

Ministry of Economic Development  
DEPARTMENT OF ENERGY  
**Directorate-General for Nuclear Energy, Renewable Forms of Energy  
and Energy Efficiency**

**Annual report on energy efficiency**  
**Results achieved as of 2011 and targets for 2020**

April 2013

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## *Introduction*

This report<sup>1</sup> describes the energy efficiency objectives to be achieved by 2020 under the programmes adopted by the Italian authorities, and the progress made by Italy in fulfilling its energy efficiency objectives in 2011.

Pursuant to the requirements of Articles 3 and 24 of Directive 2012/27/EU on energy efficiency, the report will be sent to the European Commission by 30 April 2013 in order to enable the Commission to assess, on the basis of the data and objectives set by the different Member States, whether the European Union will be able to meet the overall energy consumption target set for 2020.

Specifically:

a) the first chapter gives an overview of the primary energy requirements and the end-uses for energy in 2011, and sets out the savings achieved by 31 December 2011, including in relation to the 2016 targets established by Italy's 2011 Energy Efficiency Action Plan (EEAP);

b) the second chapter illustrates the energy efficiency objectives for 2020, the baseline and the measures in place for achieving them, as defined by the national energy strategy approved on 8 March 2013 by a decree of the Ministry of Economic Development in conjunction with the Ministry of the Environment and the Protection of Natural Resources and the Sea. These objectives are an integral part of the National Reform Programme referred to in Council Recommendation 2010/410/EU.

### **1. Progress made towards achieving the energy efficiency objectives as at 31 December 2011**

#### *1.1 Demand for primary energy in 2011*

**Demand for primary energy** was 184.2 Mtoe, 1.9% lower than in 2010.

The reduction in energy requirements can be ascribed to the influence of various factors: the milder climate, the ongoing economic crisis, and the implementation of active energy efficiency policies.

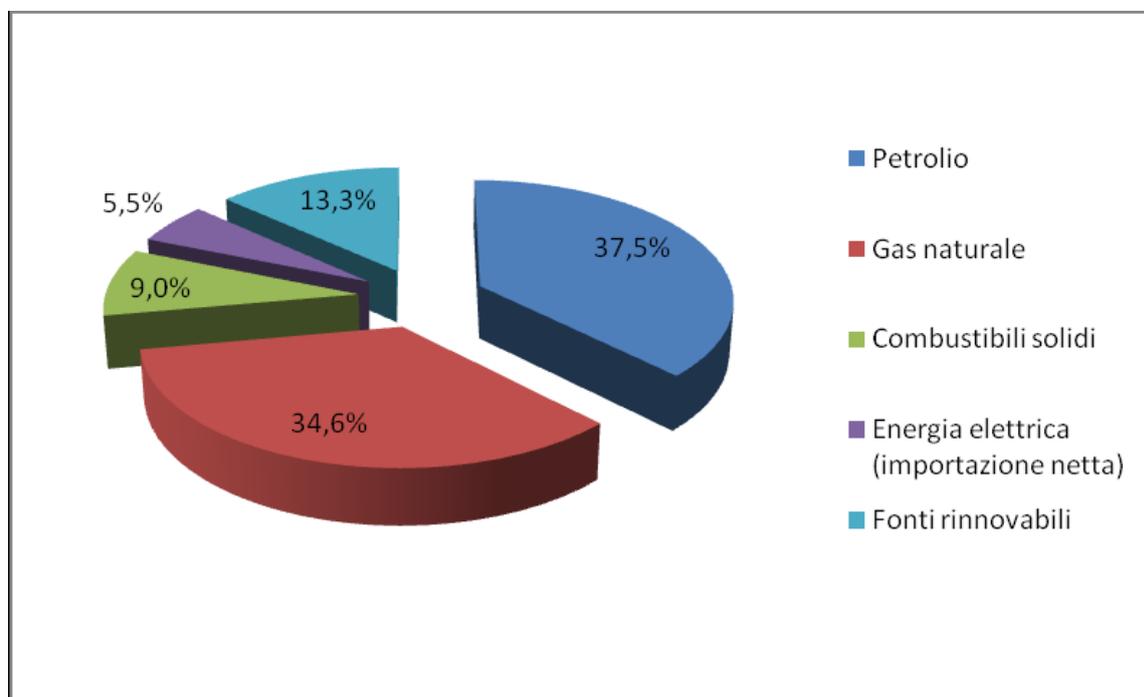
Compared with the previous year, the percentage breakdown of energy sources used to cover demand confirmed the trend already evident in the last few years, in particular in terms of the reduction in the share of hydrocarbons and the sustained growth in renewable forms of energy. A more detailed look at the figures shows that the share of oil fell from 38.5% to 37.5%, and natural gas from 36.2% to 34.6%, whilst there was a slight increase in the share of solid fuels, from 8% to 9%. The proportion covered by renewable sources grew from 12.2% to 13.3%, whilst the contribution of net imports of electrical energy remained largely stable (from 5.2% to 5.5%).

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<sup>1</sup> Prepared in collaboration with the Italian National Agency for New Technologies, Energy and Sustainable Economic Development (ENEA).

The percentage breakdown for each source confirms the distinctiveness of the Italian situation compared with the average for the 27 Member States, in terms of the greater use of oil and gas, the structured import of electricity, the reduced contribution of solid fuels, and the absence of nuclear sources (Figure 1.1).

**Figure 1.1** – Primary energy demand by source for 2011 – Total: 184.2 Mtoe



*Petrolio* = Oil  
*Gas naturale* = Natural gas  
*Combustibili solidi* = Solid fuels  
*Energia elettrica (importazione netta)* = Electricity (net imports)  
*Fonti rinnovabili* = Renewable sources

Source: Ministry of Economic Development data processed by ENEA

### 1.2 End-uses for energy in 2011

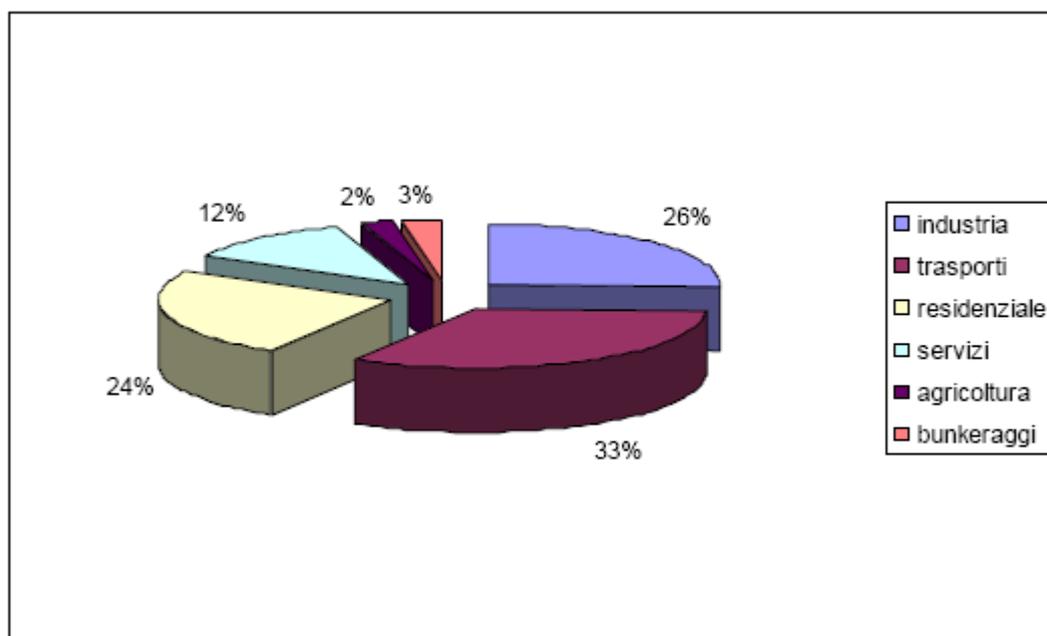
**Final energy consumption** was 128 Mtoe<sup>2</sup>.

Consumption trends for end-uses showed a reduction of 1.6% compared with 2010; this reduction affected all sectors, and was also due to the combined effect of the economic crisis and measures to promote and encourage energy efficiency in Italy at the time. As will become clearer in paragraph 1.3, the additional savings made through energy efficiency promotion and incentive measures amount to around 1 Mtoe, accounting for around 50% of the sudden reduction in final consumption.

<sup>2</sup> Not including 6.9 Mtoe for non-energy uses.

The distribution of consumption across the various sectors is illustrated in Figure 1.2, and shows that: (a) a large proportion goes to civil use, with the residential sector taking 24%, and services 12%; (b) transport continues to consume a large amount (33%), as does industry (26%); and (c) the agricultural sector, and fuel reserves for international maritime transport (known as ‘bunkers’) take smaller shares of around 2% and 3% respectively.

**Figure 1.2** – Final energy consumption by sector for 2011 – Total: 128 Mtoe



*Industria = Industry*  
*Trasporti = Transport*  
*Residenziale = Residential*

*Servizi = Services*  
*Agricoltura = Agriculture*  
*Bunkeraggi = Bunkers*

*Source: Ministry of Economic Development data processed by ENEA*

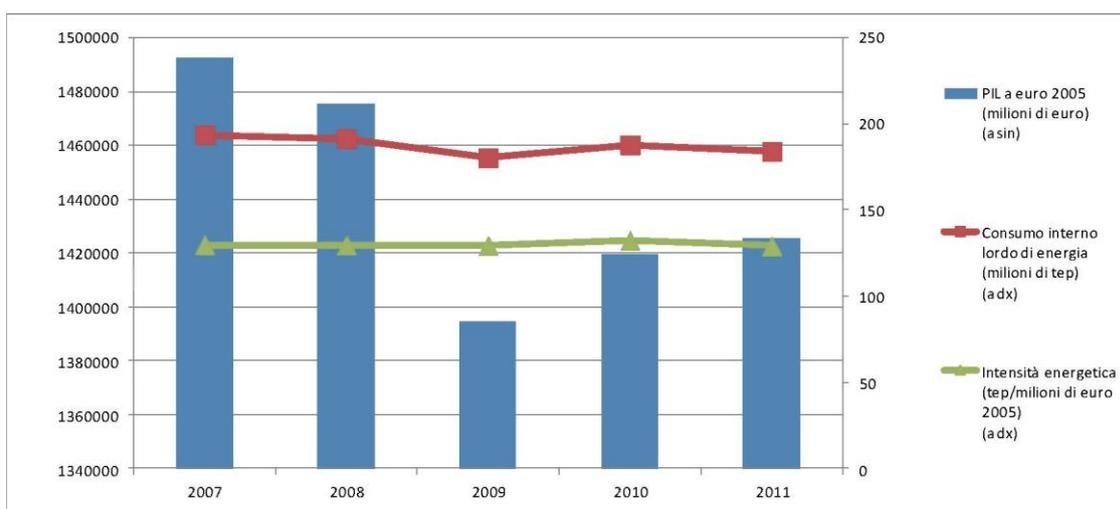
**Primary energy intensity** was 129.21 toe/M€05<sup>3</sup> (Figure 1.3).

An analysis of gross inland consumption and GDP from 2007 to 2011 shows that until 2009, the trends for GDP and energy consumption were similar, leading to stability in primary energy intensity. Primary energy intensity increased in 2010 (+2.29%), whereas in 2011 there was a reduction of 2.4% due to the combined effect of the GDP increase (+0.43%)<sup>4</sup> and a drop in energy demand (-1.9%).

<sup>3</sup> Toe per million euros linked, for the 2005 reference year.

<sup>4</sup> Source: 'General Report on the national economic situation' 2011, Ministry of Economic Affairs and Finance.

**Figure 1.3 – Primary energy intensity, GDP, and gross inland energy consumption for 2007-2011**



Blue = GDP in euros 2005 (million euros) (left); Red = Gross inland energy consumption (million toe) (right); Green = Energy intensity (toe/million euros 2005) (right).

*Source: Ministry of Economic Development and ISTAT (Italian statistical office) data processed by ENEA*

### 1.3 Final energy savings achieved by 2011

Directive 2006/32/EC<sup>5</sup> on energy end-use efficiency and energy services required Member States to adopt national indicative targets for energy savings by 2016, equal to at least 9% of the total consumption reference data<sup>6</sup>.

To implement the Directive, Italy's Energy Efficiency Action Plan (EEAP) for 2011 made provision for programmes and measures to improve energy efficiency and energy services in end-use sectors, in order to achieve annual energy savings of 126 327 GWh/year (10.88 Mtoe) by 2016, equal to 9.6% of reference consumption

The quantitative evaluation of the savings achieved in 2011 has therefore been made with reference to the measures and evaluations already contained in the EEAP on the following steps to improve energy efficiency:

- implementation of Legislative Decree No 192/05, transposing Directive 2002/91/EC on setting minimum energy performance standards for buildings;
- approval for 55% tax relief on expenditure to upgrade the energy efficiency of existing buildings and to integrate renewable energy production;
- development of the compulsory energy efficiency scheme (white certificates), charged to gas and electricity distribution companies;

<sup>5</sup> Directive 2006/32/EC was repealed by the new Directive 2012/27/EC.

<sup>6</sup> Average consumption in end-use sectors in the five years preceding adoption of the Directive.

- measures to encourage environmentally-friendly renewal of the fleet of cars and lorries up to 3.5 tons.

The first three columns of Table 1 show (respectively): energy savings achieved by 31/12/2010, by 31/12/2011, and indicative national targets set out in the 2011 EEAP for 2016. The fourth column shows the percentage of 2016 targets (by sector and in total) that had been achieved by 31/12/2011.

**Table 1** – Annual energy savings achieved by 2010, by 2011, and expected for 2016

<b>Sector</b>	<b>Energy savings achieved as of 31/12/2010</b>	<b>Energy savings achieved as of 31/12/2011</b>	<b>Expected annual energy savings as of 2016 [EEAP 2011]</b>	<b>Percentage of targets met as of 31/12/2011</b>
	<b>Mtoe</b>	<b>Mtoe</b>	<b>Mtoe</b>	<b>%</b>
<b>Residential</b>	2.95	<b>3.45</b>	5.16	<b>67%</b>
<b>Tertiary</b>	0.14	<b>0.17</b>	2.11	<b>8%</b>
<b>Industry</b>	0.72	<b>1.01</b>	1.73	<b>58%</b>
<b>Transport</b>	0.26	<b>0.46</b>	1.87	<b>25%</b>
<b>Total</b>	<b>4.08</b>	<b>5.09</b>	<b>10.88</b>	<b>47%</b>

*Source: ENEA data processing*

## 2. Energy efficiency targets for 2020

### 2.1 Energy efficiency in the national strategy

The National Energy Strategy (NES), approved by the Interministerial Decree of 8 March 2013, directs Italy's efforts towards making a substantial improvement in the competitiveness of the energy system together with environmental sustainability. Working towards the following four main objectives for 2020 will help to improve competitiveness:

- reducing energy costs by aligning prices at the European level (national savings on electricity and gas are estimated at approximately EUR 9 million per year<sup>7</sup>);
- meeting the European targets set out in the 2020 European Climate-energy package (reducing GHG emissions by 21% compared with 2005, reducing primary energy consumption by 24% with regard to the inertial trend, and achieving a 19-20% share of renewable energy in final gross consumption);
- improving supply security, with a reduction in foreign dependency from 84% to 67% of total energy needs;
- boosting growth and employment through mobilising investments of EUR 170-180 billion by 2020, whether in traditional sectors or the 'green economy'.

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<sup>7</sup> The total cost borne by consumers for the supply of electricity and gas in 2012 is estimated at EUR 70 billion.

The measures put forward in the energy strategy form part of the plan for Italy to decarbonise its economy by 2050, in keeping with DG Energy's *Roadmap 2050*.

The Strategy identifies seven priorities to achieve these objectives, setting fixed targets and specific support measures. Of primary importance is energy efficiency, which concurrently contributes to achieving all four energy policy objectives in the NES. Energy efficiency is actually the most economical way to reduce emissions, often bringing a positive return on investments; it also creates demand in a market in which many Italian firms are active, increases energy security, and reduces the trade deficit. With regard to reducing CO<sup>2</sup> emissions, energy efficiency measures should facilitate a reduction of 55 Mton per year, equal to 50% of the target set in the national CO<sup>2</sup> reduction plan.

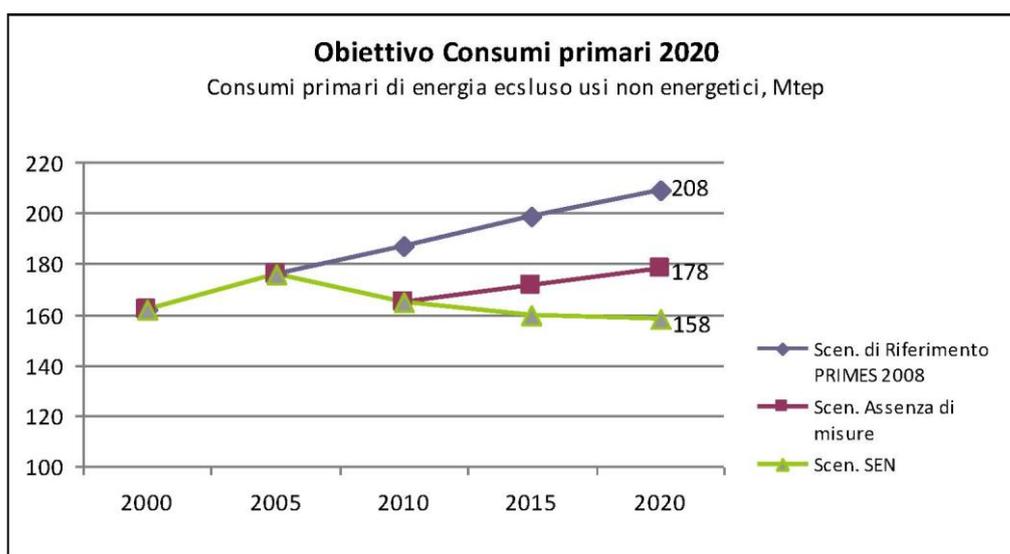
## 2.2. Objectives for primary and final energy savings

The national strategy makes provision for a reduction in primary energy of 20 Mtoe per year by 2020, and 15 Mtoe per year of final energy.

The following charts show the trends for primary and final energy consumption in three different scenarios: a baseline scenario (PRIMES 2008), a baseline scenario in the absence of measures, and the scenario set out in the NES.

The NES scenario was drawn up taking into account an average annual GDP growth rate of 0.4 percentage points for 2010-15 and 1.16 for 2015-20, and of changes in the quantity of energy imported, excluding exports, from 149.5 Mtoe by 2010 to 116 Mtoe by 2020. As shown in the chart, the reduction in expected primary energy consumption by 2020 in the NES is around 20 Mtoe less than the expected consumption in the absence of policy measures.

Figure 2.1 – Developments in primary consumption by 2020 according to different scenarios



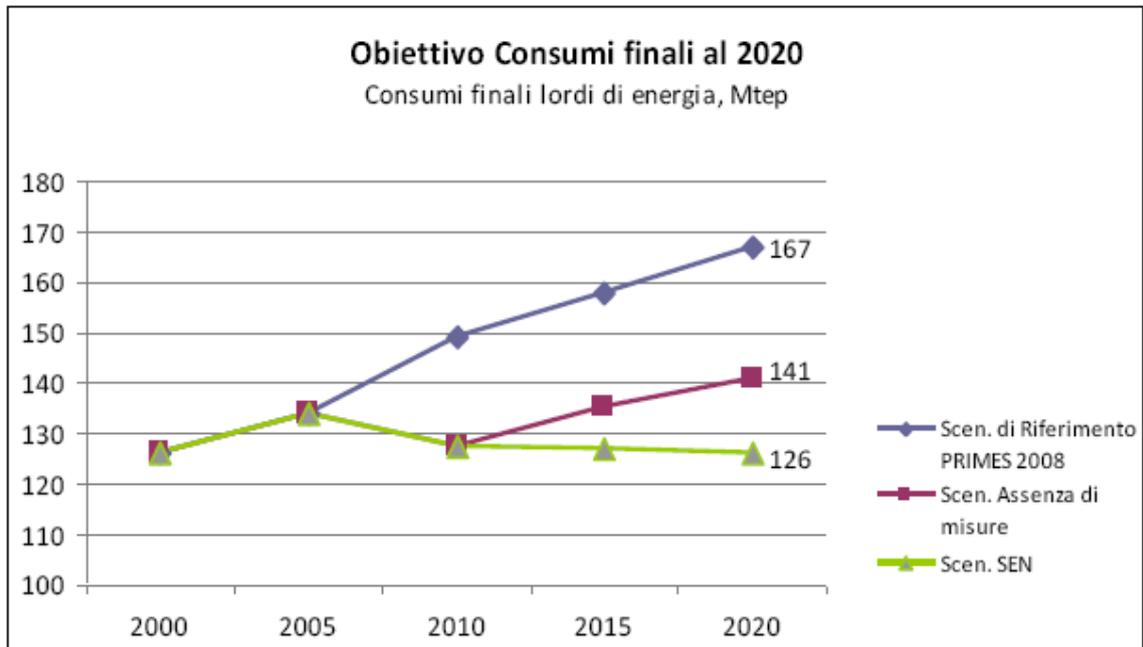
Heading: '2020 primary consumption objective.'

Primary energy consumption excluding non-energy uses (Mtoe)'

Key: Baseline scenario PRIMES 2008; Absence of measures scenario; NES scenario.

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

Figure 2.2 – Developments in final consumption by 2020 according to different scenarios



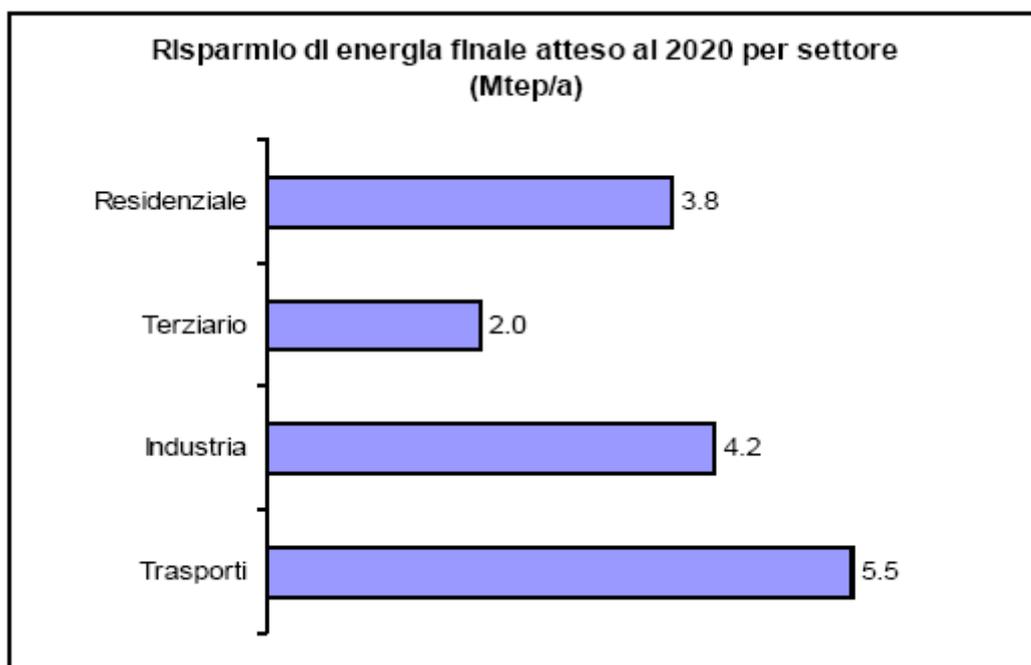
Heading: '2020 final consumption objective.  
Gross final energy consumption (Mtoe)'

Key: Baseline scenario PRIMES 2008; Absence of measures scenario; NES scenario.

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

Figure 2.3 shows expected savings in final energy by 2020 broken down into main sectors: residential, tertiary, industry, and transport. The tertiary sector includes public administration, whilst industry includes savings deriving from cogeneration and improvements to network efficiency (in order to monitor savings made in each energy-use sector, the data will be better separated in future).

Figure 2.3 – Distribution of energy savings by economic sector by 2020



Heading: 'Expected final energy savings by 2020, by sector (Mtoe/year)'

Key: Residential; Tertiary; Industry; Transport

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

### 2.3 Measures to enable energy efficiency targets to be met

To meet energy efficiency targets, the strategy makes provision for strengthening policy measures that have already been adopted to promote energy efficiency in the residential sector, public administration, services, industry, and transport, and for introducing new tools in keeping with the provisions of Directive 2012/27/EU on energy efficiency. In particular, there are provisions to:

- strengthen the rules on minimum energy performance, especially for construction (as a result of transposition of Directive 2010/31/EU), the transport sector, and all products coming under the Ecodesign directive. In this respect, over the past year new rules (on energy certification, checks and inspections of facilities, by authorised certifiers) have already been adopted to implement fully and completely the European legislation, and further provisions are about to be adopted to strengthen in particular the energy certification instrument for buildings, and to improve performance in government buildings;
- stabilise the instrument for 55% tax relief on expenditure to upgrade the energy efficiency of buildings, in operation since 2007;
- introduce direct and indirect support tools for measures promoted by the government, such as the 'thermal energy account' (activated by interministerial decree of 28 December 2012). The government also has plans to establish contractual standards based on improving energy performance, by strengthening the Energy Performance Contract (EPC);

- develop the compulsory energy efficiency scheme based on white certificates, which is also designed to promote large-scale energy efficiency projects in industry and services, and to promote measures which have an infrastructural value (ICT, water distribution, transport);
- consolidate the role of the structural funds used to implement programmes for promoting energy efficiency (POIn (Interregional Operational Programme)), which offer an important opportunity to develop advanced intervention models in the future, above all for upgrading the energy efficiency of government buildings and for integrated measures for urban sustainability;
- use the proceeds of sales of CO<sup>2</sup> allowances to support energy efficiency measures in the industrial sector.

Alongside these measures, which directly contribute to achieving the energy objectives, the following facilitative elements which are essential for promoting energy efficiency will be consolidated:

- consolidation of the ESCO (Energy Service Company) model, through the introduction of evaluation criteria, development and distribution of innovative contractual models for third-party financing, and creation of dedicated guarantee funds or special revolving funds for the most important projects, with the possible participation of public financial institutions;
- support for research and innovation with the goal of further developing technologies in the fields of materials, construction, and energy systems;
- promotion of communication and awareness initiatives designed to increase understanding of the opportunities arising from energy efficiency amongst businesses and the public.

By 2020, around EUR 25 million of public funds could be committed to these support measures combined (including sums already committed in preceding years), to stimulate total investments of around 50-60 million and generate savings on imported fuel of around EUR 8 million per year.

Table 2 shows expected savings for final and primary energy by 2020, by sector and by intervention measure. The target total savings set out in the following table are in addition to the savings already achieved by 31 December 2010 shown in Table 1.1.

*Table 2 – Energy efficiency targets for 2020 (final and primary energy, Mtoe/year)*

Sector	PLANNED MEASURES FOR 2011-20				FINAL	PRIMARY
	Regulatory standards	Thermal account	55% tax relief	White certificates	Expected savings by 2020	Expected savings by 2020
<b>Residential</b>	<b>1.60</b>	<b>0.90</b>	<b>1.00</b>	<b>0.30</b>	<b>3.80</b>	<b>5.32</b>
<b>Tertiary</b>	<b>0.20</b>	<b>1.60</b>		<b>0.20</b>	<b>2.00</b>	<b>2.80</b>
	Public administration	0.10	0.70	0.10	0.90	1.26
	Private	0.10	0.90	0.10	1.10	1.54
<b>Industry</b>				<b>4.20</b>	<b>4.20</b>	<b>5.88</b>
<b>Transport*</b>	<b>5.40</b>			<b>0.10</b>	<b>5.50</b>	<b>6.05</b>
<b>Total per measure (Mtoe/year)</b>	<b>7.20</b>	<b>2.50</b>	<b>1.00</b>	<b>4.80</b>	<b>15.50</b>	<b>20.05</b>

\*(Evaluation of the attainable savings for 2011-2020 in the transport sector – the regulatory standards also include sustainable transport measures.)

*Source: data processing by the Ministry of Economic Development and ENEA)*

## 2.5 Summary table of the main indicators in 2011

The following table summarises the main socio-economic and energy indicators, as required by Annex XIV to Directive 2012/27/EU:

INDICATOR	2011
Primary energy consumption	184.2 Mtoe
Total final energy consumption (excluding non-energy uses)	128 Mtoe
Energy consumption by sector	
• industry	32.66 Mtoe
• transport	42.47 Mtoe
• residential	31.1 Mtoe
• services	15.35 Mtoe
• agriculture	3.01 Mtoe
• bunkers	3.41 Mtoe
Value added at base prices by sector	
• industry	€ 318 112 million Value linked with reference year 2005
• services	€ 942 899 million Value linked with reference year 2005
Disposable income of households	€ 1 092.242 million (total) € 17 979 (per capita)
Gross domestic product (GDP)	€ 1 425 792 million Value linked with reference year 2005
Electricity generation from thermal power generation (gross generation)	227 700.2 GWh
<i>of which:</i> <i>Electricity generation from combined heat and power (gross generation)</i>	81 906 GWh
Heat generation from thermal power generation	59 944 GWh
Heat generation from combined heat and power generation, including industrial waste heat (gross generation of useful heat)	40 798 GWh
Fuel input for thermal power generation	41 830 Mtoe
Passenger kilometres (pkm)	915 663 million pkm (2010) 882 777 million pkm (2011)**
Tonne kilometres (tkm)*	207 181 million tkm (2010) 190 983 million tkm (2011)**
Population	59 394 207 (at 1 January 2012)

\*Excluding pipelines

\*\*Provisional data from the National Infrastructure and Transport Accounts

## *Annex – Conversion factors*

The conversion factors specified in the Directive have been taken into account in evaluating expected savings for primary energy, and for measures aimed at the residential, tertiary and industrial sectors.

The total conversion factor for final energy and primary energy by 2020 for the efficiency measures for the vehicle fleet is 1.11 for cars and 1.09 for light commercial vehicles. This factor has been estimated based on the hypothetical composition of consumption for the various fuel supplies, and on the relevant conversion factors given in the table below:

Fuel supply	Conversion factors
Petrol	1.1
Diesel	1.12
LPG	1.03
Natural Gas	1.07
Electricity	1.6

For electricity, the conversion factor from final to primary energy takes into account the mixed energy sources in the Italian electricity system, including renewable sources (RES). Further (slight) progress in national production efficiency compared with the current figure (1.66) has also been taken into account for 2020, linked to the expected increase in production from RES. In terms of the measures for a modal shift in demand (passengers and goods) from road traffic to rail traffic (overland and underground), the total conversion factor for energy savings from final energy to primary energy is approximately 1.