

**National plan for increasing the number of
“nearly-zero energy buildings”**

Guidelines and development framework

22 October 2013

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INTRODUCTION

The energy efficiency of buildings is one of the key strategic themes which in recent years have risen to the top of the European and international agendas. The EU has launched major programmes, projects and directives, such as Directives 2002/91/EC and 2010/31/EU on the energy performance of buildings, Directive 2006/32/EC on energy services and Directive 2012/27/EU on energy efficiency, in order to deploy harmonised and shared tools, criteria and solutions for increasing the energy efficiency of both existing and new buildings.

In Italy promoting the energy efficiency of buildings is a top national priority, in view of the saving opportunities achievable in this field and of the priority given by the National Energy Strategy (NES) to energy efficiency.

Compared to 2016 targets, Italy has achieved a substantially positive result, having exceeded the target for 2011 and achieved 65% of the expected target by 2012. This result is due to technology advances, to the growth of energy efficiency awareness, and, last but not least, to the effectiveness of the incentive schemes put in place by the Government.

The promotion of energy efficiency has the joint positive effect of boosting production and employment and is a driver of innovation and research in the medium and long term, which in turn has a positive impact on growth.

The promotion of energy efficiency must take place within a set of national guidelines, based on cost-benefit analysis, avoiding undue target fragmentation. This is the methodology underpinning the recent Directive 2012/27 and which was taken on board by the Italian authorities in defining the scope and timeframe for the strategy. The civil building sector is undoubtedly one of the most promising macro-areas, as it accounts for more than 36%¹ of national energy demand and in recent years it has recorded a steady increase in consumption.

Legislative Decree No 192 of 19 August 2005 which transposed Directive 2002/91/EC on the energy performance of buildings, as recently amended by Decree Law No 63 of 2013 to transpose Directive 2010/31/EU, together with Legislative Decree No 115 of 2008 and Legislative Decree No 28 of 2011, implementing respectively Directive 2006/32/EC and Directive 2009/28/EC, mark a significant step forward by Italy in the path towards greater energy efficiency of buildings and the promotion of renewable energy sources.

This document describes the national guidelines and development framework for increasing the number of “nearly zero-energy buildings” and the tools put in place to achieve this goal.

The Implementing Plan will be finalised by June 2014, as provided for by Decree Law No 63 of 2013, taking into account the developments and validation of the results of the comparative methodology (as per the documents sent to the Commission on 27 June and 3 August 2013) and the commitment of the necessary financial resources, and in line with the overall strategy for the upgrading of public and private buildings provided for by Directive 2012/27/EU.

¹ Data from the National Energy Balance 2011.

1. THE NATIONAL FRAMEWORK

Italy's territory stretches between the 35° and 47° parallel north. Its distinguishing features include a very long coastline (about 7 458 km) and the prevalence of hilly terrain (41.6%), followed by mountain areas (35.2%), and lastly by plain areas (23.2%). The average land elevation is approximately 337 m above sea level.

As to its climate, the large latitude extent of Italy means that it has a Mediterranean subtropical climate in the south (with summer temperatures that can rise above 40°C) and a temperate continental climate in the north (where wintertime temperatures can drop to lows of -20°C). These differences generate great variability in the number of heating degree days, with reference values ranging from 568 (Lampedusa) to 5165 (Sestriere). The value of the global solar radiation incident on a horizontal surface is also influenced by the different latitudes found in Italy; average annual energy is about 1500 kWh/m² (0.129 toe/m²).

The particular layout of Italy's territory makes it difficult to define univocal construction and equipment standards and solutions for buildings meeting all the various factors present.

In 2011, final energy consumption by the residential housing sector was about 30.7 Mtoe, an increase of 9% on 2010.

The main energy source used, natural gas, rose by 9.0%; increases were also recorded for wood (+52%) and electricity (+0.9%). Conversely, consumption of all the other energy sources decreased. In Italy, electricity consumption by the housing sector increased by about 1% in the period considered. The fact that the increase was modest and much below the European average of 6% is linked to the use by consumers of more effective electrical equipment; heat consumption by the housing sector² decreased, albeit far less markedly than in most other European countries.

Consumption by the non-residential sector, which includes buildings for use by the services and commercial sectors and by the public authorities, continues to grow at a steep pace, from less than 9.5 Mtoe in 1995 to more than 15.5 Mtoe in 2011. As to energy source distribution, the commercial and services sector differs from the residential sector, as the almost exclusive sources are gas (50.4%) and electricity (45.4%).

The existing stock of buildings is the sector offering the largest potential for energy savings; however, the high initial investment presents a major hurdle for small consumers (residential, offices).

1.1 Assessment of the national built stock

The official data from the last ISTAT nationwide census of 2010 and those from the latest surveys carried out by ENEA (National Agency for New Technologies and Energy), ANCE (National Builders' Association) and CRESME (building industry research centre) permit analysis of the situation of the built stock existing in Italy, starting from buildings in urban and suburban areas. As concerns buildings in rural areas, only those used for housing have been identified.

² Amount of energy consumed by a dwelling for heating alone.

There are about 13.6 million buildings in Italy. Of these, more than 87% are for residential use. The number of dwellings exceeds 32 million; about 80% are occupied by residents. Approximately 13 million of these dwellings are concentrated in just five regions: Sicily, Lombardy, Veneto, Puglia and Piedmont. Alone, Sicily and Lombardy account for 24.5% of the country's dwellings. The buildings for housing use are about 11 million; the rest are non-residential (hotels, offices, commercial use etc.). More than 400 000 buildings host recreational and sports activities, schools, hospitals and churches. Lastly, there are nationwide about 700 000 buildings not currently in use, either because they are undergoing refurbishment or because they are unsafe.

This section describes the current composition of the national built stock, broken down by use and age.

1.2.1 Residential buildings

In view of the larger comparative size of the residential built stock and the increasing attention focused since the 1980s on this especially important and varied sector in terms of energy efficiency and technical-economic solutions to be applied, more detailed data are available for this type of buildings.

Recent studies conducted by ENEA (National Agency for New Technologies and Energy) show that from a structural materials viewpoint 61.5% of residential buildings are made of load-bearing masonry walls, 24.7% of reinforced concrete and 13.8% of other materials such as wood, steel or mixed structure. More than 50% of residential buildings are separate from other buildings, whereas the rest are flanked by other structures on one or more sides.

Approximately 20% of the national built stock was constructed before 1919, numbering about 2.15 million. The period between the two World Wars saw a decline in building activity and accounts for only 12% of the current residential buildings dating from those years. On the other hand, the period from the end of World War II to the early 1980s recorded a strong increase in building activity, producing some 50% of the present-day built stock. Lastly, from the early 1980s to the present time, building activity shrank again.

Most of the current residential buildings were constructed from the second post-war period to the present. Specifically, 15.5% of the population lives in dwellings built between 1946 and 1961, 21.7% in dwellings built between 1962 and the 1971, and 20.1% in buildings constructed from 1972 onwards.

About 43% of buildings were constructed before 1972; 46% between 1972 and 2001 and almost 10% after 2001. Building types are quite varied: the most frequent is the single house (26%), followed by small multi-storey buildings (21%); tower blocks are 18% while low-rise blocks are 15% of the total.

As to number of floors, 40% of buildings have from three to five, 37% have two floors and about 14% more than five. Almost 46% of buildings have a pitched roof with non-habitable attic; about 23% have pitched roof with habitable attic, whereas 32% of buildings have flat roofs, most of them walkable. The ground floor is closed by masonry or glass walls in more than two-thirds of

buildings; the remaining third are equally divided between “fully open” (with supporting pillars, “*pilotis*”) and “partly open”. About 43% of buildings have basement floors. In 48% of cases, open or partly closed ground floors are used as garages. In 11% of buildings, there are commercial activities.

1 - Building stock in 2011 by construction period and load-bearing structure

	Before 1919	From 1919 to 1945	From 1946 to 1961	From 1962 to 1971	From 1972 to 1981	From 1982 to 1991	From 1992 to 2001	After 2001	Total buildings
Load-bearing walls	2 026 538	1 183 869	1 166 107	1 056 383	823 523	418 914	228 648	106 812	7 010 794
Reinforced concrete	0	83 413	288 784	591 702	789 163	620 698	394 445	389 059	3 157 264
Other	123 721	116 533	204 938	319 872	370 520	250 890	167 934	40 282	1 594 690
Total buildings	2 150 259	1 383 815	1 659 829	1 967 957	1 983 206	1 290 502	791 027	536 153	11 762 748
Composition by type of structure (vertical percentages)									
Load-bearing walls	94.2%	85.6%	70.3%	53.7%	41.5%	32.5%	28.9%	19.9%	59.6%
Reinforced concrete	0.0%	6.0%	17.4%	30.1%	39.8%	48.1%	49.9%	72.6%	26.8%
Other	5.8%	8.4%	12.3%	16.3%	18.7%	19.4%	21.2%	7.5%	13.6%
Total buildings	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Composition by construction period (horizontal percentages)									
Load-bearing walls	28.9%	16.9%	16.6%	15.1%	11.7%	6.0%	3.3%	1.5%	100.0%
Reinforced concrete	0.0%	2.6%	9.1%	18.7%	25.0%	19.7%	12.5%	12.3%	100.0%
Other	7.8%	7.3%	12.9%	20.1%	23.2%	15.7%	10.5%	2.5%	100.0%
Total buildings	18.3%	11.8%	14.1%	16.7%	16.9%	11.0%	6.7%	4.6%	100.0%

1.2.2 Other buildings

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 the 10 largest provinces (the top three being Rome, Milan and Naples). More than half (51%) are located in the 24 largest provinces. About 29% of schools are located in municipalities with low population (up to 5 000 inhabitants), and an equal percentage in medium-small municipalities. The area covered by school buildings is 73.2 million m² and their total volume is 256.4 million m³. The largest share of school buildings (39%) occupy an average area of 1 819 m².

As concerns shopping malls, according to estimates and interviews carried out on a representative sample, there are 1 114 such centres with unitary organisation, for a gross area available to the different retail operators of slightly more than 16 million m².

In the national territory, 25 845 buildings are entirely or partly reserved for use as hotels. Of these,

30% are concentrated in the six top-ranking 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 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.

Italy has 76 banking groups, with 33 727 branches, scattered throughout the country. Many of these branches occupy portions of buildings, mostly on the ground floor. Buildings wholly or largely housing banking operations number 1 469, with a total [floor] area of 5.5 million m².

2. NATIONAL GUIDELINES FOR INCREASING THE NUMBER OF “NEARLY-ZERO ENERGY BUILDINGS”

2.1 THE NATIONAL ENERGY STRATEGY

Italy’s National Energy Strategy (NES), published in March 2013 sets out four key targets for the medium-long term (2020): align the cost of energy with the EU average, exceed the environmental carbon reduction targets established by the EU Climate-Energy Package for 2020, increase energy supply security and boost sustainable economic growth through the development of the energy sector. The strategy for achieving these targets comprises seven priorities, each with specific supporting measures, either already launched or being finalised. The first priority identified by the NES is energy efficiency. Indeed, this contributes at the same time to achieving all the above-mentioned objectives. Thus the linchpin of Italy’s energy policy is the launch of a vast comprehensive national energy efficiency programme allowing the country to exceed the EU targets to be met by 2020.

Coming down to figures, Italy’s plans to save by the year 2020 20 Mtoe of primary energy per year, and 15 Mtoe of final energy, reaching a consumption level about 24% lower than the levels projected at European level under the “business as usual” scenario (Primes model 2008). This will also save the emission of some 55 million tonnes of CO₂ per year.

The NES has identified a high untapped energy saving potential in the building sector, where a number of actions could be implemented with economic benefit not only for the country but also for individual consumers. For example, in Italy a building constructed according to energy efficiency standards has an energy consumption up to 70% lower than a traditional building. The final energy consumption reduction target for the residential and services sectors laid down in the NES is respectively 3.8 Mtoe and 2 Mtoe.

2.2 TOWARDS NEARLY-ZERO ENERGY BUILDINGS

The EPBD was updated by Directive 2010/31/EU which, among other things, introduced a comparative analysis mechanism to determine optimal cost levels to be used as a benchmark for establishing energy requirements in the building sector. The Directive also provides that by the end of 2020 (and two years earlier for public buildings) all new buildings should be nearly zero-energy. It also introduced the energy performance certificate (EPC) and has provided for the development of a comparative methodology to check the effectiveness of the measures and standards promoted by the Member States.

In Italy, Legislative Decree No 192 of 2005, which transposed Directive 2002/91/EC was recently amended by Decree Law No 63 of 2013 to take on board the new provisions introduced by Directive 2010/31/EU.

Decree Law No 63 of 2013, converted into Law No 90 of 2013, lays the groundwork and sets the new criteria for updating and programming performance standards for buildings (shell, equipment and renewable energy sources) in order to achieve the EU targets under the nearly-zero energy building policy. This will require the development of calculus codes and analysis models and the use of tools such as the comparative methodology sent to the European Commission in July 2013. The minimum performance requirements for buildings will take into due account the winter and summer conditioning period, the climate zone and the other performance standards established by the regulatory framework. In compliance with Directive 2010/31/EU, Decree Law No 63 of 2013 also provides that all buildings should be nearly zero-energy by December 2020 (two years earlier for new public buildings).

2.2.1 DEFINITION OF NEARLY ZERO-ENERGY BUILDING

A “nearly zero-energy building” is a building meeting specific technical requirements:

- the energy performance index for winter conditioning (EP_H),
- the useful thermal performance index for summer conditioning, including any humidity control (EP_C),
- the global energy performance index, expressed in non-renewable primary energy (EP_{glr}), and
- the global energy performance index, expressed in total primary energy (EP_{gl}),

must be significantly lower than the value of the same indices calculated for a reference building. The reference building is a virtual building geometrically equivalent to the planned one, but meeting the energy parameters and minimum thermal characteristics (thermal transmittance and conversion performance) to be achieved by the year 2020.

On the basis of this criterion and of the minimum energy performance requirements which, for the year 2020, will be validated on the basis of the results of the cost-optimal method, it will also be possible to establish a range for primary energy consumption expressed in $\text{kWh/m}^2\cdot\text{year}$, differing according to building type, location and use.

2.2.2 APPLICATION OF THE COST-OPTIMAL METHODOLOGY

The new Directive 2010/31/EU introduced rules on the definition of the minimum energy performance requirements for buildings. In the past, every Member State established the minimum requirements according to nationally-set criteria, which reflected heterogeneous targets; the Directive, on the other hand, introduced a common criterion: the building must be optimal with regards to cost. Consequently, the minimum requirements will be defined through an analysis that factors in the benefits and costs stemming from the deployment of energy efficiency measures along the building's expected life-cycle (which is set at 30 years for residential buildings and 20 years for the other categories).

The rules for performing this analysis have been set by the Commission and form the "cost-optimal methodology", which must be applied by each Member State to make a comparison against the current requirements and, in the future, whenever the requirements are updated. In Italy, to meet these requirements, the Ministry of Economic Development has set up a working group including RSE (Energy Research Company), ENEA (National Agency for New Technologies and Energy) and CTI (Italian Thermotechnical Committee). The results of the analysis conducted by Italy were submitted to the European Commission on 27 June and 3 August 2013.

The last step in this methodology was to compare the optimal levels with the requirements currently in force. Comparison showed that in almost all the buildings, it is more cost-effective to exceed the minimum legal requirements and construct higher-performance buildings than those required by the current law. This will make it possible to obtain not only energy savings but also cost savings during the building's useful life. Lastly, as concerns performance of individual building elements, the minimum requirements currently in force, as laid down in Legislative Decree No 311/2006, have been found to be on the whole in line with optimal values, with the exception of the colder climate zones, where there is room for some improvement.

Finally, Decree Law No 63 of 2013, implementing Directive 2010/31/EU provides that the results of the "*cost-optimal methodology*" shall be used to determine the new energy performance requirements for buildings. Thus these requirements are destined to be revised and expanded, including certain services currently excluded, first and foremost space cooling.

2.2.3 INTERMEDIATE ENERGY PARAMETER REDUCTION TARGETS

To improve the energy efficiency of buildings, the current minimum energy parameter values and thermal characteristics (transmittance and conversion performance values) will become more demanding. The minimum transmittance values required for building elements will be lowered by 15% compared to their current value from 1 January 2016 and by another 15% from 1 January 2021. A similar improvement will apply to the minimum performance of heating and conditioning systems. For public buildings, in line with current national legislation, the minimum requirements will be made 10% more demanding. Moreover, verification of the requirements for nearly-zero energy buildings will be applied starting from 2018.

Please note that the above-mentioned reduction coefficients will be checked accurately on the basis of the results of the comparative methodology, in order to optimise them with reference to costs in accordance with Directive 2010/31/EU.

2.2.4 LEADING EXAMPLE OF THE PUBLIC SECTOR

Despite the difficult economic environment and budget constraints, the public sector is moving in the direction of low-consumption buildings with part of the energy coming from renewable energy sources. In the framework of transposition of Directive 2012/27/EU on energy efficiency and, specifically, as concerns the obligation for each Member State to upgrade each year the energy performance of 3% of the total floor area of buildings occupied by its central government, the Ministry of Economic Development has signed a memorandum of understanding with the State Property Agency (*Agenzia del Demanio*). The first output of this agreement will be the drafting of an inventory of buildings occupied by the central government including floor area and energy data, a key step towards developing a comprehensive strategy for the upgrading of public buildings.

We would also like to highlight the work done by the State Property Agency with regards to the requirements laid down in Article 3(9) of Decree Law No 95 of 2012 which provided for the setup of a system to support cost containment and energy efficiency in the use of buildings occupied by central government agencies.

We should also mention the Interregional Operational Programme for Energy (IOP Energy) 2007-2013, which is the outcome of intense coordination efforts between the Ministry of Economic Development, the Ministry of the Environment, the Italian Regions under the “Convergence” objective (Calabria, Campania, Puglia and Sicily) and a number of representative economic and social stakeholders. This programme, funded by both EU and national funds, aims to increase the share of consumed energy coming from renewable energy sources and to improve energy efficiency, by promoting local development opportunities, supplementing the system of incentives made available by ordinary policy measures, strengthening the links between the generation of renewable energy, energy efficiency and the social and economic structure of the territories where projects are implemented. The Programme has a total budget of approximately EUR 1.6 billion, 72.83% of which is funded by the ERDF and 27.17% from national co-funding.

The projects launched under “IOP Energy 2007-2013” fall under the following headings:

- Actions addressed to the public administrations to spread the uptake of renewable energy and energy saving measures through the financing of investments on buildings owned by the public authorities themselves;
- investment-support incentives for manufacturers of components for the renewable energy sector or belonging to the energy saving production chain;
- actions to upgrade the energy distribution network.

After a recent update, the Interregional Operational Programme has been expanded to include two new activity lines for the development of renewable energy and energy efficiency in urban areas.

A number of Regions are currently promoting initiatives targeting nearly-zero energy buildings, via

dedicated regional calls and efficient building construction initiatives in the social housing and non-residential (schools, offices etc.) sectors.

For example, the Region of Lombardy has already issued a regional law requiring all [new] buildings, public and private, to be nearly zero-energy from 1 January 2016. The Region has already implemented a number of energy upgrading projects in public and private buildings including several schools and healthcare centres. A showcase example is the laboratory at the Bovisa campus of the Milan Polytechnic University. This is a nearly zero-energy new university pavilion hosting a cutting-edge laboratory for the development of energy efficiency technologies.

2.3 THE LEGAL FRAMEWORK

Over the past decade, the energy policy sector has evolved significantly, through the adoption of new legislation and new economic measures to promote rational use of energy.

Directive 2002/91/EC, also known as the EPBD (Energy Performance of Buildings Directive), was issued to improve the energy performance of the civil sector, which for many years has been the greatest consumer of end-use energy and the largest issuer of climate-change gases both in Europe and in Italy.

In Italy, Directive 2002/91/EC was transposed by Legislative Decree No 192 of 2005 which lays down the minimum legislative standards of the energy performance index for the heating of new buildings divided by climate zones. Furthermore, under this Decree, at the time of undertaking a project to improve the energy performance of an existing building, its individual building elements and technical systems must comply with the minimum performance values set out in the Decree itself (transmittance and generation performance).

Subsequently, Legislative Decree No 311 of 2006 imposed gradual annual improvements to the above-mentioned indices and minimum performance values, thus launching a positive process to increase energy efficiency levels in new buildings and in existing buildings undergoing energy upgrading.

Lastly, Presidential Decree No 59 of 2 April 2009 set out the general criteria, calculation methods and minimum requirements for the energy performance of buildings and heating and hot water systems, as well as for air conditioning and, only for the services-commercial sector, the artificial lighting of buildings. These provisions apply to new buildings and to renovations of existing buildings, both public and private. The methodologies for calculating energy performance are based on the national technical standards of the UNI/TS 11300 series.

As concerns renewable energy sources, Legislative Decree No 28 of 2011 required their integration in new buildings and in buildings undergoing major renovations. The decree establishes the obligation of using an annually increasing share of renewables to cover energy consumption for heating and cooling.

The recently issued Presidential Decrees No 74 and No 75 of 2013 implement correctly and comprehensively EU rules on checks on air-conditioning systems, on certification professionals and on energy certification. Specifically, Decree No 74 supplements the current rules on heating system inspections with specific provisions covering air conditioning systems. It also updates the

regulatory framework on checks on technical systems, in the light of lessons learnt and technology developments and with a view to simplifying procedures and cutting costs for citizens and public authorities. The Decree also sets out the professional requirements and accreditation criteria to ensure the qualification and independence of the experts and bodies tasked with inspecting air-conditioning installations. The second measure sets out the professional requirements and accreditation criteria for the experts or bodies tasked with performing the energy certification of buildings, in order to:

- expand the pool of certification professionals/bodies with the aim of providing a broad choice of qualified operators to citizens, at contained and reasonable costs;
- increase the responsibility and quality of the energy certification system, to guarantee the reliability, independence and impartiality of certifying bodies/operators;
- put in place a quality control system for certifications, to protect citizens;
- favour homogeneous implementation of certification across the national territory.

2.3.1 NEW BUILDINGS

Under Italian legislation, new buildings must comply with the energy performance index for heating set out in Legislative Decree No 192 of 2005 as amended, with reference to Presidential Decree No 59 of 2 April 2009 and to the National Guidelines for the energy certification of buildings of June 2009.

The following table sets out, by way of example, the minimum energy performance requirements for the heating of residential buildings, broken down by climate zone and shape of the building, and the annual changes required in order to achieve higher energy efficiency levels.

*2 - Residential buildings: limit values of the energy performance index for heating, expressed in kWh/m²*year*

	Building surface area to volume ratio (S/V)	Climate zone									
		To:	B		C		D		E		F
		up to 600 days	to 601 days	to 900 days	to 901 days	to 1400 days	to 1401 days	to 2100 days	to 2101 days	to 3000 days	more than 3000
Before 2008	<0.2	10	10	15	15	25	25	40	40	55	55
	>0.9	45	45	60	60	85	85	110	110	145	145
From 1 January 2008	<0.2	9.5	9.5	14	14	23	23	37	37	52	52
	>0.9	41	41	55	55	78	78	100	100	133	133
From 1 January 2010	<0.2	8.5	8.5	12.8	12.8	21.3	21.3	34	34	46.8	46.8
	>0.9	36	36	48	48	68	68	88	88	116	116

The obligation to include renewable energy sources in new buildings and buildings undergoing major renovations is equal to 50% of the expected consumption for hot water and to 20% of total

consumption for heating, cooling and hot water. This latter share will be increased to 35% from the beginning of 2014 and to 50% from the beginning of 2017. These obligations cannot be met by means of installations powered by renewable energy sources generating exclusively by electricity which in turn powers devices or systems for the production of hot water, heating and cooling.

As concerns electricity it is compulsory to install power from renewables which varies according to the area of the building multiplied by a coefficient which increases in three bands from now to 2017: 1 kW every 80 m² is the application if the building licence is submitted by 31 December 2013, 1 kW every 65 m² up to the end of 2016, and 1 kW every 50 m² from 2017.

The obligation to include renewable energy sources in buildings under Legislative Decree No 28 of 2011 applies not only to new buildings, but also to existing buildings having a useful floor area in excess of 1 000 m² undergoing full refurbishment (and existing buildings pulled down and rebuilt). For public buildings the obligations of including renewables are 10% higher.

2.3.2 EXISTING BUILDINGS

Under Legislative Decree No 192 of 2005 as amended, and with reference to Presidential Decree No 59 of 2 April 2009, for all upgrading works not involving demolition and rebuilding or major works covering 25% of the area of the building shell, existing buildings must comply with the minimum performance values set out in the Decree (transmittance and generation performance), divided by climate zone. The following table sets out, by way of example, the minimum requirements for the transmittance of windows, inclusive of frames and shadings and the annual changes required in order to achieve higher energy efficiency levels.

3 - Thermal transmittance of windows inclusive of frames and shading

Windows inclusive of frames and shading			
Legal limits (maximum U-values in W/m ² K)			
Climate zone	From 1 January 2006	From 1 January 2008	From 1 January 2010
A	5.5	5.0	4.6
B	4.0	3.6	3.0
C	3.3	3.0	2.6
D	3.1	2.8	2.4
E	2.8	2.4	2.2
F	2.4	2.2	2.0

2.4 INCENTIVES AND SUPPORT TOOLS

2.4.1 NEW BUILDINGS

Decree Law No 40 of 2010 allocated EUR 60 million to facilitate the purchase of high energy efficiency new buildings. Class A buildings (energy performance 50% better than the minimum requirements set out in the Decree) are granted a contribution of EUR 116 per m², up to a ceiling of EUR 7 000. Class B buildings (energy performance 30% better than the minimum requirements set out in the Decree) are granted a contribution of EUR 83 per m², up to a ceiling of EUR 5 000. This facility remained in force until its funds were completely exhausted.

Regional governments issued provisions under their individual “*Piano Casa*” (House Plan), a complex set of measures intended to re-launch the building sector. These regional provisions grant “bonuses” to high energy performance buildings in the form of rebates on the building license fees applicable under municipal regulations, or increases in permissible volumes, in the event of demolition and reconstruction, without the obligation to maintain the shape limits of the demolished building, while complying with the applicable urban planning rules.

The Decree of the Minister for Economic Development of 28 December 2012 on incentives to the generation of thermal energy from renewable energy sources and to small-scale energy efficiency projects, also known as the “Thermal Account”, is an incentive scheme intended to promote the use of thermal renewable sources (biomass, heat pumps, thermal solar panels, solar energy heating and conditioning) and of energy efficiency improvement actions in the building sector. The incentive is identified on the basis of the type of action with reference to the increase in energy efficiency achievable by improving the energy performance of the building and/or with reference to the energy that can be generated by systems fired by renewable sources. It consists of a cost subsidy, paid out in annual instalments for a period from 2 to 5 years according to the actions implemented. The Decree provides for access to the incentives also in new buildings in the case of installation of solar thermal systems, also coupled with solar cooling technology, without prejudice to the integration of a share of renewable energy sources required by Legislative Decree No 28 of 2011.

A substantial contribution is provided by research and development activities, which are able to provide high added value proposals and solutions: one example is that of the *Nearly Zero Energy Building* seen not only as an energy-efficient building-technical equipment system, but also as a high integration system where comfort, new technologies, healthy indoor climate, safety and renewable energy sources find an optimal balance. Another example is distributed generation, where energy is generated via the integrated use of different technologies (heat pumps, solar thermal, PV, cogeneration (CHP) and trigeneration (CCHP) etc.).

In this field, we should mention the “Electrical System Research Plan”, a programme including a set of research and development activities aiming at reducing electricity costs for end users, improving the reliability of the system and service quality, reducing the impact of the electrical system on the environment and on health, enabling the rational use of energy resources and securing for the country the conditions for sustainable development.

The research and development activities, targets and budget are set out in three-year plans, approved by the Ministry of Economic Development and prepared by the Committee of Research Experts for the Electricity Sector, and are subject to the opinion of the Authority for Electricity and Gas, the Ministry of Education, University and Research, the Ministry of the Environment and Protection of Land and Sea, and the Equalisation Fund for the Electricity Sector (CCSE). In order to implement the research projects set out in the three-year plans, and in their subordinate annual operational plans, the Ministry of Economic Development concludes Programme Agreements (PAs) with ENEA (National Agency for New Technologies and Energy) , CNR (National Research

Centre) and RSE (Energy Research Company).

2.4.2 EXISTING BUILDINGS

This section summarises the main incentive schemes promoting the uptake of energy efficiency in the building sector, available nationwide. It does not include the many regional and local schemes available throughout Italy.

In addition to financial facilities and incentives, another pillar of the energy efficiency policy is the regulation and definition of precise standards for the upgrading of built stock and, indirectly, of the reference markets (building, material, technical systems, etc.). Regulation accounts for about half of the success achieved to date, and has proven to be the most effective tool in terms of cost/benefit ratio and structural advantages.

Tax deduction for energy efficiency improvement actions

This measure, in force since 2007, supports the energy upgrading of existing buildings by means of a deduction on gross tax, applicable to both personal income (IRPEF) and corporate income (IRES) tax. This deduction, which up to June 2013 amounted to 55% of expenditure incurred, was increased to 65% for expenditure incurred by 31 December 2014 and will be maintained, albeit at a progressively reduced rate, in the two-year period 2015-2016.

The deduction applies to projects for the energy upgrading of existing buildings obtaining a limit value of annual primary energy demand for heating at least 20% lower than the reference values. Other works covered by the tax incentive are the insulation of opaque structures, the installation of high-performance windows, the installation of solar panels for hot water production, the replacement of heating systems with others based on condensing boilers, the installation of high efficiency heat pumps and the installation of heat-pump water heaters.

The main results achieved by the facility from its launch up to 31 December 2011 (the data for 2012 are currently being processed) are as follows:

- total number of actions implemented: about 1 281 000;
- overall investment: about 15.4 billion euro;
- estimated energy saving as at 2012: about 9 000 GWh/year of a “lasting” type, i.e. maintained for up to several decades.

The Thermal Account

The Decree of the Minister for Economic Development of 28 December 2012 on incentives for the generation of thermal energy from renewable energy sources and for small-scale energy efficiency projects, also known as the “Thermal Account”, implements the support scheme introduced by Legislative Decree No 28 of 3 March 2011 to promote small-scale projects to increase energy efficiency and the generation of thermal energy from renewable sources.

The works covered by the incentive include: efficiency improvements on the shell of existing

buildings (insulation of walls and roofs, replacement of windows and doors and installation of shadings); the replacement of existing heating systems with more efficient equipment (condensing boilers); and the replacement or, in some cases, the *ex-novo* installation of equipment fuelled by renewable energy sources (biomass fired heat pumps, boilers, stoves and fireplaces, thermal solar systems also coupled with solar cooling technology for cooling purposes). The Decree also provides specific incentives for the associated energy audit and energy certification of the above works, under certain conditions. The incentive, identified on the basis of the type of action with reference to the increase in energy efficiency achievable by improving the energy performance of the building and/or with reference to the energy that can be generated by systems fired by renewable sources, consists of a cost subsidy, paid out in annual instalments for a period from 2 to 5 years according to the actions implemented.

The Decree allocates funds for an annual maximum cumulative expenditure of EUR 200 million for actions planned or implemented by the public administrations and an annual maximum cumulative expenditure of EUR 700 million for actions implemented by private parties.

White certificates

White certificates, also known as “Energy Efficiency Securities” (EES), are tradable securities certifying the achievement of energy saving in the final uses of energy through energy efficiency measures and projects.

The white certificate system was introduced into Italian legislation by the Ministerial Decrees of 20 July 2004 - in advance of the “compulsory regimes” introduced by EU Directive 2012/27. It sets specific quantitative primary energy savings targets, expressed in tonnes of oil equivalent (Toe) to be achieved by electricity and natural gas distributors each year. One certificate is equal to the saving of one tonne of oil equivalent (Toe).

Electricity and gas distributors can meet their obligation by implementing energy efficiency projects entitling them to the issue of white certificates, or by purchasing EES from other entities on the Energy efficiency securities market.

The national legal framework for white certificates was recently amended by the Decree of 28 December 2012, which set out national quantitative targets for energy savings, increasing over time, to be met by electricity and gas distributors in the years from 2013 to 2016 and it also introduced new entities that can submit projects for the issue of white certificates.

As at 31 May 2012, the white certificate scheme generated savings of about 15 million Toe, 70% of which in the civil sector (thermal and electrical uses).

Guarantee funds and promotion of TPF (Third-Party Financing) models

Article 5 of Decree Law No 63 of 2013, as converted by Law No 90 of 2013, provided for the use of a guarantee fund to support energy efficiency improvement projects in public buildings, especially schools and hospitals. The fund, established by Legislative Decree No 28 of 2011, was originally reserved for the installation of district heating networks.

The purpose of the fund is to provide a public financial guarantee backing bank loans granted to

projects for the construction of district heating (or district cooling) networks or projects to upgrade the energy efficiency of public buildings by enterprises, ESCOs and public authorities.

The presence of an already quite comprehensive system of direct public incentives covering renewable energy and efficiency projects led to the decision not to use the fund for direct funding of the projects. The fund will instead be used to lower the cost of debt and to improve the bankability of projects.

The fund itself is financed with a share of the proceeds from the sale of methane gas of EUR 0.05/m³ charged to end users and with part of the proceeds from the auctioning of CO₂ emission allowances for energy-environmental projects, referred to in Article 19 of Legislative Decree No 30 of 2013. The Fund's current budget is about EUR 50 million (June 2013); the estimated annual inflows from the quota on methane gas sales is approximately EUR 39 million. The estimated proceeds from auctioning of CO₂ emission allowances to be appropriated for energy-environmental projects are about EUR 210 million over the period 2013-2020. It is estimated that up to EUR 30 million per year of that revenue, or 15% of the total annual proceeds appropriated for energy-environmental projects, whichever is the lowest, could be earmarked for the fund.

A Ministerial Decree setting out the rules for operating and accessing the fund is being finalised. The co-financing choice will depend on assessment linked to other action priorities and, first and foremost, on whether and to what extent the fund will prove to be a useful tool for promoting energy efficiency.

ANNEX: National measures to promote the energy efficiency of buildings

1. Legislative Decree No 192 of 19 August 2005, implementing Directive 2002/91/EC on the energy performance of buildings.
2. Legislative Decree No 311 of 29 December 2006 - Measures correcting and supplementing Legislative Decree No 192 of 19 August 2005, implementing Directive 2002/91/EC on the energy performance of buildings.
3. Legislative Decree No 115 of 30 May 2008 - implementing Directive 2006/32/concerning efficiency of the final uses of energy and energy services and repealing Directive 93/76/EEC (Article 18(6)).
4. Presidential Decree No 59 of 2 April 2009, implementing Article 4(1)(a) and (b) of Legislative Decree No 192 of 19 August 2005, implementing Directive 2002/91/EC on the energy performance of buildings.
5. Decree of 26 June 2009, national guidelines for the energy certification of buildings.
6. Legislative Decree No 28 of 3 March 2011 - Implementing Directive 2009/28/EC of the European Parliament and of the Council on the promotion of the use of energy from renewable sources, amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC. It should be noted that Article 13 of the above-mentioned Legislative Decree No 28 of 3 March 2011 implements the rules introduced by Directive 2012/31/EU concerning energy certification in respect of real estate sale contracts and advertisements.
7. Decree of 22 November 2012, amending the Decree of 26 June 2012 laying down national guidelines for the energy certification of buildings, which removed the possibility of submitting self-declarations in energy certification procedures.
8. Decree of 22 November 2012, amending Annex A to Legislative Decree No 192 of 19 August 2005, implementing Directive 2002/91/EC on the energy performance of buildings.
9. Ministerial Decree of 28 December 2012 introducing incentives for the production of thermal energy from renewable energy sources and small-scale energy efficiency projects.
10. Ministerial Decree of 28 December 2012 setting out the national quantitative targets for energy savings to be achieved by electricity and gas distributors in the years from 2013 to 2016 and upgrading the white certificate scheme.
11. Law No 134 of 7 August 2012 laying down urgent measures to support the country's economic growth, extending to 30 June 2013 the 55% tax deductions for works for the energy upgrading of buildings previously established by Law No 296 of 27 December 2006, paragraphs 344 to 365.
12. Presidential Decree No 75 of 16 April 2013, implementing Article 4(1)(c) of Legislative Decree

No 192 of 19 August 2005, as amended, concerning implementation of Directive 2002/91/EC on the energy performance of buildings (Regulation laying down rules on the accreditation criteria to ensure the qualification and independence of the experts and bodies to be tasked with the energy certification of buildings).

13. Presidential Decree No 74 of 16 April 2013, establishing rules on the operation, management, control, maintenance and inspection of heating, air conditioning and hot water systems in buildings, pursuant to Article 4(1)(a), second part, and Article 4(1)(c) of Legislative Decree No 192 of 19 August 2005, implementing Directive 2002/91/EC on the energy performance of buildings.
14. 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 (recast).
15. Law No 90 of 3 August 2013, converting, with amendments, 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 (recast).