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PUBLIC FUNDING FOR GREEN ENERGY IN A CONTEXT OF CRISIS

Country report (Italy)

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1. Introduction

In the first decade of the new millennium, renewable energies emerged from the state of inferiority in which they had found themselves compared to fossil fuels, and thanks to the technologies and incentives that were available they saw a progressive increase both in production and end uses of energy.

Since the issuing of Legislative Decree no. 387 29.12.2003 (implementing EU Dir. 2001/77/EC), in line with the policies of the other European countries (EU15), Italy saw the establishment of a series of functional support schemes to incentivise and promote the use of renewable energies in the electricity, transport and heat sectors. As a result of these policies, over a few years, the production of renewable energy saw a rapid growth, until, in 2010, it covered 20.1% of total final energy consumption.

The evolution of this scenario took place against the background of the economic crisis that erupted in 2008. In Italy, in economic and employment terms (see Chapter 5.1) this crisis began to impact negatively from 2009 up to the present. During this period, a number of schemes that supported RES, which had been established in the years preceding the crisis, changed.

In the light of this scenario, the report examines the impact on the renewable energy sector of the financial and economic crisis that began in 2008.

The questions we asked are the following: “How has the economic crisis brought about changes to these support schemes?”; “In what terms have the evolution and change of the support schemes been linked to the development of the economic crisis?”; “How has public financing in support of RES changed?” Within this report we have sought to answer these questions.

Chapters 2 and 3 describe the current situation for the reader as regards renewable energy in Italy. In the light of the Italian energy scenario, Chapter 2 illustrates the framework within which RES are to be found and Chapter 3 focuses on the economic, employment and environmental aspects of renewable energies.

The next chapters describe the evolution and development of the different support schemes which were implemented before and after the crisis of 2008. The main support schemes in place in Italy in the early 2000s are illustrated in Chapter 4; the presentation of the different types of incentives is divided by sector (electricity, heat and transport) and within the chapter are illustrated the methods and funding bodies used, and their effectiveness in achieving the objectives set by the NAP.

Chapter 5 introduces the impact of the crisis on the Italian economy and, starting from this, illustrates the changes to support schemes that had been established in previous years. In this chapter, therefore, the reasons that led to these changes and the impact of the economic crisis are explained.

Chapter 6 presents the social debate that has accompanied this transitional phase from the point of view of the main social stakeholders involved: the business world, trade unions and government representatives.

On the basis of the evidence and the positions of the protagonists that emerge in the ongoing debate, the main strengths and weaknesses of the support schemes established for RES are summarised in the conclusions.

2. Renewable energy deployment

2.1 General energy data

In order to satisfy its energy needs, in comparison with other EU countries, Italy shows a greater vulnerability on the supply side, because of a higher dependence on fossil fuels (oil and gas), a reduced contribution of coal and the absence of electronuclear energy generation.

According to the MED[1], from 2000 to 2010, primary energy demand, after a peak consumption in 2005 of 197.8 MTOE, demonstrated a downward trend that reached its lowest point during 2009 with 180.3 MTOE. Then, thanks to a small economic recovery during 2010 (+1.3%) primary energy demand grew by 4.1%, compared to 2009, reaching 187.8 MTOE. This result is due to a significant increase in the supply of solid fuels (+14.2%), renewables (+13.3%) and gas (+6.5%); on the other hand, a reduction was recorded in oil (-1.5%) and in net electricity imports (-1.8%). The increase of primary energy demand shows a reversal of the downward trend in primary consumption recorded over the previous four years, even if the 2010 value is a long way from the maximum reached in 2005 (ENEA 2012:13).

The percentage composition of primary demand by energy sources highlights the peculiarity of Italy, the high use of oil and gas (over 83%), the structural import of electricity (about 5% in recent years), the reduced contribution of solid fuels and the absence of nuclear power (ibid.). The variation of the energy mix from 2000 to 2010 shows a tendency to reduce the use of oil (-21%), though this remains the main source used, in favour of gas (+17%) and a significant increase in the importance of renewable energies (+77%). In particular between 2007 and 2010 these energy sources showed a strong growth. (MED data). (Appendix: Figure 2.1).

The distribution of final uses by sector highlights the growing importance of the tertiary sector (with a share that rises from 30.3% in 2007 to 35.4% in 2010) and in transport (30.6%), while the industrial sector, whose share has been dropping over the past five years (-5%), accounts for 23.2% of final consumption. Agriculture, bunkering and non-energy uses (especially the petrochemical industry) consume the remaining 10.8%. (Appendix: Figure 2.2).

In 2010 the gross domestic energy consumption by source highlights the importance of oil (38.4%), followed by natural gas (36.6%). Renewable energies share represented 12.2% and electricity imports 5.2%. (Appendix: Figure 2. 3).

As regards energy efficiency, Italy is traditionally one of the OECD countries with the highest energy efficiency standards (Appendix: Figure 2.4). Primary energy intensity in 2010 was equal to 151.3 TOE/M€00 in comparison with the OCDE average. Between 1990 and 2005, this indicator, despite ups and downs, did not significantly change, while, between 2006 and 2009, it showed a continuous downward trend which indicated a marked decrease (-6%) as a result of a strong drop in primary energy demand (-8.8%) which was higher than the contraction in the GDP (-3.0%). The 2010 data recorded a turnaround, showing an increase in primary energy greater than that of the GDP and a consequent increase in primary energy (+1.4% compared to 2009) which led to an overall change of -5.8% in the period 1990-2010. (Appendix, figure 2.5). The final energy intensity trend is similar to the primary intensity one. 2010 saw a value of 114.6 TOE/M€ 001, with an increase of 2.3% compared to 2009, while the overall reduction in the period 1990-2010 was equal to 5.4%. Together with the primary intensity, the strong reduction in the final intensity, -6.2% between 2005 and 2009, was

[1] Ministry for Economic Development.

caused by a reduction in final consumption (-9.0%) which was much more marked than that of the GDP (-3.0%). (Appendix, figure 2.5).

In summary, between 1990 and 2010, Italy showed a reduction in energy intensity, both primary and final, with an average annual rate of reduction equal to 0.3% as regards primary energy intensity and 0.27% for the final one (Appendix: Table 2.1).

The cross-border interconnections that link Italy with surrounding countries for the import/export of gas and electric energy includes are of two types: interconnection lines (for the transport of electricity) and pipelines and LNG terminals (for gas). As regards oil, the transport of crude oil to Europe takes place directly by sea with oil tankers. Today, the National Transmission Grid is interconnected with five foreign countries through 16 lines: 8 connect Italy to Switzerland, 4 to France, 2 to Slovenia and 1 apiece to Austria and Greece. The connection between Italy and Greece consists of a continuous current cable designed for the import of 500 MW. It came into operation in July 2002. Currently there are four interconnections linking Italy to countries that export natural gas with a total capacity of 91.8 Gm3/year.

2.2 RE in electricity, heat and transport

From 2005 to 2010 the percentage of energy from renewable sources consumed in the total final consumption doubled. In particular, the consumption of electricity from RES represents the greatest share in comparison with the other sectors, reaching 20.1% of final energy consumption in 2010. The heat and transport sectors are those in which the consumption of renewable energy is lower, reaching respectively in 2010: 9.5% for energy from heat and 4.8% for transport. In 2010 the overall share of RES in final energy consumption was 10.1%. As we shall see in Chapters 4 and 5, the reasons for these variations are due to the differences in the targets fixed for each sector in the national plans and incentive support schemes used. (Appendix: Tables 4.5, 4.6, 4.7, 4.8).

2.3 Power capacity, production and technologies

As regards installed power capacity (the maximum output from power plants), Italy is technically self-sufficient; in 2011 the existing power plants were able to provide a maximum of net electrical power of 118 GW compared to a historical maximum demand of about 56.8 GW (the peak in summer 2007) during the hottest summer months. According to the 2010 data (when the maximum net power was equal to 106 GW) the estimated *average power available at the peak* was 69.3 GW (Terna 2011).

In terms of production and technology, the gross production of electricity from 2000 to 2011 increased from 276,629 GWh to 302,570 (+9). The largest increase occurred in production from wind/PV technologies which, in ten years, have gone from 569 GWh to 20,652 GWh in 2011, increasing by 87% in the last two years alone. Over ten years, geothermal technologies also increased by 20%, while the production from traditional plants slightly increased for thermoelectric, rising from 220,445 to 228,507 GWh (+4%), and slightly decreased - from 50,900 to 47,757 GWh - for hydropower (-6%). (Terna 2011) (Appendix: Figure 2.6).

Between 2000-2011 the power capacity installed in Italy has increased from 18,335 MW to 41,399 MW (Appendix: Figure 2.7). In particular, between 2010-2011 photovoltaic plants are doubled from 155,977 to 330,196 units, the installed capacity has tripled from 3,470 MW to 12,773 MW. Today, solar energy covers the 31% of power capacity installed by RE. Wind power plants has increased of 320 units reaching 1,122 MW. The bioenergy plants raising by 81%, but they are mainly small- medium plants (biogas or bioliquids). So the bioenergy power capacity installed has increased only of 20% (GSE).

3. Renewable energy sector

3.1 Economic aspects

The size of companies of renewable energy in Italy reflected the economic structural of the country with some big enterprise and a large presence of small-medium companies. For what regards the companies that produce renewable energy in Italy there are about 20 big companies (Enel, Sorgenia, Enimont, Endesa, etc…) and many M&S enterprises[2].

As shown in Chapter 2, in the last few years, Italy has started to change its mix of energy production with an increase in the use of renewable sources, in particular, wind and photovoltaic. As of today, however, the country has not, at least so far, matched the gradual adjustment to the demand for renewable energy with alterations in the mix of the productive offer of energy technologies (with results that can already be seen in the growing gap with European average shares of world exports of renewable energy technologies (Appendix: Figure 3.1). The most recent evidence shows a trend to *import* components for the production of energy from renewable sources which is above the average of the EU-15, and this tendency is accentuated in photovoltaic technologies. The data show a trend for a trade deficit in the photovoltaic sector with a much higher divergence with the EU-15 countries that reached its peak in 2010 with more than 11 billion in dollars at present rates. About a quarter of this deficit is due to the exchange with Germany (Figure 3.2). This aspect can be detected in the impact of RES on the GDP and employment at a national level. From the available data, we can see that Italy is among the lowest of the EU countries for the contribution of RES to the GDP and employment: <0.5% for the two indicators (Appendix: Figure 3.3). As we are going to see in the following chapters (4-5), the financial costs of incentives for RES fall on the user and are indicated by a specific item in electricity bills (A3).

In Italy there has been a heated debate about the impact of incentives for renewable energies on electricity prices. Renewable energies have been implicated as the main cause of rising energy prices. To clarify this issue, the AEEG (the Italian Electricity and Gas Authority) recently issued a statement entitled “Electricity: the transparent bill” (2012). This document deals with all the costs paid by Italian consumers. According to the AEEG the total annual cost to a “household user” with a consumption of 2700 kWh/year and a supply of 3kW amounts to 515 Euro. The cost of incentives for renewable energy in this expenditure amounts to 77.51 Euro/year (15.04%) which 67.3 Euro (86.9%) is attributable to renewable energy sources while the rest (13.1%) is due to other similar technologies.

3.2 Employment aspects

Judging from the literature and studies on employment (direct and indirect) and spill-over from the production of electricity from renewable sources, we can observe the following data[3]: according to research carried out by IRES-CGIL (January 2010) “green” employment in the renewable energy sector in Italy, including direct and indirect jobs, amounts to just over 100,000 employees. The most important sectors are: wind power with about 10,000 employees, solar/PV, with about 5,700, and the biomass

[2] The APER (Association Producers Renewable Energy in Italy) has 400 enterprise associated.

[3] The data on employment in the field of RES are subject to a high degree of uncertainty due to the lack of systematic and comparable statistics. The national and international institutions still today have failed to define the statistical categories to monitor the phenomenon, and to outline the salient traits of the border that defines the limit of the renewable energy sector.

sector with approximately 25,000 employees, while the rest of the green employment is distributed between geothermal, solar thermal, mini-hydro and other minor types of energy production from renewable energies which employ, directly and indirectly, about 50,000 workers. A study by IEFE-Bocconi University (2009) estimated that total employment in the field of RES electricity is about 170,000 workers.

Instead, as regards the photovoltaic sector, estimates are imprecise since they are not updated to include the recent explosion of growth of this sector that during 2011 led to the volumes of PV installed in Italy tripling: the most recent data (Energy Strategy Group of Milan Polytechnic) were published before the boom (early 2010), and recorded about 19,000 direct employees (including 8,000 installers and designers, around 2,200 producers of solar cells and modules, 4,000 manufacturers of inverters), which comes to 50,000 if we consider indirect employees. Because of the lack of updating, such data could be underestimated: the main associations in the sector, in April 2011, maintained there were more than 100,000 employees in the PV sector alone. (APER, Energy Without Lies Dossier 2011:46).

However, the growth prospects predict an expansion of these sectors together with related green jobs. From an analysis of the various studies carried by both national and international observatories, what emerges are interesting possibilities for development in renewable energies (Table 3.1), according to which, in the case of maximum achievement of opportunities, Italian gross employment in the renewable sector might reach 250,000, especially in the biomass, photovoltaic and wind power sectors in 2020.

The potential of renewable energies would have the effect of modifying the traditional sectors of energy production, with a net effect on total employment which is lower, although growing, than that which would be recorded in renewables. In this case, the datum ranges between 53,500 and 97,500 jobs in total (IRES 2010).

Table 3.1. Potential employment (gross and net)[4] in Italy in 2020

Employment	EmployRES	NEMESIS	ASTRA	CNEL-ISSI	GSE-IEFE	IRES
Wind	32,000	-	-	24,200	77,500	-
Photovoltaic	35,000	-	-	69,700	47,500	-
Biomass	91,000	-	-	-	100,000	-
Gross overall	210,000				250,000	200,000
Net overall(*)		97,500	67,500	75,700	-	53,500

Source: IRES elaboration

3.3 Environmental and others aspects

In 2010 the total estimate of the GHG emissions saved by the use of renewable energy sources was 61,431,068 (tCo2eq), of which: 46,195,825 from the use of renewables in the electricity sector; 13,257,410 from the use of renewables in heating and cooling and 1,977,833 from the use of renewables in transport (First Italian progress report on Directive 2009/28/EC :49)

As a consequence of the final reduction of energy consumption and the simultaneous increased growth in production from renewable sources in the two years considered, Italy recorded a surplus of 2.8 MTOE and 4.3 MTOE respectively for 2009 and 2010, compared to the minimum trajectory of reference indicated in Directive 2009/28/EC. On the basis of the data recorded in the last two years and the new growth targets in the photovoltaic sector, unlike what was foreseen in the National Action Plan of 2010, it is

[4] By net overall employment we mean the total of new employment in 2020, considering not only the gains but also the estimated loss of jobs following the application of the20-20-20 package.

estimated that the Italian surplus in the production of energy from renewable sources, albeit dropping from 2014 onwards, will remain positive until 2020.

Between 2000-2009 the dependence of the Italian energy system is unchanged (it is about 85%, EU-27 is about 53%). The oil dependence has remained stable but it is increased the dependence on natural gas. This situation shows that in Italy there is no direct correlation between the growth of renewable energy and reducing of energy dependence. The electricity production covers 35% of gross domestic consumption and the transport sector is highly dependent on oil (94%) and it covers the 64.1% of the final consumption of oil. (Appendix: Table 3.1, Figure 3.4).

4. Overview of available renewable energy support schemes before the crisis

4.1 Types of support schemes and relevant policy and legal framework

The main support schemes aimed at encouraging and promoting the use of renewable energies in Italy are divided into three categories.

- Support schemes to promote the use of RES in electricity production.
- Support schemes to promote the use of RES in the heating and cooling
- Support schemes to promote the use of renewable energy sources in the transport sector.

Over the last decade, a large amount of the legislature's attention has been focused above all on the promotion of RES in electricity production compared to other uses. In the following section we will deal with the main characteristics and the evolution of each of these in the time period that precedes the explosion of economic and financial crisis that began in the second half of 2008. We have taken into account the years from 2000 to the first half of 2008.

4.1.1 Support schemes to promote the use of RES in electricity production

The main incentive mechanisms used in Italy, at national level, for the production of electrical energy from renewable energy sources in the years 2000-2007 were based on four instruments:

- Green Certificates.
- All-Inclusive Tariff (for RES plant >1MW; 200KW for wind power)
- Energy Account
- CIP6[5]

The political framework of these schemes was provided by Legislative Decree no. 387 of 29.12.2003, with which in implementing EU Directive 2001/77/EC, the legislature set the groundwork for the definition of a framework of national policy as regards the production of electrical energy from renewable sources.
The most important points of this legislative framework include: obligations to produce electricity from RES (annual growth of 0.35% during the period 2004-2006 (Article 4); the rationalisation and simplification of authorisation procedures, indicating as being of public utility, urgent and not to be delayed, those works for the construction of power plants powered by renewable energy through single authorisation procedure (Article 12); the exclusion from the support schemes of the so-called "assimilated sources" which, in the past, had benefited from CIP6 system, which was the subject of a major dispute[6], and of the goods and products derived from the sort of processes aimed at energy production. Finally, it should be also noted that waste (including the not-

[5] Valid only for systems set up before1999. The CIP6, introduced with the CIP6/1992, incentivised energy produced in power plants using renewable and assimilated sources. Originally the CIP6 tariffs were assigned to plants that entered the list in the period 1992-1996: although there were numerous exceptions to this provision, the CIP 6 regime can now be considered extinct and therefore new plants fuelled by renewable sources, from as early as 1999, can no longer access it. (APER).

[6] The reason for the dispute regarding CIP6 lies in the fact that under the voice "assimilated sources" were included some power plants that did not use renewable energy (such as combined-cycle gas, gas recovery from refineries, waste-to-energy incinerators, etc), and in this way these plants were improperly incentivised. During the years 2000-2008, of a cost of purchasing energy of 36 billion euros, about 70% of assimilated sources, contributed to the total cost of the withdrawal of energy (estimates IEFE-Bocconi University).

biodegradable fraction and fuels derived from waste) are eligible for the regime reserved for renewable energy.
Table 4.1 shows the main characteristics for each in terms of duration, type of support (voluntary/mandatory), type of system and burden of funding.

Table 4.1 Support schemes for electrical RES 2000-2008

Green certificates	*All-inclusive tariff*	*Energy account*	CIP6
Type of scheme: feed-in tariff **Period of incentive**: 8 years (Legislative Decree 79/1999); 12 years (Legislative Decree 152/2006); 15 years (Law 244/2007). **System**: obligatory **Financial coverage**: directly on the parties responsible, P2 indirectly on the electricity bill; A3 on electricity bill)	**Type of scheme**: feed-in premium **Period of incentive**: 15 years **System**: voluntary **Financial coverage**: A3 on electricity bill	**Type of scheme**: feed-in premium **Period of incentive: 20** years (PV schemes); **System**: voluntary **Financial coverage**: A3 on electricity bill	**Type of scheme**: feed-in tariff **Period of incentive**: 8 years **System**: voluntary **Financial coverage**: A3 on electricity bill

Source: IRES

Green Certificates

The Green Certificates mechanism was introduced in 1999 by Legislative Decree 79/1999. It obliges the producers and importers of conventional energy[7] to include in their production and imports of conventional energy a percentage of energy from renewable sources starting from 1 January 2002. This percentage was initially set at 2%; Legislative Decree no. 387/2003 established a progressive annual increase of 0.35 percentage points during 2004-2006, up to 5.3% for 2010, with an annual increase of 0.75% until 2012. (GSE Guide to renewable energies: 11-12).

When companies did not produce this compulsory share of energy from renewable sources themselves, they could fulfil the requirement by purchasing from third parties an equivalent number of certificates attesting to renewable production[8]. These certificates are Green Certificates (GC), which are issued to the owners of IAFR qualified plants that entered service after 1 April 1999 as a result of new construction, reactivation, renovation or improvement.

The size of each Green Certificate, issued by the GSE, initially set at 100 MWh, was gradually lowered: first to 50MWh with Law no. 239 of 23/8/2004 and then to 1 MWh of renewable energy product (2008 Financial Act). The period of recognition for Green Certificates, initially set at 8 years, was first raised to 12 years (Legislative Decree no.152 of 3/4/2006) and then 15 years (Law 54/2007). GC are allocated on the basis of

[7] For entities who produce or import annually more than 100 GWh from conventional energy sources, net of shared generation, self-consumption and exports, to be entered into the national grid.
[8] Trading in GC between buyers (subjects who are obliged to) and sellers (producers of RES) takes places in an organised market ("The GC Exchange") or bilaterally with agreements recorded on a bilateral platform, with the assistance of the Electricity Market Commission (GME) for the organisation and management of the exchange system and the registration of the bilateral transactions.

net energy produced by the plant (EA)[9]. However, the net energy generated does not always directly constitute the term of reference for the calculation of the number of green certificates due. There are different types of interventions on plant (new building, reactivation, expansion, total or partial rebuilding) which grant the right to obtain the incentivisation of all or a part of the electricity produced. (GSE, Guide to renewable energy: 12-13).

In the 2008 the Financial Act introduced substantial changes to this scheme to the benefit of plants that came into use after 31/12/2007. There are two main new features of the green certificates:

- the incentive period is increased to 15 years;
- the number of green certificates attributed to the energy produced is varied according to the renewable source (see Table 4.2).

In addition, a new incentive scheme was introduced for the exclusive benefit of the smaller plants which can be joined as an alternative to the Green Certificates system. These plants have the right to opt for withdrawal tariffs for energy put into the grid, differentiated by source, and again for a period of 15 years. Because of the incentive component as well as that of selling electrical energy this tariff is called “all-inclusive”.

All-inclusive tariff

The “all-inclusive tariff” incentive system, as an alternative to Green Certificates, can be requested by IAFR electrical power plants of less than 1 MW (200 kW for wind turbines), which entered into operation after 1 January 2008. The prerequisite for having access to the All-Inclusive Tariff is the signing of an agreement with the GSE. The All-Inclusive Tariff remunerates for energy transferred into the network (and not for energy produced, as is the case with Green Certificates): the values of the tariffs are fixed according to law and vary according to the source (Law 244/07 and subsequent amendments, see table 4.3[10]). While Green Certificates are recognised on the basis of net energy produced (EA), the all-inclusive tariffs are recognised in relation only to net energy fed into the grid (ER). (GSE Guide to renewable sources: 18). They cannot be used in conjunction with other incentives with the exception of agricultural and agro-forestry enterprises that use biogas, biomass and vegetable oils.

Energy Account

In Italy the *Energy Account* was introduced by the EU Directive on renewable sources (Directive 2001/77/EC), implemented with the approval of Legislative Decree 387 of 2003.

This mechanism rewards with a feed-in premium tariff the total energy produced by photovoltaic schemes for a period of 20 years. It became operational with the entry into force of the implementing decrees passed by the Italian Government of 28 July 2005 and 6 February 2006 (First Energy Account), which introduced the system of funding electricity generation by a working account, replacing the previous unsecured government grants for the commissioning of plant.

[9] Net energy is the gross energy measured at the terminals of the generation units, reduced by the consumption of electricity by the ancillary services, losses in transformers and line losses to the point of the delivery of electricity to the grid with the obligation of third-party connection.

[10] The vegetable oils indicated in row 6 of Table 3.4 should be derived from crops and transformation processes carried out entirely inside the territory of the European Union. On 31/03/2010 the Minister of Agriculture, Food and Forestry issued a circular explaining the traceability system for pure vegetable oils (GSE, Guide to renewable sources: 20).

With the Ministerial Decree of 19 February 2007, the so-called Second Energy Account, the MED set new criteria to incentivise electricity production from photovoltaic schemes that had entered operation before 31 December 2010. The main changes introduced by the Second *Energy Account* include the application of incentive tariffs on all the energy produced and not only on the energy produced and consumed in situ (onsite exchange), the simplification of the bureaucratic procedures to obtain the incentive tariffs and the differentiation of tariffs based on the type of architectural integration (not integrated, partially integrated, architecturally integrated) as well as the size of the plant. In addition a premium was introduced for photovoltaic plant linked to the efficient use of energy. The upper limit for incentives for nominal cumulative power went from 500 to 1200 MW.

The incentive tariffs were reduced in proportion to the power of energy plants and they increased with their level of architectural integration (see Table 4.4). From a minimum of 0.36€Kwh (for P>20 not integrated) to a maximum of €0.49 for 1≤P≤3kwh integrated). With the Second Energy Account Italy underwent a rapid growth in terms of plants built and installed capacity of solar PV, quickly closing the gap on other European countries.

Finally, it is important to underline the role of the GSE (Energy Services Management) in Italy. Until 31 December 2007, the entity authorised to withdraw the electrical energy was the grid company the plant was connected to. From 1 January 2008, the GSE became the only intermediary entity at national level for the regulation of electrical energy fed into the grid. Therefore, the GSE's task is to manage materially and economically the energy fed into the grid from photovoltaic plants.

4.1.2 Support schemes to promote the use of RES in the heating and cooling sectors

The main operative mechanisms at national level which, also indirectly, promote the use of renewable sources for heating are energy efficiency certificates and tax deductions.

The White Certificates mechanism[11] is based on the obligation for gas and/or electricity distribution companies with more than 50,000 final customers to reach a pre-established annual energy-saving target. The electricity and gas distribution companies can fulfil their obligations by carrying out interventions, which grant the right to White Certificates, directly with end-users. Alternatively, rather than carrying out interventions themselves, the “obliged parties” can acquire the certificates on the market organised by the GME or through bilateral contracts from “voluntary parties” consisting of: energy service companies (also known as ESCOs), distributors of electricity and gas with fewer than 50,000 final customers, public companies and authorities with energy managers. The voluntary parties carry out energy-saving interventions with final customers and sell the White Certificates obtained to obliged parties.
To obtain White Certificates, obliged and non-obliged parties must carry out activities which allow the attainment of a minimum threshold of energy saving. The total savings

[11] White Certificates (energy efficiency certificates) are negotiable certificates which certify the energy savings of the users in the final energy uses. The White Certificates mechanism has as its legal basis the Ministerial Decree of 24 April 2001, the Ministerial Decree of 20 July 2004 and the Ministerial Decree of 21 December 2007. With respect to what is described in the National Action Plan, the White Certificates mechanism was updated and amended with the entry into force of Legislative Decree no. 28 of 3 March 2011 (which transposed Directive 28) and AEEG Resolution no. EEN 9/11 of 27 October 2011 (Guidelines for the preparation and evaluation of projects pursuant to Article 5(1) of the Ministerial Decree of 20 July 2004 as amended, and for definition of the criteria and methods for the issue of the Energy Efficiency Certificates, which replace the previous guidelines laid down in AEEG Resolution 103/03 of 18 September 2003).

achieved is verified by the Electricity and Gas Authority (AEEG) by use of three different evaluation methods: standardised, analytical and final (First Report Italy: 18-19). The possible interventions which can be performed giving right to White Certificates also include some types of technology which use renewable sources in the heating and cooling sector[12].

Solar-thermal energy plants, high-efficiency heat pumps, low-enthalpy geothermal systems and biomass heat generators have access to a wider incentive mechanism for energy savings in the building sector, through tax deductions. This is a voluntary mechanism which allows the possibility of deducting from IRPEF (income tax) or IRE (corporate tax), 55% of the costs incurred for certain energy efficiency upgrading interventions on existing buildings. The deductions must be spread over 10 years. Tax relief for energy-saving interventions is covered within central government's annual and multi-year budget. The scheme has been in force since 2007[13]introduce.

4.1.3 Support schemes to promote the use of renewable energy sources in the transport sector.

For the promotion of the use of bio-fuels for transport, national legislation provides the obligation to release for consumption a share of bio-fuels in relation to the amount of fuel released for consumption the previous year. This obligation[14] falls on fuel providers who released petrol and diesel for transport for consumption in the previous year.

The obligations for release for consumption are respectively: 1%, 2% and 3% during the years 2007, 2008 and 2009. With the decree of 25 January 2010, the obligatory share was increased respectively by 3,5%, 4%, 4,5% for the years 2010-2012. Legislative Decree no. 28/2011 reinforced this system, providing for the minimum share, calculated on the basis of calorific value, to reach 5% by the end of 2014. The target can be reached by using bio-diesel, bio-ethanol and its derivatives, ETBE and bio-hydrogen, in accordance with the maximum mixable thresholds.

4.2 Expenditures for promoting RE deployment: total volume of resources and by type of technology

As regards the total volume of resources spent and used in the promotion of RES in Italy it has to be underlined that the burden of funding falls largely on the electricity consumer (item A3 on bills). This system has led to a debate on the fairness of the choice of how to cover the financing: household bills *versus* general taxation. Therefore, in this case, rather than speaking of expenditure, it is appropriate to speak of costs that fall on the electricity consumer[15]. Of the support schemes mentioned the following impact directly on electricity bills: GC, All-In Tariff, Energy Account and CIP6.

[12] Use of solar collectors for production of domestic hot water; installation of aerothermal heat pumps instead of boilers in newly constructed or renovated residential buildings; application in the non-industrial sector of small CHP units for heating and cooling and production of domestic hot water; application in the non-industrial sector of district heating and cooling systems and production of domestic hot water; installation of centralised systems for heating and cooling of non-industrial building; installation of electrical heat pumps for the production of domestic hot water in new and existing systems (First Italian progress report on Directive 2009/28/EC: 20).

[13] following its introduction in paragraphs 344, 345, 346 and 347 of Article 1 of Law no. 296/2006 (2007 Financial Law).

[14] The legal basis for the obligation is contained in Law by Decree no. 2 of 10 January 2006, converted, with amendments, by Law no. 81 of 11 March 2006.

[15] There are also tax incentives (Tax Deduction mechanism) and direct subsidies (Kyoto Fund) that are not paid by final consumers. By notice of the Ministry for the Environment, in November 2011 access was unfrozen to the Kyoto Rotation fund provided by Law No 244/2007 for a total amount of financing of EUR

The Energy Account and All-in Tariff are paid directly by the users while the GC are paid by the electricity companies who are obliged to buy them on the market when they do not produce the share foreseen in the rules. However the producers may transfer this burden on to the price of energy production so the cost falls indirectly on to the consumer (item PE[16]). Moreover, when the GSE intervenes in the market by buying unsold GC it draws on the A3 item in the electricity bill. For each support mechanism we illustrate the volume of resources made available, bearing in mind that, excluding solar photovoltaic, it is not possible to disaggregate the data by technologies and that as regards GC it is not possible to directly associate the amount of incentivised electricity in a given year with the related costs. The reason for this is that the GC issued each year are valid for the next three years.

As regards the GC since 2002, the year that saw the first GC transactions on the market, until 2006, there has been an excess demand on the market due to the limited development of renewable sources. Since 2008, with the growth in the production of energy from RES, this trend was reversed, with a marked oversupply that has characterised the markets: thus it was necessary to introducer a mechanism for containing the fall of prices, consisting in the GSE withdrawing these GC unsold on the market at an administered price. According to an elaboration and estimate by APER on the basis of GSE data, in 2010 the GC mechanism incentivised the production of about 18 TWh of electricity at a cost of nearly €1.5 billion: just under half of these are due to the withdrawal system (then finding financial cover in the A3 items on household bills), while the other half is covered by the market (and therefore by energy prices). By 2016, the last year in which the GC system will produce cash outflows for the financial system, wholly traceable to the withdrawal system, the estimated cost is equivalent to less than 1.56 billion euros, for about 23 TWh of incentivised renewable production.

As regards the first 4 Energy Accounts, the one that had the biggest impact for Italians on the annual cost of electricity bills was the second at almost 3.2 billion euros annually. Today this support scheme, with 14,007,110 KW of incentivised power with a cumulative annual cost that has exceeded 6 billion euros, has been the one that generally led to the greatest burden on the Italian taxpayer, starting a debate about the fairness of the burden of covering the financial expenditure (see table 4.5). Overall in 2016, the year in which will be maximised the efforts to incentivise PV, spending will be about €6.8 billion, with a level of instalment slightly higher than 23,000 MW (APER based on GSE data).

As regards the All-Inclusive Tariff plants in 2010, the AEEG estimates the net cost for the system at about €212 million, for a quantity of electricity equal to 1.2 TWh produced by 543 plants whose total power is about 280 MW. Considering that the mechanism will only be accessible for plants entering into operation by 31 December 2012, it can be foreseen that the peak cost of the mechanism of the All-Inclusive Tariff will be relatively modest: in 2012 (the peak year) an APER estimate forecasts a cost of approximately €400 million for the incentivisation of approximately 3.5 TWh of energy produced in small plants.

Finally, mention must be made of the CIP6 mechanisms. The quantities of electricity withdrawn in the context of CIP6 conventions from “assimilated sources” are typically much higher than those from RES. Almost all CIP6 conventions related to “assimilated sources” and not renewable ones: only at the start of the new millennium did we witness an increase in energy from RES produced in this programme, set at a percentage of about 20% of the total energy produced by the plants (APER, Energia senza bugie: 6). In 2011, the CIP6 scheme incentivised about 6 TWh of annual

3.5 million for 2011. The notice is addressed to central government, regions, local authorities, public health agencies, universities and national research bodies. The figure allocated is destined for co financing of up to 90% of some interventions related to RES.

[16] Wholesale energy price.

production from RES, compared with a total of 36 TWh: the associated cost is equivalent to about €700 million per year, slightly less than 50% of the total cost of the mechanism (ibid.: 7).

Adding together the GC, All-Inclusive Tariffs, the first two Energy Accounts and CIP6, in 2008 the cost of the incentive instruments for electricity produced from RES is calculated at about €1.6 billion (AEEG data). In 2012 it reached €9.4 billion of which 8.7 are covered by the A3 item (ibid.). While in 2008 the CIP6 support schemes, followed by GC, were the major cost, in 2012 more than half of the expenditure was absorbed by the Energy Account (AEEG: Report on the state of use, 52).

4.3 Effectiveness evaluation in terms of meeting the renewable energy targets (current and past national plans and European 2020 targets)

What effect has these support schemes had on achieving energy targets? The **National Action Plan**, foreseen by Directive 2009/28/EC of the European Parliament and Council, of 23 April 2009, on the promotion of the use of energy from renewable sources, is the planning document that provides detailed guidelines about the actions to undertake to achieve these targets. As regards Italy, by 2020 the obligatory target established is to cover **17%** of its gross national final consumption with energy produced from renewable sources.

The NAP for renewable energy was transmitted by the Italian Government to the European Commission on 28 July 2010. According to the plan, the objective has to be achieved through the use of energy produced from renewable sources in the following sectors: **Electricity**, **Heating** - **Cooling** and **Transport**. By 2020, Italy will have to meet 17% of its total final energy consumption with renewable sources - of which 26.39% in the electricity sector, 17.09% in heating/cooling and 10.14% in transport. In addition to setting sectorial targets for 2020, the NAP also describes the foreseeable trajectories of the increase of the use of renewable energy in each sector between 2010 and 2020. To evaluate the effectiveness of the measures taken we need to look at the situation in 2010 with regard to each incentivised technology and sector.

As regards technologies: solar PV compared to an expected 2.505MWh saw a gross production of 3470 MWh (GSE). It is important to highlight how among all the RES technologies, in 2011, solar PV has anticipated the objectives established in the NAP by 9 years for 8000MWh of energy produced in 2020. The great leap forward took place in 2011 with a growth of plants that more than doubled compared to the previous year and by a power that went from the 3,470 MW installed in 2010 to 12,773 MW in 2011. Wind power in 2010 had 5214.3 MW installed compared to an expected 5800; bio-energies (biomass, biogas and bio-fuels) 2,351.5 MW compared to an expected 1,918 MW; geothermal 772 MW compared to an expected 774; hydraulics 17,786 compared to an expected 16,580.

As regards the sectors: in 2010 they all showed an advance on the expected trajectory. The overall percentage of renewables was: +0.6%. Of these +3.2% was from renewable energy from heating/cooling, +1.5% from electricity and +1.3% from transport.

In the light of this data, the main difference regards the MTOE to reach into 2020. While the electricity and transport sector are much closer to the level of consumption established for 2020 (-1.9 MTOE for electricity, -1,8MTOE for transport), the thermal sector (heating/cooling) has a greater gap (-5 MTOE)[17]. Overall, to achieve the goal of 21.5 MTOE of total consumption of RES at 2010 we are at -8.6 MTOE.

[17] In 2010 the expected trajectory is advanced for all sectors. However the consumption of MTOE for reaching the 2020 targets according to PAN is different for each sector: thermal sector (heating/cooling)

To close this gap, in Italy the role of biomass (as a fuel for electricity generation, thermal production and the production of bio-fuels) is the most important in the context of renewable sources. In fact, over 50% of the theoretical maximum potential development of renewable sources is linked to biomass and, therefore, their development is the most critical for the achievement of the European target defined in the Green Package. Nevertheless, until today the attention of incentive schemes has been directed more towards other renewable sources such as solar photovoltaic or wind power, although these, while deserving, brings a more modest added domestic value, since they are characterised by a production based on the import of components.

In conclusion, the state of the share of RES of total energy consumption in recent years has led to a debate about the wisdom of maintaining or not the incentive mechanisms activated in the 2000s. This discussion has affected some of the changes in these schemes, contributing to the reduction of the incentives on the one hand and changing priorities within each system (transport, heat, electricity). The economic and financial crisis that has hit Italy since 2009 has provided the framework to these changes. In the next chapter we will see how much the economic crisis has affected these changes.

from 5497ktoe in 2010 have to reach 10.456ktoe in 2020; electricity sector from 5925 in 2010 have to reach 8504ktoe in 2020 and transport sector from 1688ktoe in 2010 have to reach 2530ktoe in 2020.
For further information on the evolution of production compared to the objectives see SIMERI http://approfondimenti.gse.it/approfondimenti/Simeri/Pagine/default.aspx. SIMERI is the Italian system for the statistical monitoring of renewable energies: electricity, heating-cooling and transport. It allows the tracing of the evolution of demand satisfied with renewable sources through interactive “panels”. The document section allows the consultation of all the informative references. SIMERI allows the monitoring of the state of the achievement of the national objective of 17% in 2020 imposed by EU Directive 28/2009.

5. The effects of the economic crisis on financing RE

5.1 General description of the economic crisis in the national economy: industrial production, energy supply, energy consumption, unemployment.

The economic crisis that erupted in the second half of 2008 had its most negative impact in Italy in 2009. During this year, the index of industrial production in Italy fell by 17.2% compared to the previous year, reaching a value of 85.4, well below the EU27 average (see Table 5.1 and 5.2.). From 2010 there was a slow recovery until 2012, when the index again showed a negative performance. The industrial sectors that were most affected by the crisis in 2009 were: capital goods and intermediate goods (-25.1%) and durable consumer goods (-18.3%). In a general negative trend which again involved all the main sectors, these were the ones that were most affected by the recession in January 2012 (see Table 5.3).

In employment terms, this trend led to a gradual increase in the unemployment rate, which rose from 6.7% in 2008 to 7.8% in 2009 up to 10.9% in the first quarter of 2012 (ISTAT). (see Table 5.4)

As regards domestic energy production and consumption, the big recession of 2009 was accompanied by a collapse in demand compared to 2008 (-5.7%) and a slight increase in production (2.1%), supported exclusively by renewable energies.
In 2010 there was a slight recovery that saw a significant reawakening of the energy sector. Although we cannot speak of a true revival, this recovery involved almost all sources of energy and business sectors to a greater or lesser extent. Primary energy production increased by 11.8% over the previous year, mainly due to the large increase in the production of renewable energy and oil (respectively 21.1 MTOE and 5.08 MTOE of a total 33.9 MTOE), while the increase in gas production was much less.
The performance of the main energy indicators for the last seven years is apparently encouraging for the future security of energy supply in Italy. After the maximum value reached in 2005, primary energy demand is decreasing or at least seemed to have stabilised even before the economic crisis of 2008-2009. Despite the substantial reduction in domestic production of fossil fuels, the production of primary energy is continuously increasing thanks to the increase of renewable sources. (AEER, relazione annuale sullo stato dei servizi e sull'attività svolta, 2011: 27)

Finally, in 2011, domestic production grew by 4.4% compared to 2010, reaching 35.4 MTOE: an increase of 18% compared to the average of the previous five years, although it represents only 19% of primary energy demand.
The total production of fossil fuels increased slightly, but this increase was concentrated in renewable sources, which increased by 6.1% over the previous year. As regards the production from RES the majority of the growth occurred in the photovoltaic sector, up more than five-fold from the previous year (compared to 3% in 2010), and such as to cover 13% of generation from renewable sources. Much more contained, although still appreciable, appears the development of geothermal and wind energy, both recorded at more than 5%. (AEER, relazione annuale sullo stato dei servizi e sull'attività svolta, 2012: 31).
In summary we see that in the face of a continued decline in primary energy demand energy production in recent years has seen a significant increase in renewable energy (+76% in 2011 compared to 2005), with a particularly sharp rise in the post-crisis period. This increase was accompanied by a strong decrease in energy production from produced or imported fossil fuels (respectively -23% and -12% in 2011 compared to 2005).
In conclusion, it has to be underlined how the relationship between low Italian GDP growth (annual maximum negative value of -5.2 in 2009) and the decline in primary energy demand does not always reflect the performance of the economy or energy

saving, but includes other variables such as the effect of the mild climate, both in winter and summer, which reduced energy consumption for domestic use. In contrast, the end uses for industry were the only ones from 2009 to have seen a strong decline in demand due to a low index of industrial production after the crisis (AEEG, Relazione sullo Stato dei Servizi 2012: 31).

5.2 The impact of the crisis in the RE sector between 2008-2012: changes in support schemes, decrease/increase in resources, the consequences in current and planned funding (employment effects due to the recession)

As in many European countries, partly because of the financial crisis, in Italy, a rethinking is underway regarding national policies on renewable energy sources.
From 2010, faced with the support schemes available (see Chapter 4) and the recession described above (see 5.1), there has been a change to the main support schemes implemented and a decrease in the incentives offered.
The impact of the economic crisis in these changes is questionable (as noted in 4.3): as early as 2010, the incidence of the production of renewable energy on total energy consumption, particularly electricity, underwent a rapid growth that ended up very close to the targets[18]. It went from 16% of gross domestic consumption of electrical RES in 2008 to 24% in 2011.

This situation, combined with the reduction in costs, which is leading towards a grid parity scenario in PV, led in 2010 to a debate beginning on the abandoning of the system of incentives established and how to achieve this.
It should also be underlined that the attempt - which lasted from 2008 to June 2011 - to reintroduce the production of nuclear energy in Italy helped to extend for a period the indecision and uncertainty about the financial resources to be allocated to RES.

Today a new transitional phase has begun which, while still continuing to incentivise the production of renewable energy in different sectors, has led to a reduction in incentives available and changes in some of the support schemes that had distinguished the production of electricity throughout the previous decade. What are the main changes?

The framework that set the new strategy is outlined in Ministerial Decree 06/07/2012. In this decree it was held that in order to pursue objectives in the field of renewable energy sources, greater attention should be paid to the heat and transport sectors and energy efficiency, which are, on average, economically more efficient.
The mix of renewable energies (electrical, thermal and energy efficiency) for the future will have to foster technologies that are more advantageous in terms of:

1. a lower unit cost;
2. a stronger impact on the country's economic sector;
3. a lower impact on the environment and electric grids.

Within the electricity sector, taking into account the higher volumes of energy production already achieved (as well as the change in the nuclear scenario), there is an aim to redefine a new target for the development of the mix of productive capacity in 2020 which has to be taken into account in defining a **National Energy Strategy (NES)** which takes the place of the NAP.
According to the decree, the need to balance the mix of sources, times and costs of upgrading the network, will lead to a redefinition of the new target of electricity from

[18] The electricity sector in Italy is ahead in terms of the objectives, since the installed capacity at the end of 2011 is capable of ensuring a production of about 94 TWh/year, compared to the production objective of 100 TWh/year foreseen for 2020.

renewable sources by 2020, which may be equal to **32-35% of total electricity consumption.**

5.2.1 Support schemes to promote the use of RES in electricity production

Electrical non-PV RES: from the GC to the feed-in premium system

One of the main changes in the support schemes for renewable electricity is the replacement of the means of financial support to non-photovoltaic RES carried out in the previous decade with the GC system.
According to the new decree to guarantee a greater predictability and sustainability in the cost of incentives, in addition to a reduction in incentives, it is necessary to introduce specific mechanisms to keep the volumes of development under control through:

- auctions for power plants with a potential of over 5 MW, with the exception of hydroelectric and geothermal plants, for which it is appropriate to raise the threshold respectively to 10 MW and 20 MW, considering the reduced number of plants with a potential of over 5 MW built annually, and therefore the difficulty is setting up truly competitive auctions;
- national registers for plants with a capacity exceeding the minimum thresholds differentiated by source and technology, with predefined maximum volumes for each year and technology, and with a selection based on criteria of priority.

As regards the renewable energies that are not PV, it was decided it was necessary to pass to a feed-in premium tariff, stimulating renewable energy producers to exploit the energy in the electricity market. This change after 2015 will result in the transition from GC to tariff, and the identification of a single incentive scheme for plants that came into operation after 1 January 2013. To ensure the profitability of investments made[19], it was decided to fix the level of fixed incentive at 78% of the reference price of Green Certificates.

New criteria were established with the new incentive system:

- the plants allowed to obtain incentives are all those fuelled by renewable sources other than solar photovoltaic, new, wholly rebuilt, re-activated, the object of interventions of enhancement or recovery, with power of not less than 1 kW and coming into operation after 31 December 2012.
- the maximum value of power to be supported by incentives is 5 MW for all RES with some exceptions[20];
- the maximum limit of cumulative nominal power for incentives during the years 2013-2015 is 31,445 MW;
- the value of the incentive tariffs to come into operation in 2013 is identified, by each source, type of plant and power class (see table 5.6);
- the incentive period is equivalent to the average useful life of the plant (average 20 years);
- the cumulative annual indicative spending for incentives is 5.8 billion;

[19] With specific attention to plants fuelled by biomass and for plants provided from redevelopment projects in the beet and sugar sector.
[20] a) hydroelectric sources for which the threshold is set at 10 MW of nominal power at connection; b) geothermal sources, for which the threshold is set at 20 MW.

- the nominal objective of power installed is to cover 32-35% of total electricity consumption in 2020.

The new decree will reduce revenues for almost all RES: from 10-15% less for onshore large-size wind power to -20% for solid biomass and -35% in the case of biogas. Finally, as regards the implementation of the functional measures to support the supply chain there are no novelties or incentives.

All-Inclusive Tariff

As regards the >1 MW plants that come into operation before 31 December 2012, the norms on the incentives remains those of the 2008 Financial Act. The incentivisation values have been updated by Law no. 99 of 23/07/2009 (see table 5.7)

Energy Account

From 2008 to 2012, with three successive Energy Accounts (2010, 2011 and 2012) new criteria were established to incentivise the production of photovoltaic plants (Table 4.4). While the third was more than anything a regulating of the previous Energy Account from 2011, the fourth and fifth Energy Accounts have greatly changed the previous regulatory framework, reducing the incentives provided and modifying the means to access them. These substantial changes are due to the fact that because of the second Energy Account, in the course of 2010, Italy had already reached and exceeded the installed capacity planned for 2016[21]. In the light of this and the significant decrease in the cost of photovoltaic components a debate began about how to manage the incentives market. Very briefly, the most salient changes are as follows:

Among the main changes introduced by the third Energy Account (Ministerial Decree 06/08/2010) is the reclassification of incentives into two types of installation: “on building” and “other plants”. To these there are added another three categories: photovoltaic schemes integrated with innovative features; concentrations of photovoltaic schemes and plants with innovative technological features. The incentive tariffs are higher in schemes installed on existing buildings and they decrease with the growth of the power of the plants. This aspect will remain constant in the following Energy Accounts as well. As regards photovoltaic plants that entered into operation by August 31 2011, it goes from a minimum of 0.275 euroKwh (for P>5000 for other plants) to a maximum of 0.391 euroKwh (for 1≤P≤3kwh for installations on buildings).

The fourth Energy Account (Ministerial Decree 05/05/2011) introduces some new features for plants that came into service between 31/05/2011 and 31/12/2016: the distinction between large and small plants, limits for access to tariffs and the obligation to register in registers for large plants. From 2011 to 2012 the limits of annual cost as regards large photovoltaic plants are €580 million (between 01/06/2011 and 31/12/2912 (with an indicative target of 2,690 MW power). The indicative target of installed capacity at national level has also been changed, raising it to 23,000 MW by 31 December 2016. Again for plants that began operating in August 2011, the tariffs range goes from a minimum of 0.251 euroKwh (for P>5000 for other plants) to a maximum of 0.379 euroKwh for 1≤P≤3kwh for installations on buildings.

After a year, as a result of this legislation, photovoltaic power installed in Italy has reached 13,308 MW, at an annual cost in incentives of €5.7 billion. According to what was foreseen in the decree of the third Energy Account, on the achievement of the indicative cumulative annual cost for incentives of 6.7 billion euros, it will be necessary

[21] Among the objectives of the Second Energy Account was that of reaching 4,000MW in 2016. At the end of 2010, the cumulative installed capacity had almost reached this threshold.

to legislate for a new Energy Account. The fifth Energy Account (DM 5 July 2012) came into operation on 27 August 2012. Although there has been strong opposition from many associations, it extends the requirement for inscription in the register to access incentives for all power plants, including those of smaller size (from 12kW), with a few exemptions[22]. Moreover, while the previous mechanisms paid all the electricity produced by the photovoltaic systems with a single tariff, in the fifth Energy Account there are two kinds of tariff: an all-inclusive tariff, which applies to the part of the electrical energy fed into the grid, and a tariff on self-consumption regarding electricity produced by photovoltaic panels and consumed onsite. The Decree sets a limit of €700 million of annual expenditure for incentives and the mechanism will cease to be applied after thirty days from the date of reaching of the cumulative indicative cost of 6.7 billion per year. The incentivisation tariffs for photovoltaic plants that came into operation in the first half of 2012 go from a minimum of 0.37 euroKwh (for P>5000 with a tariff premium for energy consumed onsite) to a maximum of 0.208 euroKwh for 1≤P≤3kwh for the All-Inclusive Tariff.

As we can see, after the economic and financial crisis, the main changes made by the Energy Account were dictated in part by the excellent results achieved by the previous support schemes and in part because of an attempt of the legislature to not burden consumers during a recession in terms of costs on their electricity bill. This last reason is questionable (see Chapter 3.1.) The ways in which these changes have been introduced faced severe criticism from industry sectors (APER) who, while not against a phase of switch-off to emerge from the incentive scheme, were very critical about the impact on the economy and employment that this may lead to.

The incentive mechanism for thermodynamic solar energy plants regulated by the Ministerial Decree of 11 April 2008 remunerates the electricity produced by a thermodynamic solar energy system with appropriate fixed rates for a period of 25 years. In the case of hybrid schemes, i.e., supplied both by solar and other sources, only the electricity deriving from solar sources is eligible for incentives with Energy Account rates. In order to have access to the incentives, the systems must be connected to the electricity grid and comply with set technical requirements (minimum capitation areas, heat accumulation, etc). The incentivisation tariffs are variable on the basis of the “solar fraction” system, i.e., the portion of electricity produced which is attributable to the solar source: systems with a higher “solar fraction” are accorded higher rates. Systems which enter into operation by the end of 2012 will receive the rates indicated in the table 5.7. The rates applied to schemes which enter into operation in 2013 and 2014 will be reduced by 2% each year (once obtained, they remain constant for the 25 years of the incentive scheme)[23].

5.2.2 Support schemes to promote the use of RES in the heating and cooling sectors

The support schemes activated in the pre-crisis period (see 4.2.2) have been retained. The only change had to do with interventions that might benefit from the tax deduction for renovations and installations of renewable energy plant by 55%.

[22] The power plants exempted are those between 12 and 20 kW which accept receiving an incentivisation tariff 20% lower and those up to 50 kW for replacing asbestos. Also exempt from registration are integrated photovoltaic systems with innovative features (up to a cumulative indicative cost of 50 million euros), those in concentrations (again with ceiling of 50 million) and those on buildings and land of the public administration (if built after a public tender and here as well with a spending ceiling of 50 million euros).

[23] The Ministerial Decree of 11 April 2008 provides that, on request, the GSE may perform a preventive check of the plan of the system; six such requests have been made as of today (of which 1 in 2010). No solar thermodynamic energy plant has however requested access to the incentives system.

With Law no. 220 of 13/12/2010 the tax deductions of 55% have been extended until the end of 2011 and no changes were made to the technical requirements. However, it increased the number of years for the tax deduction (5 to 10).

As regards interventions that concern the installation of solar thermal plants, for people installing a biomass stove or boiler or a heat exchanger to tie in to a heating network fuelled by biomass, as a result of the recent financial manoeuvres (Law no. 111 of 15 July 2011 and law no. 148 of 14 September 2011), it was determined that the amount of annual deductions due to the beneficiaries of the benefits could be reduced by 5% in 2012 and 20% from 2013. This cut will not be made if, by 30 September 2012, tax and welfare reform measures that restrict government spending are adopted. Because of the advanced state of RES for heating compared to the target of 2020, this hypothesis has led to a number of criticisms. Through the *"Salva Italia Decree"* of the Monti Government (Law no. 214 of 22 December 2011) the validity of the bonus of 55% under the same conditions was extended until December 31, 2012 (later extended to June 31, 2013, Development Decree) and added to the interventions that can enjoy the benefits the replacement of conventional water heaters with those that use a heat pump used for the production of domestic hot water (DHW).

The future strategy is to pay greater attention to renewables for heating than in the past. The lack of attention to the new "support schemes for renewable energy in heating and cooling" has also been highlighted by the EU. Brussels has urged Italy to quickly adopt these dispositions and also for "clarity on the continuation of the support schemes for energy-efficiency projects and the definition of the objectives for 2020 of the system of White Certificates". The novelty being worked on as regards achieving these goals is the introduction of a Renewable Energy Account for heating renewals. Although this law was expected by the end of September 2011 it has not yet been implemented. At the moment the government is working on a draft project through consultation with associations from the sector. In the draft of the most recent Decree (06.06.2012) we can see how as regards solar heating, biomass boilers and heat pumps and heat-pump water heaters the new "Thermal Energy Account" will be valid for both individuals (who also benefit from tax deductions for interventions of energy restructuring) and for public administrations. It is expected there will be a fixed incentive for a defined number of years depending on the size of the plant and according to different classes. While, as regards other technologies such as biomass boilers and heat pumps, the incentive will also modulate according to the climate zone of installation. Other aspects being considered are a closed number for incentives. The annual spending limit being considered is €700 million.

5.2.3 Support schemes to promote the use of renewable energy sources in the transport sector.

The schemes remain the same, with a progressive increase in the obligatory proportion for placing bio-diesel and bio-fuels in the mixture. The last determination of the obligatory proportion was in Ministerial Decree 25/01/2010. The percentage share of bio-fuels is expected to increase to reach 5% by 2014. Since 2012 bio-fuels (and bio-liquids) will be incentivised only if they respect the sustainability criteria established at European level (Directive 2009/28/EC and Directive 2009/30/EC). Sustainability criteria are used to distinguish those bio-fuels that can demonstrate a high environmental and social value, because they are produced by reducing overall emissions of carbon dioxide, respecting the land and avoiding any impact on agricultural products for food production. (GSE)

5.3 The future of the RE sector by 2020. The effects on 2020 targets (RE, energy efficiency and CO2 emissions, employment...).

What have been the effects of the support schemes for renewables on the targets of 2020?

As regards the fulfilment of the objectives in relation to electricity consumption defined by the 2010 NAP the considerations are the same as those made in Chapter 4.3.

With regard to the measures aimed at improving energy efficiency indicated in the second Action Plan for Energy Efficiency (APEE 2011), compared to the indicative objective energy saving of 9% indicated by Directive 2006/32/EC, the first National Action Plan for Energy Efficiency (APEE) planned to reach a slightly higher target (9.6% energy savings in 2016) compared to that provided by the Commission through overall savings of 35,658 GWh/year in 2010 and 126,327 GWh/year in 2016. Of these, 56,830 GWh/year (approximately 45% of the total) relate to the residential sector and 24,700 GWh/year (19.5% of the total) to the services sector.

A survey carried out by ENEA on energy savings achieved as of 31 December 2010 indicates that the target for 2010 has been fully achieved (more than 30% compared to the estimated 35,658 GWh/year). More than 82% of the total savings achieved up to 2010 are derived from two instruments: minimum energy performance standards and the mechanism for the recognition of certificates of energy efficiency[24], with a roughly equivalent contribution.

As regards CO2 emissions, in 2009, as a result of the economic crisis, Italy, with 491 Mt CO2-eq of emissions took a significant step to reaching the target of 485 Mt of emissions as the average in the 2008-2012 period indicated by the Kyoto Protocol. Of these, 407 Mt CO2-eq are derived from the energy system (UNFCCC submission 2011). However, the future scenarios developed by ENEA[25] show how these trends should be considered temporary in the absence of interventions, policies and investments capable of inducing a structural change in the energy system. The *Scenario a Politiche Correnti* paints a picture of the country capable of leading the energy system towards a more environmentally sustainable path, with a trend in emission decrease for at least the next 15 years.

From the point of view of employment, among the countries that have made most use of incentive policies for the development of renewables, Italy is the one that demonstrates the greatest contradictions. The extraordinary growth of energy demand in the photovoltaic sector has led to a dramatic deterioration in the trade deficit for technologies for renewable energy. Despite the economic crisis, 2010 saw the worst result: more that 11 billion in dollars at present rates of which about a quarter is due to the exchange with Germany (ENEA, Rapporto Energia e Ambiente 2009-2010). The development of renewables in Italy did not follow trends that in many ways were

[24] The interventions that have contributed most to the goal were: the installation of efficient heating in the residential sector, the adoption of minimum standards of energy performance of the building-plant complex in the tertiary sector, the installation of high-efficiency cogeneration plant, electric motors with high efficiency and heat recovery in the industrial sector, the eco-friendly renewal of fleets in the transport sector. (ENEA:2012).

[25] The *Reference Scenario* describes a development trend in the national system, in the absence of new measures of energy and environmental policy after 2009, assuming a substantial continuation of current trends in the fields of demographics, technology and the economy, and taking into account the effects of the recent economic crisis; the *Scenario a Politiche Correnti* analyses an evolution of the national energy system able to guarantee the achievement of the objectives set out in the recent national programmes in the field of energy, from the Plans of Action for Energy Efficiency (PAEE 2011) and for Renewable Energies (NAP 2010), to the Legislative Decree 28/2011 and Ministerial Decree of 5 May 2011. The *Scenario Roadmap* describes instead a development of the national energy system in line with the trajectory of CO2 emissions indicated by the "European Roadmap 2050 EU2713" (based on the goal of reducing emissions by at least 80% in 2050).

dissimilar to those observed on average in Europe, including the role that has been assigned to the introduction of incentives for developing the sector. Our country though did show a deficit in (public) research and in the ability to stimulate and sustain new industrial sectors. It is evident then the emergence in Italy of a new kind of foreign energy dependence, but one that is related to technology. The divergence between the Italian and European deficit in renewables technologies highlights the extreme fragility of the development of renewable energy in this country. The existence of a foreign constraint may limit the capacity for growth of the economy and, therefore, employment within it.

6. Social debate about renewable energies

6.1 Methodological note

In order to reconstruct and describe the public debate that involved the social players regarding the implementation of RES support schemes in Italy, field work was carried out, employing a research methodology of a qualitative sort, which was held to be the most suitable to achieve the objectives of the project.

The technique for gathering data is that of "in-depth interviews" with "privileged witnesses", that is with "[…] people who because of their position, or in terms of their knowledge of the problem (experts) or also as subjects within the population under study (opinion leaders, or reference points for a community) have a vision of the totality, which is direct and profound, of the phenomenon under analysis" (Corbetta, 1999: 420). In this specific case, the interviews were with representative members of the principal trade unions (two interviews), employers (one interview) and the government (one interview). As established by the Proposal Methodology of the project, the themes dealt with in the interview are the following: renewable energies: the situation today; support systems and financing; employment, quality of work and unionisation (only for the social parties) .

For the unions interviews were held with: Giuseppe D'Ercole of the Confederazione Italiana Sindacati dei Lavoratori (CISL) and Oriella Savoldi of the Confederazione Generale Italiana del Lavoro (CGIL). As regards the employers' organisations the interview was with Tommaso Campanile of Confederazione Nazionale dell'Artigianato e della piccola e media impresa (CNA). At the Ministry for Economic Development the interview was with Rosaria Fausta Romano, director general for nuclear energy, renewable energies and energy efficiency.

Table 6.1 Sources

	Social partners	Names	Role
Main Unions	Cgil (Confederazione generale italiana del lavoro)	Oriella Savoldi	Coordinator Department of the Environment and Territory
	CISL (Confederazione italiana sindacato lavoratori)	Giuseppe D'Ercole	In charge of the environment
Employers' organisations	CNA (Confederazione Nazionale dell'artigianato e della piccola e media impresa)	Tommaso Campanile	In charge of the Department of competitiveness and the environment
Government	Ministry for Economic Development	Rosaria Fausta Romano	Director general for nuclear energy, renewable energies and energy efficiency.

Here follow the opinions of the representatives of the social parties, subdivided by topics ("thematic areas") on the basis of the interviews carried out.

6.2 Renewable energies in Italy according to the social parties

The current situation and future prospects

As regards the opinions about the role of renewable energies in the production of energy and in the national energy mix, all the interviewees tend to consider RES a strategic asset for future energy mixes. The differences concern exclusively the national energy strategy to adopt and the temporal horizon of reference for any such strategy.

According to the labour organisations and employers, RES might be able to play a growing and strategic role in the energy production of the country, setting itself more ambitious objectives that those indicated in the European strategy of 20/20/20. given the excellent results achieved by the electricity sector, 8 years early with respect to what was foreseen, and according to all the interviewees greater attention should be dedicated today to thermal sources, efficiency and energy saving and to the integration of RES with the infrastructures for the transportation and distribution of energy.
This last position was emphasised above all by the employers, according to whom:

> The priority and non-negotiable objective for a sustainable energy strategy is that of the diffuse generation of energy, overcoming the logic of production through a few large traditional plants and aiming at the bringing together of the production site with that of consumption, through the realisation of micro and small plants, aiming at the efficiency and development of renewables and cogeneration (Campanile, CNA).

The integration of the electricity system with that of transport is also put forward by the current Minister for the Environment Clini according to whom, *"The excess in the electricity offer could be directed to support electric cars or scooters with the advantage that the price of electric cars would quickly become competitive (…)".*
According to the Ministry for Economic Development, also backed by Confindustria (the principal employers' organisation in Italy), the four priorities that form the framework of the future NES are: energy efficiency, the development of the South European gas hub, the sustainable development of renewable energies and the relaunch of a national production of hydrocarbons. From this point of view it is possible to see a greater role being assigned to hydrocarbons with the aim of reducing current energy dependency by 2020 from 82% to 65%.
As regards the opinions about economic development all the interviewees were in agreement that thanks to the incentivisation policies and despite the economic crisis, RES had been a driving force in a number of economic sectors, principally: installation, maintenance of plant and the building sector because of the interventions of energy rebuilding and redevelopment.

Support systems

As regards the support systems put in place, the interviewees (CNA, CGIL,CISL) agree that they have been useful for the growth of the incidence of RES in the national energy mix. Because of its support for non-renewable technologies the only support system that was criticised was the CIP6. In particular, the incentivisation instrument which in everyone's opinion most helped achieve the targets of energy production from RES was the Energy Account. While, on the one hand, there is a unanimous recognition of the decisive contribution of the support regimes adopted, on the other, a series of criticism are underlined. The weak points most mentioned are:

- not having linked the development of energy production to the industrial production of the components and products for the building of plant (CNA) and the creation of the supply chain (CISL) ;
- an excessive generosity in the incentives that favoured speculation to the advantage of owners of larger plants rather than smaller ones (CGIL, CNA) ;
- excessive bureaucracy to gain access to the system (CISL);
- the lack of attention to a system of incentives for thermal renewables (CGIL, CNA);
- the unfair financing system because of which the costs end up directly in the electricity bill rather than general taxation (CNA) ;

Opinions tend to diverge as regards the impact of the crisis.
According to the representatives of the unions and the employers, the economic crisis has not had too much influence in the change in support systems. All the same, the scenario of economic recession has been for the hydrocarbon lobby and a part of the government the “smoking gun” to start to debate the incentivisation system for RES and to compromise the development of a sector which had not felt the effects of the crisis.

> *The economic crisis has been used by the lobbies of the producers of energy with traditional combustible fuels to cripple the powerful thrust and great success renewables were enjoying in our country (D’Ercole CISL)*.

The economic crisis has begun a debate on the impact on the costs on families deriving from the incentives and on the wisdom of maintaining the current level of incentivisation for renewables. What has contributed to create alarm among the workers in the field is the absence of a national strategy in which can be seen in a clear and definite way the role of RES in the future energy scenario. The principal criticisms that the organisations in the sector direct at the government is not so much having aligned the incentives to the European average but rather of not having introduced “any real measure of simplification aimed at reducing the ‘extra costs’ borne by the sector because of the bureaucracy, and even introducing ulterior mechanisms such as the auctions, the annual contingents of power for the new plants and for the rebuilding of existing ones, the introduction of registers for small plants as well” (APER).
This position is not shared by the Ministry of Economic Development according to which, talking about the system of financing RES through bills, too much money belonging to families and businesses have not been made the most of, to carry out an operation that was too accelerated at prices that were too high with incentives that were much higher than those in other countries".

As regards the perception of the future of renewable energies, the government has announced it wants to unblock the means and resources to relaunch a sector that is considered strategic for the growth and relaunch of the country. According to what is outlined in the draft from the Ministry of the new NES with regard to the objectives taken in a European setting for 2020, it is deciding to go beyond 20% of the production of electrical energy from renewable sources, to arrive at 2020 at 23% of total consumption and at 38% of electrical. According to the MED, as regards renewables, the development of clean energy will have to be “sustainable”: that is, it will have to not impact excessively on the price of energy. To this end, therefore, there is talk of progressively reducing incentives and moving them from electrical to thermal, privileging the sources with a more important national supply chain. Overall, renewables are expected to attract investments of 70 billion between now and 2020
This position is greeted with scepticism by the interviewees on both the side of the unions and the employers.
According to the CISL:

> The game is on. In the sense that the conservative forces of the traditional system at the moment seem to have managed to listened to more by the government and that the great thrust that since 2009 until today has characterised the development of wind and photovoltaic in particular seems to have run out of steam.

This concern is also shared by the employers, according to whom:

> There is a serious danger of regression which might involve firing up old, obsolete, highly polluting plants to meet the increase in the demand for

> energy because of climatic issues, and also because of a possible economic recovery (Campanile, CNA)

According to the interviewees, the future of the instruments of incentivisation should be orientated in a medium-long term period policy that aims:

- at easy access to credit with the possibility of the partial exemption from taxes of the investment (CISL);
- at bureaucratic and administrative simplicity (CSIL),
- at a perspective of incentivisation for the whole RES supply chain (CGIL; CNA).

Employment

According to the Environment Minister Clini, the future of the world is being played out in the field of renewable energies and the green economy. The data supplied by the government estimates about 120,000 jobs in the sector between 2009 and 2012.
Through the points of view gathered the creation of new jobs and the defence of existing ones represent the common "denominator" through which the diverse positions of the interviewees are directed.
From estimates supplied by the CNA today there are about 85,000 national businesses involved in the renewables sector, in the role of small producers, installers and repairers, with about 200,000 jobs. According to Campanile (CNA) these numbers are destined to rise if renewables were to become a principal objective of our national energy strategy (CNA).
Other than the supply chain of the RES technologies, the energy infrastructures represent a new frontier for employment. According to D'Ercole:

> *New services and products will have to develop with reference to the production-consumption distributed and spread throughout the territory and therefore to the smart grids with all the apparatus and professional activities connected to these new services and products (CISL).*

Other than the numerical value, the CGIL underlines how the quality of the work has to be a fixed element of employment linked to renewable sources in particular and green jobs in general. The presence of dignified material and symbolic working conditions constitute a fixed element for employment and development in the sector. According to Savoldi:

> This is the essential condition to be able to talk of an economic relaunch. A productivity that grows through the worsening of working conditions or greater precariousness, focusing on the reduction of the cost of labour has no chance in terms of relaunching positive economic dynamics that will endure (CGIL).

The theme of the quality of the work and the level of unionisation among workers employed on the renewable energies sector was looked at further with the social partners. Both the representatives interviewed highlighted how the level of unionisation is fairly low, especially in the setting of small installation and maintenance companies. The reason is that these are generally companies with a low number of employees and therefore with less possibility to sign up to union organisations (Savoldi, D'Ercole). A decent level of unionisation can be found in particular in the production of panels and components for the photovoltaic sector. Overall in the renewables sector unionisation can be considered on average to be about 30-35% (D'Ercole).

The quality of work (in terms of salary, etc.) is very variable. According to the interviewees it goes from low levels of salary and professionalism involving a large part of the employees to higher level relating to more professional workers with higher pay.
This situation derives from a sector where there is a prevalence of small and very small companies and where the lack of the role of the union does not favour a redistribution of good opportunities in terms of salary and professionalism.
From what emerged in the interviews collective bargaining in the renewable energies sector does not exist. The reason for this is that the qualification and tasks of the employees are covered by existing collective contracts for the sectors they belong to. For example, installers and maintenance workers are regulated by the engineering workers' contract. Further, because of the reality of small and medium businesses in the sector there are many autonomous professional figures, either small companies or single freelance workers who have ongoing relationships with large companies (contractors, subcontractors or suppliers). These figures do not have any contractual protection and forms of social and contractual dumping are a risk they may encounter.
On the other hand, for consumers there is a lack of a professional certification that guarantees the professionalism of these figures. Disputes may arise between suppliers and consumers.
To resolve these issues, the representatives of the social parties interviewed propose adopting the following measures:

- defining social protocols between unions and business associations (artisans, small companies, including unregulated associations, etc.) to establish rules, directions and criteria to recognise the level of professionalism and the quality of the services of autonomous workers and their relationship with prices, as a form of protection for consumers. (Savoldi, CISL).
- determining procedures to resolve any disputes between supplier and consumer, also through the construction of paths of collective action on the part of the consumers, to the stipulation of insurance against damages (Savoldi, CISL).
- establishing a register of professional qualification that attests to the professionalism of workers and protects consumers. (D'Ercole, CGIL)
- regulating forms of fair pay in relation to the quality of the work, foreseeing the means, quantity and quality of payment in collective contracts in force for the commissioning companies (Savoldi, CISL).
- creating norms to avoid social and contractual dumping (Savoldi, CISL).

6.3 Social debate and point of view of social partners

To conclude, according to what emerged from the interviews it is possible to maintain that among the social parties there is a recognition of the inevitability of RES as one of the strategic assets of the strategies aimed at promoting competitiveness and economic development along with environmental and social sustainability.
One element of the debate is whether or not to place an annual ceiling on RES incentives and, if yes, towards which technologies (thermal, PV, non-renewable electricity, etc…)
At the level of future strategies, the only differences detected were among the positions of some exponents of the government on one side (MED) and the employers and unions on the other (CNA, CGIL, CISL). The former hope for a scenario in which the development of RES is accompanied by a relaunch of the production of hydrocarbons and energy efficiency, while the latter wish to promote a change to the overall system. According to this vision RES would have to be increasingly associated to the development of new energy, transport and housing infrastructures with the aim of promoting diffuse generation, decentralised energy production, cogeneration and energy saving. Future support systems will depend very much on the predominant vision.

7. Conclusions and key messages

Today, incentivisation policies for renewable energy are at a turning point. From what we have seen in the previous chapters (Chapters 4-5) the support schemes for renewable energy in Italy can be divided in two phases: the first one was characterised by powerful incentives, especially with regard to the electricity sector. In the years after their introduction the mix of instruments used led to a rapid surge in production and consumption of RES in final energy uses. The second one, which began in 2011, led to the redefinition of support schemes with the aim of reducing financial spending on incentives and achieving a reformulation of the incentivisation instruments in order to provide more support to the heat sector. After 10 years it is possible to say that the policies implemented for achieving the objectives established in the NAP have been effective. Now, the social debate is focused on the issue of whether or not to place a ceiling on the incentives and the number of installations to incentivise (see Chapter 5.2).
How has the economic crisis affected all this? In reality, very little. As we have seen, some of the main support instruments appeared between 2008 and 2010 (during the economic crisis). However, the scenario of crisis and recession was not irrelevant. According to the questionable arguments (Chapter 3.1) used by politicians who promoted these changes, the burden of financial support for renewable energy in times of economic crisis was becoming unsustainable for households. Moreover, general taxation eats up 48.9% of the average income of Italians. This last aspect has, for the moment, suspended the debate about shifting the system of economic incentives from users towards general taxation. In conclusion what are the strengths and weaknesses of the support schemes used? As regards the strengths there are:

- The effectiveness of the system of incentives used: principally, the excellent results achieved in terms of installed capacity in the electricity sector (15,008 MW in 08-2012 with a share of final consumption of 26,1%);
- The reduction of dependence on electricity from the hydrocarbons sector with a consequent reduction in emissions of CO2;
- The creation of green jobs linked to the renewables sector in a period of low economic growth and recession (about 120,000 in 2011 - MED data).

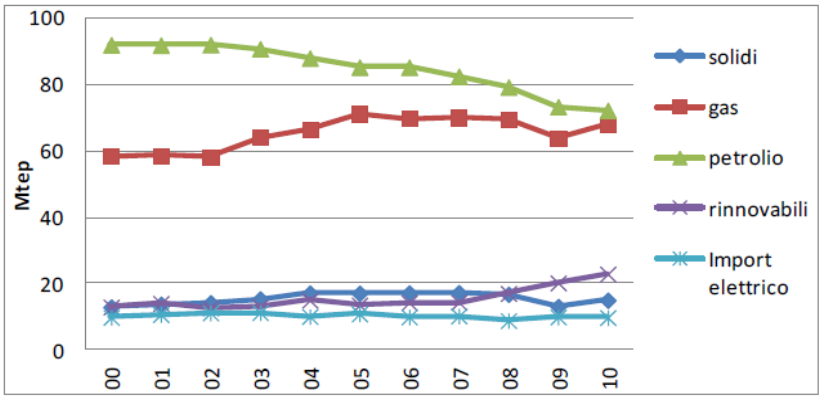
In the light of these, however, there are also some weaknesses due to:

- Uncertainty and the absence of a medium-long term strategy which would give investment certainty in all the areas involved (electricity, heat, transport, energy saving and efficiency) and that goes beyond current targets;
- An incomplete liberalisation in order to facilitate the exchange onsite for each type of plant, the direct sale of energy and the ability to create private networks;
- The delay in the development of a system of support for renewable energy in the heat sector, which still suffers from a strong foreign dependence for fossil fuel (especially gas);
- The lack of investment in distributed generation (smart grids, etc.) which is better suited to new technologies that make use of renewable energy.

Today the path of RES is not up for discussion. There is a new challenge for Italy as there was at the beginning of the new millennium. There is a necessity to move from a phase in which the RES play an “accessory” role (in a system focused on centralised production and fossil fuels) towards an “integrated system”. In this model, RES will rediscover their old role of being vectors of social, economic and productive innovation in the social and economic system and in which the advantages and benefits are increasingly distributed in a society that is fair, on the whole.

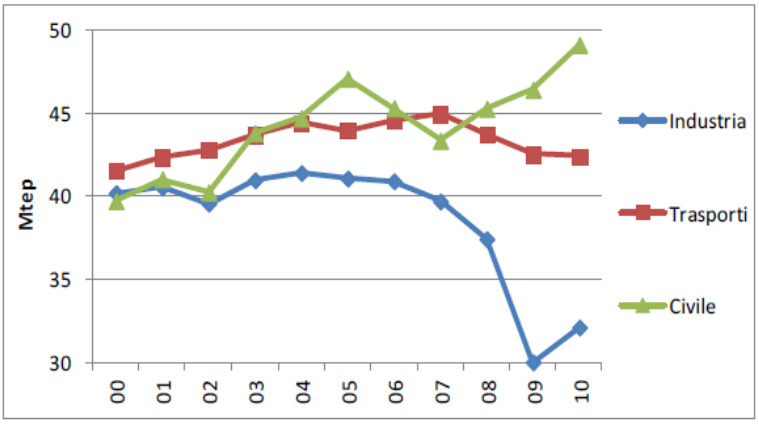
Annex

Figure 2.1 Gross domestic energy consumption by source and resource (Years 2000- 2010)



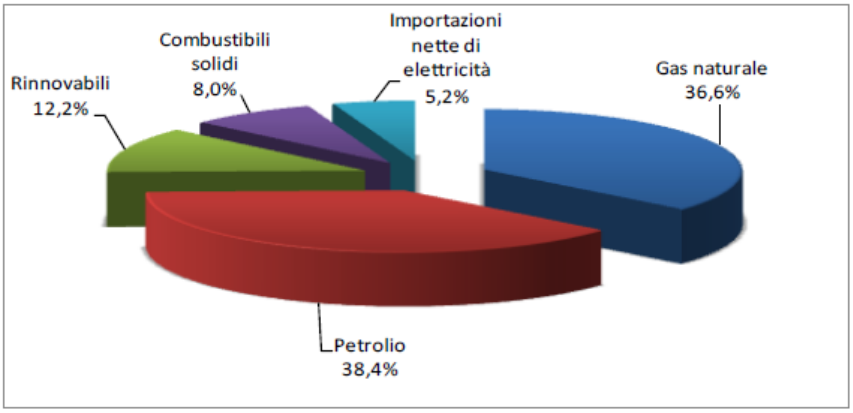
Source: ENEA on MSE data

Figure 2.2 Final use of energy by sector (Years 2000-2010)



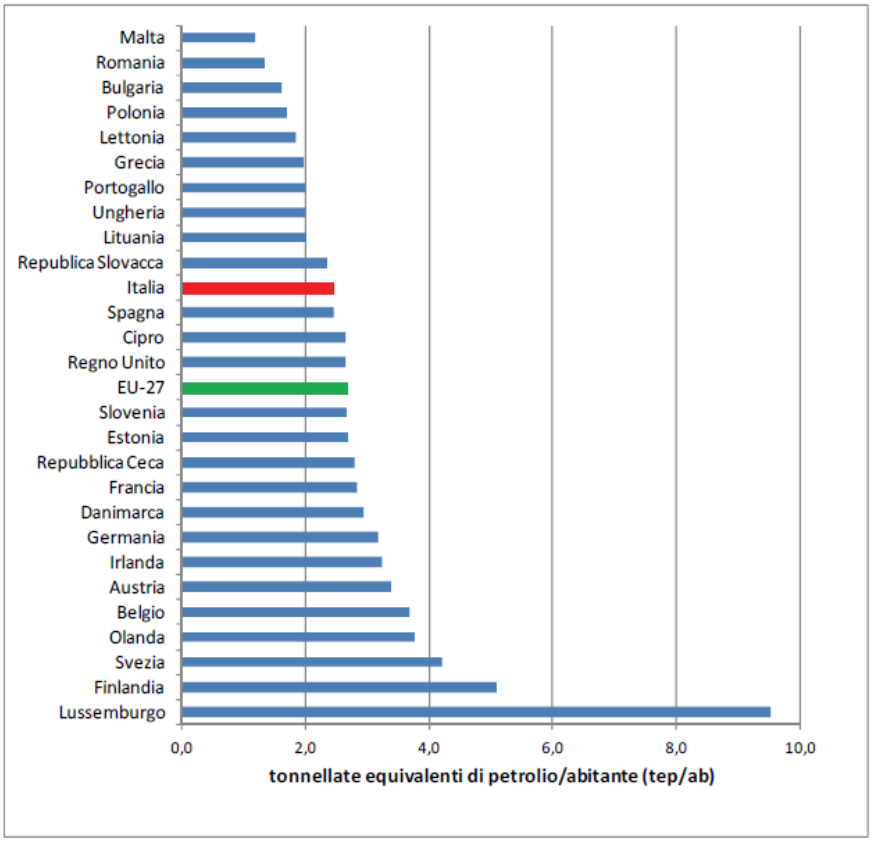
Source: ENEA on MSE data

Figure 2.3 Gross domestic energy consumption by source and resource (Years 2010)



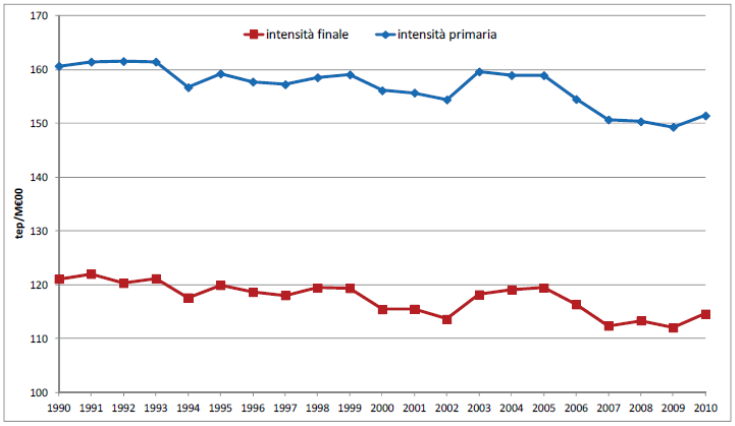
Source: ENEA on MSE data

Figure 2.4 Final energy consumption per capita (Years 2009)



Source: ENEA on Eurostat data

Figure 2.5 Energy intensity of the primary and final (Years 1990-2010) tepM / € 00



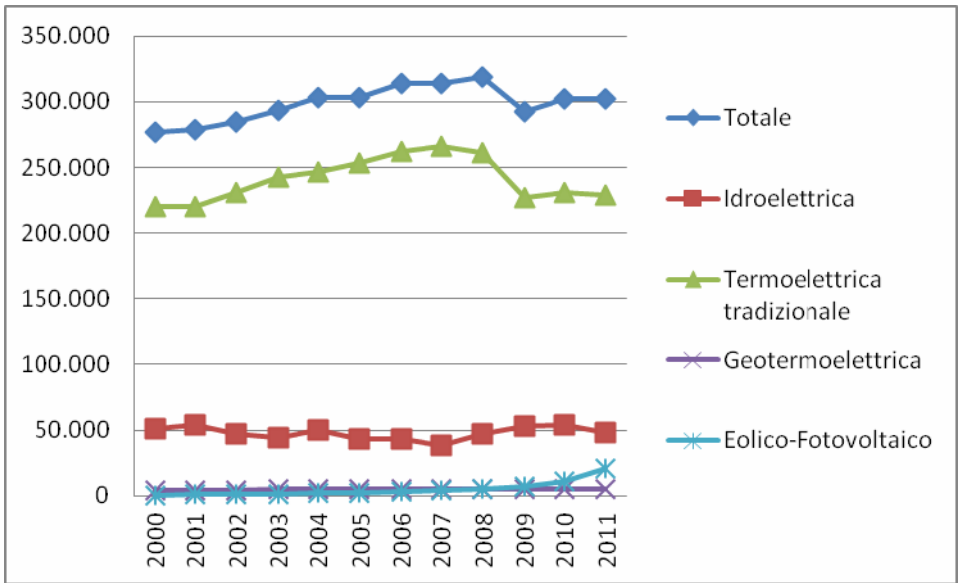
Source: ENEA on MSE data

Table 2.1 Changes in energy intensity primary and final energy intensity (% year)

	1990-2000	2000-2005	2005-2009	1990-2010
Primary intensity	**-0,29%**	**0,36%**	**-1,51%**	**-0,30%**
Finaly intensity	**-0,48%**	**0,69%**	**-1,55%**	**-0,27%**

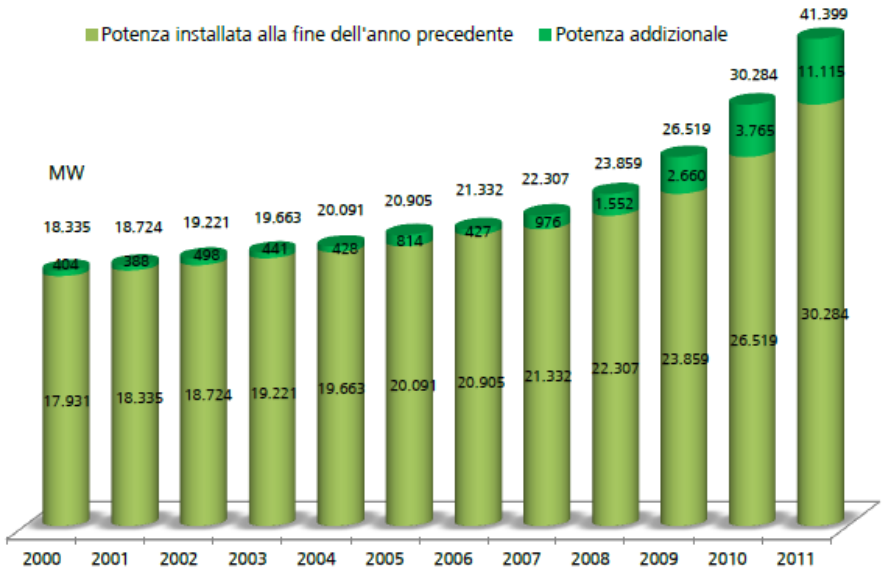
Source: ENEA

Figure 2.6 Gross Efficient Production of electrical schemes (historical series 2000-2011)



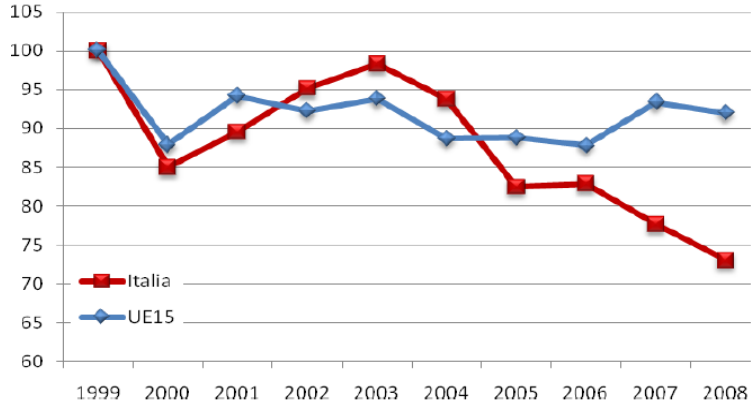
Source: IRES elaboration by TERNA data

Figure 2.7 Power capacity installed in Italy by RE



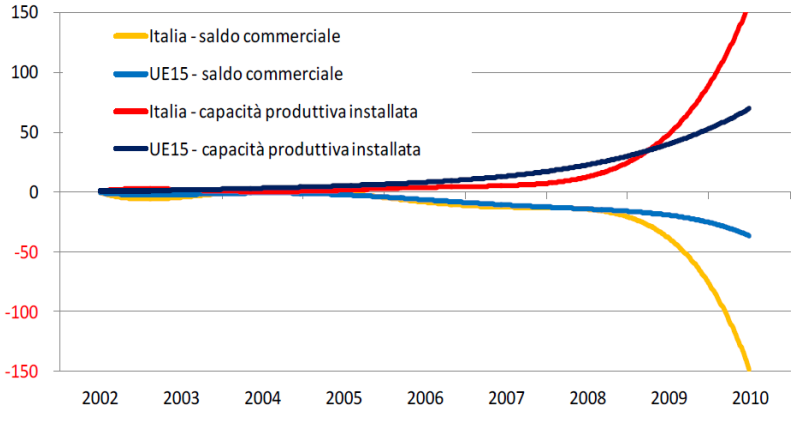
Source: GSE 2011

Figura 3.1. Dynamics of the share of world exports in renewable Energy Techologies: Italy-EU comparison (Years 1999-2008)



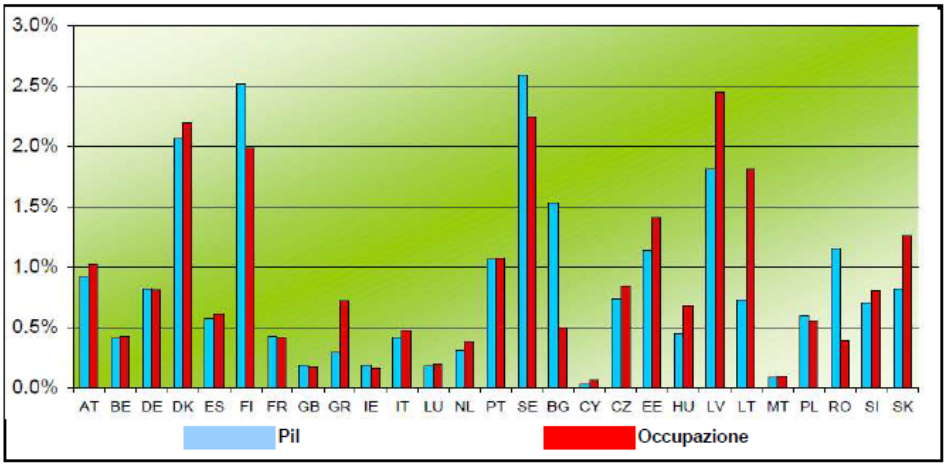
Source: ENEA by OCSE ITCS Database

Figure 3.2. Italy and the foreign bond generated by the development of photovoltaic (index 2002 = 0)



Source: ENEA elaboration by OECD ICTS EurOberv'ER data

Figure 3.3. The weight of RES in EU-27



Source: Commissione Europea Employres Final Report 2009

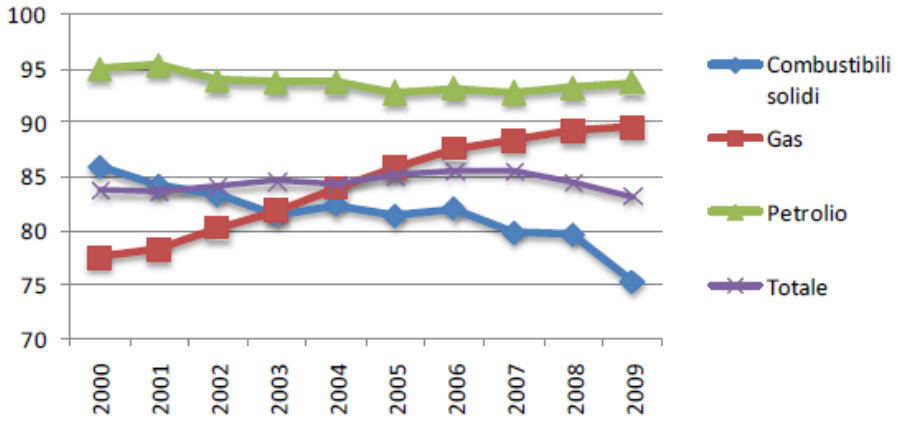
Table 3.1 Energy Dependence%*

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
EU (27 countries)	46,69	47,39	47,56	48,97	50,24	52,46	53,67	52,98	54,64	53,73	52,68
EU (25 countries)	47,22	47,85	48,08	49,53	50,7	53,05	54,3	53,49	55,28	54,52	53,44
Italy	86,54	83,29	85,98	83,93	84,73	84,41	87,01	85,09	85,31	82,75	83,78

Source:Eurostat

*** The indicator is calculated as net imports divided by the sum of gross inland energy consumption plus bunkers.**

Figure 3.4 Italy energy dependence by source/total (Years 2000-2009)



Source: ENEA on MSE data

Table 4.2 - Multiplicative coefficients for the calculation of the number of CV (Table extracted from Table 2 attached to the Finance Law 2008, as amended by Law 07.23.2009 n. 99).

Number L. 244/2007	Source	Coefficient K
1	On-shore wind turbins	1,00
1-bis	Off-shore wind turbins	1,50
3	Geothermal	0,90
4	Tide, wave, ocean	1,80
5	Hidroelectric	1,00
6	Biodegradable waste, biomass other than that in the following point	1,30
7	Biomass and biogas produced from agriculture, breeding and forestry activities, obtained within the scope of supply chain understandings, standard contracts or short supply chain.	1,80
8	Landfill gas and residue gas from sewage treatment processes, biogas other than those of the preceding point	0,80

Source: GSE

Table 4.3: Rates overarching recognized energy incentives (Law No. 99 of 23.07.2009).

Number L.244/2007	Source	Tariff [EUR/kWh]
1	Wind turbines for schemes smaller than 200 kW	0,30
3	Geothermal	0,20
4	Tide, wave, ocean	0,34
5	Hydroelectric other than in the preceding point	0,22
6	Biogas and biomass, excluding liquid biofuels with three exceptions (which are therefore notexcluded): - pure vegetable oils traceable by way of the integrated management and control system provided by Council Regulation (EC) No 73/2009 of 19 January 2009: - ethyl alcohol of agricultural origin from distillation of wine-making by-products; - butchery waste, by-products of agricultural, agro-foodstuffs and forestry activities (these are not considered liquids even when they undergo liquefaction treatment or mechanical extraction in the production sites of said waste and by-products or in the electricity conversion system).	0,28
8	Landfill gas, residue gas from sewage treatment processes and liquid biofuels with the exception of pure vegetable oils traceable by way of the integrated management and control system provided byCouncil Regulation (EC) No 73/2009 of 19 January 2009	0,18

Table 4.4 Energy Account: Support Schemes. Main features

Period	Maximum limit of cumulative nominal power for incentives	Tariff
1° Energy Account	100MW incremented to 500MW (annual limit) 60 Mw plants between >20kW; incremented to 360MW (between 20 e 50kW) and 40 Mw plants between 50kW and 1000 kW incremented to 140 MW	*O,445 €kWh (Distrect Exchange)* *O,445€kWh (cessione energia)per impianti >20kW* *0,460 €kwh* for plants between 20-50kW 0,490 € for plants between 50kW-1000 kW
2° Energy Account (plants that began operating after 13/04/07 and before 31-12-2008). *the law 129/10* plants that began operating until *30/06/2011 and finisched until 31/12/2010*	1200MW (Maximum cumulative limit)	System is not integrated Partially integrated system System with architectural integration From a minimum of 0,36euroKwh (for P>20 not integrated) to max to 0,49euro for 1≤P≤3kwh integrated) For plants that have been in service after 2008 curtailed of 2% Increased by 5% for systems with exchange of place; integrated systems or municipalities with> 5000 inhabitants
3° Energy Account For plants that have been in service after 31/12/2010 a result of work new construction, renovation or expansion total, belonging to four specific categories	3000mW for solar photovoltaic plants; 300MW photovoltaic plants integrated with innovative features; 200 MW concentrating photovoltaic plants; plants with innovative technological	**(valide per l'anno 2011)** **Photovoltaic** **Into 30 april 2011** From a minimum of 0,297euroKwh

	features	(perP>5000 other plants) to max of 0,42euro per 1≤P≤3kwh plant buildings) **Into 31 august 2011** From a minimum of 0,275 euroKwh (perP>5000 other plants) to max of 0,391euro per 1≤P≤3kwh plant buildings) **Into 31 december** From a minimum of 0,251euroKwh (perP>5000 other plants) to max of 0,380euro per 1≤P≤3kwh plant buildings) **photovoltaic plants integrated with innovative features** from 1 to 20 kwh: 0,44euro kWh between 20 -200 kwh: o,40euro kwh between 200< : 0,47kwh **photovoltaic concentration plants** from 1 to 200 kwh:0,37 between 200-1000kWh 0,32; between 1000 <: 0,28
4° Energy Account *From 31/05/2011 to 31/12/2016*	Limits annual cost of large photovoltaic plants from 2011 to 2012 Cost levels 580 million € (between 01/06/2011 - 31/12/2012 First and second half of 2012 indicative targets power 2690 MW	**Photovoltaic** **June 2011** From a minimum of 0,264euroKwh (perP>5000 other plants) to a max of 0,387euro for 1≤P≤3kwh plant buildings) **July 2011** From a minimum of 0,297euroKwh (perP>5000 other plants) to a max of 0,42euro for 1≤P≤3kwh plant buildings) **Augost 2011** From a minimum of 0,251euroKwh (perP>5000 other plants) to a max of 0,379euro for 1≤P≤3kwh plant buildings) **September 2011** From a minimum of 0,238euroKwh (perP>5000 other plants) to a max of 0,368euro for 1≤P≤3kwh plant buildings) **October 2011** From a minimum of 0,231euroKwh (perP>5000 other plants) to a max of 0,631euro for 1≤P≤3kwh impianti edifici) **November 2011** From a minimum of 0,212euroKwh (perP>5000 other plants) to a max of 0,345euro for 1≤P≤3kwh plant buildings) **December 2011** From a minimum of 0,172euroKwh (perP>5000 other plants) to a max of 0,298euro for 1≤P≤3kwh plant buildings) **integrated plants with innovative features** from 1 to 20 kwh:0,427 from 20 a 200kWh 0,388; from 200 <: 0,359 **photovoltaic concentration plants**

		from 1 to 200 kwh:0,359 from 200 to 1000kWh 0,310; from 1000 < 0,272
5° Energy Account		**photovoltaic schemes** (first half) From a minimum of 0.37 euroKwh (for P> 5000 premium rate consumed on-site) to a maximum of 0.208 € for 1 ≤ P ≤ 3kwh TO) (fifths semester) From a minimum of 0.17 euroKwh (for P> 5000 premium rate consumed on-site) to a maximum of 0.144 € for 1 ≤ P ≤ 3kwh TO) **integrated photovoltaic schemes with innovative features** (first half) between 1 - 20 kwh: 176TO/117T award between 20 - 200kWh 169TO, 109T award; between 200 <158TO, 98Taward (fifth semester) between 1 - 20 kwh: 288TO/186Taward between 20 - 200kWh 276TO,174Taward; between 200 < 255TO, 153Taward **photovoltaic concentration** (first half) between 1 - 200 kwh: 259TO;157 T award between 200 - 1000kWh 238TO;136 T award; between 1000 <: 205TO;103 T award (fifth semester) between 1 - 200 kwh: 157TO;97 T award between 200 - 1000kWh 146TO;87 T award; from 1000 <: 127TO;63 Taward *For all plants entering into operation next few quarters it apply a further reduction del15% per semester.*

Table 4.5 Results Incentive Energy Bill (07/09/2012)

	Normative	Power Plants in operation	*Power incentives (kW):*	*Annual cost (€):*
1° Energy Account	DM 28/07/2005 DM 06/02/2006	**5.729**	**163.447**	**95.168.309**
2° Energy Account	DM 19/02/2007	**203.810**	**6.812.344**	**3.281.458.040**
3° Energy Account	DM 6/8/2010	**38.544**	**1.546.799**	**641.623.808**
4° Energy Account	DM 5/5/2011	**186.189**	**6.716.535**	**2.237.646.969**
Total Energy Account		**434.272**	**15.239.125**	**6.255.897.126**

Source: GSE

	State of art				Target			
Year	Unit of Measure	CFL FER	CFL	National share (%)	Unit of Measure	CFL FER	CFL	National share (%)
2005	ktep	7.325	137.680	5,3				
2006	ktep	7.857	135.716	5,8				
2007	ktep	7.601	132.769	5,7				
2008	ktep	9.358	132.013	7,1				
2009	ktep	11.070	124.908	8,9				
2010	ktep	12.887	127.453	10,1	ktep	10.615	131.801	8,1
2011					ktep	11.406	131.925	8,6
2012					ktep	12.184	132.049	9,2
2013					ktep	13.031	132.174	9,9
2014					ktep	13.921	132.298	10,5
2015					ktep	14.882	132.422	11,2
2016					ktep	15.930	132.546	12,0
2017					ktep	17.085	132.670	12,9
2018					ktep	18.372	132.794	13,8
2019					ktep	20.109	132.918	15,1
2020					ktep	22.617	133.042	17,0

Table 4.6 State of art RES: Overall

Table 4.7 State of art RES: Electricty - E

	State of art				Target			
Year	Unit of Measure	CFL FER E	CFL E	FER E (%)	Unit of Measure	CFL FER E	CFL E	FER E (%)
2005	ktep	4.847	29.750	16,3				
2006	ktep	4.830	30.325	15,9				
2007	ktep	4.863	30.482	16,0				
2008	ktep	5.060	30.401	16,6				
2009	ktep	5.390	28.658	18,8				
2010	ktep	5.925	29.487	20,1	ktep	5.744	30.704	18,7
2011					ktep	6.038	30.856	19,6
2012					ktep	6.279	31.009	20,2
2013					ktep	6.541	31.161	21,0
2014					ktep	6.791	31.313	21,7
2015					ktep	7.045	31.465	22,4
2016					ktep	7.306	31.618	23,1
2017					ktep	7.576	31.770	23,8
2018					ktep	7.861	31.922	24,6
2019					ktep	8.167	32.075	25,5
2020					ktep	8.504	32.227	26,4

Table 4.8 State of art RES: Heating and Cooling - R&R

	State of art				Target			
Year	Unit of Measure	CFL FER R&R	CFL R&R	FER R&R (%)	Unit of Measure	CFL FER R&R	CFL R&R	FER R&R (%)
2005	ktep	2.299	64.910	**3,5**				
2006	ktep	2.828	61.756	**4,6**				
2007	ktep	2.557	58.285	**4,4**				
2008	ktep	3.575	58.508	**6,1**				
2009	ktep	4.500	54.883	**8,2**				
2010	ktep	5.497	58.119	**9,5**	ktep	3.851	58.976	**6,5**
2011					ktep	4.196	59.197	**7,1**
2012					ktep	4.583	59.418	**7,7**
2013					ktep	5.016	59.639	**8,4**
2014					ktep	5.506	59.860	**9,2**
2015					ktep	6.062	60.081	**10,1**
2016					ktep	6.698	60.301	**11,1**
2017					ktep	7.432	60.522	**12,3**
2018					ktep	8.283	60.743	**13,6**
2019					ktep	9.280	60.964	**15,2**
2020					ktep	10.456	61.185	**17,1**

Table 4.9 State of art RES: Transport - T

	State of art				Target			
Year	Unit of Measure	CFL FER T	CFL T	FER T (%)	Unit of Measure	CFL FER T	CFL T	FER T (%)
2005	ktep	338	39.037	**0,9**				
2006	ktep	373	39.362	**0,9**				
2007	ktep	344	39.384	**0,9**				
2008	ktep	918	37.664	**2,4**				
2009	ktep	1.388	36.211	**3,8**				
2010	ktep	1.688	35.100	**4,8**	ktep	1.295	37.054	**3,5**
2011					ktep	1.513	36.746	**4,1**
2012					ktep	1.719	36.438	**4,7**
2013					ktep	1.931	36.129	**5,3**
2014					ktep	2.143	35.821	**6,0**
2015					ktep	2.356	35.513	**6,6**
2016					ktep	2.570	35.205	**7,3**
2017					ktep	2.786	34.897	**8,0**
2018					ktep	3.004	34.589	**8,7**
2019					ktep	3.223	34.281	**9,4**
2020					ktep	3.445	33.973	**10,1**

Table 5.1a: Index of industrial production in Italy compared to other EU countries

	B-C-D-F total industry									
Paesi	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**
Industrial production index (adjusted for working days, base 2005 = 100)										
UE27	95,5	95,6	96,4	98,4	100,0	104,0	107,5	105,1	91,7	95,8
AE16	96,1	96,0	96,5	98,2	100,0	104,0	107,5	104,8	90,5	94,4
ITALY	100,1	100,0	100,1	100,2	100,0	103,6	106,4	103,3	85,6	89,0
GERMANY	95,5	94,3	94,5	96,8	99,7	105,4	111,6	111,5	94,3	103,9
FRANCE	100,8	99,2	98,2	99,0	99,8	101,6	103,3	100,1	89,2	92,3
SPAIN	90,6	90,9	94,2	96,1	100,8	104,0	103,3	92,0	79,0	73,2
U.K.	98,8	98,7	99,6	101,0	100,0	100,8	101,7	99,1	88,7	92,1
Industrial production index (adjusted for working days, base 2001 = 100)										
UE27	100,0	100,0	100,9	103,0	104,7	108,8	112,5	110,1	95,9	100,3
AE16	100,0	99,9	100,4	102,2	104,1	108,3	111,9	109,1	94,2	98,3
ITALY	100,0	99,9	99,9	100,1	99,8	103,4	106,3	103,1	85,4	88,9
GERMANY	100,0	98,8	99,0	101,4	104,4	110,4	116,9	116,8	98,8	108,8
FRANCE	100,0	98,5	97,5	98,2	99,0	100,9	102,5	99,4	88,5	91,6
SPAIN	100,0	100,3	103,9	106,0	111,2	114,8	114,0	101,5	87,2	80,7
U.K.	100,0	99,9	100,8	102,2	101,2	102,1	103,0	100,4	89,8	93,2

Source: MSE elaboration on EUROSTAT Data

Table 5.1b: Index of industrial production in Italy compared to other EU countries

Paesi	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**
variation% annual index of industrial production (adjusted for working days)										
UE27		0,0	0,8	2,1	1,6	4,0	3,4	-2,2	-12,8	4,5
AE16		-0,1	0,5	1,8	1,8	4,0	3,3	-2,5	-13,6	4,3
ITALY		-0,1	0,0	0,2	-0,3	3,6	2,8	-3,0	-17,2	4,0
GERMANY		-1,2	0,2	2,5	3,0	5,7	5,9	-0,1	-15,4	10,1
FRANCE		-1,5	-1,0	0,8	0,8	1,8	1,6	-3,0	-10,9	3,5
SPAIN		0,3	3,6	2,1	4,9	3,2	-0,7	-10,9	-14,1	-7,4
U.K.		-0,1	0,9	1,4	-1,0	0,8	0,9	-2,5	-10,5	3,8

Source:: MSE elaboration on EUROSTAT Data

Table 5.2. Index of industrial production adjusted for calendar effects for major groupings di industrie (base 2005=100) (a)

Period	**Consumer Products**		**Durable consumer goods**		**Consumer Products non-durables**	
	INDEX	Trend variation in %	INDEX	Trend variation in %	INDEX	Trend variation in %
2009	95,0	-7,2	79,5	-18,3	99,1	-4,5
2010	96,7	1,8	78,5	-1,3	101,5	2,4
2011	93,9	-2,9	77,1	-1,8	98,4	-3,1
2012						
January	81,6	-5,8	60,8	-12,9	87,1	-4,3

Source: Istat

Table 5.3 (continued). Index of industrial production adjusted for calendar effects for groups principali di industrie (base 2005=100) (a)

Period	instrumental goods		intermediate goods		Energy	
	INDEX	Trend variation in %	INDEX	Trend variation in %	INDEX	Trend variation in %
2009	81,3	-25,1	73,2	-25,1	87,9	-8,8
2010	89,4	10,0	79,7	8,9	90,1	2,5
2011	92,3	3,2	80,3	0,8	88,1	-2,2
2012						
January	79,2	-4,2	70,3	-5,4	92,0	-5,9

Source: Istat

Table 5.4 Unemployment in Italy

Anni	2004	2005	2006	2007	2008	2009	2010	2011	2012
									T1-2012
Sex									
Male	6,4	6,2	5,4	4,9	5,5	6,8	7,6	7,6	10,0
Female	10,5	10,1	8,8	7,9	8,5	9,3	9,7	9,6	12,2
total	8,0	7,7	6,8	6,1	6,7	7,8	8,4	8,4	10,9

Source: Istat (Labour Force Survey)

Table 5.5: Main indicators of energy in Italy. Series in 2005-2010 Mtoe

	2005	2006	2007	2008	2009	2010	2011	var%2005-2011
Primary Energy Demand	197,8	196,2	194,2	191,3	180,3	187,8	183,9	-7%
Production	29,4	28,7	28,0	29,7	30,3	33,9	35,4	20%
Fossil fuel	*16,7*	*15,3*	*14,4*	*13,3*	*11,4*	*12,7*	*12,9*	*-23%*
Renewable Energy	*12,7*	*13,4*	*13,6*	*16,3*	*18,9*	*21,1*	*22,4*	*76%*
Import Fossil fuel	185	187,6	185,7	181,5	163,7	173,3	162,6	-12%
Final Use	146,6	145,7	143,2	141,1	132,7	138,6	134,5	-8%
Industry(A)	48,7	48,9	48,1	45,2	37,2	40,5	39,2	-20%
Civilian Use	47,1	45,3	43,3	45,3	46,4	49,1	46,6	-1%
Trasport	44	44,5	44,9	43,7	42,5	42,4	42,3	-4%
Other sectors	6,8	6,9	6,9	7	6,7	6,5	6,4	-6%
Annual growth rate of GDP at constant prices (%)	0,1	1,9	1,5	–1,3	–5,2	1,8	0,4	

Source: AEEG calculations on data from the Ministry of Economic Development and Istat.

Table 5.6 Mode of incentives for the production of electricity from plants using renewable energy sources other than solar photovoltaic, new, fully rebuilt, re-activated, the object of intervention enhancement or restoration, with power not exceeding 1 kW and entering service after 31 December, 2012.

Renewable Source	Tipology	Power (KW)	CR	Variation %
			euro/kw	
Wind	On shore	1<P≤20	3.300	16%
		20<P≤200	2.700	7%
		200<P≤1000	1.600	6%
		1000<P≤5000	1.350	-4%
		P>5000	1.225	-10%
	Off shore	1<P≤5000	2.700	11%
		P>5000	2.500	4%
Hidroelectric	flowing water (including water supply systems in)	1<P≤20	4.500	35%
		20<P≤500	4.000	15%
		500<P≤1000	3.600	-18%
		1000<P≤20000	2.800	3%
		P>20000	2.700	-10%
	a basin or reservoir	1<P≤20000	2.300	-25%
		P>20000	2.200	-27%
Geothermal		1<P≤1000	5.500	-23%
		1000<P≤5000	3.600	-24%
		P>5000	3.000	-35%
Landfill gas		1<P≤1000	2.500	-38%
		1000<P≤5000	2.375	-27%
		P>5000	2.256	-30%
Residual gas from purification processes		1<P≤1000	3.900	-31%
		1000<P≤5000	3.000	-32%
		P>5000	2.700	-34%
Biogas	a) products of biological origin	1<P≤300	5.500	-23%
		300<P<600		-32%
		600<P≤1000	4.000	-40%
		1000<P≤5000	3.000	-35%
		P>5000	2.700	-43%
	b) products of biological origin d) waste from separate collection	1<P≤300	5.700	0%
		300<P<600		-12%
		300<P≤1000	4.300	-24%
		1000<P≤5000	3.000	-21%
		P>5000	2.700	-37%
	c) waste for which the biodegradable fraction is determined lump sum	1<P≤1000	6.100	-8%
		1000<P≤5000	4.000	-32%
		P>5000	3.600	-47%
Biomass	a) products of biological origin;	1<P≤1000	4.500	-3%
		300<P<1000		-23%
		1000<P≤5000	3.700	-16%

		P>5000	3.000	-23%
	b) animal by-products, as referred to in Table 1-A d) waste from separate collection other than those referred to in point c)	1<P≤300	4.500	9%
		300<p<600		-11%
		600<P<1000		1%
		1000<P≤5000	4.000	-9%
		P>5000	3.500	9%
	c) waste for which the biodegradable fraction is determined lump sum	1<P≤5000	6.500	9%
		P>5000	6.200	-21%
sustainable bioliquids		1<P≤5000	1.200	-24%
		P>5000	1.080	-31%

Table 5.7

Solar fraction	Rate [EUR/kWh]
System in which the solar fraction is higher than 85%	0.280
System in which the solar fraction is between 50% and 85%	0.250
System in which the solar fraction is lower than 50%	0.220

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