



**BUILD UP Skills – Italy –
Analysis of the national status quo**

August, 2012



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Further information

More details on BUILD UP Skills can be found at www.buildupskills.eu

More details on the IEE programme can be found at <http://ec.europa.eu/intelligentenergy>

More details on the Italian BUILD UP Skills project can be found at www.buildupskills-italy.enea.it

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1. Executive summary

According to the ISTAT, in the first half of 2011, the building sector provided work to 1,889,000 people, corresponding to 28.8% of the workers employed in the industry and to 8.2% of the total persons employed in the entire national economic system. The weight of the sector in occupational terms is especially high in the south of the Country, where the impact of those employed in construction compared to industrial workers and workers in the economy as a whole goes up respectively to 41.1% and 9%. In Central Italy, the respective percentages are 33.1% and 8.5%, while in Northern Italy building workers account for 23.2% of employees in industry and 7.7% of the workers employed in the entire economic system.

The obsolescence of Italy's real estate resources has a basic role in the acquisition of positive results in terms of energy efficiency, and in a more global, long term vision, in reaching the objective so the "20-20-20 Package". Not only for the wide margins for intervention and improvement, but also for the plurality of systems, technologies and solutions that can be used to pursue greater energy efficiency in buildings.

With regard to the characteristics of primary energy consumption in buildings in Italy, considering both the residential and non-residential sector, much consumption is related to indoor heating (approximately 48%), followed by cooling at 12 % and lighting at 11%. The production of domestic hot water (DHW) while cooking has a minor impact. With regard to the other uses, reference is made to the use of appliances or electronic applications and accessory consumption.

In the residential sector, the measures for improving energy efficiency identified in the EEAP 2011 refer to two categories of measures, energy yields of buildings (shells and installations) and consumption of equipment (appliances and lighting fixtures) with savings up to 2020 of 6.63 MTPE.

The measures for improving efficiency in the services sector regard four categories of measures: energy yields in buildings, efficient conditioning, public and interior lighting with a consumption reduction of over 2.5 MTPE in 2020.

In the industrial sector, the measures considered in the Action Plan regard the following categories: lighting of buildings and workplaces, efficient motor applications (Reg. 640/2009), operation at variable speeds, high performance cogeneration, refrigeration, replacement of boilers and recovery of residual heat with savings by 2020 of almost 2.5 MTPE.

This is the reason for the importance of planning strategic training initiatives to support these new skills, and the attempt in this report to reach out to the "new world" of green jobs in the field of renewable energy sources and the relative expressed and potential requirements, to start on a path to define and interpret this rapidly changing scenario.

2. Introduction

We need to use bifocals to look at the changes underway in the way of designing and building. This is because we need to see both the horizon of innovation in the sector as set forth by the European Union, and then to look closely and carefully at the many widespread changes underway in Italy, including the building sites. January 1st, 2021 is the deadline set for the momentous change in construction, because from then on new buildings can be built only if they are neutral from the energy point of view, i.e. able to guarantee performance levels of the shell so that additional heating and cooling is not needed, or to fulfil these requirements from renewable sources. Even more interesting is the analysis of what is happening in the 8,000 Italian municipalities in order to understand the size and characteristics of an increasingly complex process, in which these innovations are accompanied by a regulatory stratification that is increasingly important for its positives aspects and the negative features involving complication.

The Building Regulations have been confirmed as an excellent key for understanding trends towards an increasingly sustainable construction industry. These instruments are now a fundamental part of the building process, where the technical and procedural aspects, concerns and interests come together; the meeting point for skills in urban planning, construction and energy for the central and regional government and the municipal authorities. According to the analysis in the ONRE Report 2012, in the past four years, 855 Municipalities have utilised governance tools in construction to introduce new criteria and targets for energy and the environment going beyond the rules now in force. It is interesting to stress the increase, year after year, not only in the number of these Municipalities (+53.5% in the past two years) but also topics concerned. It would be wrong to think that these experiences regard marginal areas of Italy, since over 20 million people live in the Municipalities with the most energy and environmental innovation, and this process includes large cities and small towns. Compared to last year, the delays in some areas of the country have also been overcome, so that all the Italian Regions at least have “sustainable” Building Regulations. In 2011 many Municipalities revised their regulations to raise the standards of the targets and performance rates.

The reason lies in the role that these instruments can play in bringing about innovation in building, in a careful and flexible manner, so that these regulations can become an area of convergence for experts, designers and entrepreneurs.

There has been a fundamental impetus of the European Union in the past ten years in the building sector, in order to involve it in the targets, to be achieved by 2020, of reducing CO₂ emissions and developing renewable sources, by commitments that are binding for all the Member States. Starting from 2002, with the first Directive on energy performance in building, it was decided to start up an increasingly complex and in-depth process of change, in which the Directives have been followed by an accumulation of implementation regulations on the national, regional and municipal level. The last link of this innovative regulatory chain requires particular attention for the innovative contents proposed and because it lays down a specific timeline for the transition towards zero consumption buildings. Directive 31/2010 not only sets the deadline to achieve buildings that are neutral from the energy point of view for 2019 for public buildings, and 2021 for all private ones; above all, it introduces

new ideas and concepts for the building sector. The first change regards the targets proposed, which are of the performance type. This means that buildings must be conceived, designed and built to achieve specific, certified quantitative targets with respect to heating and cooling requirements, and it will be up to the intelligence and imagination of the designer to fulfil these in the most effective way by a mixture of design, plant installations and technological solutions for wall insulation. This is a radical “cultural” change that has appeared in our country since 2009, compulsory energy certification came into force for buildings with a classification referring specifically to the performance of the shell. This prospect has been further developed in 2012, because since 1 January it has become obligatory for those who sell or rent a home to also indicate the energy class of the building, i.e. the result of the energy certification (ACE), a document drawn up by an authorised technician who certifies the performance of the building. In addition, since 1° June it has become obligatory to reach specific performance rates in terms of production from renewable sources with respect to domestic hot water, heating and electrical requirements after the implementation in the entire country of the performance rates set forth in Legislative Decree 28/2011 for all the new buildings and in cases of renovation. The level for these performance standards will grow in the coming years, with the deadlines set for January 2014 and 2017.

This type of innovation obviously requires greater attention both in the design and construction stage, and then in the maintenance and management stage, and periodical checking of plant installations besides requiring **greater qualification of specialists**.

Considerable investment in training is thus required, because this type of measure needs more and above all better quality work. Specialised workers are required for the construction of thermal systems for walls, plumbers and electricians for integrating the various systems, besides qualified floor layer and maintenance personnel.

With specific reference to small scale installers and maintenance personnel for boilers or biomass heaters, photovoltaic or thermal solar systems, geothermal systems with low enthalpy, and heat pumps; Art. 15 of the Decree on Renewable Sources (Legislative Decree 3 March 2011, n. 28, published in the Ordinary Supplement of the “Gazzetta Ufficiale” n. 71 of 28 March 2011) provides for new training and certification requirements starting from 1st August 2013.

In our country, the definition of these rules is under the jurisdiction of the Regions, since with the reform of Title V of the Italian Constitution, energy is an area for joint legislation in which the State is called upon to identify the guidelines, while the single Regions must define the implementation.

However, this transfer to the Regions still raises many concerns, since differing regional provisions do not favour the harmonisation of the system or the overall, homogeneous growth of the energy savings culture throughout the country; furthermore, the multiplication of laws and rules means further costs and administrative procedures for the enterprises.

We can hope that coordination between the Regions can ensure the necessary homogeneity prevent calculations made for one area from becoming invalid in another area, which might be adjacent.

The analysis of the current status quo shows the situation in the training provided to workers in the building sector, highlighting barriers and obstacles to the achievement of the 2020 targets, as well as

possible solutions which should be taken into consideration in defining the certification systems or equivalent qualification systems.

3. Targets and methodology

The aim of analysing the national status quo is to identify and illustrate the professional skills, required and potential, and the training requirements corresponding to employment opportunities which could occur in the building and plant installation sector so that our country can reach the targets laid down in the 20-20-20 climate package.

The underlying motivation for this survey is the awareness of the important challenges we have to face in order to make our industry more competitive in the field of renewable energy sources, driven by a constantly growing international market and by the requirements regarding savings, efficiency and renewable sources set for 2020.

Within this framework the analysis mainly aims to:

- i) Contribute to the identification of the actions necessary for overcoming the difficulties preventing the full growth of the Italian renewable energy sources sector, taking advantage of the opportunities provided by corporate sustainable development policies and the green economy;
- ii) Effectively face up to the changes caused by the socioeconomic conversion processes aimed at sustainability and the new related issues of professional figures and work organisational models, starting from the proper use of social and human capital by the creation of new – and “good” – employment and the development of skills ensuring the growth of an adequate workforce, trained and qualified.

To this end, within the overall analysis, the specific focus of the investigation has been the identification of the characteristics of the key professional figures and so-called “emerging green jobs” in the field of renewable energy sources and the relative expressed and potential requirements.

In the light of the results of this investigation, we have also sought to provide useful elements and orientation for planning policy measures to implement in the context of environmentally compatible development, by activating fertile synergies between energy and environmental policies and employment policies, in order to create positive effects on environment-related development for the socio-economic system of renewable sources, favouring local growth and employment.

The method adopted for the status quo analysis consists of the following stages:

- Desk analysis of the topics studied in relation with the project partners and stakeholders;
- The systematic collection and statistical processing and analysis of data and research on the job market, the green economy and green jobs, with specific studies on the renewable energy sources sector;
- Definition of the analytical framework for empirical research on green jobs emerging in the renewable energy sources sector;
- Conducting of field research through an on-line questionnaire to be filled in by the various parties providing training in the building and plant installation sectors;

- Analysis of investigation data and drawing up of the report.

The analysis of the status quo has considered the training provided by the Formedil system, consisting of the networking and coordination of 102 local agencies. This figure rose in 2011 compared to 2010, thanks to the addition of some local agencies consisting of craftsmen and small and medium size enterprises. Almost one third of the schools combine training and safety, while in some cases the development of synergy in the bilateral structures involved the creation of combined bodies of the CE-CPT-SE system.

In the last 3-year period 2009-2011, the system of Building Schools distributed throughout the country, provided training with 32,813 courses, with almost 1.2 million hours, and 385,212 students. If we consider that total workforce in the period can be estimated at just over 1.9 million units per year, and actual employees totalled 1.2 million, in three years the system trained 20% of total workforce as estimated by the ISTAT and 30% of employees.

In the full crisis period of the sector, which we can say coincides with the 2009-2011 period, the training system of the sector bilateral bodies made an impressive effort on the national and local level that was actually a type of subsidiary welfare.

In order to classify the type of training currently provided in the sector of renewable energy and energy efficiency, Formedil issued a questionnaire to the various local agencies.

Training initiatives by Category Associations and some manufacturing companies were also taken into account. In the first case, information was provided by Assital and CNA which are partners in the project; both of them thus provided a selection of the main courses designed for blue collar workers in the building sector.

In particular, CNA involved some local agencies of the CNA-ECIPA, the branch of the association with the purpose of managing training programmes for the development and qualification of human capital in the member enterprises, through the local ECIPA branches.

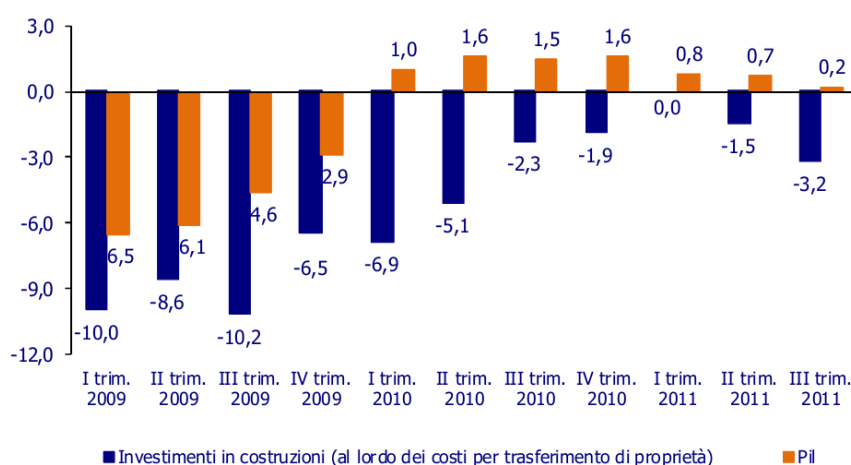
The National ECIPA issued a questionnaire to the local agencies which are familiar with the local situation and have contact with the enterprises, in order to provide a picture of the training issued.

With regard to the training in manufacturing industries, catalogues of courses provided by some producers on their websites were examined.

4. Characterisation of the building sector

The economic scenario

Although it is undergoing the most serious crisis in the post-war period, the building sector still makes an important contribution to the Italian economy, representing approximately 10% of the GDP expenditure. After the fall of 6.1% in the 2-year period 2008-2009, the GDP recorded a growth of 1.5% in 2010 and just 0.5% in the estimate for 2011. ISTAT data on quarterly trends in GDP for 2011 indicate a gradual slowdown: +0.8% in the first, +0.7% in the second and +0.2% in the third quarter. In 2012, according to the OECD, Italy's GDP will fall by 0.5% compared to the previous year; the forecast made by Confindustria by December 2011 (-1.6%) is even more negative.



Elaborazione Ance su dati Istat

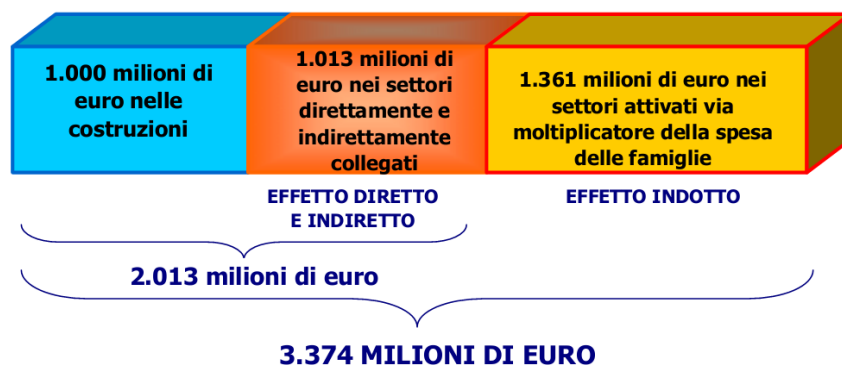
Figure 4.1 – Quarterly trends in investments in construction and GDP

The building sector acts as a driving force that reaches out to and enhances many sectors of the national economic system, with purchases of goods and services totalling 80% of all sectors of the economy. According to ANCE processing of ISTAT data, an additional demand of 1 billion euro in the building sector leads to an increase of 17,000 persons employed, of whom about 11,000 in the building sector and 6,000 in other sectors, producing an overall impact on the entire economic system totalling 3.374 billion euro, of which:

- 1 billion euro in the building sector (direct effect);
- 1.013 billion euro in the sectors directly and indirectly related to construction, i.e. goods and services necessary for the building production process, which in turn activates other sectors (indirect effect);
- 1.361 billion euro in the sectors driven by a multiplier effect of household expenditures; direct and indirect production remunerates the job factor with income

driving final consumption rates, which in turn leads to higher production (induced effect).

EFFETTI SULL'ECONOMIA NAZIONALE DI UN AUMENTO DI DOMANDA DI COSTRUZIONI DI 1.000 MILIONI DI EURO



Elaborazione Ance su dati Istat

Figure 4.2 – The building sector with respect to the Italian economy

With regard to building investments (including costs for property transfer) ISTAT data still showed a falling trend of 3.2% in real terms in the third quarter of 2011, after a stationary first quarter and the fall of 1.5% in the next quarter.

The current crisis in the building sector, which started in 2008, is not yet over.

According to the ANCE, in 2012 building investments will record a new quantitative decline, at a higher rate (-6.0%) than 2011 (-5.3%).

The results of the recent survey conducted by the ANCE with the associated enterprises showed a significant deterioration in the overall situation of the sector, also confirmed by the statistical data available.

In the early months of the current year there have been significant falls in sector occupational levels and the volume of production in building and related activities.

On the basis of this evidence, the ANCE made an adjustment for the 2012 forecasts for the 2012 issued in December last year: the quantitative change in building investments, previously estimated at -3.8%, falls to -6.0% in the adjusted forecasts, due to the redimensioning of the volume of production in the residential sector (-4.5% compared to the previous estimate of -2.1%) and in the non-residential sector (-7.7% compared to the previous estimate -5.6%).

Other major economic analysis bodies have confirmed a falling trend for 2012; however, their estimated decline rate is lower, between -1.0% for the European Commission and -2.0% for CRESME.

INVESTIMENTI IN COSTRUZIONI^(*)

	2012 ^(*) Millioni di euro	2008	2009	2010 ^(*)	2011 ^(*)	2012 ^(*)	2013 ^(*) (1)	Quinquennio 2008-2012
<i>Variazioni % in quantità</i>								
COSTRUZIONI	133.019	-2,4%	-8,6%	-6,6%	-5,3%	-6,0%	0,1%	-25,8%
.abitazioni	70.979	-0,4%	-8,1%	-5,1%	-2,9%	-4,5%	1,7%	-19,4%
- nuove ^(*)	26.159	-3,7%	-18,7%	-12,4%	-7,5%	-12,3%	-0,5%	-44,4%
- manutenzione straordinaria ^(*)	44.820	3,5%	3,1%	1,1%	0,5%	0,8%	3,0%	9,3%
.non residenziali	62.040	-4,4%	-9,1%	-8,1%	-7,9%	-7,7%	-1,9%	-32,1%
- private ^(*)	36.636	-2,2%	-10,7%	-5,4%	-6,0%	-7,1%	-1,3%	-27,9%
- pubbliche ^(*)	25.404	-7,2%	-7,0%	-11,5%	-10,5%	-8,5%	-2,7%	-37,5%

(*) Investimenti in costruzioni al netto dei costi per trasferimento di proprietà

(*) Stime Ance

(1) Al lordo degli effetti del provvedimento di urgenza in materia di infrastrutture e trasporti

Elaborazione Ance su dati Istat

Figure 4.3 – Investments in building(*)

In five years from 2008 to 2012, the building sector will have lost over a quarter (-25.8%) of investments, returning to the levels of the mid-1970s. All sectors are in difficulty, starting from the production of new housing, which will have lost the 44.4% in this period, private non-residential building, with a decrease of -27.9%, and public works, recording a fall of 37.5%.

However, the scenario formulated by the ANCE for 2013 reflects expectations for a turnaround in the negative trends in 2008 - 2012. According to the ANCE, the fall in building investments could stop, showing a slight improvement (+0.1%) compared to 2012 due to the effect of incentives measures. In particular, we should consider the immediate impact on production levels for the year due to higher Income Tax deductions for renovation from 36% to 50% up to 30 June 2013 and with an extension to 30 June 2013 of tax deductions for energy efficiency improvement measures (although with a deduction percentage of 55% instead of 50%).

According to the ANCE forecasts, building investments in 2013 will total 135,732 million euro, showing a growth of 2.0% in value and 0.1% in real terms.

The increase in Income Tax deductions for building renovation, the implementation of tax deductions for work on energy efficiency improvement, the reintroduction of VAT for the sale and rental of new buildings, the setting up of the “city development plan” and its start-up through a special fund all form part of the measures which in 2013, if promptly implemented, could lead to additional investments of about 1.5 billion euro, mainly in the residential sector, with respect to the other forecast trends.

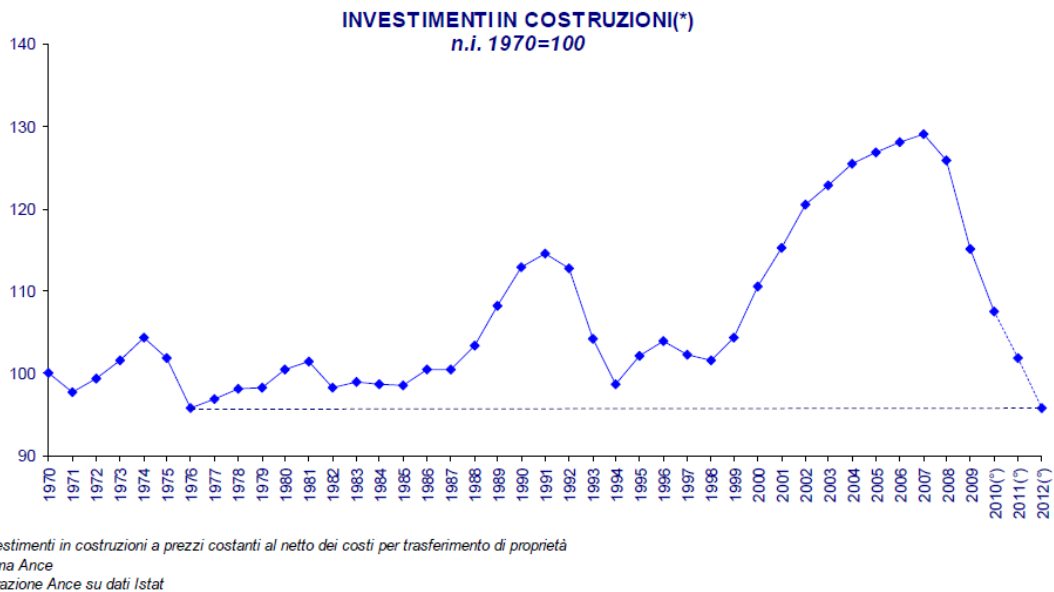
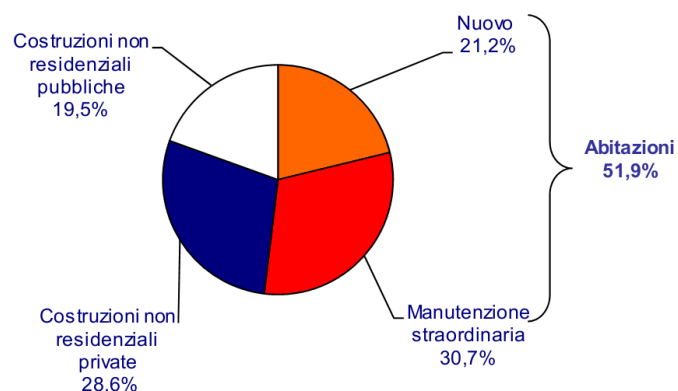


Figure 4.4 – Investments in building (*)

Investments in housing, which according to the ANCE totalled 72,835 million euro in 2011, show a basically stationary trend (+0.5% compared to -3.0% in 2010) and a fall of 2.9% in real terms compared to 2010, a year recording a quantity decline of 5.1%.

For residential investments, in 2013 is forecast to show an increase of 1.7% due to the effect of an increase in requalification and a further decline in new construction.



Fonte: Ance

Figure 4.5 – Investments in building in Italy in 2011: the weight of single sectors

In 2011, according to the ANCE, investments in new housing totalled 29,243 million euro, recording a fall in value of 1,297 million euro and 4.2% compared to the previous year. In real terms, the

production levels are 7.5% lower compared to 2010, the year recording a quantitative fall of 12.4%. Investments in new housing will also fall in 2012: their value will be 26,159 million euro, with a fall of 10.5% in monetary terms and a quantity fall of 12.3%.

In 2013 investments in new housing will continue to fall. Their value will be 26,549 million euro, with a 1.5% increase in value compared to the previous year, with a quantitative fall of 0.5%.

On the whole, according to ANCE forecasts, in the 5-year period 2008-2012 the new residential building will have lost 40.4% of the volume of investments.

From ISTAT data on the building industry, the overall amount of housing (new buildings and building extensions) for which building permits issued reached a peak in 2005 (310,978 units), and showed a moderate fall in the two subsequent years (-5.1% in 2006 and -4.6% in 2007). In any case, up to 2007 the number of dwellings that could be built was still high. Comparing the number of new housing that could be built with the number of premises sold, the theoretical impact of new building on the residential market reached its highest value in 2009 (46.3%).

Investments made for residential improvement, according to the ANCE, will total 41,720 million euro in 2011. Compared to 2010, an additional 1,021 million euro will be allocated to this purpose corresponding to a growth of 2.5% in value and 0.5% in real terms. The slightly positive trends should also be confirmed for 2012, with the same growth rates. The residential improvement sector does not show signs of recession, though in recent years growth has been lower, with an increase of 6.3% in the 5-year period 2008-2012.

According to definitive data provided by the ANCE, private and public non-residential building investments in 2011 will total 65,297 million euro, with decreases of 6.0% in value and 7.9% in quantity (-8.1% in 2009), summarising significant negative trends in both the private and public sectors.

Private investments in non-residential buildings total 38,788 million euro in the entire country. The amount of these resources was 1,667 million euro lower compared to 2010 (-4.1% in value). In real terms, private non-residential buildings recorded a fall in production levels of 6.0% (-5.4% in 2009). For 2012, private investments in non-residential buildings will total a 37,981 million euro, with a slight fall in nominal terms (-2.1%) and a quantity fall of 4.0%.

In 2011 public non-residential building investments will total 26,509 million euro. Compared to the previous year, there was an 8.7% fall in value and 10.5% in quantity terms (-11.6% in 2010). For 2012, investments in the sector, according to the ANCE, will total 24,876 million euro, with a 6.2% fall in value and 8.0% fall in real terms.

In such a difficult scenario, there is also a negative impact on the plant installation market.

According to the data collected by the Assisat Study Centre, the decline in the plant installation market in 2011 should be about 3%, while for 2012 forecasts refer to a further fall of 4%.

Finally, the effects on employment and the enterprises are very serious. Since the start of the crisis, it an estimated 325,000 building jobs have been lost. The figure rises to 500,000 if we also consider the related sectors.

In the 2-year period 2009-2010, available production fell sharply with 27,000 construction enterprises going off the market.

In particular, with an increase of about 12,000 building enterprises with one worker, there has been a sharp reduction of enterprises with more than one worker; almost 40,000 of these enterprises disappeared in two years. The increase of enterprises with only one worker can therefore be connected with the partial absorption of the employees forced out of the enterprises due to the crisis and remaining in the sector, with a poorly structured production potential.

Furthermore, in the 3-year period 2009-2011, 7,552 enterprises started bankruptcy procedures, and represent 23% of bankruptcies occurring in all the sectors of the economy. This trend was also confirmed in the first quarter of 2012 with a further increase of bankruptcy procedures in the building sector of 8.4% as compared with the first quarter 2011, corresponding to 750 more enterprises filing for bankruptcy.

The crisis situation described here is affected by the unacceptable phenomenon of late payment of works by the civil service. This is a highly serious factor, and is a risk for the very survival of building enterprises operating in the public works market.

The financial amount of late payments owed by the civil service to enterprises operating in the public works market is constantly increasing, and has reached 19 billion euro. Of these, approximately 62% refers to debts by local authorities to small and medium size building enterprises operating locally.

Besides the growth in the financial amount of late payments, there is a worrying increase in payment time. According to the survey conducted by the ANCE on the member enterprises, as of May 2012, the average time of payment of public works was 7 months (208 days compared to 189 a year ago) and maximum delays exceeded 24 months.

The situation was worsened by the fact that the banking system has blocked credit for the sector.

Credit data, confirmed by Banca d'Italia, reflect a gradual withdrawal of the banking system from the building sector. In four years, lending for residential building fell by 38.2%, while lending for non-residential building were cut by half (-44.3%).



5. National policies and strategies to contribute to the EU 2020 energy targets in buildings

Italy, together with the other European Union countries, is committed to achieving the targets set by the Presidency of the European Council in Brussels in March 2007.

On the basis of the sharing agreement reached by the Member States with the approval of the Climate Energy Package, by 2020 Italy must reach a 17% quota of final gross consumption of renewable energy.

The impetus to improve energy efficiency in buildings derives mainly from European Directive 2002/91/EC, known as the EPBD (Energy Performance of Buildings Directive), issued in order to improve energy yields of the non-industrial sector, long acknowledged to be one of the areas accounting for the highest consumption in final use of energy, and the highest greenhouse gas emissions on the European and national level. The problem is especially significant in Italy, which notoriously has a building stock with poor energy performance if compared to the mild climate. The Directive has thus given rise to a series of actions and measures which in our country have concerned the updating of the legislative framework in this area as well as of the pertinent technical regulations.

This directive was later amended with additions by the new Directive 2010/31/EC which reinforces the aim of reducing consumption, and introduces the concept of Nearly Energy Zero Buildings.

In this panorama, the Government and the Regions have issued laws and other measures to achieve maximum energy efficiency in buildings. Among the provisions on the national level, we can cite in particular National Guidelines for the Energy Certification of Buildings after the implementation of Legislative Decree 192/2005, which in turn implemented Directive 2002/91/EC on energy performance in buildings; Legislative Decree 115/08 issued to implement Directive 2006/32/EC on the efficiency of final uses of energy for energy services; Legislative Decree 3 March 2011 n. 28, implementing Directive 2009/28/EC, on the promotion of the use of energy from renewable sources.

The relations between the State, Regions and local authorities are a limitation on the homogenous implementation of legislative provisions throughout the country because:

- The current constitutional framework places energy among the area for joint legislation, with the Regions having legislative power while State legislation sets forth the basic principles. The application of this constitutional norm involves considerable difficulties in terms of harmonisation of various legislations, with more litigation brought to the Constitutional Court.
- Furthermore, a corollary of the rule is the enhanced role of the Regions on the administrative aspects, so that the authorisation of works, also coming within national jurisdiction, still requires the agreement of the region concerned (the increased spread of renewable sources, which are by their very nature not centralised, inevitably involves an active role of the regions and local authorities, especially from the administrative point of view).

The new National Energy Strategy focuses on three main targets:

1. Significantly reducing the energy cost gap for consumers and enterprises, with an alignment to European energy prices and costs;

2. Reaching and going beyond the environmental targets defined by the European Climate Energy Package 2020 (so-called “20-20-20”). All the choices in energy policy will therefore aim to improve environmental standard;

3. Favouring the sustainable economic growth through the development of the energy sector.

More specifically, in the medium-long term period, i.e. for 2020, the strategy contains 4 priorities with specific measures to support projects being started or defined:

1. The promotion of energy efficiency, the ideal tool to pursue all the targets mentioned above, for going beyond the European targets.

2. The sustainable development of renewable energy sources, for which we intend to go beyond the European targets (‘20-20-20’), while at the same time containing the costs in energy bills.

3. The development of an electricity market fully integrated with the European market, efficient (with competitive prices with Europe) and with the gradual integration of renewable production.

4. The modernisation of the governance system in order to make our decision making processes more effective and more efficient.

The implementation of this strategy will allow for the development of a gradual but significant path going beyond the 20-20-20 European targets. Their overall impact is hard to quantify, especially in terms of economic and occupational growth.

ENERGY EFFICIENCY

Energy efficiency is the top priority of energy strategy. The policies thus focus on the launching of a major programme for going beyond the European targets for 2020.

There are significant potentials for the efficiency measures in Italy, many of which will have a positive economic impact. However, a number of obstacles have prevented their full implementation. Efforts to achieve the energy savings targets will therefore be oriented to overcoming barriers to adopting technologies for enhancing efficiency, by rationalising and reinforcing instruments and regarding the building sector. In particular, these include the following:

- The strengthening of minimum standards and regulations.
- The extension over time of tax deductions mainly in the sector of residential renovation, to be corrected to make them more effective and efficient in terms of costs-benefits.
- The introduction of direct incentives for works public works not entitled to the deduction mechanism.
- The strengthening of the targets and mechanisms of the White Certificates, mainly dedicated to the industrial and service sectors, but also relevant in the residential sector; these will have a fundamental role, given the potentials of this area and the cost efficiency that this type of market instrument should guarantee.

Besides the instruments mentioned above, other positive factors will be significant, such as the strengthening of the ESCO model, the checking and enforcement of the measures, initiatives for communication and enhancement of awareness (to make final consumers more aware and active), the improvement of the system for monitoring and the results and making a balance sheet, and support to research and innovation. The reaching of the energy efficiency targets will be supported by a consumption trend, already observed, involving a more important role of the electric power carrier, by

the diffusion of applications such as heat pumps for heating and cooling, together with the improvement of the distribution network as smart grids.

SUSTAINABLE DEVELOPMENT OF RENEWABLE ENERGY SOURCES

Renewable energy sources are a key element of the Energy Strategy.

Renewables are the source expected to grow the most both in relative and absolute terms. This growth will be driven by a predictable increase in environmental awareness, but above all by the expected cost reduction in the technologies over the next 20 years (-53% for photovoltaic on buildings), which will allow many of the renewable sources to compete on an equal footing with fossil fuel technologies.

For the heating sector there are various instruments, also indirect, operating on the national level for the promotion of renewable sources for heating uses. The main ones are as follows:

- 55% tax deductions on the expenses incurred for the installation of heat pumps, thermal solar systems and biomass power plants (for now until June 2013);
- Requirement for new buildings, not yet fully operational, for covering a quota (50%) of the energy requirements for the production of domestic hot water from renewable sources, as well as the use of renewable source power plants for electricity production;
- Tax relief for users connected with the remote heating network powered by a geothermal or biomass source;
- The energy efficiency certificate mechanism, open to technologies such as thermal solar systems, biomass boilers and heat pumps, also geothermal;
- Absence of duty charges for solid biomass material used in domestic boilers.

Together with the above instruments for stimulating small scale renewable energy, there will be a "Heating Account", similar to the system used in the photovoltaic "Energy Account", with incentives to clean technologies, covering a quota of initial investment cost. This mechanism:

- Guarantees access to the incentives systems for clean technologies, with minimum criteria laid down for each type of measure.
- Assigns incentives to cover a quota of initial investment costs, varying according to the size and climatic zone, payable in 2 years (for small domestic intervention) or 5 years (for the others) and with additional premiums for the most efficient technologies.

In 2020, the Heating Account alone will enable the achieving of the National Action Plan target for renewable thermal energy, namely 17% of gross final consumption or ~10 MTPE, with an overall charge for the system of approximately 900 million euro/year with the system in operation, and coverage of natural gas tariffs (maximum estimated increase of approximately 2.2% on the cost of gas per cubic meter).

IMPLEMENTATION OF THE EPBD IN ITALY

In Italy, the implementation of the EPBD has especially regarded systems for the certification of buildings and the checking of heating systems, the training of qualified experts, information campaigns, incentives and subsidies.

Certification of buildings

Under the amendments to Part V of the Italian Constitution, energy policy is partially delegated to the Region and the Autonomous Provinces, leaving only the formulation of the general structure to the central government, while the Regions have the final power of adapting it to their individual needs. The Regions are responsible for the entire system energy, based on regional databases and registers.

The most significant progress in national regulations was made on 25/7/2009, when a new Ministry Decree came into force, adopting the National Guidelines for Energy Certification of Buildings. The guidelines specify the procedures, performance categories and basic elements of the certification, which are legally valid in all the regions that have not yet issued their own legislation, or until the issue date of the new regional law. The Regions that have already applied the regulations on the energy certification of buildings must adopt certain measures when the requisites are less strict or some aspects have been neglected, so that they will gradually adapt their rules to the national Guidelines.

The calendar for the implementation of energy certification of buildings in various categories of buildings was gradual, and was fully implemented in 1/7/2009, when all the buildings involved were included in the certification system: new construction, major renovation, public buildings and all the buildings at the time of sale.

The certification is obligatory in order to gain access to most of the public incentives for energy efficiency, for example the 55% tax deduction, the contribution granted when energy audits are conducted and the increase in the “premium” tariff for self-produced photovoltaic energy, when at least a 10% energy savings has been achieved.

Checking of heating systems

The checking of heating systems started up in Italy in 1993, with Law N. 10/1991 and subsequent decrees. The aim of the regulations on checking is to make changes in some procedures, giving greater responsibility to the Regions and allowing a longer maximum time for the maintenance and checking of small gas powered equipment.

The Italian checking system is based on the principle of the requirement for owners/users to organise the regular maintenance of heating systems by service staff, who fill in an inspection report and send it to the local authority in charge of checking compliance. This is undertaken by checking the documents received as well on-site spot checking of the installations recorded. The checking procedure is not limited to checking the energy efficiency but also includes safety aspects.

Given their autonomy, the Regions and the Autonomous Provinces have added further details to the national rules, and the local authorities have implemented databases with the results obtained.

The Qualified Experts composing the checking staff are trained by public and private organisations according to a programme defined by ENEA and are required to pass an exam. Maintenance personnel are normally trained through category associations.

Qualified Experts

Energy Certificates can be issued only by Qualified Experts. The Qualified Experts may be architects, engineers and technicians with a technical upper school diploma, duly qualified and recognised by their professional associations. When required, the Qualified Experts must attend a training course organised by training agencies with regional accrediting, and must pass an exam. The list of Qualified Experts is available publicly on the regional websites updated regularly.

55% tax deduction

Besides the incentives for the promotion of renewable energy sources, we should highlight the importance of the tax deduction (55%) in recent years for the energy efficiency improvement of existing buildings.

In force since 1 January 2007, it is a financial incentive consisting in an income tax (IRPEF) or company tax (IRES) deduction established under Law 27 December 2006 N. 296 (2007 Budget Law) and subsequent laws. In particular, the measures for the energy efficiency improvement of existing buildings set forth in paragraphs 344, 345, 346 and 347 of Art. 1 of Law 27 December 2006 n. 296, with subsequent additions and amendments, are as follows:

- Paragraph 344: overall energy efficiency improvement of the building;
- Paragraph 345: measures on opaque horizontal structures, vertical and transparent horizontal structure, including frames and glass;
- Paragraph 346: installation of solar panels for the production of hot water;
- Paragraph 347: replacement of winter heating with systems using condensation boilers or, alternatively, with systems using high efficiency heat pumps or with low enthalpy geothermal systems.

This form of incentive is cumulable with some of the White Certificates provided for in the Ministry Decrees date 20 July 2004. The following table shows the subdivision of the types of work for energy savings in terms of Final Energy Consumption of 5,204 GWh/year, of which over 40% deriving from the use of efficient heating installations.

Risparmi energetici conseguiti dal riconoscimento delle detrazioni fiscali (55%) per la riqualificazione energetica degli edifici esistenti (FEC)

Interventi	Misura PAEE	Risparmio energetico (FEC) [GWh/anno]				
		2007	2008	2009	2010	Totale 2007-2010
Coibentazioni superfici opache	RES-1	54	218	199	108	579
Sostituzioni serramenti	RES-2	177	350	297	173	997
Installazione di pannelli solari termici per acqua calda	RES-6	135	394	247	195	971
Impiego impianti di riscaldamento efficienti	RES-8	370	837	705	420	2.332
Camini termici e caldaie a legna (caldaie a biomassa)	RES-9	51	160	40	74	325
	Totale	787	1.95	1.48	970	5.204

(source: EEAP – Energy Efficiency Action Plan 2011)

White Certificates

This initially came into force in the 5-year period 2005 – 2009, and is an incentives mechanism consisting in the creation of a market in Energy Efficiency Certificates or White Certificates, certifying

the reduction of primary energy consumption deriving from measures and work for energy efficiency, on the basis of Ministry Decrees 20 July 2004 *New identification of quantitative targets for the increase of energy efficiency in final uses of energy, pursuant to Art. 9, paragraph 1, Legislative Decree 16 March 1999, n. 79* and subsequent amendments and additions.

This incentive is cumulable with the granting of tax deductions (55%) for the energy efficiency improvement of existing buildings and tax deductions (20%) for the installation of high efficiency electric engines and inverters.

The following table shows energy savings (FEC) certified with the Standardised Analytical Charts method. Since the list of measures set forth in the EEAP 2007 does not directly correspond with the types of measures undertaken with the White Certificate mechanism, it has been necessary to re-group the latter in accordance with EEAP 2007 (second column): the data, consolidated and derived from the annual reports of the Electric Power and Gas Authority, were processed to ensure the correct attribution to the measures stated in PAEE26.

Risparmi energetici conseguiti da Certificati Bianchi al 30/09/2010 – Progetti a Consuntivo (FEC)

Proposte di progetto e di misura	Riferimento PAEE 2007	Risparmio energetico (FEC) [GWh/anno]
GENERAZIONE-INDUSTRIALE	IND-4	2.493
ELETTRICITA'-INDUSTRIALE	IND 1-3-5-6	1.028
TERMICO-CIVILE	RES 1-9 / TER-1	796
TERMICO-INDUSTRIALE	IND-6	4.706
GENERAZIONE-CIVILE	RES-11	182
ILLUMINAZIONE PUBBLICA	TER-4	142
ELETTRICITA'-CIVILE	TER 2-3	110
Totale		9.457

(source: EEAP – Energy Efficiency Action Plan 2011)

TARGETS AND RESULTS FOR EEAP ENERGY SAVINGS

This paragraph shows the results of the activity of energy savings monitoring as of 31.12.2010 for measures implemented under the main instruments for energy efficiency improvement, mostly already set forth in the EEAP 2007.

EEAP 2007 contained programmes and measures for the improvement of energy efficiency and energy services in various sectors of the economy (residential, services, industry and transport) for annual energy savings by 2016 of 126,327 GWh/year. This saving, equivalent to 9.6% of the average national annual consumption concerned (average of the amount of energy distributed or sold to final clients in the last five years before the implementation of directive, not adapted to degrees/day or to structural or production changes), corresponds to the total energy savings to be achieved in 2016

through lasting measures and actions conducted in the years of the reference period, and fully effective as of 31 December 2016.

The quantitative assessment of savings was conducted with reference to the following measures for the improvement of the energy efficiency:

- a) Implementation of Directive 2002/91/EC and implementation of Legislative Decree 192/05;
- b) Granting of tax deductions (55%) for the energy efficiency improvement of existing buildings;
- c) Granting of tax deductions (20%) for the installation of high efficiency electric engines and inverters;
- d) Incentives for environmentally sustainable renovation of the automobile and truck stock up to 3.5 tons;
- e) Mechanism for the recognition of energy efficiency certificates (White Certificates) pursuant to Ministry Decrees 20/07/04.

Considering the type of measures introduced and the relative (partial) overlapping in some cases, as well as the broad spectrum of possible measures considered, a Bottom Up approach adopted in the modelling phase has allowed a more reliable quantification of energy savings for every single measure rather than for general measures.

The following table shows the annual overall energy savings targets by sector, planned for 2010 (intermediate target) and 2016 (final target) indicated in the EEAP 2007, as well as the results achieved in 2010: the annual energy savings achieved is 47,711 GWh/year, equivalent to approximately 3.6% of the national target. The table shows that **approximately 70% of annual energy savings achieved in 2010, amounting to 31,427 GWh/year, comes from the residential sector.**

Risparmio energetico annuale complessivo conseguito al 2010 e atteso al 2010 e 2016 (FEC) – Sintesi settoriale

Settori	Risparmio energetico annuale conseguito al 2010 [GWh/anno]	Risparmio energetico annuale atteso al 2010 – PAEE2007 [GWh/anno]	Risparmio energetico annuale atteso al 2016 – PAEE 2007 [GWh/anno]
Residenziale	31.427	16.998	56.830
Terziario	5.042	8.130	24.700
Industria	8.270	7.040	21.537
Trasporti	2.972	3.490	23.260
Totale	47.711	35.658	126.327

(Source: EEAP –Energy Efficiency Action Plan 2011)

Requirements for new construction and buildings undergoing major renovation (Art. 13, paragraph 4 of the RES directive)

Legislative Decree 28/2011, in which Italy implemented the RES directive, cites the requirement of the integration of renewable sources in new buildings and existing buildings undergoing major renovation, already set forth in Legislative Decree 192/05 implementing Directive 2002/91/EC on energy performance in building, for covering 50% of domestic hot water consumption.

In addition, it provides for using renewable energy to cover the forecast consumption of domestic hot water, heating and cooling. In this case, the energy produced from renewable sources must cover the following consumption percentages, growing over time:

- a) 20% when the application for the pertinent building permit is made from 31 May 2012;
- b) 35% when the application for the pertinent building permit is made from 1 January 2014;
- c) 50% when the application for the pertinent building permit is made from 1 January 2017.

These requirements cannot be implemented by systems operating from renewable sources producing exclusively electricity which, in turn, powers devices or systems for the production of domestic hot water, heating and cooling.

These requirements do not apply if the building is connected to a remote heating network covering the heat requirement for the heating premises and providing domestic hot water.

For public buildings, the above requirements are increased by 10%.

Should it prove technically impossible, wholly or partially, to comply with the integration requirements, this must be stated and illustrated in detail by the designer in the technical report, examining the non-feasibility of all the various technological options available.

Envisaged contribution of the building sector to the 2020 targets

Since 2020 is a reference year for the major European targets and the commitments made on the national level, the evaluation of the EEAP 2011 impact on primary energy and CO₂ emissions have been made for this timeframe. To this end, the measures provided by the Plan have been extended up to 2020, while the hypotheses and assumptions for the measures planned for 2016 remain unaltered (e.g. penetration and replacement rates for higher performance equipment, efficiency enhancement of systems, application of regulations etc.).

The extension of the EEAP 2011 to 2020 results in a reduction of final energy of approximately 15.9 MTPE.

Sector	Reduction of final energy in 2016		Reduction of final energy in 2020		CO2 saved in 2020
	GWh/year	MTPE/year	GWh/year	MTPE/year	Mton
Residential	60027	5.16	77121	6.63	18.0
Services	24590	2.11	29698	2.55	9.45
Industry	20140	1.73	28678	2.47	7.20
Transport	21783	1.87	49175	4.23	10.35
Total	126540	10.88	184672	15.88	45.0

Figure 5.1 – Reduction of final energy in 2016 and 2020 (EEAP 2011)

In the residential sector, measures for improving energy efficiency as identified in the EEAP regard two categories: the energy yields of buildings (shells and installations), and consumption by equipment (appliances and lighting fixtures).

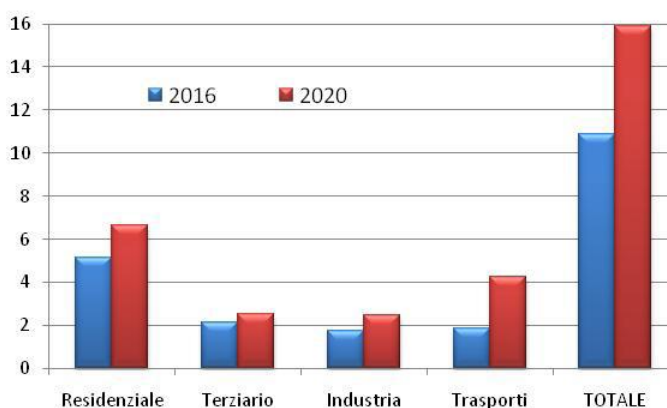
In the first case, the measures respond to the expectations introduced by the energy certification of buildings (Directive 2002/91/EC, Legislative Decree 192/05), while in the other case they are related to the current European and national legislation framework on energy labelling (Directive 2005/32/EC Energy Using Products, EUP). The extension of the measures up to 2020 produces about 1.4 MTPE in additional savings compared to the value expected for 2016. Out of these, over 80% is accounted for by measures regarding the demand for heating and domestic hot water. Major reductions are also with regard to the main appliances, where a faster improvement in average performance is expected due to the rapid spread of new generation products.

The measures for improving efficiency in the services sector regard four categories: energy yields of buildings, efficient conditioning, public lighting and indoor lighting. As for the residential sector, these measures derive from the implementation of the directives on the energy certification of buildings (EPBD 1 and 2), the requirements for energy related products (ErP) and eco-labelling. In 2020, extension of the Plan will lead to a reduction in consumption of over 2.5 MTPE in the sector.

In the industrial sector, the measures considered in the Action Plan specifically concern the lighting of buildings and workplaces, high yield cogeneration, refrigeration, replacement boilers and recovery of thermal residues.

By 2020 the extension of the measures will lead to savings of almost 2.5 MTPE.

Figure 5.2 - Reduction of final energy, total and by sector, years 2016 and 2020 (MTPE)



An examination of the current situation shows that the measures chosen to respond to the aims have immediate and

numerically relevant impact in terms of guarantee a reduction in energy consumption, and less quantifiable in the medium-long term, when there is structural intervention on the system. Furthermore, **the Plan highlights that the building sector is the sector where it is suitable and useful to focus the measures.**

Given the lack of official data, there follow some proposals and the results of the estimate of energy savings obtainable with energy efficiency improvement measures for some types of building use.

Smart Cities and urban renovation

It is estimated that Italy has about 2,000,000 homes in a poor state of conservation, and that need to be demolished and rebuilt or renovated. Considerable urban areas contain complexes of buildings that have now concluded their lifecycle, and thus require substantial renovation, with a process of “integrated renovation” for Smart Cities.

In recent years there has been a great cultural change compared to the past, when there was a mainly architectural approach to building replacement, and the measures were mainly limited to single dwellings or a single building. Today, the commitment to implementing sustainable development policies through the quality improvement of the energy-environmental system, and the need to

relaunch the building sector, have led to the extension of the focus of measures in the residential building sector towards a neighbourhood outlook, and find effective procedures to face all problems— environmental, town planning, economic, social and occupational – characterising these areas, with effective application in the Smart Cities.

For starting this process, incentives measures can be applied for a new urban model (governance of local systems) ensuring high residential comfort and excellent energy-environmental performance, implemented by public and private stakeholders.

Public building - services (source Cresme – ENEA)

The savings obtainable up to 2020 for public buildings for office use, subjected to energy efficiency measures, conducted in 80% of the total number (the remaining 20% is considered to consist of listed buildings, and buildings for which there is not an adequate costs/benefits ratio) are shown in the following table:

Public offices – N. buildings considered: 11.000

	Current consumption in total MTPE	Consumption after intervention total MTPE	Savings obtainable by 2020 total MTPE	% savings on total consumption
Heating	0.33	0.22	0.12	17.52%
Lighting	0.07	0.04	0.023	3.33%
Other Electr.	0.26	0.22	0.016	2.42%
Total	0.66	0.48	0.16	23.27%

Figure 5.3 – Savings obtainable by 2020 in public buildings for office use

The savings obtainable by 2020 in school buildings are:

School buildings - N. buildings considered: 30.000

	Current consumption in total MTPE	Consumption after intervention total MTPE	Savings obtainable by 2020 total MTPE	% savings on total consumption
Heating	1.05	0.68	0.37	31.29%
Electric	0.12	0.07	0.02	1.37%
Total	1.17	0.75	0.39	33.36%

Figure 5.4 – Savings obtainable by 2020 in school buildings

Energy efficiency measures in this type of building are especially interesting since evaluation is underway for intervention on a significant number of school buildings for structural safety reasons. Given the importance of the measures in any case required on these buildings, the costs and payback time of any additional investments in energy efficiency would fall significantly.

On the basis of an estimated building stock of about 53,000 school buildings, energy efficiency measures will be conducted on approximately 57% of the total buildings. This percentage takes into account that some of the buildings are listed, and that in other cases the costs of works, due to architectural and/or systems characteristics do not show a reasonable costs/benefits ratio.

Social Housing

The public residential building sector includes housing owned by the former IACP (799,872 housing units rented and another 81,255 units from social housing) and the dwellings owned by regional and local authorities. At the present time the number of buildings concerned has not been quantified, but with according to a general estimate the number involved may be approximately 90,000 units.

It should be observed that both building quality and the energy efficiency rate of this building stock are very poor. In particular, very high levels of energy consumption are recorded, in some climatic areas exceeding 240kWh/m² per year.

In order to estimate the savings obtainable, also in this case the entire building stock has not been considered, but about 80%, for the same reasons already mentioned in the cases of the public non-residential buildings for office use and school buildings.

Social Housing – N. buildings considered: 70,000

	Current consumption in total MTPE	Consumption after intervention total MTPE	Savings obtainable by 2020 total MTPE	% savings on total consumption
Heating	1.02	0.61	0.41	39.45%
Electric	0.02	0.02	0.003	0.29%
Total	1.04	0.63	0.41	39.74%

Figure 5.5 – Savings obtainable by 2020 in Social Housing

In order to support the above measures, adequate incentives are required; these could consist in the creation of a national fund to support the measures and ensure that the planned high energy efficiency standards are achieved.

The fund, which could be a rotation fund type accompanying the traditional financial channels (e.g. bank credit), would especially provide support to public bodies and/or ESCo through subsidised rate loans, loans linked to performance rates or other instruments to guarantee risk sharing.

The green job market in Italy

According to research conducted by the UNEP (United Nations Environment Programme), the International Labour Organization (ILO) and the International Organization of Employers (IOE) and the International Trade Union Confederation International (ITUC), green jobs consist of all the “employment in the sectors of agriculture, manufacturing, research and development, administration and services that contribute in an incisive manner to preserving or restoring environmental quality”.

The definition also includes the sectors most connected with the green revolution: renewables, building, transport, basic and recycling industry, agriculture and forestry.

These so-called “green jobs” include not only people directly employed in the production or distribution of energy, but also a wide variety of professions, such as lawyers specialised in environmental violations.

Since the introduction of the 20-20-20 Climate Energy Package of the European Commission (2008), European forecasts have mentioned a million new jobs to be created in the next decade in the renewable energy sector alone. In general, as the International Labour Organization (ILO) has

observed, the shift towards a more sustainable economy will affect the job market in at least four ways:

- 1 The creation of professions (for example installers of photovoltaic panels or workers specialised in installing instruments for pollution monitoring).
- 2 The replacement of traditional professional figures with new ones followed by the shift of production from traditional fossil technologies towards renewables.
- 3 The disappearance of some jobs with no replacement by alternative operations, as in the case of the elimination of depot operations for petroleum used to produce electricity.
- 4 The transformation and adaptation of professional figures existing today (such as electricians, blacksmiths or labourers) to the new qualifications requested by technologies and work methods compatible with green production and renewables.

While in our country the occupational impact is still modest, it is also true that there is no lack of demand for people with qualifications required by the market, and some of the most sought-after profiles are well paid, so that the companies hiring them may pay several thousand euros to cover the cost of non-competition agreements.

Thanks to the retaining of the 55% tax deduction in the 2011 Budget Law, there should be a further increase in the demand level for the “green” professions.

For building workers who have lost their jobs due to the economic crisis, green jobs could thus be a good option for re-employment, after brief on-the-job updating on technical aspect of the sector, adequate training and complete information on health and safety.

According to Unioncamere data (2009/early 2010) 30% of small and medium size enterprises in Italy are betting on the green economy. Not all agree on this. According to criticism in the research by: Luciano Lavecchia and Carlo Stagnaro, of the Istituto Leoni (a free market think tank), “Renewable sources are not an efficient instrument for the creation of employment”. They hold that each green job absorbs an amount of resources which, if invested in other sectors of the economy, could produce on average 4.8 jobs. Furthermore, in order to achieve the estimated 112,000 green jobs, an enormous amount of funding would have to be activated (about 6 billion euro per year). According to the authors, the green industry would on the whole be “capital intensive rather than labour intensive”.

The figures required by the market

In Italy there were 100,000 people employed in the sector 2010, with almost 250,000 by 2020, according to the estimates by the Power Services Manager of the IEFE Bocconi, with a higher quota for bioenergy (over 100,000 employed), followed by wind energy with 80,000 and solar power with 50,000.

According to the report drawn up by Serena Rugiero, coordinator of the Energia Ires-Cgil Observatory, and Giuseppe Travaglini, Professor of Political Economy at the University of Urbino, Italian jobs in the renewable energy sector (especially photovoltaic, wind energy and biomass), now total about 100,000 on a direct and indirect basis, but by 2020 there will be another 60,500 “green workers”.

Between 2008 and 2011, in the crisis period, almost the 24% of Italian enterprises invested in the green economy; for the current year, 38% of hiring planned by enterprises regards professional figures linked to sustainability.

The green economy seems to be spreading over the country from north to south. The regional classification for the impact of green enterprises green on the total number shows Trentino-Alto Adige to be at the top (with 29.5% of enterprises investing in green technologies) followed Valle d'Aosta (27.3%). They are followed by five regions in Southern Italy with figures between 27.2% in Molise and 25% in Abruzzo, as well as Basilicata, Puglia and Campania. Lombardy, Friuli-Venezia Giulia, Veneto and Piedmont show figures of just under 24%. With regard to absolute values, on the other hand, Lombardy is at the top with 69,330 enterprises investing in the green economy, followed by Veneto with 32,250 enterprises and Lazio with 30,240 enterprises.

Numerous professionals are connected with the construction of green buildings (according to the report entitled "Il futuro verde dei mestieri" – The green future of the professions - *Il Sole 24 Ore*, May 2010). According to the report by *Il Sole 24 Ore*, the general focus is on electrical, electronic or civil engineers as designers of renewable systems, project managers or green business developers, economists and legal experts in the specific legislation. In the photovoltaic sector, according to the report, there is great demand for physicists, chemists, specialised technicians for panel factories, installers, electric and mechanical maintenance personnel, energy managers and energy traders.

The new figures proposed by the world of training

Although not all the workers employed in "green" enterprises can be defined as "green workers", there is no doubt that the green economy has led to the creation of specific jobs such as installers of photovoltaic panels and other clean technologies. These new jobs, according to the research by Ires Cgil, require new skills to be developed through training and the adoption of training programmes. The study has identified 16 new professions for thermal and photovoltaic solar energy; 14 new professions for wind energy; 13 new professions for biomass sources and 11 general figures.

However, the encounter between job supply and demand in Italy is still difficult: websites for green jobs have developed only recently, are not yet numerous and do not always ensure complete information. Employment agencies, labour consultants, the inter-professional funds and the social partners have had to adapt rapidly for studying the true requirements of the market, the leading enterprises, training supplied and the contents of the professions. The contents of the emerging professions must be defined in terms of skills, with their characteristics and the qualifications required. The site managers go under various names according to the company, although they always have a managerial profile.

The difficulty in finding candidates suited to green professions could also be due to reluctance to accept an "ongoing" professional profile which is stratified and complex. While on the one hand there are new jobs clearly identifiable as "green" (for example wind turbine designers), on the other hand there is the transformation or "greening" of already jobs (not only those linked to green profiles in the narrow sense such as installers, technicians, managers etc., but also jobs in education, services etc.).

The gap between the world of training and the world of enterprises

A widespread uncertainty has emerged on the new professions and the relative skills and formal requirements, the gender aspect, and future trends in training and employment in the green sectors over the long term (after 2020). For example, with reference to the sector of renewable energy sources, on the one hand, large companies, aware of their own requirements, do not always find people who can meet these needs. The educational and training sector responds on a geographically fragmented basis, only partially adequate and in any case not prompt enough to supply what the green companies want. The small and medium size enterprises, already overwhelmed by European limitations and standards, are facing the same difficulties in relating with the world of training for green jobs. Adult workers cannot easily find opportunities for reconversion and improvement, above all at a difficult phase of emerging from the crisis, although the opportunities, which have been studied and monitored, could be around the corner. Apart from best corporate practices, even today women seem to show little interest and propensity of the range of professional profiles in the sector.

Given the speed of change, and the fact that the demand is not met by the skills available, in Italy and in Europe, the placement approach could break the barrier between training and work, favouring the dynamic encounter between job supply and demand.

In general, the entire sector of renewable energy sources has been characterised by a lack of specialised installers and specialised engineers. These profiles could easily be converted from those in the building sector. For building workers who have lost their jobs due to the economic crisis, green jobs could thus be a good option for re-employment, after brief on-the-job updating on technical aspect of the sector, adequate training and complete information on health and safety.

The specific nature of the sector, on the other hand, regards the time required for changing it. At the time of opening of a factory for producing photovoltaic panels, for example, estimates on the productivity of the plant after five years already consider a technological change, and therefore the necessity of expanding and updating worker skills. However, this clashes with the need to comply with legal requirements, for example those on information and training for health and safety at the workplace, which require more time with respect to what the market needs to drive productivity and competitiveness, besides a faster re-employment of unemployed workers in such a way that green jobs would be a concrete response to the crisis.

The lack of sufficient integration of the world of education and training with the job market could produce training programmes that fail to take into account the real requirements of the green industry, where professional requirements are yet not very clear even now, and where the speed of change is greater compared to traditional sectors. Besides continuing professional development, professional updating and lifelong learning, which may also be non-formal or informal, during the leisure time or between jobs, is highly important.

Emilia-Romagna has drawn up a **“Guide to Green Jobs”**, a book published by Ermesambiente, the regional website dedicated to sustainability, to provide useful information to the public with a list of numerous professional figures, regional initiatives, useful links and regional qualification charts.

In general, schools have failed to provide widespread, information among young people on the existence of green jobs and the training paths providing minimum preparation in this regard. On the

other hand, in order to guarantee that the results of training turn into employment, it is essential to start from the analysis of professional requirements. There are many enterprises that decide to plan training internally with the paths for skills development and updating, in order to guarantee the closest possible compliance with their requirements.

Since these are new sectors, the start up of green enterprises may be inhibited above all by the lack or inaccuracy of the information available. Furthermore, many professional figures in green jobs will actually have a specific mix of skills, not all of them new, with so-called system learning (such as familiarity with the country, the sector market etc.), as well as language and communications skills, legal and negotiation skills and technical specialisation. Together with these, other skills traditionally referred to as “soft” will be the true core of green expertise: strategic and leadership capabilities, a spirit of enterprise, knowing how to adapt and transfer knowledge, to analyse and evaluate risks, co-ordinate a working group, and manage efficient projects and financial plans.

The difficulty of finding candidates suited to green professions could also be due to reluctance to accept an “ongoing” professional profile which is stratified and complex while involving traditional skills, revised in the light of the new scenario.

In the next decade, specialised jobs and the demand for a highly qualified and flexible workforce very will grow. According to forecasts by the Cedefop (European Centre for the Development of Vocational Training) the jobs requiring higher levels of education (ISCED 5 and 6) will increase by 18.7 million, and those requiring an ISCED 3 and 4 level by 13.3 million. On the other hand, the occupations either not requiring formal qualifications, or calling for a low level (ISCED from 0 to 2), will fall to 12.5 million. This could mean the risk of polarisation in the new occupations on the job market in favour of highly qualified non-manual jobs such as administration, marketing, logistics and sales management. One of the reasons for the overall rise in demand for higher standard training is the change in the nature and requisites of all the occupations, also on the lower levels: employers (above all in the service sector) will increasingly require more widely applicable skills, starting from the capacity to “learn how to learn”, i.e. to recognise their own training need and find opportunities to satisfy them, which is essential in a changing economy where some jobs disappear and new ones are born. Other non-routine skills include language and computer skills, problem-solving skills, analytical and communicative abilities, self-management, and skills ranging over the potentials of advanced technologies, already ready to undertake the routine and repetitive tasks and traditionally assigned to workers with medium level qualifications – an area which now seems to be shrinking.

State of implementation and application in Italy of the European Qualifications Framework (EQF) and other European policies for education and training in the building sector:

The Single European Framework for Educational Qualifications - EQF

The Recommendation on the setting up of the European Qualifications Framework for lifelong learning was formally adopted by the European Parliament and the Council of the European Union on 23 April 2008. The Recommendation asked the Member States of the European Union to connect their national systems for educational qualifications and the sectorial systems to the EQF by 2010, and to indicate by 2012 the EQF levels in the certifications issued in the various countries. As early as April

2006, Italy set up a technical round table promoted by the Ministry of Labour, the Ministry of Education, Universities and Research, the Regions and the social partners, in order to start a process of defining a national qualifications systems coherent with EQF. The EQF format based on the results of learning classified as KSC (Knowledge, Skills and Competences) was adopted in the regulations for the reform of second level secondary schools.

Major work for the implementation of the European system for the recognition and transferability of certificates and skills, was conducted in the Leonardo da Vinci Programme, now integrated in the Lifelong Learning Programme 2007-2013. (Source: *Lifelong Learning Programme (2007-2013) Leonardo da Vinci Sectoral Programme - Thematic Group on "Transparency of qualifications, Validation of the non-formal and informal learning, transfer of credits" – Final Report: activities and results*).

The Italian National Agency in charge of managing the Leonardo da Vinci Programme (ISFOL) has undertaken the coordination of Group 4 - Transparency of qualifications, validation of non-formal and informal learning, transfer of credits. The first initiatives of the Thematic Group have concerned: the identification of the main themes involved (transparency and validation); the analysis, through a field survey, of the contribution of the VET projects on these areas. The analysis was conducted jointly by CEDEFOP and CNCP. After defining the reference context and analysing the contribution of projects, the Group then organised several thematic events, also involving promoters of projects and final beneficiaries, stakeholders, experts, political decision-makers on the European, national, regional and sector level: a meeting on "Validation of competences"(Brussels, June 2003); the conference "Leonardo's Europe" (Bordeaux, March 2004); a seminar on "The needs of individuals and guidance as regards transparency tools" (Brussels, November 2004). The work (after a period of suspension in 2005) were resumed and the Group was renamed "Transparency of qualifications, non-formal and informal learning, transfer of credits" (Thematic Group TG4). At the start-up meeting (Rome, April 2006), the Thematic Group has then defined first key points forming the basis of the future work. The first event organised by the Thematic Group was held in Bucharest on 23 March 2007. The conclusions of the workshops were illustrated in the plenary session by a facilitator, and formed the point of departure for a debate on the challenges arising for mobility, and involving European authorities (representatives of the European Parliament and the European Commission), national authorities (representatives of the Romanian Ministry of Education and the Italian Ministry of Labour), sector stakeholders and experts. The second event organised by the Thematic Group was held in Rome on 5-6 July 2007 and entitled "Competences, Learning outcomes, Qualifications: Transparency contributing to Employability". Also in this case the Conference explored the developments of European policies and project practices regarding the transparency of skills and qualifications, the transfer of credits in VET and the validation of non-formal and informal learning. This took place from the specific prospect of how the existing and future outlooks and experiences in these areas can support and facilitate employability, thus contributing to the Lisbon target of more and better jobs through a better reconciling of supply and demand on the job market.

UNDERSTANDING on Vocational Training between the Government, Regions, Autonomous Provinces and social partners - GUIDELINES FOR TRAINING IN 2010

The positive cooperation initiative started up institutionally by the Agreement of 17 February 2009 on “Measures to support income and skills”, featuring a great political and financial commitment by the Regions which includes Community participation, has pursued the aim of responding to the current crisis in a jointly agreed and effective manner.

The Government, Regions, Autonomous Provinces and social partners agreed on the need to promptly identify some fundamental guidelines to orient, with an initial trial in 2010, the use of financial resources for the training of the non-employed, the unemployed, workers in mobility or temporarily suspended (recipients of layoff payments, unemployment subsidies etc.). This was related to the irregular and selective features of economic recovery, which might lead to a lengthening of the period out of work or making the transition to a new job more difficult for many workers. The training is organised in relation to the professional requirements of the sectors and enterprises, and taking into account employability and the social inclusion of persons.

The Government, Regions, Autonomous Provinces and the social partners agreed to favour the utmost simplification of the management of allocation to funds for continuing training, enhancing the subsidiarity of public measures with respect to local level independence. The commitment also extends to procedures for adjusting the resources of the inter-professional funds for continuing training in relation to emerging needs.

The parties likewise agreed to promote a more efficient synergy between public and private resources for training, in order to sustain employability, as well as to achieve the definition of shared organisational model for the implementation of the measures and the use of resources.

The parties, in the context of raising the quality of training and of a necessary agreement with the public employment services and other employment agencies, agreed to assess the hypothesis of creating a national system for professional and training standards, with the certification of skills and the accrediting of training providers responding to standards agreed on the national level.

The application of the agreement was positively judged by the parties.

ENEA: THE DEVELOPMENT OF THE TRAINING METHOD FOR PROFESSIONAL FIGURES IN THE ENERGY FIELD ACCORDING TO EQF

ENEA, with the contribution of practical field testing, which took place by specific courses conducted by the MESOS company, a spin-off of an ENEA consortium, has developed training methods responding to the specifications required by European directives and Italian legislation, and fully compliant with the European Qualification Framework.

This initiative comes within the COMPENER project, coordinated by ENEA and funded by the European Union. The project targets are all the technicians in Italy concerned in various ways with the design, creation and management of all the systems and devices for energy production in the various sectors of industrial and non-industrial installations. Considering the number of professionals, technicians, local authorities and other bodies involved in various ways or which could plan a major

active role for reaching the targets of energy efficiency in the non-industrial sector, there are a large number of users who are potentially interested or could be involved in the subsequent training process.

ENEA has followed a project path beginning with the Qualicert Project, continued with the COMPENER project and due to end with the Build Up Skills Italy Project. The leading target of the training project is to provide technical updating, training and specialisation for a specific professional figure, in order to respond to the demand for this type of skill expressed by the market of energy installations in the non-industrial, services and industrial sectors.

6. Statistics on building and energy sectors

Statistics on the building sector

Building stock, namely type of buildings (residential, commercial, industrial, public), annual rate of new construction and renovation

Italy has an enormous real estate stock, reflecting its past urban civilisation, and at the same time the different rural traditions of the regions. These physical resources, in turn, form the data resources recorded by the “Agenzia del Territorio” (Property Tax Authorities) database in terms of the stock of land and buildings, and their use, transfer and value throughout the country.

Recently, some studies have highlighted the record figures of Italian households in terms of real estate ownership. Our country has one of the highest percentages in the world of families who own the home they live in.

This also reflects the wide range of building types in the country, varying greatly in value and quality, and of the lifestyles and economic activities of the owners. The analysis of the types of housing in the Property Register and a comparison with commercial and productive property also highlights the close link between residence and employment.

The real estate stock recorded under various types, identified by the Property Register categories that cover the possible types of property use consists of the following numbers of units:

<i>COD</i>	<i>Aggregation</i>	<i>Property registry categories</i>	<i>Number of units</i>
ABI	Housing	A1 to A11 (excluding A10)	33,095,409
PRT	Pertinences	C2, C6 and C7	21,451,490
COM	Commercial	C1 and D5	2,112,783
PRO	Productive	C3, D1, D7 and D10	1,430,592
TER	Services	A10, B4 and D5	678,435
RCU	Recreation and cultural	B6, C4, C5, D2, D3 and D6	120,862
SIS	Health and education	B2, B5 and D4	64,548
AL	Other uses	B1, B3, B7, B8, D9	76,726

Figure 6.1 – Composition of the real estate stock (Agenzia del Territorio – data 2009)

Excluding the remainder of units under “other” (AL), regarding special buildings (prisons, barracks, chapels, floating buildings), seven of the groups are deemed significant for identifying housing, infrastructures (schools and hospitals, recreation, tourism and cultural) and facilities for production, services and commerce.

With regard to the residential building stock, 46% of buildings were built before 1962. These data derive from the 14th National Population and Housing Census, held in the now distant year of 2001. Data on the 15th National Population and Housing Census, held in 2011, are unfortunately not yet available.

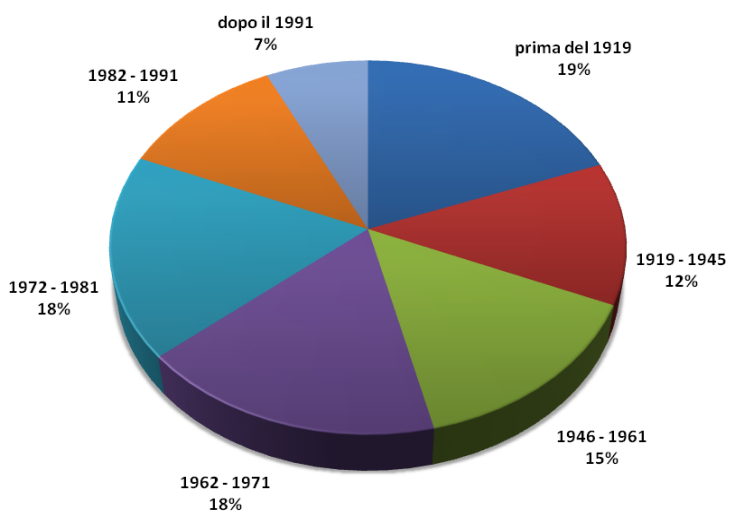


Figure 6.2 - Distribution of buildings by period of construction (ISTAT Survey 2001)

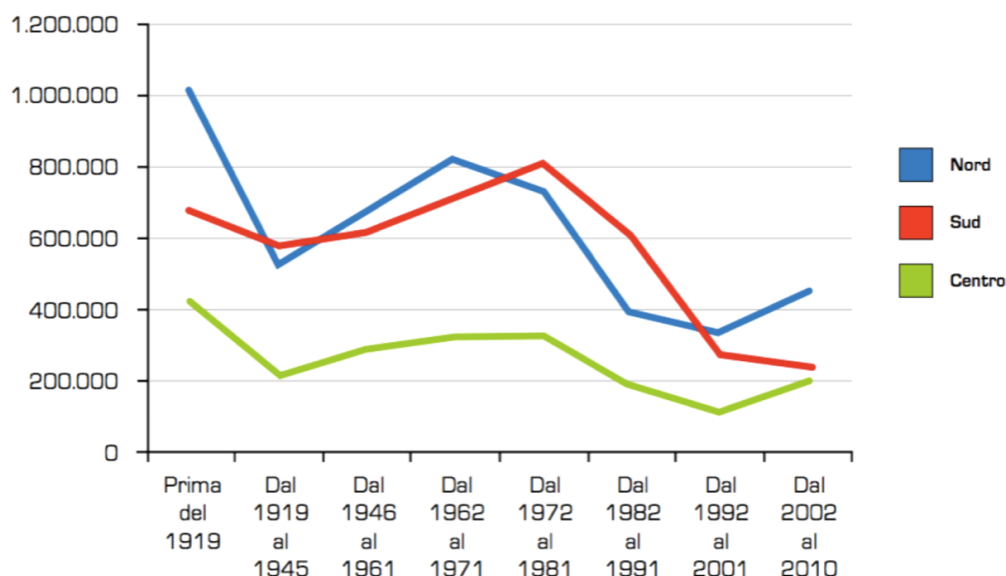


Figure 6.3 - Distribution of new construction by geographical area and time of construction (ISTAT and Agenzia del Territorio)

With regard to the 12.1 mln residential buildings, the average requirement is about 180 kWh/m² of primary energy, while in Spain and France this requirement is respectively 160 kWh/ m² and 150 kWh/ m². Lombardy and Sicily are the regions hosting a large number of all the buildings existing in Italy (by geographical zones), totalling respectively 12.5% and 11.6%. The geographical distribution of buildings in Italy is less unbalanced if we look at the number of dwellings, totalling just over 30 mln, representing approximately 60% of the 4 bln m² of the country's building stock (source: Censis).

TOTAL NORTH	5,112,243	41.2%
NORTH WEST	2,771,532	22.8%
NORTH EAST	2,340,710	19.3%
TOTAL CENTRAL	2,061,351	17.0%
TOTAL SOUTH	4,973,240	40.9%
SOUTH	3,059,121	25.2%
ISLANDS	1,914,119	15.8%
ITALY	12,146,833	100.0%

Figure 6.4 – Geographical distribution of residential buildings (ISTAT and Agenzia del Territorio)

The age of buildings often has direct consequences on the state, not only for the eventual poor conditions or the lack of services and installations, but also for the distribution and technological choices regarding the period when they were built.

The analysis of the various sectors of the building market shows substantial changes (source CRESME):

- The fall of the residential building market by half, compared to the steadily growing non-residential sector. The stable housing threshold is around 200,000 dwellings/year;
- With regard to the types, there is a crisis in intensive multi-floor construction compared to the consolidation and growth of single-family and two-family housing (approximately 70%). Most buildings have two floors above ground (therefore not counting half-basement and basement floors)

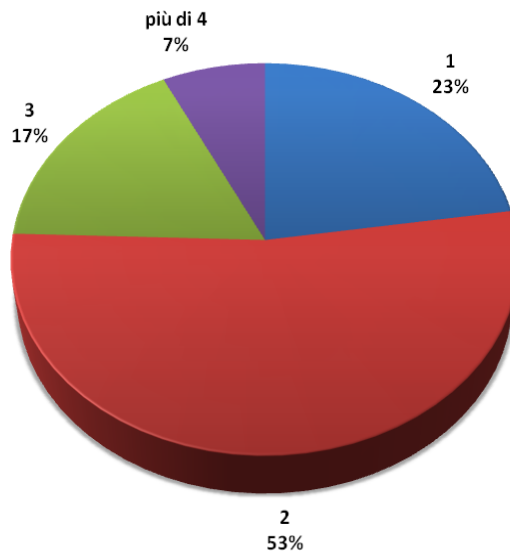


Figure 6.5 - Number of floors in residential buildings

With regard to the construction type, 61% of buildings have supporting walls, while 25% of buildings have a reinforced concrete structure.

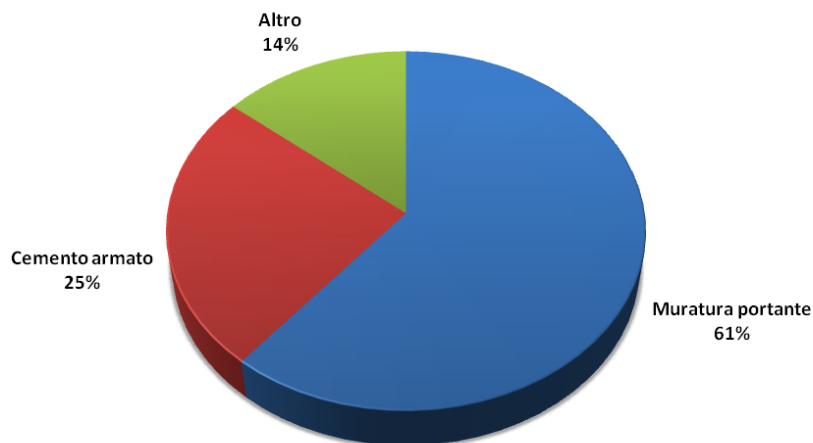


Figure 6.6 – Construction type of residential buildings

Number of low energy buildings, annual rate of new construction of energy efficient buildings and energy efficient renovations

By their nature, significant measures for the improvement of the energy efficiency in buildings imply work on systems and the structures, and accessory costs are compensated only in case of inclusion in more general renovation or extraordinary maintenance of the building.

Every year, only a small part of the national building stock undergoes major energy efficiency improvement measures, mainly conducted in more extensive planned renovation. On the other hand, there are more numerous partial measures such as the replacement of fixtures, the replacement of winter heating systems, the installation of solar panels for the production of domestic hot water, and the insulation of opaque horizontal and vertical structures.

The following figures show the natural rate of transformation in the EU building stock (source: Energy-efficient buildings PPP – Multi-annual roadmap and longer term strategy, European Union 2010):

- Annual rate of new building: 1-1.5%;
- Annual rate of conducting ordinary and extraordinary maintenance: 2%;
- Annual rate of installation renovation: 5%;
- Annual demolition rate: 0.2-0.5%;

The trends in building stock in Italy do not show substantial differences, although renovation rates are higher than the European average.

In 2010, approximately 30% of investments for building improvement involved energy efficiency measures:

	2007	2008	2009	2010
Total improvement	40,632	41,134	41,215	43,300
Energy efficiency measures	10,480	11,476	11,843	13,264
Weight %	25.8%	27.9%	28.7%	30.6%

Table 6.7 – Investments in improvements of residential buildings – Million euro (Cresme)

Companies (e.g. SMEs) operating in the building sector

Data on the structure and size of building enterprises in Italy show the high fragmentation of the sector, with approximately 95% consisting of enterprises with less than ten workers (Sources: ISTAT-ASIA, “Struttura e dimensione delle imprese” (Structure and size of enterprises); ISTAT survey on the “Structure and competitiveness of the industrial and services enterprise system”).

In 2010, there were about 607,000 building enterprises operating, representing 14% of total enterprises, totalling about 4.8 million in the ISTAT-ASIA archive. Building enterprises provide work to about 1.8 million workers, of whom 60% are dependent workers. In 57% of the building enterprises, i.e. 350,000 firms, there is only one worker. Enterprises with from two to nine workers total about 230,000, representing 37% of building enterprises, employ about 800,000 workers (almost 45% of the

workforce in the sector). On the whole, in 2010 the enterprises with less than nine workers this accounted for 95.2% of the total and employed approximately 65% of the workers of the sector.

IMPRESE DI COSTRUZIONI NEL 2010

Classe di addetti *	Imprese (numero)	Addetti (numero)	Variazione % 2010/2009		Composizione percentuale	
			Imprese	Addetti	Imprese	Addetti
1	349.627	351.142	2,1	1,9	57,53	19,68
2-9	229.149	797.788	-8,0	-8,6	37,70	44,70
10-19	21.029	271.259	-10,2	-10,1	3,46	15,20
20-49	6.441	185.116	-5,9	-6,3	1,06	10,37
50-249	1.429	124.811	-5,9	-5,6	0,24	6,99
> 250	83	54.568	-1,2	0,7	0,01	3,06
Totale	607.758	1.784.684	-2,5	-6,2	100,00	100,00
DI CUI IMPRESE CON OLTRE 1 ADDETTO	258.131	1.433.542	-8,1	-8,0	42,47	80,32

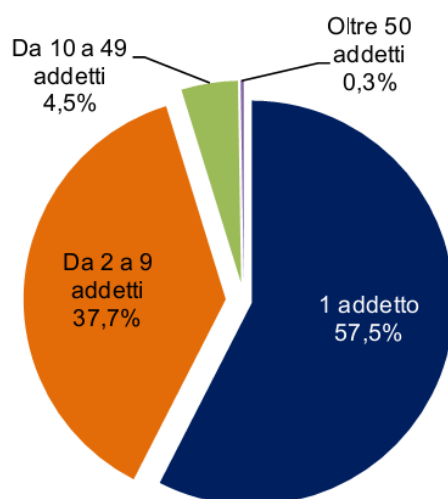
Elaborazione Ance su dati Istat "Struttura e dimensione delle imprese" (archivio ASIA 2009;2010 - classificazione Ateco 2007).

* Poiché il numero degli addetti di un'impresa è calcolato come media annua, la classe dimensionale "1" comprende le unità con in media fino a 1,49 addetti; la classe "2-9" comprende quelle con addetti da 1,50 a 9,49 e così via.

Table 6.8 – Building enterprises in 2010 –ANCE processing of ISTAT data

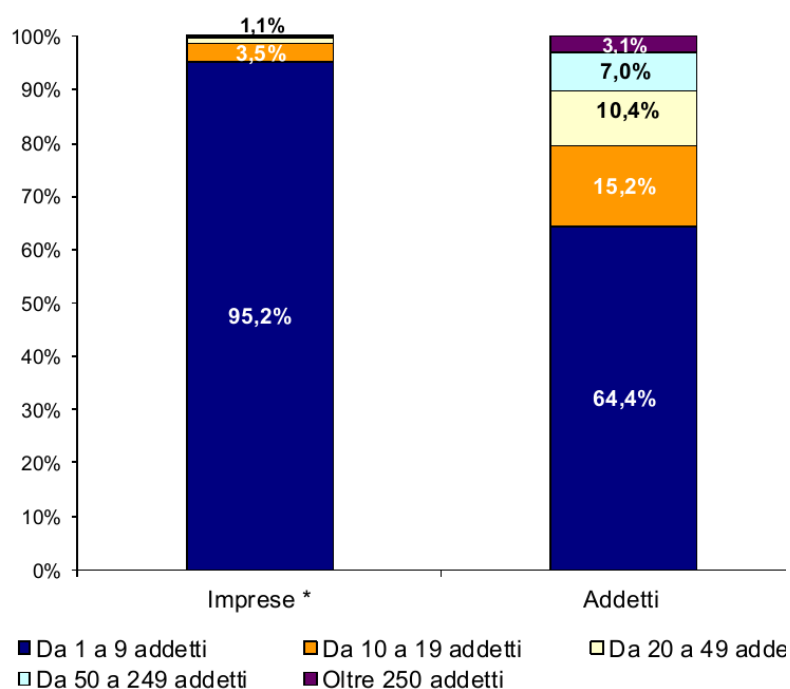
The enterprises with between 10 and 49 workers accounted for 4.5% of the total (about 456,000 enterprises) and employed 25% of the workers in the sector, while enterprises with over 50 workers are numerically small (1,512 enterprises, equivalent to 0.3% of the total) employing 10% of the workers.

IMPRESE DI COSTRUZIONI, 2010 - Composizione %



Elaborazione Ance su dati Istat (classificazione Ateco 2007)

IMPRESE DI COSTRUZIONI - 2010 Composizione %



* Le imprese da 50 a 249 addetti rappresentano lo 0,24%; le imprese oltre 250 addetti rappresentano lo 0,01%.

Elaborazione Ance su dati Istat (classificazione Ateco 2007)

Table 6.9 – Building enterprises in 2010 – composition % - ANCE processing of ISTAT data

With regard to the average size of building enterprises, ISTAT data show that in 2010 the average number of workers per firm was 2.9 while the average number of dependent employees per firm was 1.8.

DIMENSIONE MEDIA DELLE IMPRESE DI COSTRUZIONI - 2010

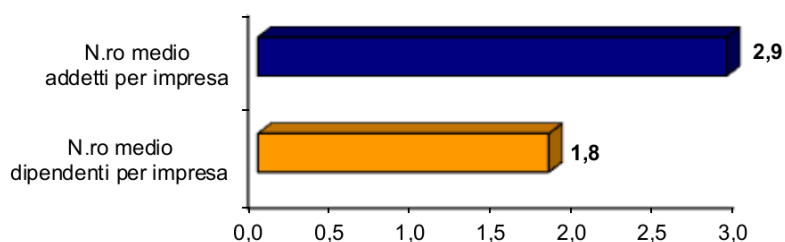


Table 6.10 – Building enterprises in 2010 – average size - ANCE processing of ISTAT data

In the 4th quarter of 2011, according to Movimprese data, there were 828,767 building enterprises in operation. The regions showing an increase in the number of firms in the sector are Liguria (+2.2%), Lazio (+0.8%), Abruzzo (+0.6%) and Puglia (+0.5%). On the other hand Valle d'Aosta (-1.9%) and Umbria (-1.5%) show the highest fall in percentage terms.

Regions	Enterprises operating end of 2011	Enterprises operating end of 2010	Difference 2011/2010 (units)	% Enterprises operating fine 2011/ end of 2010
Liguria	28,318	27,695	623	+2.2%
Lazio	73,074	72,490	584	+0.8%
Abruzzo	20,499	20,376	123	+0.6%
Puglia	42,956	42,754	202	+0.5%
Lombardy	147,956	147,692	264	+0.2%
Trentino	14,593	14,586	7	0.0%
Friuli	15,866	15,891	-25	-0.2%
Emilia Romagna	75,017	75,231	-214	-0.3%
Piedmont	72,433	72,795	-362	-0.5%
Molise	4,112	4,133	-21	-0.5%
Sicily	46,702	46,946	-244	-0.5%
Calabria	20,737	20,848	-111	-0.5%
Basilicata	6,677	6,718	-41	-0.6%
Marche	23,721	23,877	-156	-0.7%
Veneto	74,029	74,566	-537	-0.7%
Campania	59,574	60,069	-495	-0.8%
Tuscany	64,455	65,044	-589	-0.9%
Sardinia	22,314	22,557	-243	-1.1%
Umbria	12,890	13,085	-195	-1.5%
Valle d'Aosta	2,844	2,900	-56	-1.9%
TOTAL ITALY CONSTRUCTION SECTOR	828,767	830,253	-1,486	-0.2%

Figure 6.11 – Number enterprises in the building sector (Movimprese)

The installation market consists of three macro sectors:

- Electrical sector: installation and repair of electric and electronic systems, installation of lifting devices, installation and repair of electricity distribution systems, installation and maintenance of elevators and escalators;
- Heating sector: installation and maintenance of water and heating systems;
- Other Systems: installation of systems for gas distribution; installation of lighting systems; installation of swimming pool purification systems; installation of garden irrigation systems.

TYPE OF ACTIVITY	ABSOLUTE VALUES				Change % 2008/2011
	2008	2009	2010	2011	
ELECTRIC SYSTEMS	92,464	94,488	95,119	95,694	3.49%
HEATING SYSTEMS	66,284	66,693	66,427	66,118	0%
OTHER SYSTEMS	3,568	4,779	5,338	5,721	6%
TOTAL	162,316	165,960	166,884	167,533	3.21%

Figure 6.12 – The sector distribution of the installations market in 2008/2011 (Assistal processing of Infocamere – ISTAT data)

Despite the worldwide crisis that has affected the entire economy, the data show an overall 3.21% increase of installation enterprises from 2008 to 2011.

Enterprises in the electrical sector grew more than those in the heating sector.

The growth of enterprises defined as “other systems” requires special interpretation. This is because in 2009 the ATECO codes were revised with the insertion of new types of enterprises (new codes); some of the enterprises classified under electric or heating in 2008 have been reclassified under “other systems”.

	N° enterprises	%
ELECTRIC SYSTEMS	95,694	57.12%
HEATING SYSTEMS	66,118	39.47%
OTHER SYSTEMS	5,721	3.41%
TOTAL	167,533	100%

Figure 6.13 – The sector distribution of the installations market in 2011

	2001	2007	2008	2009	2010	2011
INSTALLATIONS ENTERPRISES	133,082	151,675	162,316	165,960	166,884	167,533
POPULATION (IN THOUSANDS)	59,961	59,131	59,619	60,045	60,340	60,626
ENTERPRISES/ POPULATION *1000	2.219	2.565	2.723	2.764	2.766	2.763

Figure 6.14 – Enterprises/Population ratio 2008/2011

Our country features a large number of installations enterprises compared to the other European countries. The comparison of the number of enterprises in the sector to the resident population confirms the high density of these firms. From 2001 to 2011, installations enterprises grew with the resident population, but at a faster rate.

TYPE OF ACTIVITY	2010		2011 (3re quarter)	
	ENTERPRISES	WORKERS	ENTERPRISES	WORKERS
ELECTRIC SYSTEMS	95,119	347,505	95,694	354,326
HEATING SYSTEMS	66,427	188,576	66,118	188,893
OTHER SYSTEMS	5,338	22,428	5,721	24,723
TOTAL	166,884	558,509	167,533	567,942

Figure 6.15 – Number Workers Year 2010-2011(Assistal processing of Infocamere – ISTAT data)

The installations market consists of small and medium size enterprises and sometimes micro-enterprises.

Firms with less than 5 workers account for 90% of the entire installations market.

	CRAFTSMEN	INDUSTRY
INSTALLATIONS ENTERPRISES	95.5%	4.5%
WORKERS	55%	45%

Figure 6.16 – Number of installations enterprises and workers - 2011

Size	%
Up to 5 workers	89.65
From 6 to 20 workers	9.10
Over 20 workers	1.25

Figure 6.17 – % weight on size categories - 2011

Trends in the number of enterprises / number of workers for 1981 - 2011

	1981	1991	1996	2001	2007	2008	2009	2010	2011
N° Installations enterprises	57,165	76,344	110,748	133,082	151,675	162,316	165,960	166,884	167,533
N° Workers	162,688	288,155	366,452	426,118	504,455			588,509	567,942

Figure 6.18 – Trends in the number of installation enterprises /number of workers - 1981/2011

	Year 2010	Year 2011
	%	%
Joint capital companies	14.31%	15.18%
Partnerships	17.68%	17.13%
Individual firms	67.09%	66.65%
Other Forms	0.92%	1.03%

Figure 6.19 – Distribution of installations enterprises by legal form 2010 – 2011

From the analysis of the enterprises subdivided by legal form, we can see the Italian installation market tends to be mainly occupied by small businesses, such as individual firms, which represent 67% of the total.

Statistics on the current workforce in the building sector (number of workers by crafts and skills levels).

In the first half of 2011, according to ISTAT data, the building sector provided work to 1,889,000 people, corresponding to 28.8% of the workers employed in industry and 8.2% of the total employed in the entire national economic system. The weight of the sector in occupational terms is especially high in the south of the country, where the impact of construction workers compared to those in industry and in all sectors of the economy is, respectively, 41.1% and 9%. In Central Italy these percentages are 33.1% and 8.5%. In Northern Italy, building employs 23.2% of industrial workers and 7.7% of the workers employed in the entire economic system.

Posizione nella professione	2010	I sem. 2011	var. % rispetto allo stesso periodo dell'anno precedente			Biennio 2009-2010
			2009	2010	I sem. 2011	
Indipendenti	736	725	1,4	0,0	-2,7	1,3
imprenditore	50	38	-3,2	2,1	-24,9	-1,2
libero professionista	24	27	8,9	2,0	17,3	11,1
libero professionista senza dipendenti	20	20	13,7	4,9	1,0	19,2
libero professionista con dipendenti	4	7	-6,4	-9,1	110,9	-14,9
lavoratore in proprio	611	608	2,2	-0,9	-1,7	1,3
lavoratore in proprio senza dipendenti	428	427	2,3	0,2	-1,6	2,5
lavoratore in proprio con dipendenti	183	181	2,0	-3,4	-1,9	-1,5
coadiuvante familiare	35	33	-9,5	9,5	-9,5	-0,9
socio cooperativa	5	4	43,6	42,8	-16,4	105,1
collaboratore	11	15	-10,7	-4,5	27,2	-14,7
Dipendenti	1.213	1.164	-2,7	-1,1	-4,8	-3,8
- Dirigenti	8	9	-15,2	-3,4	-7,1	-18,1
- Quadri	19	18	26,8	15,8	0,1	46,9
- Impiegati	169	182	-6,7	-0,3	1,7	-7,1
- Operai	986	922	-1,4	-0,8	-5,9	-2,2
- Apprendisti	32	32	-20,6	-16,9	-10,6	-34,0
Totale	1.949	1.889	-1,2	-0,7	-4,0	-1,9

Figure 6.20 – Persons employed in the Italian construction sector by professional position – ANCE processing of ISTAT data (ATECO 2007)

In order to investigate the building jobs market, it is also useful to observe the data of the “Casse Edili” (Building Workers Social Security Funds), which show the serious difficulties in the sector during the period. Data for the first nine months of 2011 show a further fall of 5% for the hours worked compared to the same period in the previous year. There was a 6.8% fall in the number of workers and a 5.8% fall in the number of registered enterprises. If this trend for the first nine months of 2011 is confirmed for the remaining part of the year, the overall fall in the 3-year period 2009-2011 would be 23% for the number of hours worked and workers registered, and 19% for the enterprises. In particular, with

reference to dependent employment, and considering an overall fall in the number of hours worked of about one fifth since the start of the crisis (2008), it is estimated that the job loss for the building sector is about 250,000; this figure rises to 380,000 if related sectors are also considered.

According to data issued by the ISTAT for its survey on the workforce, there has been a fall in occupational levels in the sector, although to a lesser extent compared to the data of the Casse Edili. One of the factors that might help explain the discrepancy between the two sources, Casse Edili and ISTAT, is the informal workforce, shown to varying extents in ISTAT data alone but not in the Casse Edili data; in 2009 and 2010 this type of labour rose in building and in all sectors of the economy. According to the ISTAT, the number of persons employed in building, after an overall fall of 1.9% recorded in the 2-year period 2009-2010, showed a fall of 4% in the first half of 2011. It should be observed that of the ISTAT survey on the workforce (a sample survey based on interviews with resident households) the “employed” are all those persons who, in the week concerned, have done at least one hour of work, and can be either regular or irregular workers. On the other hand, the enterprises registered in the Casse Edili represent a more structured workforce. The fall of employment recorded in building in the first six months of 2011 (-4%) is the highest of all economic sectors.

Settori di attività economica	I sem. 2011 (migliaia)	var. % rispetto allo stesso periodo dell'anno precedente			Biennio 2009-2010
		2009	2010	I sem. 2011	
Agricoltura, silvicoltura, pesca	823	-2,1	2,1	-1,8	-0,1
Industria in senso stretto	4.680	-4,1	-3,5	1,3	-7,4
Costruzioni	1.889	-1,2	-0,7	-4,0	-1,9
Totale Industria	6.569	-3,3	-2,7	-0,3	-5,9
Servizi	15.592	-0,8	0,1	0,9	-0,8
Totale	22.984	-1,6	-0,7	0,4	-2,3

Figure 6.21 – Workers by sector of economic activity - ANCE processing of ISTAT data (ATECO 2007)

The highest occupational losses are still recorded in dependent employment, which fell by 4.8% in the first six months of 2011 (-3.8% in the two previous years), compared to a 2.7% fall in independent workers against the corresponding period of 2010 (+1.3%). In the 2-year period 2009-2010, the fall of dependent workers was partly compensated by the increase of some categories of independent workers. A breakdown by subcategories of dependent and independent workers in the building sector shows that the falls in dependent employment in the 2-year period 2009-2010 were partly compensated by increases of particular types of independent workers. In the period considered, in fact, the self-employed rose by 19.2% and professionals without employees by 2.5%. This means that some of the dependent workers who lost their jobs in the sector have sought a new placement on the market, providing independent, non-structured services.

The informal workforce

Starting from 2002, construction recorded a decrease in the weight of the informal workforce, and in 2003 fell under the national average, with a rate of 11.2% (total economy 11.6%). The regularisation of the construction workforce has undoubtedly been supported by the implementation of the DURC (single contribution regularity document) which introduced the requirement of regular social security payments by enterprises, also for private jobs. The reduction of irregular work can furthermore be connected with the effects produced by tax relief on building renovation (36%); besides responding to a demand linked to the age of the real estate stock and the need for residential quality expressed by households, this has helped reduce the informal workforce.

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Settore costruzioni											
% irregolari	15,2	15,7	13,3	11,2	10,9	11,0	11,3	10,1	10,1	10,7	11,3
Totale economia											
% irregolari	13,3	13,8	12,7	11,6	11,7	12,0	12,0	11,9	11,8	12,1	12,3

Figure 6.22 – Weight of the irregular workforce in the economy and building in Italy (% irregular workers on total workers) - ANCE processing of ISTAT data

However, data on irregular employment issued by the ISTAT for 2009 and 2010 showed an increase in irregular work in the building sector, as well as in the economic sectors as a whole, undoubtedly encouraged by the current crisis. In 2010, the irregular work in the building sector was equivalent to 11.3% (after 10.7% recorded in 2009) and was 12.3% in all sectors of the economy (compared to 12.1% in 2009).

Foreign employment on the building market

The latest ISTAT data on foreign workers, referring to the year 2010, show that foreign workers residing in Italy total just over 2 million, of whom about 349,000 (16.7% of the total) were employed in the building sector.

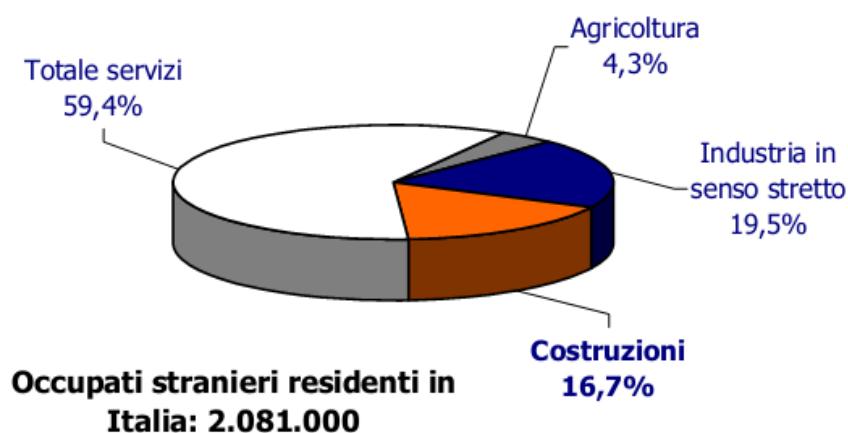


Figure 6.23 – Foreign workers by sectors of economic activity in 2010 – % composition

Compared to the previous year, foreigners employed in construction in 2010 recorded a growth of 11.4%, compared to the fall (-0.7%) recorded in employment in the sector as a whole. The growth of foreign employment above all involves dependent workers (+15.3%) who represent about three quarters of the total number of foreign workers in construction in the year considered. Independent foreign workers, who represent about one quarter of the total, showed a lower increase (+1.2%) after the sharp increases recorded in previous years.

If we break down workers employed in building into foreign and Italian nationals, in 2010, as in previous years, **the foreign component sustained employment in the sector**. The number of foreign workers gradually rose over time compared to a reduction of Italians employed in the sector. In five years (2005-2010), the number of foreigners employed in the sector almost doubled, rising from 184,000 to 349,000; in the same period the Italian workers decreased by 8.5%.

Anni	<i>dipendenti</i>	<i>indipendenti</i>	Totale occupati
2005	147	37	184
2006	186	47	232
2007	195	62	257
2008	209	77	286
2009	226	86	313
2010	261	87	349
<i>I Trim. 2010</i>	<i>244</i>	<i>75</i>	<i>319</i>
<i>II Trim. 2010</i>	<i>276</i>	<i>85</i>	<i>361</i>
<i>III trim. 2010</i>	<i>272</i>	<i>93</i>	<i>366</i>
<i>IV trim. 2010</i>	<i>252</i>	<i>97</i>	<i>349</i>
<i>Var. % rispetto allo stesso periodo dell'anno precedente</i>			
2006	26,3	26,6	26,4
2007	4,9	32,9	10,5
2008	7,4	24,3	11,4
2009	8,2	12,4	9,3
2010	15,3	1,2	11,4
<i>I Trim. 2010</i>	<i>14,7</i>	<i>-0,3</i>	<i>10,8</i>
<i>II Trim. 2010</i>	<i>23,0</i>	<i>-12,6</i>	<i>12,3</i>
<i>III trim. 2010</i>	<i>23,2</i>	<i>3,6</i>	<i>17,5</i>
<i>IV trim. 2010</i>	<i>1,9</i>	<i>16,3</i>	<i>5,5</i>

Figure 6.24 – Foreign workers in the building sector (thousands) ANCE processing of ISTAT data

In 2010, in particular, foreign employment increased by 11.4% on an annual basis, while Italian workers decreased by 3.1%. It should be highlighted, however, that while the fall of Italian employment in 2010 – as we can read in the latest annual report published by the ISTAT - has concerned the more specialised professions more (works directors, construction technician, building site electrician), the growth of foreign labour has involved less qualified duties (masons and labourers).

Anni	<i>Italiani</i>	<i>Stranieri residenti</i>	Totale occupati
2006	-3,5	26,4	-0,6
2007	1,8	10,5	2,9
2008	-0,9	11,4	0,7
2009	-3,1	9,3	-1,3
2010	-3,1	11,4	-0,7
<i>I Trim. 2010</i>	<i>-2,2</i>	<i>10,8</i>	<i>-0,3</i>
<i>II Trim. 2010</i>	<i>-0,8</i>	<i>12,3</i>	<i>1,4</i>
<i>III trim. 2010</i>	<i>-3,4</i>	<i>17,5</i>	<i>0,0</i>
<i>IV trim. 2010</i>	<i>-5,8</i>	<i>5,5</i>	<i>-3,9</i>

Figure 6.25 – Workers in the building sector – % change compared to the same period of the previous year - ANCE processing of ISTAT data

The growth of foreign workers and at the same time the reduction of Italians in constructions has led to an increase of the percentage for foreign workers in the sector as a whole. **In 2010, foreign workers in the building sector amounted to 18.1% of the total** (in 2005 the figure was 9.6%). This is the highest impact rate in all sectors of the economy; in agriculture for that year the percentage of foreign workers on the total employed was 10%; the figures for industry in the narrow sense and for services was respectively 8.9% and 8%. On the whole, in the entire economic the percentage of foreign workers on the total employed was 9.1%.

Settori di attività economica	Occupati stranieri	Occupati totali	% occupati stranieri sul totale occupati
	<i>migliaia</i>		
Agricoltura	89	891	10,0
<i>Industria in senso stretto</i>	<i>407</i>	<i>4.581</i>	<i>8,9</i>
Costruzioni	349	1.930	18,1
Totale industria	755	6.511	11,6
Totale servizi	1.237	15.471	8,0
Totale occupati	2.081	22.872	9,1

Figure 6.26 – % foreign workers on the total employed by sectors of economic activity in 2010 – ANCE processing of ISTAT data

Some comments should be made on the data discussed thus far on foreign labour in the construction market. Foreign employment is analysed by the ISTAT in a survey on the workforce. This survey is based on interviews with resident households. The “employed” are all those persons who, in the week concerned, have done at least one hour of work, and can be either regular or irregular workers. With reference to foreign employment, another aspect should be taken into account, i.e. that the survey on the workforce reflects the delay in the registration of foreigners at the municipal registry offices. A migrant worker, in fact, though inserted in the Italian job market and thus being an employed person for all effects, is recorded by the survey as such only at the time of regularisation. This implies that part of the increase of foreign employment resulting from the survey is not the result of an actual growth in jobs but only of foreigners already present on the market and who have now become “visible” because of regularisation.

This discrepancy is presumably more relevant in sectors where there are more migrant workers. This occurs with a greater use of foreign manpower (for example, the building sector where almost one worker out of five is foreign) or in specific geographical areas with a high level of economic attraction and therefore the most frequent destination of persons coming from other countries (for example some regions of Northern Italy like Lombardy, Emilia-Romagna and Veneto).

Statistics for energy consumption and renewable energy in buildings

A total of 31% of the electricity and 44% of the thermal energy (fuels) are used in the residential sector, offices and commercial premises. Much of these energy sources are used for air conditioning of premises (heating in winter and cooling in summer). Lighting represents a small but not irrelevant percentage of total consumption (approximately 2%), since it nevertheless represents 15% of the costs of the average electricity consumed in non-industrial premises (gp).

Therefore, out of 100% of final energy consumed in the home, only 2% is used for lighting, and 5% for cooking and appliances, while 15% is for supply hot water and 78% for heating. For those who have a summer cooling/conditioning system we must 25% more energy consumption (gp).

Currently, in Italy the overall energy requirement in buildings is on average 300 kWh/m²/year, and as already stated much of this energy is thermal (heating of premises and hot water) so that much is lost as thermal dispersion towards the environment.

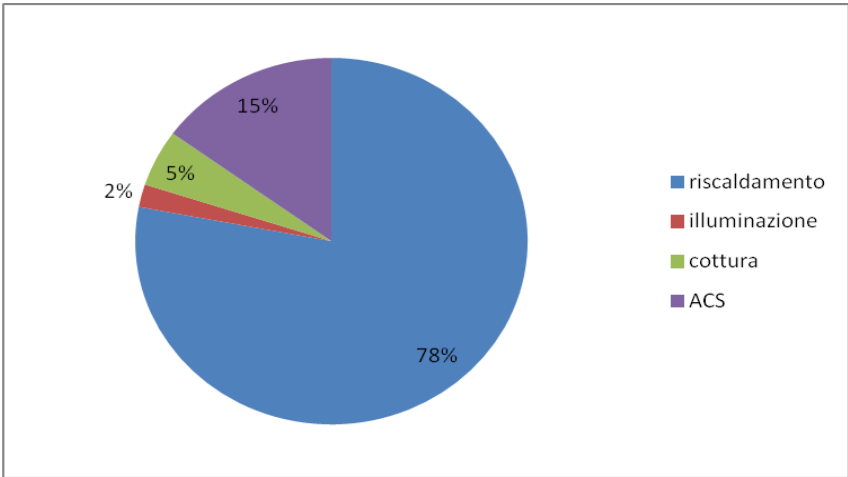


Figure 6.27: Distribution of the average consumption of buildings by category of use

The energy-hungry nature of buildings in Italy is due to the extremely low energy efficiency of buildings, closely connected with their obsolescence. This means considerable potentials in terms of energy improvement.

Almost 70% of buildings were built before the introduction of any energy efficiency regulations in the construction field, i.e. in 1976, and a quarter of the building stock has never undergone any maintenance or improvement work.

The obsolescence of the Italian building stock thus plays a fundamental role in achieving positive results in terms of energy efficiency, and in a more overall, long term view, in reaching the targets of the “20-20-20 Package”. Not only, as already mentioned, for the considerable margins for intervention and improvement, but also for the range of systems, technologies and solutions that can be used to pursue greater energy efficiency of buildings.

There is thus a high potential of unexploited energy savings, with numerous measures offering a positive economic return for the country as well as for individual consumers. For example, in Italy, a building constructed according to energy efficiency standards entails a reduction in consumption of up to 70% with respect to a traditional building.

Penetration and potential of renewable technologies (source: Energy efficiency report 2011)

Photovoltaic power has an enormous theoretical potential in Italy. If we installed systems on all the roofs of existing buildings in Italy not yet provided with photovoltaic systems, we would achieve about 58.5 GW of nominal power, with an annual production of about 67 TWh in electricity and an overall volume of business of approximately 200 bln €. To this we could add an annual production reaching almost 5 TWh in electricity deriving from the theoretical potential of installation in new buildings in the next five years, with a volume of business of 3.5 bln € per year and installations totalling 4.3 GW per year.

The residential and industrial building sectors play a major role as areas for the application of this technology, which has an enormous potential, with an estimated 22-23% of Italy's current annual electricity requirement. However, the actual feasibility of this theoretical potential is highly difficult to assess, considering, in particular, the heavy dependence of photovoltaic installations in the coming years on the existence of a subsidised tariffs system, and it is not clear how long this will be available in our country. There are likewise evident problems related to the degree to which a large amount of power from renewable sources can be integrated into Italy's existing power transmission network, which even considering the planned modernisation measures, might not be able to absorb this type of growth in installed power. It should also be pointed out that, for some applications and in some parts of the country, specialists believe that the time is not far off for achieving grid parity, i.e. the point where it becomes economically convenient to produce energy from a photovoltaic source with respect to purchasing it from the grid. In buildings, this is especially true for industrial installations, where the penetration percentage will be higher than the potential for the other sectors.

Furthermore, requirements for using renewables to integrate electric power in buildings could to some extent be a stimulus to installations in the medium term, above all in residential buildings. Considering

these elements, we can estimate a penetration in existing buildings of between 5 and 15% of the theoretical potential over the next five years.

With regard to new construction, the penetration is definitely greater, with an estimated 20-35%.

With regard to thermal solar technology, which currently covers a slight percentage of heat production in buildings (about 8% of DHW production), the theoretical potential, calculated with the hypothesis of installation of these systems to produce in all buildings, existing and new, is about 50.2 TWh of annual thermal production in existing buildings.

Also in this case, the actual penetration of this technology will depend on how far the tax bonus mechanism manages to promote the installation of these systems.

The tax deduction issue is obviously lined to incentives for heat produced from renewable sources, for which the issue of the implementation decrees is expected in the coming months.

In the light of these considerations, it is reasonable to hypothesis that for existing buildings there will be a penetration rate of 5-15%, according to the type of benefits mechanism.

Finally, with regard to biomass boilers, the same considerations made for thermal solar will apply.

The role of non-residential buildings (in particular, these include schools and universities, offices and industrial buildings) is, however, relatively marginal, above all with regard to heating plant, while for electric power consumption, non-residential buildings account for 27% of the theoretical savings.

In this imbalanced scenario we should also consider the “starting point”, i.e. the relative “backwardness” of our building stock which thus offers enormous opportunities for improvement; however, it is equally obvious that betting on energy efficiency can be a powerful driving force for accelerated renovation to make Italy catch up with Europe in this sector.



7. Existing VET provisions

The national VET system for craftsmen and other on-site workers in buildings

The reform of Title V of the Italian Constitution led to the assignment of education and training directly to the exclusive jurisdiction of 20 Italian Regions and two Autonomous Provinces.

For the above reasons, Vocational Education and Training (VET) is extremely complex and it is not easy to establish a common “conduct” at national level having, as a minimum, twenty regions and two autonomous provinces which could act in complete autonomy. There are some cases where a national roadmap has been defined but not yet in the energy field.

Today, nothing has yet been established and the legislation defines accreditation as the act by which the Public Administration provides a training organization the opportunity to propose or implement action-oriented training financed by public resources. Through accreditation, the Regions assess the possession of minimum requirements by the applicant institutions, in order to guarantee the quality of training scheduled in the territory.

The system of accreditation of training centres, in 2011, represents another significant regulatory and revolutionary moment aimed at raising the quality of education and training.

To summarise, training in the building sector is moving in a scenario that considers the institutional regulatory region as the administration responsible for:

- Vocational education and training in terms of planning, accreditation of training institutions that can provide the training offer recognised and supported by public and European funding;
- Educational programmes, professional setting, assessment procedures and certification of qualifications and / or skills.

Private entities, if credited by the Region, can carry out training and guidance activities and they can benefit from public funds.

The vocational training as a "system of training measures aimed at the dissemination of theoretical and practical knowledge, necessary for undertaking professional roles and aimed at first insertion, qualification, improvement, specialisation, updating and development of the workers" is supervised and monitored by the Ministry of Labour and Social Policy, through the Observatory on Continuing Training, consisting of representatives of the Ministry, the Regions and the social partners, but it is governed and managed by the Regions and the Autonomous Provinces of Trento and Bolzano; the Regions, in turn, are entitled to delegate management of some sectors to the Province.

Some Regions, such as Tuscany, Emilia Romagna and Umbria have systems that are in line with the EQF European Framework and lifelong learning, others have partial systems or in contrast with it. In this framework, ***each Region acts in a wholly autonomous way, without any direct dialogue between local authorities, leading to a non-homogeneous and fragmented situation on the national level.***

Each Region has a different range of professional figures, sometimes similar, with the identification and description of the professions identified.

The Regions define the standards for education and vocational training, as well as the planning and organisation of courses on the basis of locally identified requirements, in accordance with the common minimum aspects defined on the national level and on the basis of current legislation on vocational training.

The agreement signed between the State and the Regions on 29 May 2010 defined the minimum training standards of the education and vocational training programmes inserted in school curricula to comply with educational requirements.

In particular, the agreement has defined the minimum training standards for 3-year education and vocational training paths for the following professional figures:

1. CONSTRUCTION OPERATOR
2. ELECTRICAL OPERATOR
3. ELECTRONICS OPERATOR
4. THERMOHYDRAULIC SYSTEMS OPERATOR

This also applies to the minimum training standards for the 4-year education and vocational training paths for the following Professional figures:

1. CONSTRUCTION TECHNICIAN
2. ELECTRICAL TECHNICIAN
3. ELECTRONICS TECHNICIAN
4. TECHNICIAN FOR OPERATION AND MAINTENANCE OF AUTOMATIC SYSTEMS
5. TECHNICIAN FOR INDUSTRIAL AUTOMATION
6. HEATING SYSTEMS TECHNICIANS

These paths aim to identify the basic skills that the students must acquire in order to comply with educational requirements.

At the present time, only the educational path for construction operators is being implemented.

Construction operator

Reference economic activities:

ATECO 2007/ISTAT
41 Construction of buildings
41.20 Construction of residential and non-residential buildings

43 Specialised construction work
43.12 Preparation of the building site
43.31 Plastering
43.33 Lining of floors and walls

Figure 7.1: Classification ATECO 2007

Brief description of the figure:

The construction operators work in the process of building construction, autonomously and with responsibility limited to the aspects established in terms of procedures and methods for these operations. Their qualification in the application and use of basic methods, instruments and information enable them to undertake activities in the undertaking and finishing of building works, with skills in the setting up of the building site, planning and checking, verification and compliance and adequacy of their own work.

Characteristics of the course:

The course, provided by organisations accredited on the regional level, is designed for students holding a lower school leaving certificate and with duration from over 900 hours to 1,200 hours annually.

The structure of the course involves theoretical and practical lessons and the passing of a final exam.

The Certification issued is a Certificate of Attendance with profit.

The course is financed by national/local and Community public funds

:

Year	n. courses	n. participants
2009	96	1485
2010	86	1361
2011	92	1490

Figure 7.2: Number courses/year and participants/year

Courses on energy efficiency in building installations/equipment and/or renewable energy sources

Course conducted in some regions

Main topics covered:

- Use of renewable energy sources
- Technical legislation on energy efficiency
- Technical regulations on energy efficiency

The Regions and the Autonomous Provinces have likewise defined minimum training standards for the entire country for the following two professional figures:

1. Heating system operator (> 232 kW)

2. Steam generator operator

This training is provided by training providers identified and recognised on the regional level.

1. Heating system operator (> 232 kW)

Pursuant to Art. 287 of the Environmental Code (Legislative Decree 3 April 2006, N. 152 “Regulations on environmental subject” and subsequent amendments and additions), the personnel in charge of operating non-industrial heating systems with a nominal thermal power exceeding 200,000 Kcal/h (232 kW) must hold a certified authorisation issued at the end of a course for operating heating systems, after they have passed the final exam.

This requirement applies not only for heating systems powered by solid or liquid mineral fuels, as stated in Law 615/1966, but also for those powered by gas fuel.

Heating systems with thermal potentials exceeding 200,000 Kcal/h are classified in two categories:

- 1st category system which, to maintain operation, also requires the certificate qualifying for the operation of steam generators pursuant to Royal Decree 12/05/1927 n. 824;
- 2nd category system which, to maintain operation, does not require the certificate qualifying for the operation of steam generators.

Two levels of qualification are provided for these:

- 1st level authorisation license:
 - qualifies for operation of 1st category heating systems
 - for issue, the applicant must also hold a valid qualification certificate for operating steam generators, issued by the Labour Inspectorate
 - qualifies directly, without any other formalities, also for operating the systems for which the 2nd level licence is requested
- 2nd level authorisation license:
 - qualifies for operation of 2nd category heating systems

The training of heating systems operators comes under the jurisdiction of the Regions and the Autonomous Provinces of Trento and Bolzano, which define the standards of training courses, as well as planning and organisation the courses on the basis of locally relevant requirements, in compliance with the following minimum common elements defined on the national level and on the basis of current provisions on vocational training.

The training courses are provided by the Regions and the Autonomous Provinces of Trento and Bolzano, directly or through accredited providers, in compliance with the model defined pursuant to the 20/03/2008 Agreement between the State and the Regions and the Autonomous Provinces, and/or through bodies specifically authorised according to provisions adopted by each Region and Autonomous Province.

Until the aforesaid regional provisions come into force, the courses and exams shall be governed by the rules set forth in Ministry Decree 12 August 1968 (Art. 287, paragraph 6, Legislative Decree 152/06 and subsequent amendments and additions). The Provincial Labour Directorates may therefore continue to issue the authorisation license until regional laws are issued.

ORGANISATION OF THE TRAINING COURSE (minimum national elements)

Learning:

- Elements of heating technology
- Combustion
- Techniques for heating water
- Characteristics and types of heating systems
- Control and safety devices
- Techniques for system regulation
- Techniques for checking pollution emissions
- Techniques for analysing energy consumption
- Sector regulations
- Elements of heating system maintenance

Requirements for admission to course:

The requirements for admission to training course are as follows:

- age not less than 18;
- 1st degree secondary school diploma.

With regard to those who have obtained an educational qualification abroad, a declaration of value or an equivalent/corresponding document must be presented, stating the equivalency of value with the qualifications issued in the State of origin, and showing the educational level reached.

Foreigners furthermore require a good knowledge of the Italian language, oral and written, that will enable them to participate actively in the training programme. This knowledge must be checked by an entrance test, which will be kept in the records of the training provider.

Duration of training course:

The minimum duration of the training course is 90 hours, save for different provisions by the Regions and the Autonomous Provinces of Trento and Bolzano on the recognition of training credits.

Maximum absences allowed are 20% of total hours.

Final exam and certificate

At the end of the course a certificate of attendance with the final exam is issued.

The final exam must be organised and managed according to principles of transparency and traceability of the procedures.

The failure to pass the final exam means that the certificate cannot be issued.

In order to favour the recognition and the free circulation of persons throughout the country, the certificate of attendance must contain the following minimum common elements:

- Name of training organisation
- Personal data of attendant

- Title of course and reference legislation
- Duration of course
- Signature of training organisation

The certification issued at the end of the course enables the student to acquire the 2nd level authorisation license (pursuant to Art. 287 of Legislative Decree 3 April 2006, n.152) for the operation of heating systems.

The Regions and the Autonomous Provinces of Trento and Bolzano will define the composition of the board of examiners and the contents of the exams in compliance with their regulations.

The Regions and the Autonomous Provinces of Trento and Bolzano agree to mutually recognise the certificates issued.

2. Steam generator operator

The personnel for operating steam generators must have an authorisation license issued after they have passed the qualification exam.

The certificate of qualification, based on Form 2 attached to Ministry Decree 7 February 1979, is issued by the Provincial Labour Inspectorate on the basis of the report by the board of examiners and is valid for five years from the date of issue.

In any case it expires when the holder reaches the age of 65.

There are four levels of qualification certificates for operating steam generators:

1. The 1st degree certificate qualifies for the operation of steam generators of any type and any area;
2. The 2nd degree certificate qualifies for the operation of steam generators of any type, with production up to 20 t/h of steam or heating area not exceeding 500 m²;
3. The 3rd degree certificate qualifies for the operation of steam generators of any type, with production up to 3 t/h of steam or heating area not exceeding 100 m²;
4. The 4th degree certificate qualifies for the operation of steam generators of any type, with production up to 1 t/h of steam or heating area not exceeding 30 m².

Requisites for admission to final exams

The qualification certificates are issued after the favourable result of the final exams. For admission to the exams for obtaining each of the following levels of qualification the candidate must have the requirements shown below

- 1st degree

- Having a degree in Engineering or in Industrial Chemistry, or a diploma from an Industrial Technical School with specialisation in mechanics, or a 2nd degree certificate for at least one year, as long as compulsory education curricula have been completed;
- On the job training of 180 working days at a steam generator with a potential of over 20 t/h of steam or a steam generator with a heating area exceeding 500 m²;

- 2nd degree: on the job training of 240 working days at a steam generator with a potential of over 3 t/h of steam or a generator with a heating area over 100 m²;

- 3rd degree: on the job training of 180 working days at a steam generator with a potential of over 1 t/h of steam or a steam generator with a heating area over 30 m²;
- 4th degree: on the job training of 150 working days at a steam generator of a type not requiring an authorised operator.

Procedures for admission to final exams

For the admission to the exams the candidate, who must not be under the age of 18, shall present a specific application on legal paper, declaring the qualification he wished to obtain, to the Provincial Labour Inspectorate in the area where the exam session in which he wishes to participate.

The following must be attached to the application:

- The birth certificate showing that the candidate has reached the age of 18 upon expiry date of the deadline set forth in the exam announcement for the presentation of the application;
- Medical certificate for good physical and mental health for operating steam generators, issued no earlier than six months before the deadline in the announcement, by the Local Health Unit – Legal Medicine;
- The personal on the job training booklet;
- Two recent identity-card sized photos signed on the rear by the candidate;
- (Only per for candidates for the 1st degree): authenticated copy or certificate with duty stamp of the educational qualification held. Candidates with the 2nd degree qualification must also produce a photocopy of the qualification certificate;
- Any other qualification allowing the reduction of the time for on the job training pursuant to Art. 9 of Ministry Decree 1.3.1974, amended with Ministry Decree 7.2.1979:
 - certificate of attendance, with favourable outcome, of a course for operators of steam generators, regarding the degree the candidate intends to achieve, authorised by the Ministry of Labour and Social Security;
 - certificate of 3rd and 4th degree qualification for obtaining the next highest qualification.

These reductions are not cumulable.

Validity of the qualification certificates

The qualification certificate has a validity of five years from the date of issue and In any case it expires when the holder reaches the age of 65.

The Provincial Labour Inspectorate renews the qualification certificates, upon request by the holders, at the expiry of the 5-year period; a medical certificate showing the continuation of the physical and mental abilities of the operator must be attached to the application.

Training courses on energy efficiency and renewable energy sources in buildings that are not yet part of a national VET system

Training in energy efficiency and renewable energy sources for buildings that is not yet part of a national continuing training system and is therefore provided under various names by various bodies, and with varying frameworks and contents.

The main training organisations are:

- Building Schools
- Category associations
- Manufacturing firms
- ENEA

Training in Building Schools

The system of Building Schools is a network coordinating 102 local bodies with grassroots structure throughout the country. In the last 3-year period 2009-2011, its 32,813 courses provided training for a total of almost 1.2 million hours and 385,212 students. If we consider that total estimated total employment in the sector during the period just over 1.9 million units per year, and that there are 1.2 million dependent employees, **in three years it trained 20% of the workers estimated by the ISTAT and 30% of dependent employees.**

It could be said that in the heart of the crisis in the sector, which could be considered to coincide with the 3-year period 2009-2011, the training system of the bilateral sector organisations has made an impressive effort on the national and local level, amounting to a significant welfare programme. This is what especially emerges from the analysis of data on the training supplied by the building training system, on the basis of the indications of social partners, and adopted by the Formedil on the national level in some structural projects that have oriented and structured the training process in the sector. These are called “16 hours”, “training for requirements in the field of construction site equipment and machinery”, “apprenticeship”.

	Courses	Hours training	Students	of which			
				Workers	Technicians	Foreigners	Women
2009	10,633	413,759	126,121	100,406	21,117	28,063	5,917
2010	10,335	386,287	116,734	94,230	19,977	26,668	5,387
2011	11,845	399,616	142,357	116,539	23,180	29,665	14,825
TOTAL	32,813	1,199,662	385,212	311,175	64,274	84,396	26,129
% change '11/'10	14.6	3.5	21.9	23.7	16.0	11.2	175.2

7.3: Formedil Courses - Source: CRESME development of Formedil data

The first source of funding is the contribution from the “Casse Edili” and therefore the system of enterprises that are members of the bilateral organisation network (52.4 million, i.e. 58.6% of the total funding), followed by public funding, totalling 24.8 million euro in 2010. There was also a significant amount coming from the other sources of funding, such as course by payment, donations and other contributions, showing that many Building Schools tend to seek even just partial coverage of the costs of training provided through the job market or other sources of funding.

Funding in 2011	Total (million euro)
Amounts received by the “Casse edili”	52,446
Public funding	28,708

Other types of funding	8,309
TOTAL	89,463
%	100.0

7.4: Forms of funding - CRESME development of Formedil data

With regard to training contents, this training is traditionally divided into two broad areas: “vocational training” as such, aimed at offering new notions, updating and requalification courses for personnel for new insertion, employed or unemployed; and for “safety training” in compliance with contract and legal provisions.

Nevertheless, there are new demands for training:

- Recovery and maintenance of the building stock
- Environmental requalification
- Energy savings and ecobuilding
- Laying of materials with innovative technology and components.

Training by category associations

In Italy, the market of energy sources and energy efficiency is currently in a launching phase and has significant growth prospects in relation to increasing interest for energy savings by the public bodies involved in the commitments for reaching the international target and ensuring better safety conditions in energy supply, as well as for final energy users, the public and enterprises who are interested in opportunities for economic savings and motivated by the positive environmental spinoff from energy improvement measures.

This context includes some significant elements: on the one hand, knowledge by final energy users is still rather limited regarding the real possibilities for energy efficiency measures and the technical and technological implications and the various options of the specific results obtainable, the necessary costs and the current incentives. On the other hand, the relevance of the energy issue is leading to increasing demand for measures, and stimulates enterprises to enter this market, though not always with adequate skills.

In a context of market and company growth, the CNA and Assital associations have promoted a series of initiatives to enhance quality in the enterprises working in the energy sector, through the promotion of a quality brand and actions for technical and vocational information and training. **These actions qualify the enterprises voluntarily joining** the various initiatives, enabling them to work in the sector with suitable knowledge, competences and skills, so that they can work on the market in such a way as to offer complete and quality solutions to customers.

The following pages show the outlines for some courses proposed by the CNA system for the renewable energy sources sector and energy efficiency in building. The overall training provided by the CAN – ECIPA system regards about 25,000 enterprises and their employees.

Promoting body (CNA, ECIPA, other)	Fondartigianato – Notice 4/2007 published in GU n. 123 of 22/10/2007 and approved on 08/09 2009 by the Fondartigianato Board of Directors
Title of course	SOLAR SYSTEMS: DESIGN, INSTALLATION AND MAINTENANCE
Targets	Employees, organisational and technical production profiles in enterprises of the traditional installations: electrical and hydraulic; heating, conditioning, cooling systems for private and industrial systems; installers of boilers and plumbing systems; maintenance and operation of public and private buildings and with specific reference to the energy operation, design, installation, management and maintenance of photovoltaic systems.
Description of training project/targets	The project is developed in three training courses: Course 1 – The energy situation in Italy and Campania: the role of renewable sources and energy efficiency ; Course 2 – Designing and installing renewable energy source systems: photovoltaic and thermal solar . Course 3 – The management and maintenance of systems. Safety: working on electrical systems .
Didactic method	All three courses use the same didactic method based on a mixture of classroom lessons, coaching, guided tours (only Course 1) case studies.
Contents of course	<p>Course 1</p> <p>a) The concept of sustainable development; the sources of the renewable energy; the Italian energy situation; the liberalisation of the energy market in Italy; energy management; photovoltaic and thermal solar; incentives structure and systems: the “Energy Account”</p> <p>b) Photovoltaic technology; the characteristics of solar radiation and the photovoltaic effect; the cell, types of photovoltaic systems; presentation and direct display of photovoltaic systems; presentation of the direct use of solar energy for thermal use or producing electricity; direct presentation of the critical aspects and the advantages of photovoltaic</p> <p>Course 2</p> <p>Verifying the site in question (for thermal solar and photovoltaic solar); conducting the analysis of data on billing from the energy management and supply companies; avoiding and monitoring dangers of the over- and under-dimensioning of the systems; creating and drawing up the feasibility project of the systems; presenting the project to the client together with the necessary documentation; inspecting the site: maximising sunlight exposure and evaluation of the electric power producible; analysis of the space available for the systems; drawing up and producing the feasibility project of the systems; presenting the project to the client with the necessary documentation; maximising sunlight exposure and evaluation of the electric power producible; analysis of the space available for the systems: positioning of modules; choice of type of module with the adequate power; analysis of sunlight available with measuring instruments (by pyranometer or from institutional sources that have already surveyed sunlight exposure in the area); choosing the best components: inverters, switching cables, measuring instruments, control elements, space available for their installation</p> <p>Course 3</p> <p>Operation and management of the photovoltaic and thermal solar systems, regulations in force on materials and equipment; quality of</p>

	materials: CEI and UNI rules and EU directives. The national programme for the incentives to renewable energy systems; tariffs entitled to incentives; procedures for admission to the "Energy Account"; procedures for the presentation of the GSE (Electricity Service Manager) application; decisions by the authorities having jurisdiction; regulations of the technical committees and specialised bodies such as ENEA, CEI, CTI; regulations issued by the local authorities, the maintenance of photovoltaic systems and thermal solar; remote monitoring of system functioning; periodical inspection of the systems; recording meter readings and any anomalies; cleaning of panels; planned annual maintenance; extraordinary maintenance in case of breakage.
Duration of course	<ul style="list-style-type: none"> • Course 1: 16 hours • Course 2: 22 hours • Course 3: 24 hours
Certification/qualification issued	Certificate of Attendance

Promoting body (CNA, ECIPA, other)	CNA
Title of course	PLANT FOR THE PRODUCTION OF ELECTRIC POWER FROM SOLAR SOURCES: PHOTOVOLTAIC SYSTEMS
Targets	Electric installers
Description of training project/targets	Study of the technical aspects and economic payback for the installation of photovoltaic systems
Didactic method	Classroom lesson
Contents of course	See project description
Duration of course	3.5 hours
Updating	Conducted by information mail/brochures and other technical seminars
Certification/qualification issued	Certificate of Attendance

Promoting body (CNA, ECIPA, other)	CNA
Title of course	ENERGY CERTIFICATION AND ENERGY PERFORMANCE OF BUILDINGS: INNOVATIONS OF THE REGIONAL REGULATIONS IN FORCE SINCE 1 JULY 2008
Targets	Designers, builders, installers and systems maintenance personnel
Description of training project/targets	Presentation of main contents of regional regulations and the requirements for economic specialists; Illustration of the 55% tax deduction for energy efficiency improvement measures.
Didactic method	Classroom lesson. Participation of RER consultant who has contributed to the drawing up of the regional law and the CNA official in charge of the service on tax deductions for energy savings
Contents of course	See project description
Duration of course	3 hours
Updating	Conducted by information mail/brochures and other technical seminars
Certification/qualification issued	Certificate of Attendance

Promoting body (CNA, ECIPA, other)	CNA
Title of course	CONDENSATION BOILERS AND THERMAL SOLAR SYSTEMS
Targets	Heating installers
Description of training	Study on the technical aspects and economic payback for the

project/targets	technologies of Condensation Boilers, thermal solar systems and integrated systems
Didactic method/characteristics of course	Classroom lesson. Lecture by an expert on the commissioning of plant for the supply, transport and unloading of gas combustion
Contents of course	See project description
Duration of course	3 hours
Updating	Conducted by information mail/brochures and other technical seminars
Certification/qualification issued	Certificate of Attendance

Promoting body (CNA, ECIPA, other)	CNA
Title of course	INSULATION OF BUILDINGS, TECHNICAL SOLUTIONS MATERIALS AND INCENTIVES
Targets	Designers, builders
Description of project	Framework of applicable regulations and examination of the most widespread techniques for insulation, assessing economic savings and incentives regulations
Didactic method/characteristics of course	Classroom lesson. Participation a design engineer specialised in construction and a CNA official from the service for tax deductions for energy savings
Contents of course	See project description
Duration of course	3 hours
Updating	Conducted by information mail/brochures and other technical seminars
Certification/qualification issued	Certificate of Attendance

Promoting body (CNA, ECIPA, other)	CNA
Title of course	INSULATION OF BUILDINGS, TECHNICAL SOLUTIONS MATERIALS AND INCENTIVES
Targets	Designers, builders
Description of training project/targets	Framework of applicable regulations and examination of the more widespread insulation techniques, assessing the economic savings and incentives regulations
Didactic method/characteristics of course	Participation of a design engineer specialised in construction and a CNA official from the department for tax deductions for energy savings
Duration of course	3 hours
Updating	Conducted by information mail/brochures and other technical seminars
Certification/qualification issued	Certificate of Attendance

Promoting body (CNA, ECIPA, other)	CNA
Title of course	HIGH EFFICIENCY COGENERATION SYSTEMS
Targets	Construction designers, builders
Didactic method/characteristics of course	Classroom lesson. Lecturers from ISES Italia and GSE (Electricity Service Manager) for the theoretical part of the presentation of technologies and applicable regulations. Participation of HERA and CISA for the presentation of case studies on

	the local level.
Duration of course	4 hours
Updating	On cogeneration
Certification/qualification issued	Certificate of Attendance

Promoting body (CNA, ECIPA, other)	CNA - Club Eccellenza Energetica - Unione Costruzioni – Unione Installazione – Politiche Ambiente Energia
Title of course	THE NEW RULES FOR THE SERVICE OF ON-SITE EXCHANGE
Targets	Electrical designers, installers
Description of training project/targets	Study of the innovations introduced by decision ARG/ELT 7408 on the mechanism of on-site exchange
Didactic method/characteristics of course	Classroom lesson. Lecture by GSE (Electricity Service Manager) officials.
Contents of course	See project description
Duration of course	3 hours
Updating	Conducted by information mail/brochures and other technical seminars
Certification/qualification issued	Certificate of Attendance

Promoting body (CNA, ECIPA, other)	CNA - Comune di Budrio - Unione Costruzioni – Unione Installazione – Politiche Ambiente Energia – ECIPAR BOLOGNA
Title of course	WHAT CLASS ARE YOU? TECHNOLOGIES TO ACHIEVE THE ENERGY YIELDS OF BUILDINGS FROM CLASS C TO CLASS A
Targets	Designers, builders, installers and plant maintenance personnel
Description of training project/targets	Study of the innovations introduced by decision ARG/ELT 7408 on the mechanism of on-site exchange
Didactic method/characteristics of course	Classroom lesson. The aim of the course was to provide useful information to those who design and install measures for the energy efficiency of buildings and those who have the public function of providing information to the public and evaluating the projects presented. The presentation of the more widespread technologies applied to buildings for energy savings will be connected with the energy yield obtainable, i.e. the energy classification of the building where these solutions are applied. After the presentation of the technologies there was a part dedicated to presenting quantity data on costs and savings. Finally there was a survey of the incentives available and procedures for access. There was analysis of documentation and sample forms to respond to the needs of municipal technicians and the enterprises
Contents of course	<ul style="list-style-type: none"> - Insulation systems - Air conditioning and liquid circulation systems - Exploitation of renewable sources: thermal solar systems Exploitation of renewable sources: photovoltaic plant
Duration of course	16 hours
Certification/qualification issued	Certificate of Attendance

Promoting body (CNA, ECIPA, other)	CNA - Unione Costruzioni – Unione Installazione – Politiche Ambiente Energia – ECIPAR BOLOGNA
Title of course	TAX INCENTIVES FOR ENERGY SAVINGS AFTER THE INNOVATIONS OF MINISTRY DECREE 6/8/2009

Targets	Electrical and heating designers and installers, builders
Description of training project/targets	Presentation to specialists of the innovations on the 55% tax deductions after the issue of Ministry Decree 6/8/2009
Didactic method/characteristics of course	Classroom lesson. Participation of a CNA official from the department for tax deductions for energy savings
Contents of course	See project description
Duration of course	2 hours
Updating	Conducted by information mail/brochures and other technical seminars
Certification/qualification issued	Certificate of Attendance

Promoting body (CNA, ECIPA, other)	CNA - Unione Costruzioni – Unione Installazione – Politiche Ambiente Energia – ECIPAR BOLOGNA
Title of course	SMALL SCALE WIND ENERGY –TECHNOLOGY, APPLICABILITY IN THE BOLOGNA AREA AND THE RESULTS OF PLANT INSTALLED
Targets	Electrical designers and installers
Description of training project/targets	Study seminar on the technological, operational and applications aspects and the relative incentives to small wind energy systems
Didactic method/characteristics of course	Classroom lesson. Lectures by researchers from the University of Bologna, Department of Electrical Engineering (theoretical part) and CISA (for presentation of case study)
Contents of course	See project description
Duration of course	4 hours
Updating	Communications and seminars for the part on incentives
Certification/qualification issued	Certificate of Attendance

Promoting body (CNA, ECIPA, other)	CNA - Unione Costruzioni – Unione Installazione – Politiche Ambiente Energia – ECIPAR BOLOGNA
Title of course	SOLAR COOLING – SYSTEMS FOR THE SOLAR AIR CONDITIONING
Targets	Heating designers and installers
Description of training project/targets	Study seminar on the technological, operational and application aspects of solar cooling systems and their incentives
Didactic method/characteristics of course	Classroom lesson. Lectures by ENEA researchers and CNA officials from the department for tax incentives
Contents of course	See project description
Duration of course	2 hours
Updating	Communications and seminars for the part on incentives
Certification/qualification issued	Certificate of Attendance

Promoting body (CNA, ECIPA, other)	CNA - Unione Costruzioni – Unione Installazione – Politiche Ambiente Energia – ECIPAR BOLOGNA
Title of course	PLANT FOR MICRO-COGENERATION
Targets	Heating and electrical designers and installers
Description of training project/targets	Study seminars on the technological, operational and applications aspects of micro-cogeneration systems and their incentives
Didactic method/characteristics	Classroom lesson. Lectures by researchers from ENEA and the Milan Polytechnic (Department of Energy) and CNA officials from the

of course	department for incentives to energy savings and renewable energy
Contents of course	See project description
Duration of course	4 hours
Updating	Communications and seminars for the part on incentives
Certification/qualification issued	Certificate of Attendance

Promoting body (CNA, ECIPA, other)	CNA - Unione Costruzioni – Unione Installazione – Politiche Ambiente Energia – ECIPAR BOLOGNA
Title of course	THE PROSPECTS OF PHOTOVOLTAIC
Targets	Electrical designers and installers
Description of training project/targets	Classroom lesson. Study seminar on the technological development of photovoltaic production electricity and updating with regard to incentives systems
Didactic method/characteristics of course	Lectures by researchers from CNR Bologna, University of Parma (Department of Physics), University of Bologna (Department of Electrical Engineering) and GSE (Electricity Service Manager) (Operational Division).
Contents of course	See project description
Duration of course	4, 5 hours
Updating	Communications and seminars for the part on incentives
Certification/qualification issued	Certificate of Attendance

Promoting body (CNA, ECIPA, other)	CNA
Title of course	RESEARCH AND ENTERPRISE –SKILLS AND PROCEDURES FOR COLLABORATION
Targets	Enterprises operating in the sector of energy savings and renewable sources (producers and installers / users of technologies)
Description of training project/targets	Seminar to present to the enterprises the procedures for developing research and innovation projects, also through networks, concerning the development of technologies for energy savings and renewable sources
Didactic method/characteristics of course	Classroom lesson. Lectures by representatives of ASTER who supervise contacts between the enterprises in Emilia Romagna and the local research system.
Duration of course	2 hours
Certification/qualification issued	Certificate of Attendance

Promoting body (CNA, ECIPA, other)	CNA
Title of course	TECHNOLOGIES FOR ENHANCING ELECTRICAL SYSTEM EFFICIENCY
Targets	Electrical designers and installers
Description of training project/targets	Study seminar held in the European Energy Week, dedicated to a survey of the main innovative solution applicable in the field of diffuse production and consumption of electricity.
Didactic method/characteristics of course	Classroom lesson. Lectures by technology experts and suppliers.
Contents of course	See project description
Duration of course	3 hours
Certification/qualification	Recognition of training credits for technicians and surveyors

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Promoting body (CNA, ECIPA, other)	CNA
Title of course	ENERGY SAVINGS IN AIR CONDITIONING
Targets	Installers
Didactic method/characteristics of course	Classroom lesson
Contents of course	• Design and installation of systems
Training requisites	
Duration of course	8 hours
Certification/qualification issued	Certificate of Attendance

Promoting body (CNA, ECIPA, other)	CNA
Title of course	ACOUSTICS IN BUILDING
Targets	Installers, building technicians
Description of training project/targets	Technical and legal aspects
Didactic method/characteristics of course	Classroom lesson
Duration of course	8 hours
Certification/qualification issued	Certificate of Attendance

Promoting body (CNA, ECIPA, other)	CNA
Title of course	SOLAR THERMAL PANELS
Targets	Installers
Didactic method/characteristics of course	Classroom lesson
Duration of course	4 hours
Certification/qualification issued	Certificate of Attendance

Promoting body (CNA, ECIPA, other)	CNA
Title of course	PHOTOVOLTAIC SOLAR SYSTEMS
Targets	Installers
Didactic method/characteristics of course	Classroom lesson
Duration of course	8 hours
Certification/qualification	Certificate of Attendance

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Promoting body (CNA, ECIPA, other)	CNA
Title of course	DEVELOPMENT OF REGULATORY FRAMEWORK AND THERMAL SOLAR SYSTEMS
Targets	Installers
Description of training project/targets	The aim of the course is to provide information on: 1. The regulatory development in the field of energy efficiency and renewable sources 2. Thermal solar technology 3. Funding opportunities
Didactic method/characteristics of course	Classroom lesson
Contents of course	<p>1. <i>From Presidential Decree 412/93 and subsequent amendments and additions to Legislative Decree 192/05 and subsequent amendments and additions</i></p> <ul style="list-style-type: none"> • Development of the legislative situation (requirements and possibilities) regarding heating systems and the use of renewable sources. <p>2. <i>Funding opportunities</i></p> <ul style="list-style-type: none"> • Budget Law, Decree 19 February 2007; other forms of funding enacted or previously issued on the regional level. <p>3. <i>Thermal solar systems</i></p> <ul style="list-style-type: none"> • Components of the plant and their type • Natural and forced ventilation • Installation layout
Duration of course	16 hours
Certification/qualification issued	Certificate of Attendance

Promoting body (CNA, ECIPA, other)	CNA
Title of course	DEVELOPMENT OF THE REGULATORY FRAMEWORK AND PHOTOVOLTAIC SOLAR SYSTEMS
Targets	Installers
Description of training project/targets	The aim of the course is to provide information on: 1. The regulatory development in the field of energy efficiency and renewable sources 2. Photovoltaic solar technology 3. Funding opportunities
Didactic method/characteristics of course	Classroom lesson
Contents of course	<p>1. <i>From Presidential Decree 412/93 and subsequent amendments and additions al Legislative Decree 192/05 and subsequent amendments and additions</i></p> <ul style="list-style-type: none"> • Development of the legislative situation (requirements and possibilities) regarding plant and the use of renewable sources. <p>2. <i>Funding opportunities</i></p> <ul style="list-style-type: none"> • The Budget Law, Decree 19 February 2007; the photovoltaic “Energy Account”; other forms of funding enacted or previously issued on the regional level. <p>3. <i>Photovoltaic solar systems</i></p> <ul style="list-style-type: none"> • Components of the system and their type • System layout

Duration of course	16 hours
Certification/qualification issued	Certificate of Attendance

Promoting body (CNA, ECIPA, other)	CNA
Title of course	DEVELOPMENT OF THE REGULATORY FRAMEWORK AND INNOVATIVE TECHNOLOGIES FOR ENERGY EFFICIENCY AND RENEWABLE SOURCES: THERMAL SOLAR AND PHOTOVOLTAIC SYSTEMS, NEW DESIGN GENERATORS, GEOTHERMAL ENERGY
Targets	Installers
Description of training project/targets	The aim of the course is to provide information on: 1. The regulatory development in the field of energy efficiency and renewable sources 2. The most efficient technologies currently on the market 3. Funding opportunities
Didactic method/characteristics of course	Classroom lesson
Contents of course	<p>1. Module on legislation and funding (8 hours) Development of the regulatory situation (requirements and possibilities) regarding heating systems and the use of renewable sources (L 10/91, Presidential Decree 412/93 and subsequent amendments and additions); The European Directive and its national application (Legislative Decree 192/05 and subsequent amendments and additions). Energy certification in the Lombardy Region; Funding opportunities (Budget Law, Decree 19 February 2007; other forms of funding enacted or previously issued on the regional level).</p> <p>2. Module on solar energy: n.° 2 modules (8 hours) The sunshine rate (values, changes according to the angle); Physical principle of thermal solar panels; type and characteristics of thermal solar panels. Possible systems and systems layout. Physical principle of photovoltaic solar panels; type and characteristics of photovoltaic solar panels. Possible plant and plant layout.</p> <p>3. Module on physics of the building (4 hours) Introduction to the transmission of heat. Evaluation of the significant parameters of a multilayer wall; examples of walls complying with the new regulations. Building shell; behaviour. Evaluation of the energy requirement of a building.</p> <p>4. Module on combustion and boilers (4 hours) Physics of combustion and significant physical parameters; New types of generators (from running temperature to condensation); Notions on biomass generators.</p> <p>5. Module on special and renewable thermodynamic machines(8 hours) Definition of inverse thermodynamic machine. The heat pump; general, typical parameters, applications in non-industrial use. The absorption machine; general, typical parameters, applications in non-industrial use. Geothermal energy; general, cold geothermal energy and applications in non-industrial use, technical and economic evaluation</p>
Duration of course	32 hours
Certification/qualification issued	Certificate of Attendance

Promoting body (CNA, ECIPA, other)	CNA
Title of course	MAINTENANCE OF GAS SYSTEMS UNDER 35 KW

Targets	Maintenance personnel
Didactic method/characteristics of course	Classroom lesson
Contents of course	Basic elements for maintenance under 35 Kw. The correct filling in of Annexe G. The determination of fuel yield according to 10389. Liability of maintenance personnel under criminal and civil law.
Duration of course	8 hours
Certification/qualification issued	Certificate of Attendance

Promoting body (CNA, ECIPA, other)	CNA
Title of course	MAINTENANCE OF GAS SYSTEMS OVER 35 KW
Targets	Maintenance personnel
Didactic method/characteristics of course	Classroom lesson
Contents of course	Basic elements for maintenance over 35 Kw. The correct filling in of Annexe F. T The determination of fuel yield according to 10389. Liability of maintenance personnel and of the person in charge of the plant under criminal and civil law
Duration of course	8 hours
Certification/qualification issued	Certificate of Attendance

Promoting body (CNA, ECIPA, other)	CNA
Title of course	THERMAL SOLAR SYSTEMS: REGULATORY FRAMEWORK AND MAIN TECHNICAL ASPECTS OF THE SYSTEM
Targets	Installers, builders
Didactic method/characteristics of course	Classroom lesson
Contents of course	Thermal solar systems: regulatory framework and main technical aspects of the system
Duration of course	6 hours
Certification/qualification issued	Certificate of Attendance

Promoting body (CNA, ECIPA, other)	CNA
Title of course	ASPECTS ON INCENTIVES AND TAX BENEFITS REGARDING ENERGY SAVINGS IN BUILDINGS
Targets	Installers, builders
Didactic method/characteristics of course	Classroom lesson
Duration of course	4 hours
Certification/qualification issued	Certificate of Attendance

Promoting body (CNA, ECIPA, other)	CNA
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Title of course	BUILDING ENERGY CERTIFIERS - 2011
Targets	Professionals registered in their professional registers (engineers, surveyors, architects, etc.)
Description of training project/targets	Getting the qualification as energy certified of buildings pursuant to DGR 8745 RL
Didactic method/characteristics of course	Classroom lesson
Contents of course	See programme DGR 8745 R.L.
Duration of course	72 hours
Certification/qualification issued	Certificate of Attendance

Promoting body (CNA, ECIPA, other)	CNA
Title of course	PHOTOVOLTAIC – PROJECT 236 RIPRESA
Targets	Employees
Description of training project/targets	Enabling the participants to design and install a photovoltaic system
Didactic method/characteristics of course	Classroom lesson
Contents of course	Introduction to photovoltaic solar: motivation, solar radiation, atmospheric constants, measurement, sunlight on slanted surfaces. Reference regulations: “Energy Account”, “Exchange Account”, decisions by AEEG, ENEL DK 5940, standards CEI -EN. Basic technical knowledge about the photovoltaic effect, types of semiconductors, advantages and defects of semiconductors, types of modules FV, construction of a photovoltaic module (video). Knowledge basic techniques: from the module to the system: sub-fields, systems, overvoltage discharge inverters, magnetothermal switches etc., DC line, AC line, plant grid connected, systems on islands. Installation procedures: installation regulations, installation on roofs, authorisations, work in safety, Legislative Decree 81 08. Installation procedures: installation: phases at the building site, asbestos and the building site, installation phases: installation of the system on the roof, installation phases: the DC and AC line connection, inverters, accessories, control panels. Installation procedures: structures for securing on the roof, structures for securing on the ground, followers, dimensioning of sample system, simplified calculation of the economic payback of the system. Customer assistance: maintenance, checking, influence of maintenance on energy performance, verification and commissioning, guarantees, applications for connections, applications for incentives, “Exchange Account”
Duration of course	16 hours
Certification/qualification issued	Certificate of Attendance

Promoting body (CNA, ECIPA, other)	CNA
Title of course	EUROPEAN DIRECTIVES FOR ENERGY SAVINGS
Targets	Employees
Description of training project/targets	Enhancing the knowledge of regulations on energy savings
Didactic	Classroom lesson

method/characteristics of course	
Contents of course	The responsibility of the installer UNI regulatory framework Gas heating systems UNI 7129 UNI 10738 Combustion analysis and UNI 10845 Liquid fuel heating systems Filling in booklets
Duration of course	16 hours
Certification/qualification issued	Certificate of Attendance

Promoting body (CNA, ECIPA, other)	CNA
Title of course	UPDATING COURSE FOR INSTALLERS
Targets	Installers
Description of training project/targets	The main aim of the training course for the design and installation of photovoltaic systems is to provide participants with in-depth knowledge on the potentials of photovoltaic technology with particular regard to the application in buildings, providing them with both technical / plant skills and regulatory, economic and financial skills, to effectively assess the validity of application necessary for the development of an executive project. The course involves the study of the design of the main systems and photovoltaic systems (grid connected and stand alone), incentives plans ("Energy Account") and the costs-benefits analysis
Didactic method/characteristics of course	The didactic method involves the classroom environment with the use of blackboards and projectors. Interaction and constant discussion with technicians for tests and computerised simulations are the most interesting elements for the participants.
Contents of course	<p>1st day 17.00-20.00</p> <p>Introduction to photovoltaic technology</p> <ul style="list-style-type: none"> <input type="checkbox"/> Solar radiation, physical characteristics of light <input type="checkbox"/> Power and energy <input type="checkbox"/> Energy received according to UNI10349 <input type="checkbox"/> Photovoltaic effect <input type="checkbox"/> Photovoltaic cells and modules, materials, characteristics <p>2nd day 17.00-20.00</p> <p>Elements of a photovoltaic system</p> <ul style="list-style-type: none"> <input type="checkbox"/> Modules, arrays <input type="checkbox"/> Panels <input type="checkbox"/> Cables <input type="checkbox"/> Fuses, diodes, dischargers <input type="checkbox"/> Inverters <input type="checkbox"/> Protective and interface devices <input type="checkbox"/> Compatibility between modules and inverters <p>Site inspection</p> <ul style="list-style-type: none"> <input type="checkbox"/> Indications for correct inspection <input type="checkbox"/> Shade and verification of the suitability of the site <input type="checkbox"/> Local technicians <input type="checkbox"/> Areas available <input type="checkbox"/> Drawing up the check-list

	<p>3rd day 17.00-20.00 Design of photovoltaic systems</p> <ul style="list-style-type: none"> <input type="checkbox"/> Types of use of the energy produced (isolated systems, systems connected to the grid) <input type="checkbox"/> Calculation of system requirement and size <input type="checkbox"/> Positioning of modules <input type="checkbox"/> Electrical systems CEI 0-2, 82-25 <input type="checkbox"/> Interconnection with the grid and certified devices DK 5940 (low voltage) DK 5740 (medium voltage) <p>4th day 17.00-20.00 The “Energy Account”</p> <ul style="list-style-type: none"> <input type="checkbox"/> Legislative Decree 19/2/2007 (New Energy Account) and subsequent amendments - Exchange processes - Architectural integration in buildings - Tariffs with incentives - Price increases - Premium for the efficient use of energy <input type="checkbox"/> AEEG 88/07 (measure) <input type="checkbox"/> AEEG 89/07 (connection) <input type="checkbox"/> AEEG 90/07 (incentive application) <p>5th day hours 17.00-20.00 Procedures for the admission to the “Energy Account”</p> <ul style="list-style-type: none"> <input type="checkbox"/> Application for connection to distributor grid <input type="checkbox"/> Presentation of the application to the GSE (Electricity Service Manager) <p>Economic and financial aspects</p> <ul style="list-style-type: none"> <input type="checkbox"/> Costs <input type="checkbox"/> Funding <input type="checkbox"/> Investment payback
Duration of course	15 hours
Certification/qualification issued	Certificate of Attendance

Promoting body (CNA, ECIPA, other)	CNA
Title of course	ECOBUILDING
Targets	Installers
Didactic method/characteristics of course	<p>1st day 2012 INTRODUCTION TO THE PRACTICE OF ECOBUILDING 1.0 Principles and methods of the sustainable project: case studies of ecobuilding applications</p> <p>2nd day 2012 CONSTRUCTION TECHNIQUES: CONCRETE EXAMPLES Mass construction systems: (bricks, earth) Frame construction systems (wood) and mixed (straw etc.)</p> <p>3rd day 2012 ECOBUILDING BIOEDILI: CONCRETE EXAMPLES Introduction to certification systems and ecological materials Natural insulators</p> <p>4th day 2012 PLANT: SYSTEMS E INSTALLATIONS Electrical and photovoltaic systems Heating systems and renewable energy sources</p> <p>5th day 2012 MANAGEMENT OF WATER</p>

	PLUMBING SYSTEMS: Water recovery, saving and treatment systems 6 th day 2012 VISITS TO PRACTICAL AND PRODUCTION EXAMPLES Visit to a manufacturer (e.g. wood systems) Visit to an ecobuilding construction site
Contents of course	Introduction to certification systems and ecological materials Natural insulators
Duration of course	15 hours
Certification/qualification issued	Certificate of Attendance

There follows a selection of the main courses provided by Assistal to installation enterprises on topics related to renewable energy and energy efficiency:

Promoting body	ASSISTAL
Title of course	THE PRODUCTION OF ENERGY FROM ANIMAL E PLANT BIOMASS
Targets	Installers
Didactic method/characteristics of course	Classroom lessons
Contents of course	Anaerobic digestion of biomasses Technologies for anaerobic digestion Optimisation of the anaerobic digestion process Techniques for removal of nitrogen from digested material Gasification and combustion of biomasses Regulation for incentives on biomass systems (Green Certificates) Economic evaluation and investments in biomass systems
Duration of course	16 hours
Certification/qualification issued	Certificate of Attendance

Promoting body	ASSISTAL
Title of course	HEATING AND COOLING WITH GEOTHERMAL ENERGY
Targets	Installers
Didactic method/characteristics of course	Classroom lesson
Contents of course	Regulatory reference framework - Geothermal sources (earth, groundwater, surface water) and relative availability Positioning and calculation of geothermal probes Installation solutions and possible integrations with traditional heating systems Authorisation procedure Economic aspects
Duration of course	24 hours
Certification/qualification issued	Certificate of Attendance

Promoting body	ASSISTAL
Title of course	THERMAL SOLAR SYSTEM

Targets	Installers
Didactic method/characteristics of course	Classroom lessons
Contents of course	Basics (solar radiation, the solar collector) Design (measurements, analysis of hot water requirements, area dimensioning and tank, heat exchangers and solar circuit) Construction of a solar system Functioning and start-up of a solar system The technical varieties available today (applications in various sectors) Integration of the solar system Regulations and legislation Considerations on the profitability of solar systems Maintenance
Duration of course	30 hours
Certification/qualification issued	Certificate of Attendance

Promoting body	ASSISTAL
Title of course	PHOTOVOLTAIC SYSTEMS
Targets	Installers
Didactic method/characteristics of course	Classroom lesson
Contents of course	Regulatory framework; Photovoltaic systems: types and basic components; Design and dimensioning of a photovoltaic system; Installation and maintenance of a photovoltaic system; “New Energy Account”, costs of investment and payback time.
Duration of course	30 hours
Certification/qualification issued	Certificate of Attendance

Promoting body	ASSISTAL
Title of course	MAINTENANCE OF CONDITIONING SYSTEMS
Targets	Installers
Didactic method/characteristics of course	Classroom lesson
Contents of course	Regulatory framework Ministry of Health protocols for planned maintenance of air conditioning systems Basics of thermodynamics and cooling circuits Equipment and components of the system Planning of maintenance Special situations
Duration of course	12 hours
Certification/qualification issued	Certificate of Attendance

Promoting body	ASSISTAL
Title of course	DOMOTIC SYSTEMS

Targets	Installers
Didactic method/characteristics of course	Classroom lesson
Contents of course	<p>Basic concepts of domotics The domotic system as the development of the traditional system Wiring system: description and configuration of system devices connected by the bus Radio system: description and configuration of system devices connected by radio waves Domestic automation: general characteristics and management of the following systems:</p> <ul style="list-style-type: none"> ▪ Burglar alarm ▪ Load control ▪ Light control management ▪ Temperature management (if separate management is not provided) ▪ Scenario management (window blinds etc.) ▪ Remote monitoring ▪ Diffuse sound system ▪ Fire detection (UNI 9795) (if separate management is not provided) ▪ Water leakage and/or gas detection system. <p>Software for domotic equipment Examples.</p>
Duration of course	24 hours
Certification/qualification issued	Certificate of Attendance

Training by manufacturers

The considerable technological development characterising the sector of renewable energy the energy efficiency has in general led to an import role of manufacturers in theoretical and practical training.

This training represents an opportunity for knowledge, professional growth and discussion for acquiring more updated and appropriate technology.

Obviously, training activities must be limited to personnel who are technicians or who have proven skills in the subject so that the course does not just become a promotional meeting.

The topics most covered are:

- Medium and large size thermal solar systems
- Thermal solar systems for single and 2-family homes
- Management of the solar energy systems
- Heat pumps: principles of functioning and dimensioning
- Air-water heat pumps: how to install a split system
- Hydronics: management, verification, protection
- Medium and high power heating systems
- Wood biomass heating systems
- Towards the class A+ building
- Controlled mechanical ventilation for high energy efficiency buildings
- Regulatory framework for heating systems over 35 kW
- Installation, start-up and maintenance of systems

- First turning on of wall-installed condensation boilers
- Proposing efficiency in an effective manner.

Training by ENEA

ENEA offers a range of opportunities in the training field in the sectors it covers (energy, the environment, innovative technologies).

The main topics include:

- Biomass systems
- Photovoltaic systems
- Thermal solar
- Lighting
- Energy for non industrial building: technologies for energy savings

Considering the wide variety of organisations participating in the training system and the many types of courses provided, a survey has been made to identify the existing training courses in the construction and installations sectors.

To this end a questionnaire, available on the link <http://www.assistal.it/indagini/indaginebuildup.aspx> was prepared and sent to the training organisations and companies, employers' associations, manufacturers, research organisations and professional bodies.

Although these bodies were requested, also by telephone, to reply to the survey, only 45 of them responded to the questionnaire, with the following distribution:

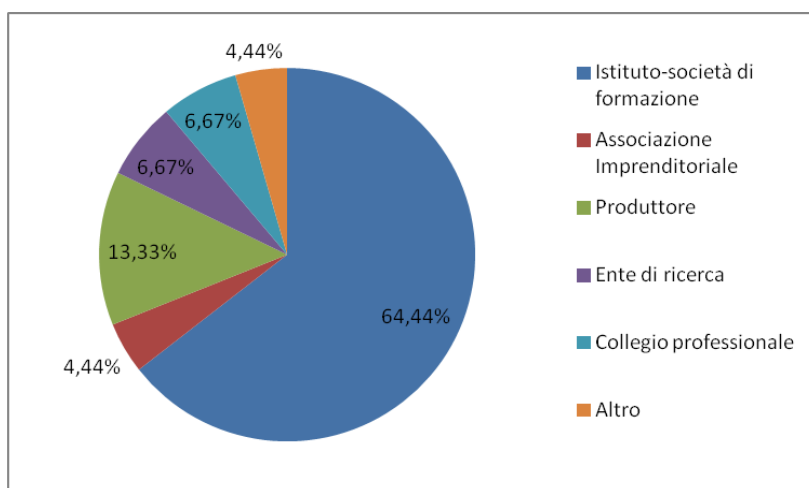


Figure 7.5 – Survey sample

The analysis of the training courses in the above sectors regarding energy efficiency and renewable sources shows a wide range of activities oriented to responding to a number of training requirements. In particular, the survey focused on all the training activities leading to professional qualification and aimed at blue collar workers to enable them to acquire a specific professional skill and for technical and regulatory updating.

The training has been proposed by a number of bodies with specific characteristics. These range from training organisations accredited for this activity on the regional level, to category associations providing courses free of charge or with fees, and manufacturers providing product updating training. Besides these bodies there is also ENEA.

The survey was focused in particular on the following areas for analysis:

- Procedures for course admittance
- Training targets
- Identification elements of the training activity
- Certification issued
- Sources of funding.

On the whole the training activities surveyed are especially designed for installers and maintainers of the following systems:

- Heating systems with combustion generators
- Heat pump heating systems
- Thermal solar systems
- Heating systems with radiating panels
- Air conditioning and treatment
- Low voltage electrical systems
- Medium voltage electrical systems
- Domotic systems
- Lighting systems
- Automation systems for doors/gates and barriers
- Photovoltaic systems

In the building sector they regard in particular the following professional figures:

- Building carpenter
- Layer of plasterboard
- Mason
- Layer of lining (tiles, parquet etc.)
- Layer of heat and sound proofing
- Yard foreman
- Painter
- Operator of drilling machines

The following table shows how training courses are distributed for each of the installation and building sectors considered:

Training courses for installer/maintainer of:
--

A1	Heating system with fuel-powered generators	15.79%
A2	Heating system with heat-pump	10.53%
A3	Solar energy system	2.63%
A4	Underfloor heating systems	2.63%
A5	Conditioning and air handling systems	2.63%
A6	Electrical low-voltage system	13.16%
A7	Electrical medium-voltage system	13.16%
A8	Domotic system	2.63%
A9	Lighting systems	2.63%
A10	Automation system for doors/gates/barriers	2.63%
A11	Photovoltaic system	31.58%
TOTAL		100.00%
Training courses in the building sector:		
B1	Carpenter	14.29%
B2	Layer of pasterboard	5.71%
B3	Mason	28.57%
B4	Layer of lining (tiles, parquet, etc.)	8.57%
B5	Layer of heat and sound proofing	2.8 6%
B6	Yard foreman	11.43%
B7	Painter	8.57%
B8	Operator of drilling machines	20.00%
TOTAL		100.00%

Figure 7.6 – Summary of training provided

This shows how in the installations sector most of the courses regard photovoltaic technology where 31.58% of the courses surveyed were concentrated.

Heat pumps account for about 11%.

With regard to distribution of training provided in building, there is a particular focus on for the professional figures of mason (28.57%), drilling machine operator (20%) and carpenter (14.29%).

Most of the training courses are aimed at employed workers and are intended for the acquisition of specific skills and of technical and regulatory updating.

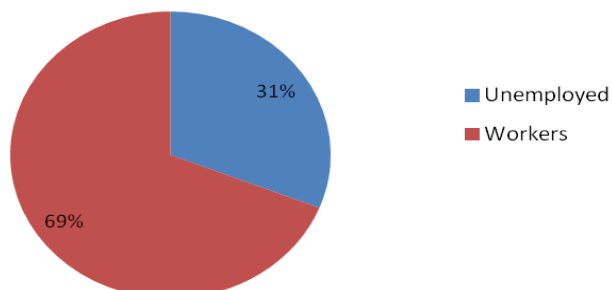


Figure 7.7 – Targets of training

With regard to certification of the training activity (Fig. 6.6), in most cases, at the end of the course a certificate of attendance is issued (68.49%).

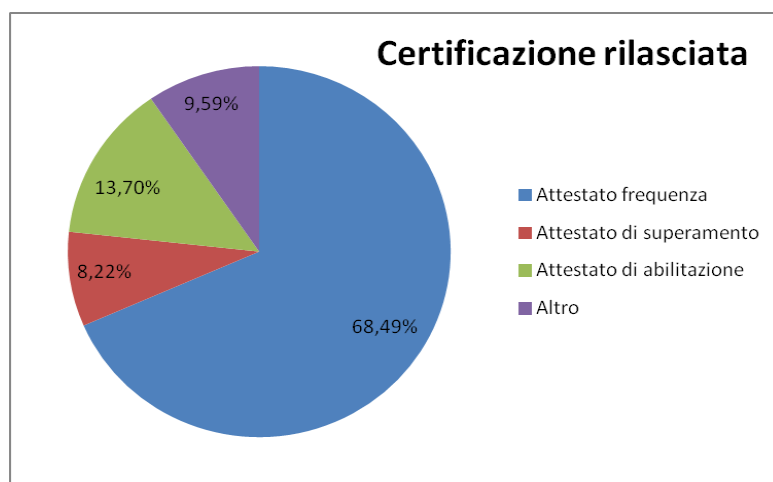


Figure 7.8 – Certification issued

Considering the duration of the courses, these are mainly short courses with a total maximum of 50 hours, while the medium and long courses and those over 600 hours are very rare.

Furthermore, in most cases the courses are subsidised.

The table below shows, for each type of course, the occurrence of the cases where an educational qualification (diploma or lower middle school certificate) is required for course admittance, and the cases where there is an admittance test.

		Entry requirements				
		Educational qualification			Experience %	Admittance test %
		Diploma %	Lower middle school %	None %		
Training courses for installer/maintainer of:						
A1	Heating system with fuel-powered generators	33	-	67	50	67
A2	Heating system with Heat-pump	-	25	75	100	50
A3	Solar energy system	-	100	-	-	-
A4	Underfloor heating systems	100	-	-	100	50
A5	Conditioning and air handling systems	-	-	100	100	-
A6	Electrical low-voltage system	20	20	60	80	20
A7	Electrical medium-voltage system	-	20	80	100	20
A8	Domotic system	-	-	100	100	-
A9	Lighting systems	-	-	100	100	-
A10	Automation system for doors/gates/barriers	-	-	100	100	-
A11	Photovoltaic system	42	16	42	50	33
Training courses in the building sector:						
B1	Carpenter	-	-	100	60	-
B2	Layer of pasterboard	-	-	100	-	-
B3	Mason	-	50	50	30	30

B4	Layer of lining (tiles, parquet, etc.)	-	33	67	33	-
B5	Layer of heat and sound proofing	-	-	100	100	-
B6	Yard foreman	25	25	50	-	-
B7	Painter	-	-	100	33	-
B8	Operator of drilling machines	-	43	57	100	-

Figure 7.9 – Admittance requirements for training courses

The following table shows useful indications on the structure of the courses, distinguishing between the cases where, with or without a final exam, the course involves only lessons on theory and those which are partly theoretical and partly practical:

		Structure course			
		Theory	Theory/Practical	Theory/Final exam	Theory/Practice/Final exam
Training courses for installer/maintainer of:					
A1	Heating system with fuel-powered generators	-	33%	-	67%
A2	Heating system with Heat-pump	25%	-	25%	50%
A3	Solar energy system	-	-	-	100%
A4	Underfloor heating systems	-	-	100%	-
A5	Conditioning and air handling systems	-	-	-	-
A6	Electrical low-voltage system	20%	-	20%	60%
A7	Electrical medium-voltage system	40%	20%	20%	20%
A8	Domotic system	-	-	-	100%
A9	Lighting systems	-	100%	-	-
A10	Automation system for doors/gates/barriers	-	100%	-	-
A11	Photovoltaic system	8%	33%	8%	50%
Training courses in the building sector					
B1	Carpenter	-	-	-	100%
B2	Layer of pasterboard	-	50%	-	50%
B3	Mason	10%	-	-	90%
B4	Layer of lining (tiles, parquet, etc.)	-	67%	-	33%
B5	Layer of heat and sound proofing	-	100%	-	-
B6	Yard foreman	25%	-	50%	25%
B7	Painter	-	-	-	100%
B8	Operator of drilling machines	-	-	-	100%

Figure 7.10 – Structure of training courses

Finally, with regard to the training method, the analysis shows that almost all the courses are held in classrooms. However, there is also growing interest for blended training in which traditional classroom training is integrated by distance training courses (e-learning).

Cases of blended training are recorded for the courses on photovoltaic technology (about 17%), heat pumps (25%) and combustion generators (about 17%).

Relevant initiatives at national/regional level supported by the EU:

With regard to initiatives developed in the European context, the ones developed by ENEA are of interest, since the national energy agency has managed to attract the interest of all the parties involved.

In particular, we can cite the following projects concerning energy efficiency and renewable energy sources:

Qualicert: www.qualicert.enea.it involving the development of minimum criteria for the certification of installers of small renewable energy source systems (biomass, photovoltaic, heat pumps, thermal solar, low enthalpy geothermal energy).

Compener: www.compener.enea.it focusing on the detailed definition of knowledge, abilities and skills not only for the figures mentioned above, but also for experts on building energy, energy managers and teacher trainers. The latter figure is considered fundamental to ensure not only a standard level of the training on the national level, but also to monitor continuing updating starting from the teacher trainers who will train the installers.

ELIH-Med: www.elih-med.eu is a project, still underway, regarding the implementation of some pilot cases for enhancing energy efficiency of about 500 low income housing units of which 100 in Italy. We believe that the case studies can provide useful elements to understand training requirements of workers who will work on the energy efficiency of buildings.

HEAT4U: www.heat4u.eu is a research project including training on absorption heat pumps, with Robur, an Italian company, as the coordinator while ENEA plays the role of extension by conducting an e-learning course.

As a result of ENEA's activity of dissemination and endorsement the results of other European projects, with some Italian partners, have been used. Among these we should recall:

- The EUCERT project on heat pumps
- The GEO HP project on low enthalpy geothermal energy
- the Soltec project www.soltec-project.eu on the figure of maintainer of photovoltaic systems.

8. Skills gaps between the current situation and the needs for 2020

Labour force evolution

In Italy there are just over 14 million people aged between 15 and 34, equivalent to 23% of the country's resident population (data ISTAT as of 31 December 2008). Their positioning in the category of the "young" is due to the well known delays, at least with respect to people of the same age in other Countries, both in job insertion and in leaving their family home of origin. Almost all children stay at home until the age of 24: 96.9% between 18 and 19; 86.1% between 20 and 24. The percentage is still high also for the 25-29 age group, at 59.2%, falling to 28.9% for the 30-34 age group. While on the other hand this is in alignment with international comparisons, the section of people aged between 15 and 24 years equals 10.1% of the total population (data: ISTAT- Istituto Nazionale di Statistica) and many of them have never come into contact with the world of work. This shows that besides a problem of insecurity and difficult transition from school to work, Italy is also experiencing a serious demographic problem linked to increasing population ageing. Forecasts for Italy in 2020 estimate an increase of about 800,000 young in the 15-24 age group. In the light of these data, and taking the ISTAT figure available according to which the number of upper school graduates for the scholastic year 2009-2010 is 450,150 we can see the following distribution:

Type of school	percentage	absolute value
High schools	39.0%	175,558
Former teacher training schools	8.7%	39,163
Technical schools	33.8%	152,151
Vocational schools	15.0%	67,523
Artistic education	<u>3.5%</u>	<u>15,755</u>
TOTAL	100%	450,150

Figure 8.1 – Number of upper school graduates in the scholastic year 2009-2010 per type of school

After the State exam in scholastic year 2011/2012, 56 young people out of 100 decided to continue their studies, taking a university course in the year just after getting their diploma but the 44% of graduates drops out of school to work.

The profile of interest in this case regards graduates from the technical and vocational schools that have a particular professional vocation for the role of blue collar works in both the industrial and building system because they have already acquired basic professional skills and a qualification that can be used to enter the job market.

Given the above, it can be assumed that about 90% of graduates in technical and professional (about 198,066 units) enter the labor market as blue collar.

Always related to the year 2009/2010, approximately 40,061 units join the labor market after primary education and, therefore, are other workforce in the sector.

For the calculation of the workforce up to 2020 involved in the **market of energy production from renewable sources** we must start from the analysis of following data for each production sector.

Photovoltaic sector

According to the National Commission for Solar Energy¹ (2008), CNEL (2009), ENEA (2009) and CU (2009), the photovoltaic sector in Italy now employs about 5,700 workers directly and indirectly. According to the EPIA, however, in 2007 the directly employed workers Italy numbered about 1,700. Despite the still small size, this part of the renewable energy sector still has the greatest potential for expansion, even though solar production in Italy today covers less than 3% of the EU15 production (193 GWh out of 6,899 GWh). This limited size corresponds to the small number workers. In our country regional distribution of solar production (and of employment) shows homogeneous values in some northern regions: Lombardy (10.5%), Trentino (10.0%), Emilia Romagna (9.1%). In Central Italy, Umbria and Marche are first, respectively at 5.3% and 5.1%. In the southern regions and the islands, Puglia holds the national record with 12.3% and Sicily with 5.5% is in second place.

Currently, this area has major growth opportunities, and in their study CNEL-ISSI estimates an especially high growth rate in photovoltaic electricity production, with 70% in 2009 and 20% in 2020.

The initial amount for 2008 is estimated at 200 GWh of total installed power², while the 2020 target is based on the targets of the 2007 Position Paper, excluding thermodynamic solar.

With regard to employment, estimates call for a considerable increase (ten times the value for 2008) with an annual average of 57,601 units. It should be pointed out that the new employment would be distributed in the following sectors: electric (19%), metal products (4%), building (8%), wholesale trade (4%), professional activities (18%) and other activities (47%). However, there are still problems regarding the growth of work productivity. In this simulation, in fact, the level of productivity remains constant, and is approximately 54,000 euro per worker, during the entire timespan of the simulation, thus impeding growth and the independent affirmation of the sector.

Employment	2009	2020	annual average
temporary	15,119	64,655	52,587
permanent	120	5,014	5,014
total	15,239	69,669	57,601

Figure 8.2 - New employment in the photovoltaic sector. Processing of CNEL-ISSI data (2009). Employed in thousands.

In this scenario, the previous considerations also apply with regard to the capacity of the sector to promote itself, beyond the incentives, through the creations of a positive cycle linking incentives to productivity and technological progress. In order to be competitive, compared to the other traditional forms of energy, technology from renewable sources should be able to justify its use in economic terms. However, in the light of the current incentives this target seems hard to reach. For the estimate

¹ Commissione nazionale per l'energia solare (2008), "Rapporto preliminare sullo stato attuale del fotovoltaico solare nazionale", 2008.

² Final data for 2008 was just under and equal to 193 GWh

of the effects linked to the application of the energy package, careful monitoring is thus required on fiscal and industrial policy on accumulation in the sectors green, on the “production” of knowledge for renewable technological and on the changes in the cost curve, so that the measures implemented are able to promote innovation and independent investment in these sectors.

Biomass sector

In Italy, about 25,000 workers work directly and indirectly in the biomass sector. According to GSE (Electricity Service Manager) data (2009), the regional distribution of the production from biomass and bioliquid is widespread in Italy. The top region is Emilia Romagna with 13.3% of the total national. In Central Italy only Umbria with 3.7 % uses it, while it is not used in the other regions. Among the southern regions we can city Calabria and Puglia, with respectively 26.4% and 24.8%; they are also those with the highest quotas on the national level. Sardinia has a respectable 4.7%, while Sicily has a zero value.

Summarising, total employed (directly employed in italics) in 2008 in Italy were:

Photovoltaic	5,700	(source C.E., ENEA, CNEL)
Biomass	25,000	(source C.U.)

The research conducted by IRES and CIGL “Verso la green economy lotta ai cambiamenti climatici e fonti rinnovabili: gli investimenti, le ricadute occupazionali, le nuove professionalità” (S. Rugiero 2010), involves, with about 8 billion euro average annual investments since 2008, an employment potential (gross and net) in Italy up to 2020 in the more optimistic scenarios:

Employment	Employ RES	NEMESIS	ASTRA	CNEL ISSI	GSE IEFE	IRES
Photovoltaic	35.000	-	-	-	69.700	47.500
Biomass	91.000	-	-	-		100.000
Gross total	210.000				250.000	200.000
Net total (*)	97.500	67.500	75.700	-	53.500	

(*) Overall net employment is the sum of new employment up to 2020 considering not only estimated gains but also job losses following the application of the 20-20-20 package. Source: Ires processing

Figure 8.3 – Occupational impact of the Green economy – Scenarios up to 2020

These data are confirmed by further research conducted by the GSE (Electricity Service Manager) and *Iefe Bocconi*. While in Italy they cite 100,000 employed in 2010, there will be almost 250,000 up to 2020, with a higher quota for bioenergy (over 100,000 employed), followed by solar with 50.000.

In this scenario we should, however, consider that pursuant to Art. 15 of the recent Legislative Decree 3 March 2011 N. 28, containing the “implementation of Directive 2009/28/EC on the promotion of the use of energy from renewable sources, with the amendment and subsequent abrogation of Directives 2001/77/EC and 2003/30/EC”, starting from **2013 the Regions and the Autonomous Provinces will implement a qualification system for installers and maintainers of boilers, chimneys and**

biomass heaters, photovoltaic and thermal solar systems in buildings, low enthalpy geothermal system and heat pumps.

Italian law already considers as being qualified the technical experts in charge of installations enterprises, having the technical and professional requisites, alternatively, under letters a), b) or c) of paragraph 1, Art. 4 of Decree 37/08, i.e. in cases of:

- a) Technical degree certificate;
- b) Technical diploma followed by a period of job insertion, for at least 2 continuous years, working directly for an enterprise in the sector;
- c) Vocational training qualification or certificate, with a period of job insertion of at least 4 consecutive years, working directly for an enterprise in the sector.

After 1 August 2013, the technical experts in charge having the technical and professional requisites set forth in letter c) will be considered as qualified when the vocational training qualification, as well as the previous period of training, correspond to the procedures and criteria defined on the regional level. On the other hand, they will have to follow the training path and qualification to be defined by the Regions and Autonomous Provinces by 31 December 2012. These paths should also regard technicians having the requisites set forth in letter d) of Ministry Decree 37/08 i.e. the technicians in charge having suitable educational qualifications, but also having adequate employment experience. If the Regions and Autonomous Provinces fail to do so by 31 December 2012, ENEA will define training programmes for the issue of the training certificate.

With regard to professional figures, there is interesting research conducted by the IRES and CIGL entitled “*Verso la green economy lotta ai cambiamenti climatici e fonti rinnovabili: gli investimenti, le ricadute occupazionali, le nuove professionalità*” (S. Rugiero 2010) which identifies a series of professional figures in the sector of energy production from renewable sources. These figures, revised in the light of the minimum requisites they have acquired in education (2nd degree middle school diploma), and of the present focus are:

Electrician specialised in the installation of residential photovoltaic systems

Brief profile: person in charge of hardwiring the system of photovoltaic energy to the mains (electric panel)

Minimum training: diploma from a technical-vocational school

Sector training: degree in electrical engineering; on the job training after the technical diploma or degree diploma; post-diploma training courses on techniques for renewable energy sources and energy savings, i.e. as an electrician for industrial and non-industrial installations with photovoltaic specialisation or an expert in renewable energy source installations

Previous professional experience: experience as an electrician required

Occupational contexts: private companies and public organisations.

Electrician specialised in the installation of commercial photovoltaic systems

Brief profile: installs solar electricity generation systems at the sites of commercial customers

Minimum training: diploma from a technical-vocational school

Sector training: post-diploma training courses on techniques for renewable energy sources and energy savings, i.e. as an electrician for industrial and non-industrial installations with photovoltaic specialisation or an expert in renewable energy source installations

Previous professional experience: required

Occupational contexts: private companies and public organisations, power plants

Solar system installer

Brief profile: installs, commissions, starts up and handles the ordinary and extraordinary maintenance of photovoltaic systems and/or residential, commercial or industrial thermal solar. In corporate contexts they can work with the energy manager and design expert

Minimum training: diploma from a technical-vocational school

Sector training: technical specialisation courses in the installation of solar photovoltaic and/or solar thermal systems; continuing training courses on heating systems with alternative and renewable sources; post-diploma training courses as an industrial and non-industrial electrician with photovoltaic specialisations or as an expert in renewable energy source installations

Previous professional experience: not required

Occupational contexts: private companies and public organisations, power plants

Electric generator operator

Brief profile: Monitors and ensures the functioning of the transmission lines and the transformer in power stations. Checks the distribution and regulates the flow of electricity in the mains transmission grid.

Scholastic education/ vocational courses: diploma from a technical-vocational school

Sector training: No specific university educational qualifications and post-diploma training courses as an electrician and/or computer programmer required.

Previous professional experience: Major job experience in the sector.

Occupational/organisational contexts: Public organisations, power plants³

Going on to calculate the workforce up to 2020 in the **construction market (building and plant)**, we can start from the analysis of the following data:

- The Italian building stock now consists of 4,000 million m², with the residential sector consisting of about 30 million dwellings and represents approximately 60% (source Censis), with 24% of the buildings in energy class G
- The sector of renovating buildings over 50 years old is a major area of investment in Italy, with a quota of well over 60% of the entire building sector; according to forecasts for 2020, it will account for 80% of the entire construction market.

According to ISTAT, Annual Report 2012, **the number of employees in the construction industry (construction and plant engineering) in 2011 amounted to 1,847,000 units**, with a trend variable in the years 1993 to 2011 (Figure 8.7). The workforce is also divided into three main types of employment (Figure 8.8).

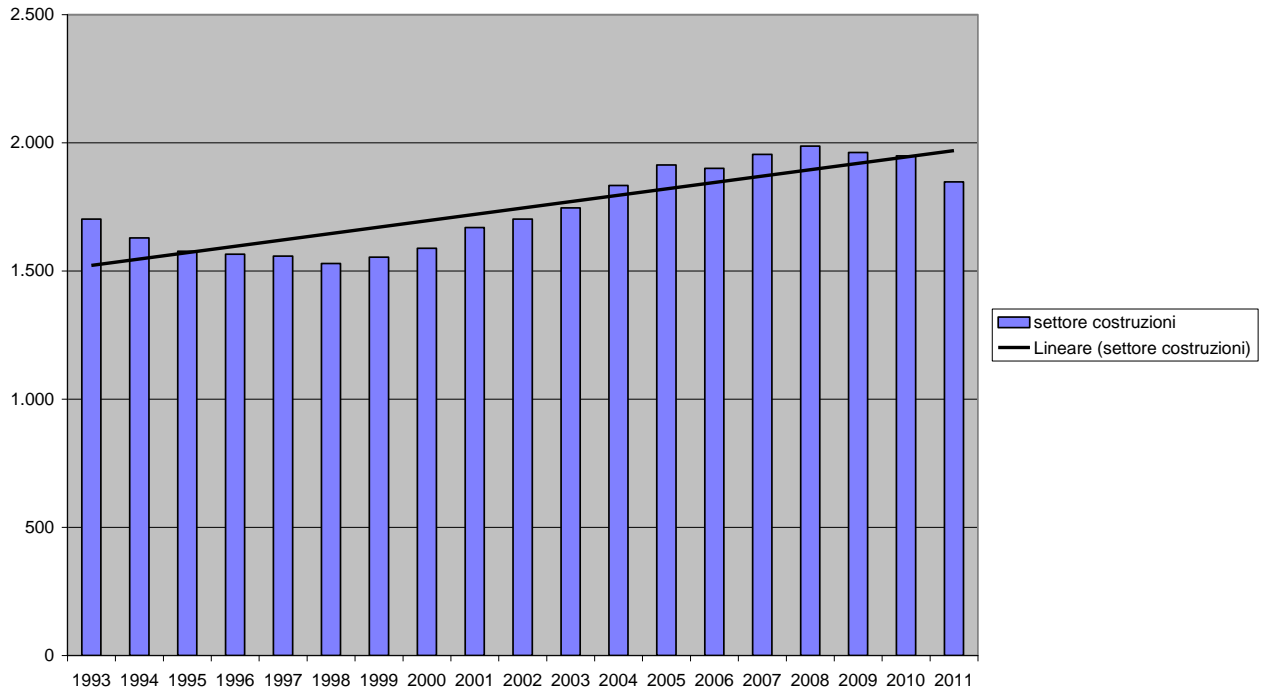


Figure 8.4 – Employed in the building sector - Years 1993-2011 (thousands) - Source ISTAT – Annual Report 2012

³ IRES and CIGL “Verso la green economy lotta ai cambiamenti climatici e fonti rinnovabili: gli investimenti, le ricadute occupazionali, le nuove professionalità” (S. Rugiero 2010)³

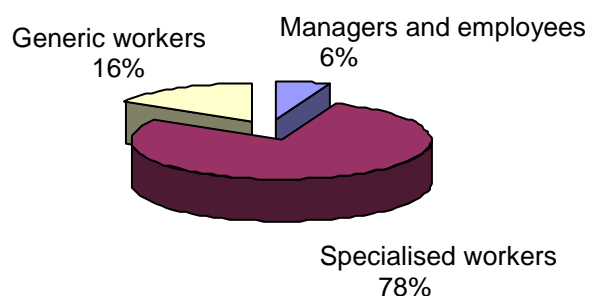


Figure 8.5: Workers in the building sector – Source ISTAT

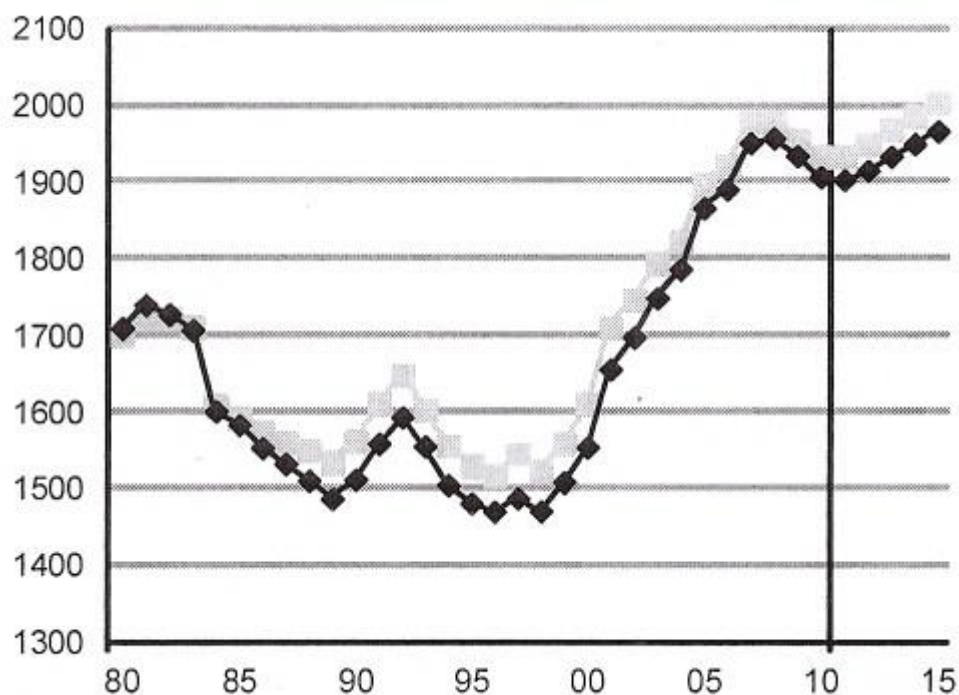
In particular, the labor force is characterized by the following main professions (Source: Based on data Assista Unioncamere):

The specific professions most demanded in the construction sector in 2011

	Workers	Percentage
Managers and employees	110.820	6%
Masons	661.820	
Carpenters	162.273	
Workers installing insulation, windows and fittings	50.459	
Painters	14.908	
Other building workers	17.202	
Floor layers, layers of lining and plasterers	16.055	
Electricians	354.326	
Plumbers and heating experts	188.893	
Other plant workers	24.723	
Specialised workers	1.440.660	78%
Workers not qualified in the building sector	275.989	
Other workers	19.531	
Generic workers	295.520	16%
TOTAL workers in 2011 in the building sector	1.847.000	100%

If you look at the trend in the number of employees from 1980 with forecasts to 2015 (Figure 8.9) and, in particular, the same forecast assumes an increase in labor demand in the period 2010-2015 by 0.6% on average per year, starting from the ISTAT data of 2011 amounted to 1,847,000 units, lower

than the forecast of the same figure, **we can be expected in 2020 about 1,946,738 units employed in the construction sector.**



- Total workers
- Work units

Figure 8.6: Employed (in thousands) in construction sector from 1980 with forecasts to 2015

Source: ISFOL-IRS processing of microdata Istat Workforce and forecasts ISFOL-REF

Making a projection up to 2020 with the data shown previously, we will get the following outline:

The specific professions most demanded in the construction sector (forecasts for 2020)

	Workers	Percentage
Managers and employees	116.804	6%
Masons	644.858	
Carpenters	171.036	
Workers installing insulation, windows and fittings	53.184	
Painters	15.714	
Other building workers	18.131	
Floor layers, layers of lining and plasterers	16.922	
Electricians	373.460	
Plumbers and heating experts	199.093	
Other plant workers	26.058	
Specialised workers	1.518.456	78%
Workers not qualified in the building sector	290.893	
Other workers	20.585	
Generic workers	311.478	16%
TOTAL workers up to 2020 in the building sector	1.946.738	100%

Job title	Actual workers 2011	Estimated workers 2020	Workforce gap
Masons	611.820	644.858	33.038
Carpenters	162.273	171.036	8.763
Workers installing insulation, windows and fittings	50.459	53.184	2.725
Painters	14.908	15.714	805
Other building workers	17.202	18.131	929
Floor layers, layers of lining and plasterers	16.055	16.922	867
Electricians	354.326	373.460	19.134
Plumbers and heating experts	188.893	199.093	10.200
Other plant workers	24.723	26.058	1.335
Specialised workers	1.440.660	1.518.456	77.796
Personale non qualificato nelle costruzioni	275.989	290.893	14.903
Other workers	19.531	20.585	1054
Generic workers	295.520	311.478	15.958
TOTAL BLUE COLLAR	1.691.926	1.783.290	99.738

To follow the educational level of the individual job profiles (Source: Unioncamere - system Excelsior):

Stonemasons, bricks, refractory	
Occupations included in this category build masonry building structures, interpret and translate operationally drawings and instructions of the designer, choose and prepare the pastes and mortars suitable for materials used and the type of masonry building shape material and pose in work of stones and bricks and refractory materials	
Level of education	%
Compulsory school ⁽³⁾	63,9
Professional school (3-4 years)	19,8
Secondary diploma (5 years)	16,3
Degree	0,0
<i>(3)Required by the regulations in force until the school year 2009-2011</i>	
Need for additional training	%
training required	50,8
training not required	49,2

Masons reinforced concrete

The Masons reinforced concrete building structures built of reinforced concrete interpreting and translating operationally drawings and instructions of the designer; arm themselves and prepare shoeing forms of casting, fitted and removed the formwork and structures in which particular dough, choose and define mixtures of sand, gravel and cement more suitable, prepare and sink the dough by building concrete structures designed.

Level of education	%
Compulsory school ⁽³⁾	76,8
Professional school (3-4 years)	15,8
Secondary diploma (5 years)	7,4
Degree	0,0
<i>⁽³⁾Required by the regulations in force until the school year 2009-2011</i>	

Need for additional training	%
training required	47,3
training not required	52,7

Carpenters

The professions included in this class build, assemble and manutengono wooden products that are the basis or support operations or construction sites, such as armor and propping aimed at supporting structures and contain cast in concrete and cement or controforme for particular walls and lava.

Level of education	%
Compulsory school ⁽³⁾	61,4
Professional school (3-4 years)	19,8
Secondary diploma (5 years)	18,7
Degree	0,0
<i>⁽³⁾Required by the regulations in force until the school year 2009-2011</i>	

Need for additional training	%
training required	52,3
training not required	47,7

Electricians

Occupations classified in this category are responsible for installation, repair and maintenance, according, electrical installations of buildings for civil use or ensure the adaptation of existing installing electrical lines, switches and sockets suitable for the absorption of energy of the individual equipment set, lighting systems, security equipment, telephone lines, television and data transmission.

Level of education	%
Compulsory school ⁽³⁾	36,6
Professional school (3-4 years)	20,6
Secondary diploma (5 years)	42,8
Degree	0,0
<i>⁽³⁾Required by the regulations in force until the school year 2009-2011</i>	

Need for additional training	%
training required	70,7
training not required	29,3

Plumbers and heating experts

Occupations classified in this category are responsible for the construction, commissioning works according to the standards and maintenance of plumbing and heating in the building products that install, repair and mantengono the discharge piping of sewage and water supply of gas and water drinking water or health, hot or cold, the services of dwellings or other buildings civilians, define and regulate the flow view of the pressures and slopes available to be overcome, using the materials prescribed by the regulations; install, repair and mantengono plants heating and cooling of buildings using the supply pipes, surfaces and radiant systems, the media, the insulation and equipment prescribed by standards.

Level of education	%
Compulsory school ⁽³⁾	47,3
Professional school (3-4 years)	22,5
Secondary diploma (5 years)	30,2
Degree	0,0
<i>⁽³⁾Required by the regulations in force until the school year 2009-2011</i>	

Need for additional training	%
training required	66,8
training not required	33,2

Installers of insulation and soundproofing

The professions included in this class shall provide for selection and installation of physical barriers, such as panels, foams and resins with sound-absorbing and insulating properties, contained within masonry or on demand, to reduce the energy exchanges between the inside and the 'exteriors of buildings and / or to mitigate the environmental noise.

Level of education	%
Compulsory school ⁽³⁾	82,4
Professional school (3-4 years)	3,2
Secondary diploma (5 years)	14,4
Degree	0,0
<i>(3)Required by the regulations in force until the school year 2009-2011</i>	

Need for additional training	%
training required	86,8
training not required	13,2

Glaziers

The Glaziers shall provide for selection, cutting, manufacture, and installation of replacement windows and mirrors on doors, windows, skylights, windows, displays, building facades, interior walls, ceilings, shelves ensuring the safety of installations, their static seal and conditions to withstand weathering and stress standard for the uses identified.

Level of education	%
Compulsory school ⁽³⁾	61,9
Professional school (3-4 years)	10,8
Secondary diploma (5 years)	27,2
Degree	0,0
<i>(3)Required by the regulations in force until the school year 2009-2011</i>	

Need for additional training	%
training required	54,8
training not required	45,2

Installers fixtures and serramenta

Installers of windows and doors install, repair and manutengono fixtures, blinds, shutters and other serrermenteria all 'inside or outside the buildings.

Level of education	%
Compulsory school ⁽³⁾	52,7
Professional school (3-4 years)	1,6
Secondary diploma (5 years)	45,7
Degree	0,0

(3)Required by the regulations in force until the school year 2009-2011

Need for additional training	%
training required	78,5
training not required	21,5

Painters

Occupations classified in this category are responsible for finishing walls, surfaces or other elements of buildings and building products that they paint and decorate walls, equipment, buildings, apply stucco works and realize stucco decorations.

Level of education	%
Compulsory school ⁽³⁾	43,2
Professional school (3-4 years)	49,4
Secondary diploma (5 years)	7,5
Degree	0,0

(3)Required by the regulations in force until the school year 2009-2011

Need for additional training	%
training required	59,9
training not required	40,1

Others workers

The professions included in this class build artifacts mounting and assembling on appropriate bases and media, parts, prefabricated or preformed concrete or other materials used in construction, welded together making it viable for the intended uses the facilities so constructed.

Level of education	%
Compulsory school ⁽³⁾	58,5
Professional school (3-4 years)	7,4
Secondary diploma (5 years)	34,0
Degree	0,0
<i>(3)Required by the regulations in force until the school year 2009-2011</i>	

Need for additional training	%
training required	67,4
training not required	32,6

Floor layers and layers of coatings

Floor layers and layers of coatings are responsible for finishing the walls and floor surface laying and repairing of buildings mosaic floors, marble, stone, ceramics, concrete or other hard materials, it eliminates the shortcomings of laying arrotandoli and lucidandoli; cover the applying wall tiles, marble, stone, ceramic, or other hard materials for finishing and decoration.

Level of education	%
Compulsory school ⁽³⁾	63,0
Professional school (3-4 years)	29,6
Secondary diploma (5 years)	7,4
Degree	0,0
<i>(3)Required by the regulations in force until the school year 2009-2011</i>	

Need for additional training	%
training required	57,5
training not required	42,5

Considering a move employment in entry of 5% per year and an average of 60% of new entrants require additional training to the school already acquired, it can be assumed that **in the period 2012-2020 will be to form about 428.000 employees.**

Assuming an average of 20 students / class, an average duration / course of 40 hours and a commitment to teaching of 80 training days / year per teacher, will serve 21.400 courses equivalent to 107.000 training days 8 hours and about 1.338 teachers.

Job title	Estimated workers 2020	Qualif. Need (workers)	No. Courses	No. Trainers
Masons	644.858	154.766	7.738	484
Carpenters	171.036	41.049	2.052	128
Workers installing insulation, windows and fittings	53.184	12.764	638	40
Painters	15.714	3.771	189	12
Other building workers	18.131	4.351	218	14
Floor layers, layers of lining and plasterers	16.922	4.061	203	13
Electricians	373.460	89.630	4.482	280
Plumbers and heating experts	199.093	47.782	2.389	149
Other plant workers	26.058	6.254	313	20
Specialised workers	1.518.456	364.429	18.221	1.139
Personale non qualificato nelle costruzioni	290.893	69.814	3.491	218
Other workers	20.585	4.940	247	15
Generic workers	311.478	74.755	3.738	234
TOTAL BLUE COLLAR	1.783.290	427.990	21.399	1.337

Figura 8.8: Estimated need of qualification schemes/ training courses 2012-2020

To identify the new skills, in the light of the new scenarios, we have to point out that **a survey must be made on the professional profiles already existing**, identifying a general framework of the contents and then identifying the future trends and the emerging new professional figures and their characteristics. These include the roles, capacities and skills required, the context where the work takes place in order to determine the training requirements connected with these new figures, who should not be sought in traditional ambients and who will in any case need updating in skills and new capacities in relation to the increasing rate of technological improvement, but essentially and substantially in green jobs.

The transition towards new professional profiles, caused by the complex interaction between technological innovation and the structure of the skills, is a key area of study for the more general process of the transformation of the trades and professions underway in post-industrial societies. Technological and scientific development, together with the prevalence of the service economy and the new forms of enterprise and organisational culture, underlies the profound changes in the structure of the occupations and professions. This has led to the current “internal shifting of positions which makes profiles and professional figures unstable” (Minardi, 2008, p. 7), and also affecting career paths and the building of professional identities. Today we are witnessing the transformation not only of the organisational models for production and work, but also of the traditional occupational categories. They are significantly affected by technological innovation processes that enrich the work activities

with new meanings and new contents, demanding the continuous adaptation of the sets of skills required, and thus favouring the spread of figures who increasingly redefine knowledge and practices (ibid.). As Reyneri writes (2005), in the process involving the reconfiguration of knowledge and profiles, to the problem of “trades and jobs losing importance, but without disappearing, we can add the quasi-professions that complicate the way in which employment is organised” (Reyneri, 2005, p. 71). These intermediate figures derive from the fact that trades are evolving towards the organisational forms of the professions, while vice versa, we can be witnessing the possible return of the professions to the regulatory systems of trades (Minardi, 2008).

The differentiation of the occupational structure is accompanied by the affirmation of figures that have their independence on the job market, thus effecting the shift from organised careers to a professional growth path involving performance in free work for several companies. High mobility between different companies, and increasingly flexible work formulas, have enhanced the fragmentation of employment biographies.

The loss of the single job and the weakening of corporate hierarchies are accompanied by another important change largely caused by technological development: the breakdown of the connection between job tasks and production sectors. “Thanks to the new technologies there is an increase in plant and production systems that can be used with minor adaptations in various sectors, or that in any case require similar performance from the workers, since they are not affected by ‘experience with and knowledge of the materials handled, but are rather based on generic skills or the capacity to manage and combine resources” (Reyneri, 2005, pp. 60-71). The development of new technical knowledge and practices with a general character – we can refer, for example, to the spread of digital technologies – applicable to a wide range of processes that may also be very different, leading to the appearance of “[...] large professional areas, defined by the functions and level rather than the product sector or manufacturing technology: data treatment, management and administration, research and development, engineering and maintenance, sale, finance and top management (ibid.). The reference to the concept of “professional area” thus enable us to indicate the figures which, though found in occupational contexts and ambients that are structurally different, have in common basic working and/or professional skills, forming part of the same “area” (ISFOL, 2003, p. 73).

In the past, the industrialisation processes had transformed the organisation of work, until then based on trades, changing it into an enterprise-based system.

While trades were based on the pre-industrial model, typically represented by the figure of the craftsman who could control the entire production cycle, the industrial model is Fordian (large factories and assembly lines) with the destructuring of tasks, assigning to the worker a specific task defined on the basis of the “[...] product, organisational and technical characteristics of each enterprise” (op.cit., p. 69).

Today a change is again taking place in the nature of work, with a loosening of the bonds of previously defined corporate and sector dependence. These dynamics can be seen in the transformation of job profiles, which from “merely occupational are becoming technical and professional” (Minardi, 2008, p. 5), leaving behind the concept of the “single job” in a large enterprise based on Taylorist principles in favour of greater autonomy with respect to both the enterprise and the sector.

In this new transition phase, the distinction, still maintained, between trades, semi-professions and professions seems to be a valid instrument to orient our analysis of the changes occurring in the occupational structure in the field of renewable energy sources.

Quoting Minardi (2008), we can define trades as “[...] the set of knowledge and practices that are acquired by persons on a hereditary basis from a social group that has conserved the initial knowledge, technical and manual matrix” (Minardi, 2008, p. 2).

“Abilities and skills belong to the worker and are separate from the enterprise where he works” (Reyneri, 2005, p. 69); this allows inter-company mobility, but unlike the professions, does not allow mobility between sectors, “[...] since the trade is linked to the materials and the particular production process” (ibid.).

The concept of profession, according to the model derived from the American system O*NET, used for the ISFOL survey on the professions (2008), can be considered as a multi-dimension concept, i.e. consisting of several areas of information consisting of: I) The requisites needed by the worker in order to do the work; II) The characteristics of the worker affecting job performance; III) The characteristics of the profession.

In particular, the three macro-areas identified in this model are in turn subdivided into the following sub-dimensions:

- The “requisites needed by the worker”: education/ training (formal qualifications), professional experience, knowledge and skills
- The “characteristics of the worker”: aptitudes, work styles, professional values
- The “characteristics of the profession”: contents of the work, activities, tasks, work conditions.

The use of this type of definition has the advantage of considering both the structural aspects (on the contents and context of work) and the subjective aspects (regarding the worker), both closely connected to the concept of profession, representing two sides of the same coin; if considered separately, instead of integrating them, the concept could not be adequately represented.

The issue raised by Accornero (2006) in his analysis of the contents of work, i.e. whether ‘the profession is an attribute of the worker, or an attribute of the work, can thus be interpreted along these two axes marking the contrast between actor and structure, a contrast with all its problems seen in the various fields of application in social studies. We can, in fact, interpret the profession as a set of skills and knowledge that accumulates and grows with job experience, defining the profession in terms of personal investment (subject oriented). Alternatively, we can define the profession as the contents of a certain task, an idea according to which the worker applies his own work to what he is asked to do (structure area). The model proposed here, as we have said, tends to call for the necessary integration of the various elements which, on the whole, contribute to the richness of that theoretical phenomenon called “profession”.

It is thus important to design strategic training policy to support these new skills; this work has attempted to make an initial analytical bridge to connect us with this “new world” of green jobs in the field of renewable energy sources, and the requirements and potentials expressed by it, to start up a process for the definition and interpretation of this fast changing situation.

It is estimated that buildings are on the whole responsible for the use of 30-40% of all the primary energy, as well as for a similar percentage of greenhouse gas emissions and waste production.

Fortunately, most of the changes required in the building sector can be met with current technologies either at zero cost or in any case with limited costs. The building sector employs 111 million people in the world and on average approximately 5-10% of the workforce on the national level.

It is no recent discovery that the development of sustainable building creates new jobs.

Research made in 1992 by Jochem and Hohmeyer with an analysis of energy efficiency programmes in West Germany between 1973 and 1990 showed that 400,000 new jobs had been produced thanks to the saving of 4.1 exajoule per year; in other words, each petajoule of saved would offer 100 new jobs.

Other more recent studies conducted in Europe and North America have confirmed the increase of employment but reduced the estimate to 40-60 jobs per petajoule, probably because they calculate an increased productivity of the work.

Research commissioned by the American Solar Energy Society has calculated that in 2006 in the United States there were 3.5 million jobs directly related to energy efficiency activities and another 4.5 million in related sectors, for a total of over 8 million. Efficiency measures in the building sector include ecobuilding and renovation, as well as improvement of the efficiency of single building components. According to the authors of the Green Jobs Report, the aim is to achieve what is defined as a “double dividend”, a concept of environmental economics introduced by economist David Pearce and the focus of much debate above all in the early 1990s, when it was used in the Delors plan with respect to unemployment in the European Union.

“Double dividend” means being able to obtain two different beneficial results as a result of a tax or some other fiscal reform in the environmental sector. The improvement of the quality of the environment would be the “first dividend” and the increase in employment the “second”.

There is no specific data on environmental employment linked with the building sector since the data tends to survey either a single project or a single country rather than defining a broader sector framework.

Various studies have started to assess the number of potential jobs that could be created by energy efficiency measures.

The jobs created in ecobuilding and in the process of renovating the housing stock thus include designers, architects, auditors, project managers and various other blue collar trades like plumbers, metal workers and labourers. With regard to enhancing efficiency energy, almost all the specific measures in the building sector have shown a positive trend, with the growth in the number of jobs and with an important economic impact. Thanks to the most innovative technologies, high energy efficiency building can reduce energy consumption by over 80% compared to the traditional ones. **The jobs related to this sector can be undertaken by people already working in the “traditional” building sector, but with added value,** on the training and professional level of the new skills specifically involving sustainable building.⁴

⁴ IRES and CIGL “Verso la green economy lotta ai cambiamenti climatici and risorse rinnovabili: gli investimenti, le ricadute occupazionali, le nuove professionalità” (S. Rugiero 2010)⁴

Monitoring needs

The absolute need to establish a model for the system for monitoring training courses requires a “quality” management system and must therefore have the following characteristics:

- Organisation of a process management system for adequate and effective action, providing all the parties concerned with complete, updated and easily available information on the targets, training paths and resources used;
- Outlining a post-training professional and skills profile coherent internally and with the requirements identified in the analysis of training requirements for innovation among the parties concerned;
- Use of human and infrastructure resources, and definition of actions and measures for support and accompaniment suited to reaching the preset targets;
- Creation of a training process suited to the professional profile and the skills after the course, with monitoring and analysis of the results of monitoring;
- Promotion of continuing improvement of the efficacy of the management processes: there is a self-assessment and review of the management system in order to ensure its continuous adequacy and efficacy.

It should be considered that the professional profile must be “put into context in the scenario and the prospects of the professional figures after training”, and include a description and specifications of the professional activities.

Skills “are defined as all those resources (knowledge, abilities, etc.) which a person must have in order to effectively undertake insertion a job context, and more in general to undertake his own professional and personal development”.

Finally, the term concerned parties regards all those who have an “interest” and, therefore, in particular, the students and the world of work in its various components.

The five points characterising the quality of a training path form the “key aspects” to be considered in the management for the quality of courses and correspond to the five “dimensions” contained in this model:

- Management system;
- Requirements of the parties concerned, professional profile and resulting skills;
- Resources;
- Training process;
- Ongoing improvement and revision.

A feature of the Model is the focus not only, of course on the “product” aspects, i.e. the training service offered, by also on the “system” aspects and therefore the entire management system.

With regard to the product aspects, the Model aims to promote the quality of the “training service” offered, understood as the extent to which the training service will provide all the students with admission requisites for reaching a level of learning corresponding to the targets set within the preset time.

With regard to the system aspects, the Model aims to promote the quality of the management system, considered as the extent to which the system allows and favours the achieving of the targets set within the present time, i.e. the extent to which the system makes the quality of the product “systematic”.

Process-based approach

Since the training service offered can be considered as a set of more or less organised and interacting activities, the Model will adopt the process-based approach promoted by standard ISO 9001:2000, which defines the requisites that must characterise systems for quality management in any organisation.

Any organisation, in order to function effectively, must identify and handle numerous interrelated activities. An activity utilising resources and managed in order to allow the “transformation of incoming elements with outgoing elements”, can be considered as a “process-based approach” if it means the application of a system of processes in the context of an organisation, based on the identification of the processes necessary for conducting the activities and their interactions.

In this context, the “fundamental processes” characterising the dimensions of the Model can be defined as follows:

System dimension of management:

- Definition of the processes for the management of the network and of documentation for their management;
- Definition of the organisational structure for the management of the processes identified;
- Organisation and management of communication;

Requirements dimension of the concerned parties, Professional profile and skills after the course:

- Identification of the requirements for innovation and training by the parties concerned;
- Definition of the professional profile and skills after the training path;

Resources dimension:

- Definition of the needs of teachers and for support to teaching and learning, and the attribution of appointments;
- Teacher training;

- Definition of the needs of personnel working in infrastructures and support activities to the training process and attribution of appointments;
- Definition of requirements and making infrastructures available;
- Use of financial resources;
- Definition of agreements for conducting on the job training;
- Organisation, management and monitoring of the activities for support to the training process;

Training process dimension:

- Layout of training process;
- Planning of the implementation of the training process;
- Admission to the course,
- Monitoring of the implementation of the training process;
- Monitoring of the results of the training process;

Continuing improvement and revision dimension:

- Continuing improvement of the efficacy of the processes identified;
- Self-assessment;
- Revision of management systems.

With regard to the management of every single process, the Model adopts the Plan-Do-Check-Act (PDCA) method, which is promoted by standard ISO 9001:2000. This can be briefly described as follows:

Plan: setting the targets and processes necessary to provide results in accordance with targets

Do: implementing the processes

Check: monitoring and measuring the processes and results with respect to the targets

Act: adopting actions for continuous improvement of the performance of the processes.

Quality requisites

For each process fundamental for the management of the training path, the Model defines a “quality requisite” which summarises the results expected by the implementation of the processes.

The Model thus describes the “expected behaviour” in managing the process considered, in order to reach these results. In this way, the Model can also be interpreted as a “quality management system”.

This involves the definition of the “factors for evaluation” to be taken into consideration for quality assessment, with regard to the process considered.

The aim of the quality evaluation is to promote the continuing improvement of their quality through the highlighting of the strong points and weak areas.

The experimental method for quality assessment is based on self-assessment followed by external assessment.

Self-assessment is the evaluation of an activity undertaken independently by the management structure with respect to the evaluation model.

For the management structure of the activity, self-assessment is a fundamental tool for monitoring and “anamnesis” of its modus operandi, in order to assess the efficacy of the governance undertaken, to identify and become aware of the strong points and areas for improvement, and then to adopt suitable actions to guarantee the quality of the training service offered.

Self-assessment involves the drawing up of a Self-Assessment Report (SAR), drawn up internally and under the complete responsibility of the management structure.

Definition of “Quality Assurance” (under ISO 9000:2000): “Part of the quality management aimed at ensuring that the requisites for quality will be satisfied”.

The presence of various components in the Self-assessment Group must be linked with the aim of the self-assessment process, which is to achieve an analysis that is as complete and balanced as possible of the training activity, through the contribution and collaboration of the various parties concerned.

External evaluation, on the other hand is the evaluation that must be conducted by an Assessment Group formed by external “experts” to be assessed.

External assessment, by subjecting the governance, the choices made, the results obtained and the processes managed to independent and objective verification, has the double aim of helping the management structure to identify and become aware of its strong points and areas for improvement, and to evaluate the overall quality.

External assessment also involves the drawing up of the Assessment Report by the Assessment Group. This report must show the results of the critical analysis of what has been described and highlighted by the SAR, and the evidence uncovered during the evaluation visit, with reference to the aspects involving the dimensions considered by the Model.

According to the method adopted, the evaluation group consists of at least three experts:

- One from the world of post-secondary level training
- One from the world of production, research, services or the professions

- An expert belonging to the sector experts group.

They must have the following requisites:

- Familiarity with post-secondary level training;
- Familiarity with the Model and the assessment processes.

9. Barriers

The following tables show the legal, institutional, technical, financial and communication problems identified during the 1st project workshop in which the partners also took part. Not all the problems will be faced in the Build up Skills Italy project, but it is useful to point them out in view of the 20-20-20 targets. Possible solutions have been identified for some of them.

The problems have been grouped into five sections for easier analysis. However, they are often interlinked, and this will be taken into consideration during the preparation of the roadmap.

Legal and institutional problems

PROBLEM	ACTIVE PARTY	PASSIVE PARTY	SUGGESTIONS / SOLUTIONS
Terminological and substantial confusion between Qualification and Certification	State, Regions ENEA, ACCREDIA	<ul style="list-style-type: none"> • Manufacturers • Training providers • Sector specialists 	Clarify that second part qualification can be issued by a manufacturer but does not have legal value, while third part certification has legal value because it respects standards shared on the national level

Absence of a clear regulatory framework defining: <ul style="list-style-type: none"> the technical and professional requisites of the workers for building and installation work the parties for which certification is obligatory 	State and Regions	Enterprises and specialists in construction and building installations	National legislation and consequent regional legislation (an example of the national law is Legislative Decree 28/2011 for renewable source installations)
Absence of certification models shared on the national level	For the sectors of specific jurisdiction: <ul style="list-style-type: none"> Regions ENEA Ministry of Education, Universities and Research 	<ul style="list-style-type: none"> Enterprises and specialists in construction and building installations Students of vocational schools 	Development of layouts for national and regional certification and legislation on the topic
No access by the final user to the list of companies using personnel certified according to legally recognised methods	Regions and Enterprises	Final user	Drawing up of lists, for example on the regional level, of companies and professionals qualified /certified according to legally recognised methods
Lack of attention for the qualification / certification of professional skills	State, Regions	Enterprises, specialists and sector professionals	Make obligatory the certification of professionals in the public context, and for access to public economic incentives (for example for access to the 55% deductions)
Large number of persons to be certified	Regions, State	Enterprises Specialists	Establish gradual timing for making certification compulsory
The variety of training providers issuing certificates, often not valid from the legal point of view			It is important to identify the organisation operating in the sector, in order to provide information what we intend to do with BUS Italy and, at the same time, to identify a possible solution
Misleading claims by some providers of training courses			Identify the parties that could intervene to “dissuade” them and at the same time offer high quality courses, so that final users are no longer induced to choose organisations without serious accreditation

Regional accrediting of training providers is often based on criteria that are more formal than substantial, and does not request requisites as to competence	Regions	Training providers Teachers	Base criteria for the accrediting of training providers on requisites that are substantial and not purely formal. Provide monitoring of training providers
Lack of workshops for vocational training courses	ENEA, Regions	Training providers.	Define the minimum characteristics of training facilities and maintenance regulations Survey the existing workshops having the preset characteristics
Lack of on the job training and apprenticeship offers	State, Regions	Enterprises, Specialists	Increase on the job training and apprenticeship offers by providing the enterprises with instruments such as tax incentives or others
Lack of agreed minimum admittance standards			Refer to qualifications according to EQF in the definition of admittance requirements for each professional figure
Presence of various bodies funding training projects without any common strategy			Also in this case, these organisations should be identified in order to implement a single policy, also considering the hundreds of thousands of workers who must be qualified. The large number of course providers could be a positive factor, as long as there is a verification of the requisites of both trainers the facilities
Failure to implement the EU directive on the professions			We suggest that the BUS Italy Roadmap should also consider the application/ citing of the directive on professions and identify the minimum skills to be inserted in all the profiles
Failure to implement the individual training booklet			We suggest that the BUS Italy Roadmap should also consider the application/ citing of the individual training booklet
Lack of a list of qualified courses			Currently there are no qualified courses other than those for some figures for installations for renewable energy sources; most were qualified with the collaboration between ENEA and Mesos, published on the Cepas website, a body accredited for the qualification of professionals. There are presently no other courses that have been qualified for other topics

Critical aspects involved in the wide gap between education and training systems on the European and national level. Factor 22-110-27			We are all aware of the complexity of this topic, since Italy has 20 regions and two autonomous provinces; but funding is often provided by the provinces, numbering over 100, and this is multiplied by similar situations in 27 other countries. This is why 27 projects were funded, one for each European country

TECHNICAL PROBLEMS

PROBLEM	ACTIVE PARTY	PASSIVE PARTY	SUGGESTIONS / SOLUTIONS
The training systems stress the formal and theoretical aspects, and there is thus a lack of practical training; this creates a gap between the world of work and of training			Minimum standards will be defined by the project partners and then extended to all the associated partners, then the requisites of the stakeholders in the world of work will be considered. In this regard, there is a proposal to use the “tagged book” for management via the web
It is important to find a way to recognise formal, non-formal, informal and experience-based knowledge			The implementation of the EQF should finally solve this problem from the present time, since it specifically covers the definition of knowledge, abilities and skills so that workers can be defined as “qualified” for a given trade
Difficulty in getting a shared vision of training standards by all the various stakeholders			In drawing up the project it has already been decided to open a wide-ranging public discussion on these topics, both to identify the best solutions and to inform everyone about what they intend to do
Definition of the minimum requisites for those who provide courses, i.e. training organisations (practical)			The roadmap also intends to identify the minimum requisites for those providing theoretical and practical courses in the various areas, and for training personnel

Lack of integration between borderline skills among the various professional profiles			A solution must be found to enable “traditional” professionals to implement and obtain recognition of their skills in the field of energy efficiency for buildings. An idea could be to issue the professional’s booklet as already mentioned above
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FINANCIAL PROBLEMS

PROBLEM	ACTIVE PARTY	PASSIVE PARTY	SUGGESTIONS / SOLUTIONS
Excessive costs of new courses and training seen as a double cost, because generally provided during working hours			The problem of costs is probably a “false problem,” since at the present time the acquisition of new skills will also allow professionals to extend their clientele. In any case, we can think of adopting forms of mixed training, thus based on remote training and short direct sessions to acquire the practical abilities. Another solution could be to set up “learning building sites” where willing sites host training workers who learn while working and are therefore duly paid
Companies do not have any interest in investing in the certification of personnel that could leave at any time, taking their certification with them			Since the certification is required for the individual and not the company, it could be charged to the worker but recognised on a wage basis by the employer
Firms do not invest in training			Companies must first of all be motive, and then new training procedures must be found like those described above, so that firms do not see training only as a cost, but as an opportunity to improve their performance and serve more customers. Other ways to “convince” the firms could be to insert the requirement of presenting the qualification of employees at the time of participation in public and private tender announcements. Recommendation to the institutions and banks to make training obligatory in the future.

The banks do not have special packages to finance training			Proposals could be made to finance the training undertaken by the firms, which would then request funding from the bank for their activities. This could be inserted in roadmap, but will not be an activity to develop within the partnership
Funding of public training without specific targets, and thus with uncertain results, waste and low quality courses			In the dialogue we hope to open with the ministries, regions and provinces, ESF measures in favour of workers already employed must be optimised
Taking into account the costs of non-training and poor quality			It would be interesting to propose a study on the costs of non-training and the problems linked to the low quality of the installations (these data may be available through the GSE - Electricity Service Manager). This cannot be done in BUS Italy, but can be highlighted in the roadmap
Under-use and low quality of the training funded by Fondimpresa			We could envisage collaboration with Fondimpresa to propose the joint development of the planning of courses on the energy efficiency of buildings and updating of workers. (outside BUS Italy)
Lack of harmonisation with respect to national contracts for the insertion of new professional figures and/or qualifications			It is important to involve the social partners in the campaign of endorsement of the roadmap and keep them informed on the progress of the activities

COMMUNICATION PROBLEMS

PROBLEM	ACTIVE PARTY	PASSIVE PARTY	SUGGESTIONS / SOLUTIONS
Lack of a sustainable building market			We believe that this problem is linked to the non-standardised application of the energy certification of buildings a throughout the country, producing the “merchandising of certificates” that provide no guarantees to the buyer
No clearly definition of the added value of low energy consumption buildings			A way should be found to justify the eventual higher cost with an effective reduction of consumption, and therefore with the introduction, for example, of a document on the payback time of the additional cost

Lack of interaction between local planning and technicians			The analysis of the status quo should also contain local data of the regions in order to have mapping that more closely corresponds to local needs. It might be useful to involve the Chambers of Commerce
Public regulations that fail to reward virtuous professionals and enterprises			The Ministries and Regions that have shown interest for the BUS Italy project should be contacted/ interviewed, as provided in the project, in order to understand how to highlight the professional skills
The public does not always perceive the added value of the enhanced efficiency of buildings			The new directive on the energy efficiency of buildings involves first of all efficiency in all the buildings of the central civil service, and then the regional and local offices, therefore the mentality should change in the coming months
Linguistic difficulty			Two problems were highlighted: one involving the different interpretation of the terms used and the other on the number of foreigner workers (above all Poles and Romanians, but not only) present in our country, and who therefore did not know Italian. On the first point, the idea is to produce a glossary of terms, also to be made available on site, starting from the one made for the Qualicert manual. For the second point, the idea could be to create multimedia products explaining more with images than text, the correct operations to undertake when working on the energy efficiency of buildings
Failure to comply with the requirement of issuing the user and maintenance booklet for the system			This was considered as an important element that must be taken into consideration in drawing up the roadmap to identify the parties that can make the use of this documentation compulsory
Lack of communication between the public and private sectors			The presence of the consumers' association, as subcontractor of Assital, will enable us to open this channel of communication

10. Conclusions

As shown in the ISFOL 2012 Report presented to Parliament, in recent years, investments in human capital have undergone a slowdown. While in some European countries the difficult economic situation has stimulated production, services and occupations with a high focus on knowledge, i.e. high added value, in Italy employment in the elementary professions has risen. In the last 5-year period, highly specialised jobs have fallen by 1.8%, against an average increase in Europe of 2%. A paradox in our country is that we have a low percentage of employment in the professions characterised by high skills (18% compared to 23% of the EU average) and at the same time these qualified jobs are only partly undertaken by workers with further education (53.6% compared to 70.6% of the EU average). All this has reduced the wage advantages of those with the highest education levels. On average, in Europe, the wages of workers with further education are 48.3% over those of workers with secondary education, while in Italy this value is 36.2%. In 2010, 49.2% of workers with university degrees and 26.3% of high school graduates occupied positions lower than their qualifications. Higher levels of under-qualified positions occur among young people with non-typical contacts (54% of university graduates).

While in the crises the system European production system has accelerated innovation processes in production, services and occupations with a greater focus on knowledge and skills, and thus with higher added value, Italy is doing the opposite. There is a trend to compete on costs, reduce investment in highly specialised jobs and increased poorly qualified employment, with the dampening of productivity and innovation.

In Italy it is advantageous to study, but less no than in the other European countries.

ISFOL has stressed that investment in continuing education is still advantageous from the employment point of view. Between 2007 and 2010, employment fell in Italy by 350,000 units. This is the result of a fall of about 850,000 people with maximum qualification being a middle school certificate or 3-year diploma, and an increase of over 500,000 in workers with medium to high educational qualifications. The number of people seeking employment increased by 596,000 units, with a change of about 40%, but the most penalised were people with lower educational qualifications (in 2011 the unemployment rate of university graduates was 5.4% compared to 10.4% for middle school certificate holders). However, also in this case there is a gap with Europe: since 2007 the employed with further education have increased in Italy by 10% while the EU average is 14% (Germany +17.8%, France +13.4%). While study and specialisation generally ensure better opportunities, in terms of wages and career, this is less true in Italy. Our unemployment rate for middle school certificate holders (10.4%) or high school graduate (7.5%) today is much higher with respect to university graduates (5.4%). However, compared to other European countries, there is in any case a gap: the unemployment rate of Italian university graduates increased in 2007-2011 by 1%, while in Germany it fell by 1.4%.

As for the education and training system, the ISFOL Report confirms the high rate of abandonment among young people in the 18-24 age group: 18.2% compared to 13.3% of the EU average. There is a higher number of high school graduates, but the spread of further education still shows low levels and growth rates under the European average.

High school graduates in 2011 accounted for 76.9% of the 20-24 age group compared to the European average of 79.3%, while the figure of 56.0% of high school graduates on the entire adult population is still far from the European average of 73.2%.

People with university degrees in 2011 in the 30-34 age group total 20.3% compared to 34.5% of the EU average, which has recorded an increase of 12.3 points since 2000 compared to 8.7% in Italy.

The skills of 15-year olds (survey OECD-PISA) showed an improvement in 2009 compared to 2006: the young people with lower levels of cognitive skills decreased both in language skills (from 26.4% to 21%) and in maths skills (from 32.8% to 20.6%).

It is hard to understand the excessively optimistic view taken by the ISFOL on the alleged relaunching of technical and vocational education and of regional education and vocational training compared to a very low increase of 0.4% in admissions to technical schools, a rate that is 1.5% for state vocational schools and 3-year regional courses, where the number of students has risen by 7 times in 7 years. This increase can also be seen as one of the effects of the crisis inducing families, increasingly uncertain about their future, to seek short, reassuring paths because these rapidly place young people in the job market; however, as shown by data in the Report, the market expels them equally fast in case of crisis or technological changes.

Advanced technical training is being implemented with the opening of 59 higher technical schools between September and December 2011, further education and technical training course rose from 200 courses in 2009/10 to 120 in 2010/11.

There has been a decrease in the number of apprentices and in adult training.

ISFOL data show a growing dislike for this instrument. Between 2008 and 2010, the average annual number of young people employed with an apprenticeship contract has fallen by over 100,000 units, recording a fall of 19% and now totalling 542,000 young people. Compared to trends in overall employment in the 15- 29 age group, rate of apprenticeship has been falling, from 16.1% in 2008 to 15.1% in 2010. At the same time, there is a higher average age of apprentices: apprentices aged under-18 decreased by more than half in the 3-year period considered (from about 17,000 to 7,500); and the 19-24 age group, still the largest one, has shown a decline.

With regard to adult training, Italy actually fell from 6.2% in 2010 to 5.8% in 2011, a percentage higher only than Greece; this shows that the enterprises have reacted to the crisis by further reducing investment in training.

The Report confirms that participation in training programmes is greater for the individual with a better education. The position in the profession is another highly important variable: managers, middle managers, entrepreneurs and professionals have participation rates double than those among workers, the self-employed, merchants and craftsmen. Most of the training initiatives (53.8%) take place solely during working hours, with a prevalence of compulsory types of training (safety, environmental protection and food monitoring) compared to technical and specialised courses.

According to ISFOL INDACO data, between 2005 and 2010 the percentage of firms with more than 9 workers that organised training initiatives rose from 32.2% to 45.1% but the European average is 60%. The increase in the number of enterprises that conduct training is almost solely due to the diffusion of compulsory courses for safety at the workplace. There has also been a fall in the average number of hours provided per participant. Italy's backwardness with respect to the other European countries can be explained by lower availability of public and private resources, and the low propensity, above all in small and micro enterprises but also by persons with low educational qualifications, to consider training as an investment. Considering the enterprises with more than 5 workers, the first phase of the economic crisis (2009-2010) led to a marked fall in investments, both on the production side (machinery technologies), and on the promotions side (marketing and advertising). With regard to investment in training, only 4.4% of the enterprises have decided to increase this item, while 27.9% have reduced expenses.

With regard to certification, the various barriers to the setting up of an Italian system, as reported by the stakeholders consulted in the first phase of the project, include the costs and non-obligatory nature of the certification process.

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13. Glossary

Certificate. Official document issued by a certification body showing the results achieved, the knowledge, know-how, abilities and/or skills at the end of an exam and convalidating with respect to a preset standard.

Certification Procedure by which an external entity provides written guarantees that a product, process or service is compliant with specific requisites.

ECVET A mechanism to facilitate the transfer and the capitalisation of the results of learning (knowledge, abilities and skills) of a person going from one learning context to another and/or from one qualification system to another. ECVET was designed for the entire system of vocational education and training, and allows for the awarding of credits in relation to learning paths, whether these involve formal or non-formal situations. It can be applied in a regional or national context (in the case of inter-regional mobility or mobility between formal and non-formal systems) and in case of bilateral or multilateral mobility.

It is likewise a method for the description of a qualification in terms of units of results of the learning with which the credit points are associated. In practice, in each regional or national context, the education/training qualifications or programmes can be divided into units or parts of units. A unit is defined within the ECVET as the smallest part of the training qualification or programme, and is result-oriented. The unit is the object of evaluation and can also be certified. Each unit likewise corresponds to a specific combination of knowledge, abilities and skills and can have a different type of measurement in accordance with the national education and training systems.

Provider of education or training Organisation or person offering services in the sector of education or training.

Exam Analysis of individual knowledge, experiences and abilities. A pass certificate is usually issued.

EQF "European Qualifications Framework" is a system allowing for the comparison of vocational qualifications of the citizens of the European countries. Since 14 February 2008, for every qualification issued in Europe, the corresponding EQF level can be identified, allowing for the comparison of the qualifications issued in various countries.

Certifying body A body issuing an official document (certificates, diplomas, titles or trademarks) formally certifying the knowledge, abilities and/or skills after a process of ascertainment and validation.

Education or training programme The set of activities, contents and/or methods to reach given targets for learning or training (acquiring knowledge, abilities and/or skills), structured according to logical sequence in a given period of time.

Qualification The formal result (certificate, diploma, title or trademark) issued by a process of ascertainment and validation, obtained when the certifying body determines that training results have been reached for a specific standard and/or that the person has the skills necessary to undertake a task in a certain area of employment,. A qualification is the official recognition of the validity of the results of the learning on the job market and in the education and training sector. In training, a qualification is the formal certification issued by an authority having jurisdiction upon the completion of a training path to certify that the student has acquired skills compatible with the standards established in the national educational system

BUILD UP Skills

The EU Sustainable Building Workforce Initiative in the field of energy efficiency and renewable energy

BUILD UP Skills is a strategic initiative under the Intelligent Energy Europe (IEE) programme to boost continuing or further education and training of craftsmen and other on-site construction workers and systems installers in the building sector. The final aim is to increase the number of qualified workers across Europe to deliver renovations offering a high energy performance as well as new, nearly zero-energy buildings. The initiative addresses skills in relation to energy efficiency and renewable energy in all types of buildings.

BUILD UP Skills has two phases:

- I. First, the objective is to set up national qualification platforms and roadmaps to successfully train the building workforce in order to meet the targets for 2020 and beyond.
- II. Based on these roadmaps, the second step is to facilitate the introduction of new and/or the upgrading of existing qualification and training schemes.

Throughout the whole duration of the initiative, regular exchange activities are organised at EU level to underline the European dimension of this important initiative and to foster the learning among countries.

The BUILD UP Skills Initiative contributes to the targets of two flagship initiatives of the Commission's 'Europe 2020' strategy — 'Resource-efficient Europe' and 'An Agenda for new skills and jobs'. It is part of the Commission's Energy Efficiency Action Plan 2011. It will also enhance interactions with the existing structures and funding instruments like the European Social Fund (ESF) and the Lifelong Learning Programme and will be based on the European Qualification Framework (EQF) and its learning outcome approach.