	**6 436**	**4 827**	**108 309**	A

connected PV plants)						
Installation of a photovoltaic plant connected to the grid for the production of electricity from renewable sources supplying the building on ped. 2395 of the Municipality of Predazzo Le Fassane locality (14 - grid connected PV plants)	Predazzo (Trento)				-	B
Installation of a photovoltaic plant connected to the grid for the production of electricity from renewable sources supplying the building on ped. 805 NOV. Ziano di Fiemme (14 - grid connected PV plants)	Ziano di Fiemme (Trento)				-	B
Development of the production and distribution of sustainable energy by installing a photovoltaic plant on the roof of the residence for the elderly Renon 1 G.P. 47/5 kg	Bolzano				-	-

Key: A = Infrastructure; B = Incentives to businesses

Source: Opencoesione

VENETO

Main projects funded under the ERDF by source of funding

Project	Territory	European Union €	National co-financing €	Region €
Preliminary project for a trigeneration (CCHP) plant and associated neighbourhood district heating network using the heat produced by the waste incinerator of Padua, sub-lot	Padua	**1 148 361**	**1 203 674**	**147 964**
Municipal urban district heating network coupled with electricity generation	Vazzola (Treviso)	**226 153**	**237 046**	**29 139**
ROP 2007-2013 ERDF AXIS 2 Energy - Action 2.1.3 "Revolving fund for investments to contain energy consumption"	Venice	**10 932 402**	**11 458 976**	**1 408 620**

Source: Opencoesione

Regional Policies 2011 / 2012

	Measure	Funding source	Contribution paid out	Planned contribution	Savings achieved	Expected savings
1	Regional Law No 25/2000, Article 4	Regional funds	€1 105 502.76	€1 643 317.00	toe/y 147.41 CO_2 avoided t/y 758.50	toe/y 373.24 CO_2 avoided t/y 1 680.35
2	ROP ERDF 2007-2013. Axis 2. Action 2.1.3 "Revolving fund and capital subsidies for investments made by SMEs to contain energy consumption"	45.93 % EU funds (ERDF) 54.07% national funds (5.92 % Region + 48.15 % FDR)	€0.0	€0.0	0.0 toe/y	0.0 toe/y
3	Regional Law No 17/2009 and Regional Law	Regional funds	€0.00	€1 284 600.00		

	No 3/2000 Decree of the Regional Executive No 2878/2012 and Decree of the Regional Executive No 2879/2012					
4	Axis 3 Measure 311 action 3	EAFRD	€4 188 871.72	€7 180 386.28	44 823.95 MWh/y	98 700 MWh/y
5	Regional Law No 17/2009 (Decree of the Regional Executive No 2403/2011 Regional Manager Decree last paragraph Air Protection No 99/2012)	Regional funds		€1 261 202.77		
6	ROP ERDF 2007-2013. Action 2.1.1: competition notice for thermal energy production from renewable sources	EU funds ROP ERDF RCE 2007-2013	€2 046 137.26	€5 773 612.54		CO_2 avoided 2090 t/y
7	ROP ERDF 2007-2013. Action 2.1.1: regional project for photovoltaic installations	EU funds ROP ERDF RCE 2007-2013		€ 962 885.10		CO_2 avoided 870 t/y
8	ROP ERDF 2007-2013. Action 2.1.2: public notice for the funding of heating networks	EU funds ROP ERDF RCE 2007-2013		€ 10 456 887.81		= 17 329.43 toe
9	ROP ERDF 2007-2013. Action 2.1.2: energy upgrading of public buildings (projects coordinated by the	EU funds ROP ERDF RCE 2007-2013		€17 999 963.56		650.41 toe/y CO_2 avoided 1 559 t/y

	region)					
10	Incentives to new construction and renovation projects based on sustainable building criteria implementing Regional Law No 4 of 9 March 2007	Regional funds	€541 868.00		Not monitored	
11	Articles 57 and 58 of Regional Law No 40/2003, revolving funding of productive investments in the agricultural and agro-industrial sector	Regional funds, see note on the following pages				
12	Rural development programme of Veneto 2007 2013 (Measures 121, 123, 311, 312 and 321)	Co-financing with ERDF, National and regional funds	n.a.	€12 165 286	3 260	n.a.

Source: Veneto Region

FRIULI VENEZIA GIULIA

Main projects funded under the ERDF by source of funding

Project	Territory	European Union €	National co-financing €	Region €	Province
Use of geothermal energy for the ice stadium "Pala Vuerich" in Pontebba	Pontebba (Udine)	95 454	204 545	-	409 355
Woodchip fired plant for heat production in the village of Campolongo al Torre	Campolongo Tapogliano (Udine)	134 746	288 742	-	126 496
Extraordinary maintenance of heating/cooling systems using geothermal energy in the primary school of Percoto	Pavia di Udine (Udine)	73 040	156 514	-	68 568
Geothermal energy heating and cooling system in the ex town hall of Erto	Erto and Casso (Pordenone)	40 506	86 800	-	38 026
Construction of CHP installation	Udine	49 000	105 000	46 000	-
Electricity from solar energy	San Vito al Tagliamento (Pordenone)	18 507	39 658	17 374	-

Source: Opencoesione

LIGURIA

Main projects funded under the ERDF by source of funding

Project	Territory	European Union €	National co-financing €	State: other measures €	Region €	Other public sources €
Energy efficiency and energy generation project at the elementary school	Busalla (Genoa)	88 748	113 726	-	39 992	Municipality 86 418
Energy efficiency and energy generation project at the municipal swimming pool	Sestri Levante (Genoa)	36 602	46 904	-	16 494	Municipality 100 874
Port Authority of Genoa - Supply of electricity to the ships via connection to the land network	Genoa	1 248 308	1 455 459	6 293 166	769 350	933 855
Generation of power from renewable sources in the mountain hostels of: Casermette del Penna (stand-alone photovoltaic, thermal solar and two wood-fired boilers)	Santo Stefano d'Aveto (Genoa)	55 578	59 170	-	31 277	36 506
Power generation from renewable sources: photovoltaic installation connected to the grid on Fortezza Umberto 1, Palmaria island	Portovenere (La Spezia)	49 742	52 957	-	27 993	36 036
Power generation from renewable sources: installation using forestry biomass supplying the Centro Parco building and town hall	Piana Crixia (Savona)	42 724	45 485	-	24 043	49 378
Power generation from renewable sources: stand-alone photovoltaic installation on the mountain hostel Loc. Veirera	Rossiglione Genoa	31 970	34 037	-	17 991	21 000
Power generation from renewable sources: installation of renewable sources installation (stand-alone photovoltaic and mini wind turbine) on the Semaforo Vecchio building	Camogli (Genoa)	23 493	25 011	-	13 221	15 431
Power generation from renewable sources: in the alpine hostels (Passo Muratone, Loc. Sanson): photovoltaic (stand alone and grid-connected) and thermal solar	Pigna (Imperia)	19 671	20 942	-	11 070	12 920
Power generation from renewable sources: grid-connected photovoltaic plant on Muvita (Arenzano),	Arenzano (Genoa)	15 224	16 208	-	8 567	10 000

headquarters of the Park Agency						
Power generation from renewable sources in the guest quarters of the park (Batteria Chiodo, Foresteria Beverino): grid-connected photovoltaic and pellet-fired heating system	Ameglia (La Spezia)	57 286	60 988	-	32 238	37 628
Power generation from renewable sources: grid-connected photovoltaic installation and thermal solar system at the horseback tourism centre "Mulino del Lupo"	Torriglia (Genoa)	23 548	25 069	-	13 251	15 467

Source: Opencoesione

EMILIA ROMAGNA

Main projects funded under the ERDF by source of funding

Project	Territory	European Union €	National co-financing €
Energy efficiency improvements in production plant (efficiency upgrading of existing heating and cooling systems, installation of an industrial type heat pump generator using the waste heat from the cooling of production machinery)	Bentivoglio (Bologna)	64 075	109 442
Production plant energy efficiency improvement actions (improvement of the efficiency of electricity, heating and hot water distribution systems). Installation of biomass-fired boiler (wood shavings).	San Mauro Pascoli (Forlì - Cesena)	40 002	68 325
Production plant energy efficiency improvement actions (optimisation and adjustment of electrical control panels and electricity consumption, replacement of electric lamps with low-consumption lamps and conversion of the thermal plant from LPG to gas).	Bologna	13 995	23 905
Actions to reduce energy consumption in production processes (energy monitoring and installation of inverters, heat recovery from the compressors and furnace flue gases)	Gaggio Montano (Bologna)	20 012	34 181
Heat recovery and cogeneration plant using the thermal energy of the metal stamping and	Pianoro (Bologna)	24 925	42 574

processing			
Energy savings actions in production processes (recovery of thermal energy from process hot water). Cogeneration plant	Sala Baganza (Parma)	42 466	72 533
Actions for energy savings in production processes (heat recovery from the calcination and furnace flue gases with electricity generation)	San Felice sul Panaro (Modena)	47 488	81 111
Action for energy savings in production processes (heat recovery from the production process for energy purposes). Installation of a micro-hydroelectric power plant to recover energy from an industrial cooling plant. 104.72 kWP photovoltaic installation	Rolo (Reggio nell'Emilia)	45 517	77 745
Energy saving actions in the production plant (reduction of heating/cooling and lighting consumption and production of hot water via installation of a solar energy plant). Actions for energy savings in production processes	Spilamberto (Modena)	32 957	56 292
Reduction of energy consumption in the heating/cooling of workplaces (insulation of the production plant) installation of a thermal solar panel system	San Mauro Pascoli (Forlì - Cesena)	19 568	33 422

Source: Opencoesione

TUSCANY

Main projects funded under the ERDF by source of funding

Project	Territory	European Union €	National co-financing €	Region €	Private parties €
Pursuing efficiency in energy consumption (acronym PECE)	Siena	6 479	9 722	3 968	51 898
Biomass fired CHP plant	Volterra (Pisa)	127 288	196 770	82 743	1 073 198
Biomass fired CHP plant	Castelfranco di Sopra	102 055	157 763	66 340	489 240

	(Arezzo)				
Biomass fired CHP plant	Foiano della Chiana (Arezzo)	102 055	157 763	66 340	489 240
Biomass fired CHP plant	Civitella in Val di Chiana (Arezzo)	102 055	157 763	66 340	489 240
Biomass fired CHP plant	Civitella in Val di Chiana (Arezzo)	102 055	157 763	66 340	489 240
Biomass fired CHP plant	Cortona (Arezzo)	102 055	157 763	66 340	489 240
Biomass fired CHP plant	Arezzo	49 563	76 618	32 218	237 600
Jolly energia	Subbiano (Arezzo)	20 091	31 059	13 060	24 288
Construction of a photovoltaic power plant	Signa (Firenze)	10 332	15 972	6 716	132 088

Source: Opencoesione

UMBRIA

Main projects funded under the ERDF by source of funding

Project	Territory	European Union €	National co-financing €	Region €
Reduction in the quantity of fuel used (methane) for winter heating/summer cooling; reduction in electricity consumption for lighting	Città di Castello (Perugia)	212 776	281 133	73 364
AXIS lll. ACTIVITY B3. Support to measures and investments for energy efficiency. Reduction in the consumption of electricity, water and detergents	Gubbio (Perugia)	52 013	68 723	146 345
AXIS III: ACTIVITY B3. Support to measures and investments for energy efficiency in a laundry business. Reduction in methane and electricity consumption, reduction in heat dispersal for radiation and irradiation and wet waste collection	Gubbio (Perugia)	50 433	66 636	136 001
AXIS III: ACTIVITY B3. Support to measures and investments for energy efficiency. Significant electricity savings on an annual basis.	Terni	21 062	27 829	277 057
AXIS III: ACTIVITY B3. Energy efficiency: reduction in consumption for heating, reduction in electricity consumption for air conditioning and for compressed air production and distribution.	Sigillo (Perugia)	12 083	15 965	71 543
AXIS III: ACTIVITY B3. Support to measures and investments for energy efficiency. Reduction in fuel consumption to generate the heat required for the production process - Baltint S.n.c.	Magione (Perugia)	11 271	14 892	48 589
Reduction in heat demand and in operating costs	Marsciano (Perugia)	11 026	14 568	47 534
Rational use of energy and energy	Gubbio	6 885	9 097	23 973

savings	(Perugia)			
Reduction in LPG and electricity use for painting and furnace drying operations	Acquasparta (Terni)	4 824	6 375	20 800
Rational use of energy and reduction in electricity consumption	Spoleto (Perugia)	3 542	4 680	32 893
Rational use of energy and reduction in electricity consumption	Perugia	1 973	2 607	18 325
Design and implementation of a website on energy with online services - Energy Efficiency	Perugia	10 357	13 684	-
Support to power generation from renewable sources	Umbria	861 600	1 138 400	
Use of media for the second publicity campaign "Bando Energia 2009"	Umbria	19 374	25 599	-
Implementation of the initiative "L'energia spiegata - festival dell'energia 2012" (Energy explained - energy festival 2012). Promotion of renewable sources	Perugia	13 031	17 218	-
Implementation of the initiative "L'energia spiegata - festival dell'energia 2012" (Energy explained - energy festival 2012). Promotion of Energy Savings	Perugia	13 031	17 218	-
Publication on the supplement to "Repubblica" of an addendum to the first publicity campaign "Bando energia 2009"	Umbria	2 067	2 732	-
Publication of special features "Energia e Ambiente" on the daily newspaper Corriere dell'Umbria; published on 30 October 2012 and 1 January 2013	Perugia	471	622	-

Source: Opencoesione

MARCHE

Main projects funded under the ERDF by source of funding

Project	Territory	European Union €	National co-financing €	Region €	Municipality €	Private parties €

ITAC Energia - Replacement of heat generator with biomass boiler	Grottammare (Ascoli Piceno)	50 041	60 483	17 474	-	192 000
Installation of two 19.44 kWp photovoltaic power plants and use of a 31.2 kW geothermal system for space heating/cooling	Maiolati Spontini (Ancona)	41 049	49 615	14 334	-	45 000
Installation of photovoltaic solar panels on the roof converting solar energy into electricity to be used for ordinary company activities.	Ascoli Piceno (Marche)	37 264	45 040	13 012	-	54 683
Installation of a photovoltaic power plant supplying the commercial unit in the Municipality of Cagli (PU), via A. Volta 6, Frazione Candiracci, housing the EDIL MARKET business	Cagli (Pesaro and Urbino)	18 143	21 930	6 335	-	19 890
ITAC Energia - Replacement of unit heaters using methane gas with unit heaters using superheated water	Grottammare (Ascoli Piceno)	12 510	15 120	4 368	-	48 000
Photovoltaic system to be installed on a shed with southern exposure using high-efficiency monocrystalline technology using Sunpower modules	Monte Urano (Fermo)	11 728	14 175	4 095	-	120 000
Installation of a photovoltaic power plant with a peak output of 42 840 Wp on the roof of the industrial building	Fabriano (Ancona)	11 728	14 175	4 095	-	120 000
Installation of a photovoltaic plant on the roof of a shed next to a building used for tourist accommodation. The rated power of PV installation is 199.50	Cingoli (Macerata)	11 728	14 175	4 095	-	120 000

kWp						
Construction of a photovoltaic plant to be installed on the south-facing side of the roof of the company's building, with high-efficiency monocrystalline technology using Sunpower modules	Montelabbate (Pesaro and Urbino)	11 728	14 175	4 095	-	360 000
Installation of a photovoltaic plant integrated in the building, having power output 30.7 kWp, directly connected to the medium voltage public grid with on-site exchange and full consumption of the power of self-produced from renewable sources	Potenza Picena (Macerata)	11 728	14 175	4 095	-	120 000
Construction of a photovoltaic power plant installed in the local unit where the company currently operates its commercial activity	Castelbellino (Ancona)	11 728	14 175	4 095	-	120 000
Photovoltaic system installed on the roof of the building owned by the applicant. The flat roof led to installation of the non-integrated type of system pursuant to the energy account; peak installed power 19.2 kWe	Recanati (Macerata)	10 432	12 609	3 643	-	96 464
Installation of a photovoltaic panel power system on the municipal primary school in Viale Evangelisti n. 3 and supplying electricity to the following buildings: nursery school, primary school, gymnasium of the primary school.	Orciano di Pesaro (Pesaro and Urbino)	104 084	125 804	36 346	71 764	-

Source: Opencoesione

LAZIO

Regional Policies 2011 / 2012

Measure	State sources of finance	Contribution paid out	Contribution planned	Savings achieved	Expected savings
Axis II Activity 1 - Regional supply chains, Ceramics, Paper and Innovation	EU funds (ROP ERDF)		643 652.64		
Axis II Activity 1 - New financial engineering fund for (Green) SMEs September 2013	EU funds (ROP ERDF)		50 000 000.00		
Axis II Activity 1 - Improvement of the energy efficiency of street lighting, networks and traffic lights - (Audit and upgrading)	EU funds (ROP ERDF)	2 554 266.75	9 960 000.00	n.a. (only the audit was implemented)	26.000 MWh/y
Axis II Activity 1 - Support to the installation of solar systems in buildings and building components (14 May 2012)	EU funds (ROP ERDF)	1 512 216.03	19 750 000.00	420 MWh/y	11 640 MWh/y
Axis II Activity 1 P.L.U.S. - Local Urban Development Plans	EU funds (ROP ERDF)	533 882 31	8 674 692.00		

Source: Lazio Region

ABRUZZO

Main projects funded under the ERDF by source of funding

Project	Territory	European Union €	National co-financing €
Energy and environment: new key success factors	Teramo	50 437	74 562
Renewable energy: course for photovoltaic and thermosolar plant installers and maintenance technicians	Francavilla al Mare (Chieti)	24 210	35 790
Installers and assemblers of renewable energy thermohydraulic systems	Lanciano (Chieti)	24 210	35 790
ESCO in Europa -S.E.A. Servizi Energia Ambiente S.r.l.	L'Aquila	3 934	5 815
Continuing training for workers, entrepreneurs and managers of small enterprises participating in company plans "Quality for ESCO" - S.E.A. Servizi Energia Ambiente S.r.l.	L'Aquila	2 689	3 975
Special multiaxis project "Giovani (in)determinati" ((Un)determined youths): S.E.A. Servizi Energia Ambiente S.r.l.	L'Aquila	6 052	8 947
Special multiaxis project "Giovani (in)determinati" ((Un)determined youths): GRES Energia Acustica S.r.l.	Pescara	6 052	8 947
Special multiaxis project "Giovani (in)determinati" ((Un)determined youths): S.E.A. Servizi Energia Ambiente S.r.l.	L'Aquila	4 842	7 158
S.E.A. Servizi Energia Ambiente S.r.l. (ROP RCE ERDF ABRUZZO; AXIS: Economic and social recovery and promotion of the earthquake-hit areas)	L'Aquila	3 557	5 242

Source: Opencoesione

MOLISE

Main projects funded under the ERDF by source of funding

Project	Territory	European Union €	National co-financing €

Project manager for power plants using renewables 16.02A MOB	Campobasso	5 080	8 799
Studio Energia S.r.l.- WTW Assunzione	Campobasso	1 242	2 152
Energia Prima S.r.l. WTW Assunzioni	Campobasso	1 800	3 118

Source: Opencoesione

Measure	State sources of finance	Contribution paid out	Contribution planned	Savings achieved	Expected savings
AXIS II - Action 2.1.1 Decree of the Regional Executive No 759 of 13 July 2009. Call for applications for subsidies to energy investments by enterprises	ROP ERDF 2007/2013	Total subsidies granted in 2011: € 2 399 259.66 In 2012: € 1 988 317.58 In 2013: €374,943.45	Total capital subsidies (granted in 2011) €10 440 696.34	In 2011: toe/y 755.13 In 2012 toe/y 668.84 In 2013: toe/y 190.06	Toe/y) 3 185.79
AXIS II - Action 2.1.1 Decree of the Regional Executive No 718 of 30 August 2011. Notice to the Municipal Authorities and other Public Bodies in the Molise Region for the funding of projects to improve the energy efficiency of public buildings and technical systems - Category "A"	ROP ERDF 2007-2013	0	Total subsidies (in progress) € 14 816 928.42 including: as capital grant € 3 642 331.60 and € 11 174 596.82 as zero interest loan.		Toe/y 1 117.50
AXIS II - Action 2.1.1 - Decree of the Regional Executive No 718 of 30 August 2011. As above but category "B"	ROP ERDF 2007/2013	0	Total subsidies (in progress) € 5 028 341.00 as capital grant		Toe/y 410

Source: Molise Region

CAMPANIA

Main projects funded under the ERDF by source of funding

Project	Territory	European Union €	National co-financing €

Exemplary projects - POI Energy call 30/12/2010	Montella (Avellino)	721 022	268 978
Exemplary projects - IOP Energy call 30/12/2010	Eboli (Salerno)	329 472	122 909
Exemplary projects - IOP Energy call 30/12/2010	Benevento	283 776	105 863
Exemplary projects - IOP Energy call 30/12/2010	Cassano Irpino (Avellino)	277 484	103 515
Exemplary projects - IOP Energy call 30/12/2010	Saviano (Napoli)	277 057	103 356
Exemplary projects - IOP Energy call 30/12/2010	Fisciano (Salerno)	271 912	101 437
Exemplary projects - IOP Energy call 30/12/2010	Benevento	245 985	91 764
Exemplary projects - IOP Energy call 30/12/2010	Sant'Angelo a Cupolo (Benevento)	232 172	86 612
Exemplary projects - IOP Energy call 30/12/2010	Grottaminarda (Avellino)	222 574	83 031
Exemplary projects - IOP Energy call 30/12/2010	Venticano (Avellino)	219 219	81 780

Source: Opencoesione

PUGLIA

Main projects funded under the ERDF by source of funding

Project	Territory	European Union €	National co-financing €
Exemplary projects - IOP Energy call 30/12/2010	Tuglie (Lecce)	**648 919**	**242 080**
Exemplary projects - IOP Energy call 30/12/2010	Montesano Salentino (Lecce)	**499 471**	**186 328**
Exemplary projects - IOP Energy call 30/12/2010	Trepuzzi (Lecce)	**471 941**	**176 058**
Exemplary projects - IOP Energy call 30/12/2010	Bari	**386 729**	**144 270**

Exemplary projects - IOP Energy call 30/12/2010	Bari	**292 630**	**109 166**
Exemplary projects - IOP Energy call 30/12/2010	Melpignano (Lecce)	**263 500**	**98 299**
Exemplary projects - IOP Energy call 30/12/2010	Mesagne (Brindisi)	**263 055**	**98 133**
Exemplary projects - IOP Energy call 30/12/2010	Castelluccio dei Sauri (Foggia)	**255 416**	**95 283**
Exemplary projects - IOP Energy call 30/12/2010	Gagliano del Capo (Lecce)	**248 352**	**92 647**
Exemplary projects - IOP Energy call 30/12/2010	Andrano (Lecce)	**237 427**	**88 572**
Project on public buildings - IOP Energy call 19/05/2010	Corsano (Lecce)	**220 239**	**82 160**

Source: Opencoesione

BASILICATA

Main projects funded under the ERDF by source of funding

Project	Territory	European Union €	National co-financing €	Region €
Province of Potenza -Construction of renewable power plants for all the schools in the province and establishment of training and experimentation workshops - Vulture	Genzano di Lucania (Potenza)	230 000	736 000	184 000
Province of Potenza -Construction of renewable power plants for all the schools in the province and establishment of training and experimentation workshops - Val d'Agri	Corleto Perticara (Potenza)	119 529	382 494	95 623
Province of Potenza -Construction of renewable power plants for all the schools in the province and establishment of training and experimentation workshops	Lagonegro (Potenza)	108 983	348 746	87 186
Province of Potenza -Construction of renewable power plants for all the schools in the province and establishment of training and experimentation workshops -ITC photovoltaic installations Avigliano-Acerenza	Acerenza (Potenza)	63 672	203 750	50 937

Source: Opencoesione

CALABRIA

Main projects funded under the ERDF by source of funding

Project	Territory	European Union €	National co-financing €
Exemplary projects - IOP Energy call 30/12/2010	Crotone	373 463	139 321
Exemplary projects - IOP Energy call 30/12/2010	Rogliano (Cosenza)	291 322	108 677

Exemplary projects - IOP Energy call 30/12/2010	Cosenza	263 173	98 176
Exemplary projects - IOP Energy call 30/12/2010	Isola di Capo Rizzuto (Crotone)	256 711	95 766
Exemplary projects - IOP Energy call 30/12/2010	Crosia (Cosenza)	229 411	85 582
Exemplary projects - IOP Energy call 30/12/2010	Cosenza	222 746	83 095
Exemplary projects - IOP Energy call 30/12/2010	Crucoli (Crotone)	222 566	83 028

Source: Opencoesione

SICILY

Main projects funded under the ERDF by source of funding

Project	Territory	European Union €	National co-financing €
Exemplary projects - IOP Energy call 30/12/2010	Palermo	452 277	168 722
Exemplary projects - IOP Energy call 30/12/2010	Palermo	427 304	159 406
Exemplary projects - IOP Energy call 30/12/2010	Santa Margherita di Belice (Agrigento)	226 437	84 472
Exemplary projects - IOP Energy call 30/12/2010	Santa Ninfa (Trapani)	225 046	83 953
Exemplary projects - IOP Energy call 30/12/2010	Palermo	223 123	83 236

Source: Opencoesione

Regional Policies 2011 / 2012

Measure	Funding source	Contribution paid out	Contribution planned	Savings achieved (ktoe/y) (**)	Expected savings (ktoe/y)
2.1.1 Favouring energy generation from renewables by activating energy technology, agroenergy and biofuel production chains.	P.O. ERDF 2007/2013	14 506 954	319 108 951	2.5	56 (***)
2.1.2 Supporting the increase in energy efficiency increase in end uses and reduction in climate changing emissions.	P.O. ERDF 2007/2013	40 361 404	166 877 610	9.7 - 13.7	40 – 57 (****)
Granting of subsidies for implementing the thermal solar programme	Agreement Region of Sicily - Ministry of the Environment (Decree of the General Manager of 16 April 2007)	200 000	1 800 000	0.06	0.6 (****)

TOTAL	**55 868 358**	**487 786 561**	**12.26-16.26**	**1 171-1 561**

(*) Source SI Caronte - Total validated payments (payments certified by Ade)

(**) New production/estimated savings, as a proportion to the target on the basis of the funds disbursed, with respect to the total budget for the line. (***) Target-based estimate installation of electric RES = 200 MW (source RAE 2012 ROP 2007/2013 Sicily), $HOURS_{eq}/Y$ = 1,500, Efficiency of the National Electric System = 0.46% (AEEG)

(****) Estimate based on average unit cost (EEC, personal income tax deduction 55%) of the energy saved/generated per unit of invested capital €/kWh = 0.25 - 0.35

Source: Region of Sicily

SARDINIA

Main projects funded under the ERDF by source of funding

Project	Territory	European Union €	National co-financing €	Region €
Structural funds: Establishment of the Jessica fund - Energy fund	Sardinia	18 900 000	10 787 000	5 313 000
National programme: Business promotion - Sulcis Plan - Energy from renewable sources - Clean energy production plants, thermodynamic solar systems	Carbonia Iglesias		CIPE (Interministerial committee for Financial Planning) allocation 10 000 000.	

Source: Opencoesione

Regional Policies 2011 / 2012

Measure	Energy commodity	Contribution paid out (€)	Contribution planned (€)	Savings achieved (*) (ktoe/y)	Expected savings
3.1.1 Increasing energy generation from renewables including via small-scale power generation. 57.5% of total resources (***)	O.P. ERDF 2007/2013	35 167 600	104 756 222	2.5	7.7 (**)
3.1.2 Promoting energy savings, intensity reduction and efficiency. 42.5% of total resources (***)	O.P. ERDF 2007/2013	35 692 581	77 428 512	3.3	7.1
TOTAL		**70 860 181**	**182 184 735**	**5.8**	**14.8**

(*) New production/estimated savings, as a proportion to the target on the basis of the funds disbursed, with respect to the total budget for the line.

(**) Calculated on the basis of the renewable energy target = 42 000 MWh/y (source RAE 2011 of ROP 2007/2013 Sardinia) and National Electric System Efficiency = 0.46% (AEEG)

(***) Breakdown, based on the UVAL - ENEA methodology, from the total budget allocated to the two lines

amounting to EUR 182 184 735.00.
Source: Region of Sardinia

Policy document for Improving Energy Efficiency in Sardinia 2013-2020
By Decision No 49/31 of 26 November 2013, the Regional Executive approved the "Policy document for Improving Energy Efficiency in Sardinia 2013-2020".

Regional Department/Service	Project	Resources used
Industry/Energy	Axis III Energy - Line 3.1.2.C of ROP Sardinia 2007-2013 - Support to enterprises to promote the use of high-efficiency and energy saving technologies and support to small-scale cogeneration	€1 334 000
Industry/Energy	Axis III Energy - Activity Line 3.1.2.b of ROP Sardinia 2007-2013 - Actions to promote energy savings and efficiency - Support Actions and measures to reduce GHG emissions	€3 800 000
Industry / Energy Environment/ SAVI (Environmental Impact Assessment Service)	Incentives for thermosolar plants for private citizens Energy efficiency in buildings (2011) 9 projects	€ 1 500 000 C 12 700 000.00 total
Environment/SAVI	Energy efficiency street lighting (2008) and 2009 394 projects (Municipalities and Provinces)	€ 46 600 000.00 total