



Intelligent Energy  Europe



# **Energy Efficiency Policies and Measures in Italy**

**Monitoring of Energy Efficiency in EU 27,  
Norway and Croatia (ODYSSEE-MURE)**

ENEA

Rome, September 2009

## **Contacts:**

**Giulia Iorio**

**Pier Giorgio Catoni**

ENEA

Lungotevere Thaon di Revel, 76, Rome

Tel.: +390630483674 / Fax: 0630483657

E-Mail: [giulia.iorio@enea.it](mailto:giulia.iorio@enea.it)

[piergiorgio.catoni@enea.it](mailto:piergiorgio.catoni@enea.it)

[www.enea.it](http://www.enea.it)

The sole responsibility for the content of this publication lies with the authors. It does not necessarily reflect the opinion of the European Communities. The European Commission is not responsible for any use that may be made of the information contained therein.

## Contents

	Page
<b>1 Executive Summary .....</b>	<b>1</b>
<b>2 The Background to Energy Efficiency .....</b>	<b>3</b>
2.1 Overall economic context.....	3
2.2 Energy consumption trends: by fuel and by sector .....	4
2.3 The policy background to energy efficiency .....	5
<b>3 Overall Assessment of Energy Efficiency Trends .....</b>	<b>7</b>
3.1 Overall trends in energy intensity.....	7
3.2 Industry .....	8
3.3 Households .....	10
3.4 Services .....	12
3.5 Transport.....	14
3.6 Assessment of energy efficiency/savings through ODEX: total and by sector.....	17
3.7 CO <sub>2</sub> -emissions trends: <i>total and by sector; role of fuels         substitutions and of energy efficiency</i> .....	21
<b>4 Energy efficiency measures.....</b>	<b>23</b>
4.1 Recent Energy Efficiency Measures .....	23
4.2 Patterns and Dynamics of Energy Efficiency Measures.....	26
4.3 Innovative Energy Efficiency Measures .....	29
4.4 Energy efficiency measure evaluations.....	31
4.4.1 Semi-quantitative Impact Estimates of Energy Efficiency Measures .....	31

4.4.2	Lessons from Quantitative Energy Efficiency Measure Evaluations.....	37
-------	--	----

<b>5</b>	<b>National Developments under the EU Energy Efficiency Directive and the 20% Energy Efficiency Target of the EU.....</b>	<b>39</b>
----------	---	-----------

**Annex 1: Energy Efficiency Measure Summary by Country**

**Annex 2: Country Profile**

## Index of Figures

	Page
<b>Figure 2.1: Macro-economic developments.....</b>	<b>3</b>
<b>Figure 2.2: Final energy consumption by energy source .....</b>	<b>4</b>
<b>Figure 2.3: Final energy consumption by sector.....</b>	<b>5</b>
<b>Figure 3.1: Energy intensities .....</b>	<b>7</b>
<b>Figure 3.2: Energy consumption of manufacturing sectors.....</b>	<b>8</b>
<b>Figure 3.3: Energy consumption by branches .....</b>	<b>9</b>
<b>Figure 3.4: Energy intensity by branches .....</b>	<b>9</b>
<b>Figure 3.5: Manufacturing industry: energy intensity, energy intensity at constant structure and structural changes .....</b>	<b>10</b>
<b>Figure 3.6: Energy consumption of households .....</b>	<b>11</b>
<b>Figure 3.7: Energy consumption of households by sources .....</b>	<b>11</b>
<b>Figure 3.8: Energy consumption by end-use.....</b>	<b>12</b>
<b>Figure 3.9: Final consumption, energy intensity and electricity intensity of services sector .....</b>	<b>13</b>
<b>Figure 3.10: Energy consumption by energy source .....</b>	<b>13</b>
<b>Figure 3.11: Energy consumption per employee .....</b>	<b>14</b>
<b>Figure 3.12: Energy consumption of transport sector by mode .....</b>	<b>15</b>
<b>Figure 3.13: Energy consumption of road transport.....</b>	<b>15</b>
<b>Figure 3.14: Energy consumption trends of road transport.....</b>	<b>16</b>
<b>Figure 3.15: Energy consumption of passenger transport by mode .....</b>	<b>17</b>
<b>Figure 3.16: Energy efficiency index .....</b>	<b>18</b>
<b>Figure 3.17: Energy savings by sector.....</b>	<b>18</b>
<b>Figure 3.18: Energy efficiency in industry sector.....</b>	<b>19</b>
<b>Figure 3.19: Energy efficiency in transport sector .....</b>	<b>19</b>

<b>Figure 3.20: Unit consumption of passenger and goods transport .....</b>	<b>20</b>
<b>Figure 3.21: Energy efficiency in households.....</b>	<b>21</b>
<b>Figure 3.22: CO<sub>2</sub> emissions by sector .....</b>	<b>21</b>
<b>Figure 3.23: Emissions variations in steel production.....</b>	<b>22</b>
<b>Figure 3.24: Emissions variations in households .....</b>	<b>22</b>

## Index of Tables

	Page
<b>Table 2.1: Yearly growth rate of GDP, industry value added, tertiary value added and private consumption .....</b>	<b>3</b>
<b>Table 3.1: Variations in primary and final energy intensities in Italy.....</b>	<b>7</b>
<b>Table 3.2: Variations in energy consumption by end-use .....</b>	<b>12</b>
<b>Table 3.3: Variations in energy consumption by mode .....</b>	<b>14</b>
<b>Table 3.4: Variations in energy consumption of goods transport by mode.....</b>	<b>16</b>
<b>Table 3.5: Unit consumption variations by road transport mode .....</b>	<b>20</b>
<b>Table 5.1: Energy efficiency measure in NEEAP .....</b>	<b>40</b>



## 1 Executive Summary

In the period 1990-2007 both primary and final consumption increased in Italy: 18.0% and 20.9%, respectively. The corresponding energy intensities fell: primary energy intensity by 6.9% and final energy intensity by 4.7%.

The driving sector is tertiary, +78.0% of energy consumption, followed by transport sector, 31.9%. The other sectors had smaller increases in 1990-2007 and in the last years showed a reduction in energy consumption: -8.9% for households and -4.1% for industry sector in 2004-2007.

About the energy sources, electricity consumption displayed the highest increase, +44.2% in 1990-2007, followed by gas, +37.0%. The oil products had a small grow, 5.1%, while the coal decreased in 1990-2007, -9.6%, but in the last years the consumption is increasing again caused by steel and non metallic minerals branches. The renewable sources had a high growth rate but their use is limited (1.6% of energy consumption in 2007).

The energy efficiency was measured by ODEX index: in the period 1990-2007 a improvement of 5.6% was observed for the whole economy. The households sector contributed the most to this result with an improvement of 10.3%, followed by transport sector by 7.7%, while industry showed a slight worsening of 0.2%. The improvements are especially in the last years. Households keeps on increasing the energy efficiency, even if more slowly because of a larger diffusion of electrical appliances such as air-conditioner. Transport showed the bigger and faster increases in 2000-2007, 7.0%, caused by the efficiency improvement in cars transport due to new cars. Industry displayed grow in energy efficiency only in the last years: 4.1% in 2000-2007. This performance is caused by steel, non ferrous metals and chemicals but over all by the improvements in textile, food and machinery that showed the worst loss in energy efficiency in the previous years.

The institutional actions go to the improvement of energy efficiency, the reduction of greenhouse gas emissions and spread of the renewable energy sources. In 2007 the Energy Efficiency Action Plan was submitted to European Commission with the target of 9.6% energy savings in 2016.

The 2007 and 2008 Finance Laws implemented measures to improve the energy efficiency in the residential sector and settled the minimum required standards for new buildings and restructured buildings, such as minimum energy performance index and compulsory photovoltaic plants to produce electricity. For industry sector it were decided incentives for high efficiency motors and inverters, for mechanical vapour

compression and for high-efficiency cogeneration. The Legislative Decree n. 20/2007 sets the support to high efficiency cogeneration.

Italy has the target of 17% of energy consumption from renewables in 2020 and for this aim it's working on the promotion of energy from renewables (green certificates and other incentives) and on burden sharing between the regions.

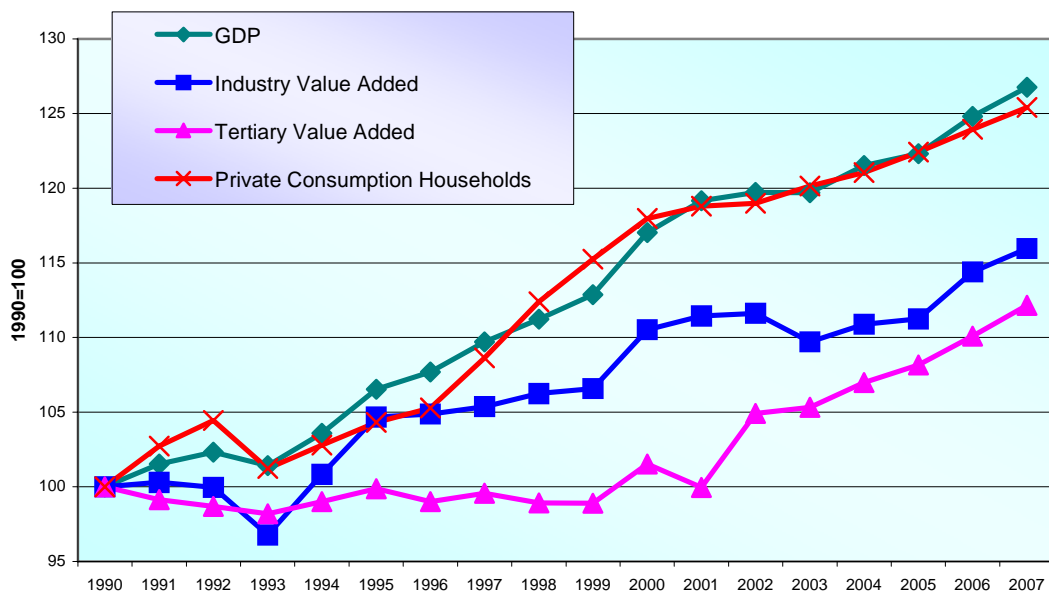
## 2 The Background to Energy Efficiency

### 2.1 Overall economic context

In 2007 the GDP grew by 1.6%, against 2.0% of the previous year. After a stagnation between 2001 and 2003 the GDP increased again: the yearly growth rate was about 1.5% between 1990 and 2007 and 1.2% in 2003-2007.

The main contribution to the growth of GDP is the private consumption of households with an increase of 25.4% in the period 1990-2007. The private consumption grew more rapidly in the nineties, +18.0%. In the last years the tertiary sector, measured by value added, has become the driving sector: +1.9% in 2007 compared with 2006, +6.5% in 2003-2007 with 1.6% yearly. The industrial activity grew all over the period, +16.6%, except for 1993 and 2003.

**Figure 2.1: Macro-economic developments**



**Table 2.1: Yearly growth rate of GDP, industry value added, tertiary value added and private consumption**

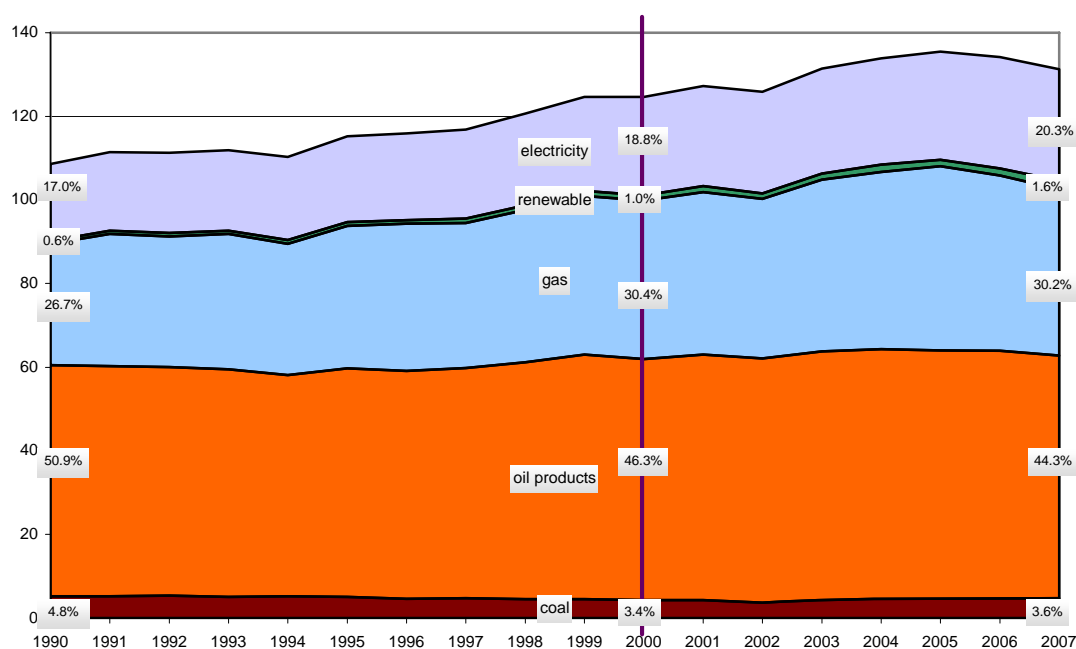
	1990-2000	2000-2003	2003-2007	1990-2007
GDP	1.7	0.8	1.5	1.6
Industry Value Added	1.1	-0.2	1.4	0.9
Tertiary Value Added	0.2	1.2	1.6	0.7
Private Consumption	1.8	0.6	1.1	1.5

## 2.2 Energy consumption trends: by fuel and by sector

In 2007 the final consumption was 131.3 Mtoe with a cut of 2.1% compared with 2006. In the period 1990-2007 the increase of final consumption was 20.9% with an average growth rate of 1.2%/year. In the last years the growth rate has gone down: 0.7% in 2000-2007.

The increasing trend of coal, started in 2003, is carrying on: in 2007 there was a light increase of 0.5%. The consumption of gas showed a drop for the second consecutive year: -4.9% in 2006 and -5.2% in 2007. The decrease in the consumption of oil products kept on, -2.0%, as the consumption of electricity went on increasing, even if a little, +0.2% in 2007.

**Figure 2.2: Final energy consumption by energy source**

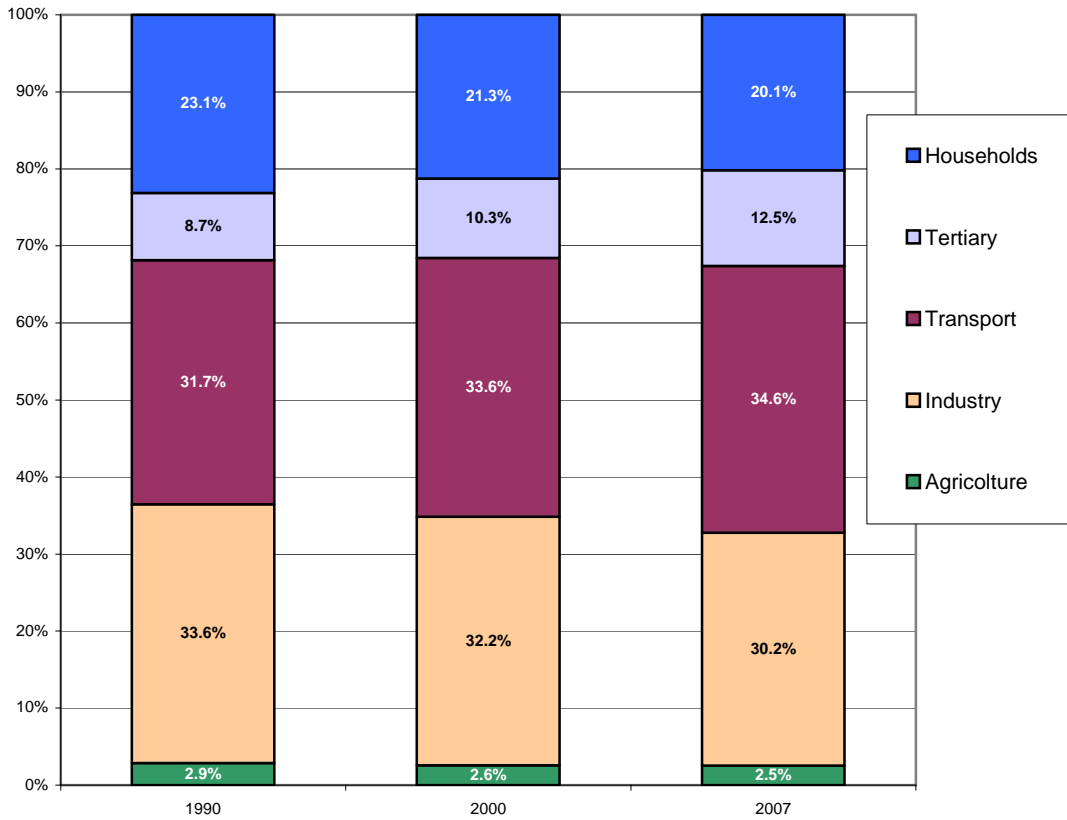


The consumption structure by fuel is showed in figure 2.2, with focus for 1990, 2000 and 2007: the oil products are the main energy source, but their share are decreasing, followed by gas and electricity. The renewable sources have a high growth rate, +225.4% in 1990-2007 and 65.7% in 2000-2007, but their use is limited, 2.1Mtoe in 2007.

In 2007 transport and tertiary sectors had a light increase in energy consumption: +0.8% and +0.3%, respectively, while the consumption of the other sectors decreased as in the previous year. Transport and tertiary sectors showed the main increases in

the period 1990-2007, +31.9% and +73.0%, respectively, and in 2000-2007, +8.5% and +27.7%. As a result the share of transport sector raised to 34.6% and the share of tertiary sector to 12.5%, while the share of the other sectors decreased (figure 2.3).

**Figure 2.3: Final energy consumption by sector**



## 2.3 The policy background to energy efficiency

National targets are the improvement of energy efficiency, the reduction of greenhouse gas emissions and spread of the renewable energy sources.

The improvement in energy efficiency involves in all sectors:

- residential: incentives for energy efficiency, energy certifications of the buildings;

- industrial: high efficiency motors/inverters, high efficiency cogeneration;
- tertiary: efficient heating, conditioning, lighting and public lighting;
- transport: use of biofuels, reduction of emissions for new vehicles to 140 gCO<sub>2</sub>/km
- cross-cutting: obligations to energy savings, obligations and incentives to spread renewables.

This energy policy is contained in the Energy Efficiency Action Plan submitted by Italy in 2007.

The institutional actions of the last two years stir in this direction:

- Legislative Decree n. 20/2007 that defines the high efficiency cogeneration and the incentives to support;
- Legislative Decree n. 115/2008 that assigns to ENEA the task of Energy Agency, provides for the development of white certificates system, assigns an important role to public sector in order to make interventions for improvement of energy efficiency and to promote actions on the territory;
- the Ministerial Decree 26 June 2009 that sets the guidelines for the energy certifications of the buildings and DPR n. 59/2009 that defines calculation methodology and the least requirements for energy performance of the buildings and thermic systems.

It's defining a Law Decree for the promotion of investments in technologic innovation in order to environmental protection, reduction of emissions, reduction of natural resources consumption and improvement of energy efficiency in the refineries, steel plants, chemical plants with the production greater than a threshold and thermal plants over 300MW power.

To achieve the target of 17% of energy consumption from renewable energy sources in 2020 Ministry of Economic Development with Environment Ministry and State-Regions Conference is working on the burden sharing of renewables.

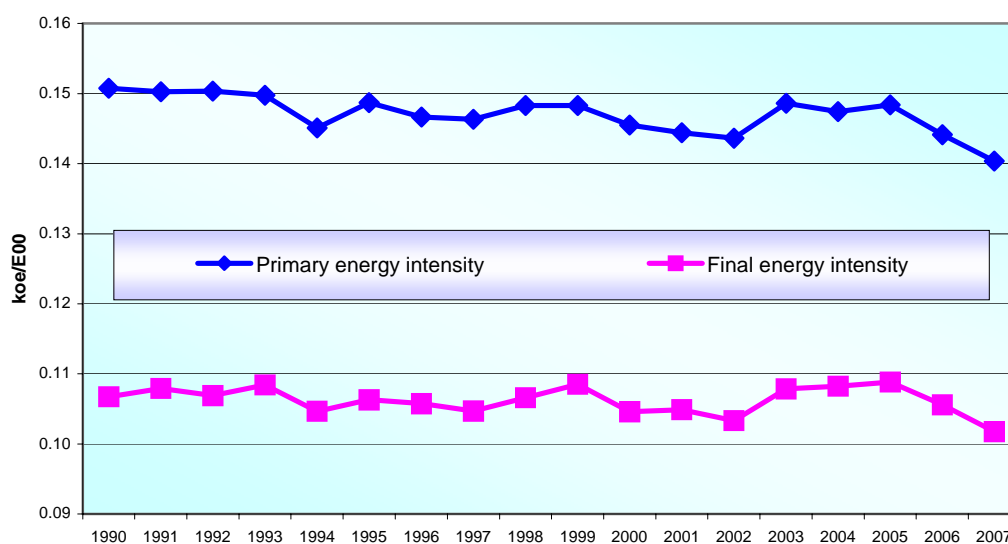
### 3 Overall Assessment of Energy Efficiency Trends

#### 3.1 Overall trends in energy intensity

The primary energy intensity and the final energy intensity (i.e. ratio between primary or final consumption and GDP) are the indicators generally used to assess the energy efficiency of the overall economy and final consumers.

In 2007, the primary energy consumption was 0.140koe/E00, -2.6% compared with 2006 and -6.9% in the period 1990-2007. The primary energy intensity had quite steady values in the range 0.145-0.150koe/E00 with a decreasing trend until to 2005; in the last 2 years the decrease is more quick, table 3.1.

**Figure 3.1: Energy intensities (koe/E00)**



The final energy intensity has a quite similar trend to the primary energy intensity. In 2007 it was 0.102koe/E00, a decrease of 3.6%koe/E00 compared with the previous year and of 4.7% in 1990-2007. In the period 1990-2002, GDP grew at a higher rate than primary and final consumption: +19.7%, 14.0% and 15.9%, respectively; in 2002-2005 the primary and final consumption grew at a higher rate; from 2005 to 2007 GDP carried on increasing while primary and final consumption were decreasing.

**Table 3.1: Variations in primary and final energy intensities in Italy (%/year)**

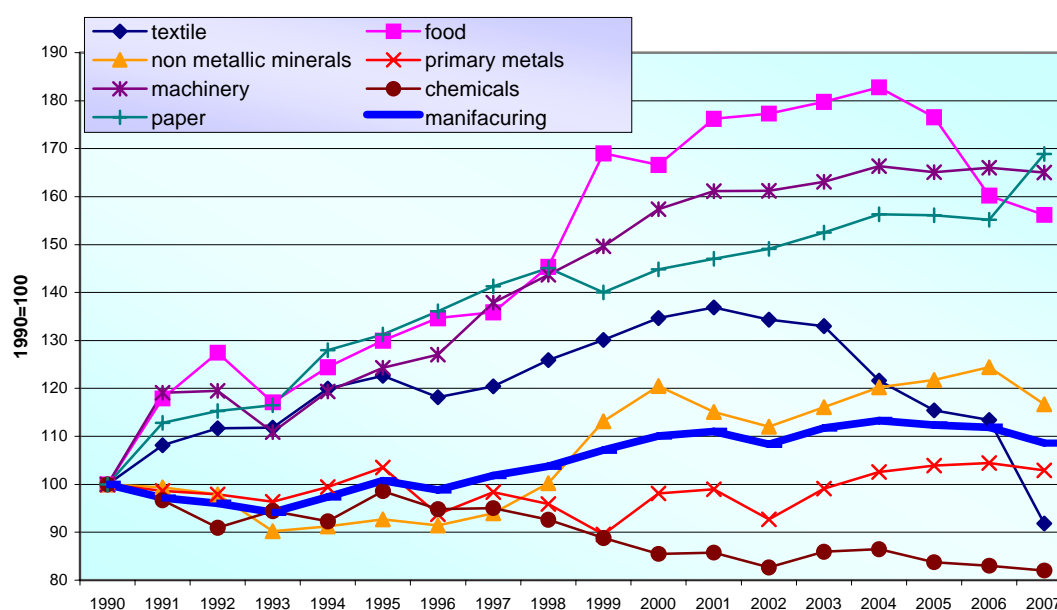
	1990-2000	2000-2002	2002-2005	2005-2007	1990-2007
Primary intensity	-0.35	-0.65	1.11	-2.70	-0.40
Final intensity	-0.20	-0.61	1.78	-3.25	-0.27

## 3.2 Industry

In 2007, the industry consumption was 39.7Mtoe with a decrease of 3.0% compared with 2006. This value seems to confirm the decreasing trend started in the last years: +8.9% in the period 1990-2007, but -1.23% in 2000-2007. In the last years also the industrial production has started growing again. As consequence, also the energy intensity decreased: -6.1% in 1990-2007 but -5.9% in 2000-2007.

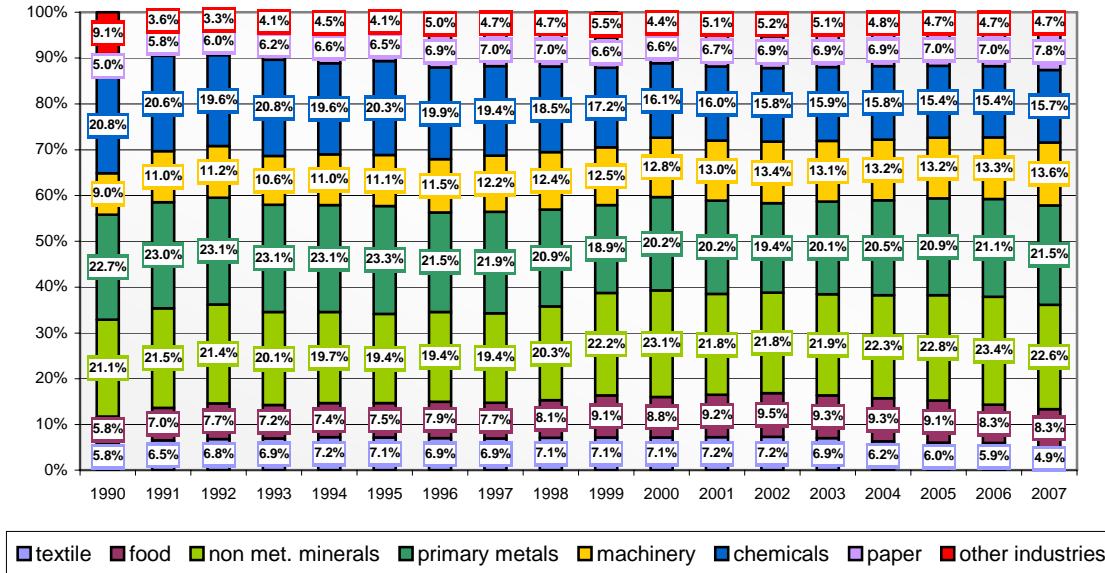
In the last years the energy consumption of the industrial branches showed a decreasing trend (figure 3.2): especially textile, energy consumption in 2007 was lower than the consumption in 1990, and food. The only exception was paper whose consumption carried on increasing.

**Figure 3.2: Energy consumption of manufacturing sectors (1990=100)**



In 2007 almost all the industrial branches showed a cut in energy consumption: -19.0% for textile and -6.2% for non metallic minerals; paper had an increase of 8.8%. The main branches are primary metals, non metallic minerals and chemicals but their share is changed in the period 1990-2007: non metallic minerals are the first branch, primary metals and chemicals have reduced their weight while machinery, food and paper have increased it (figure 3.3).

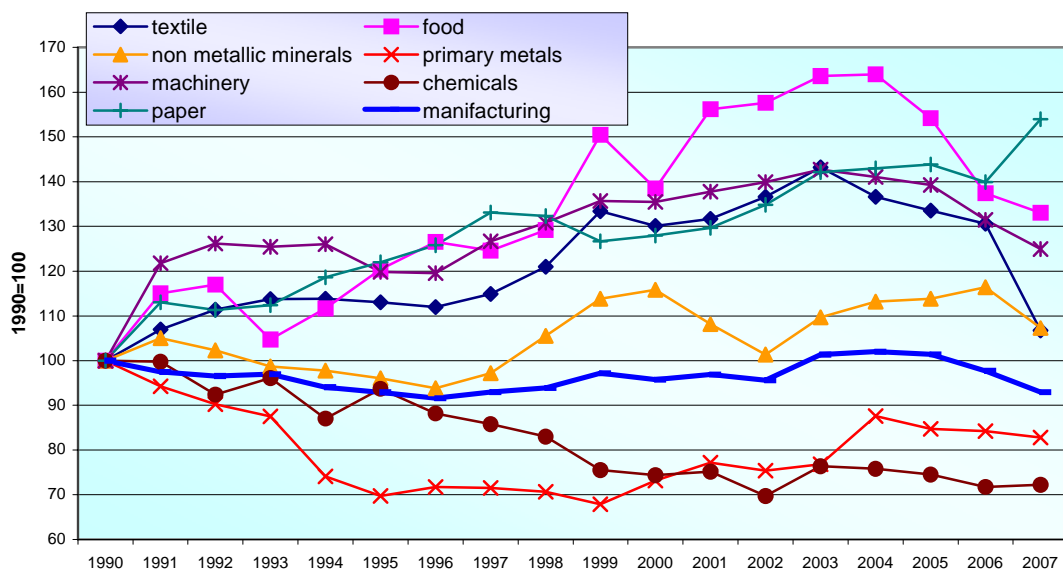
Figure 3.3: Energy consumption by branches



The energy intensive branches have spread their share: from 48.8% in 1990 to 51.9% in 2007.

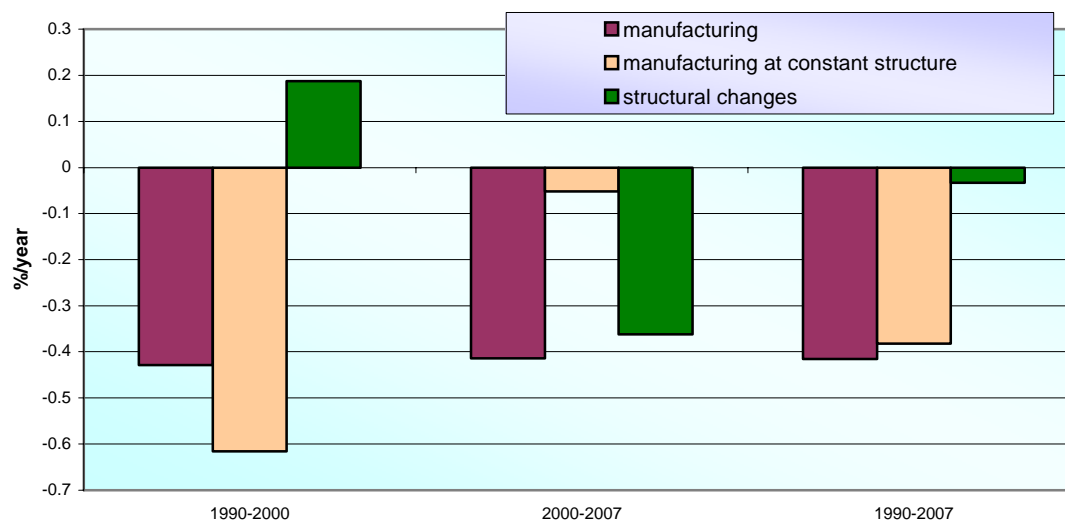
The energy intensities showed the same trend of the energy consumptions, figure 3.4: in 2000-2007 there were drops in textile, food, non metallic minerals and chemicals. Also the machinery showed a decrease despite a growth in the consumption because of an higher increase in the value added.

Figure 3.4: Energy intensity by branches



The changes in energy intensity mainly derive from changes in energy consumption, especially from 2000. This is also showed by considering the energy intensity at constant structure (figure 3.5).

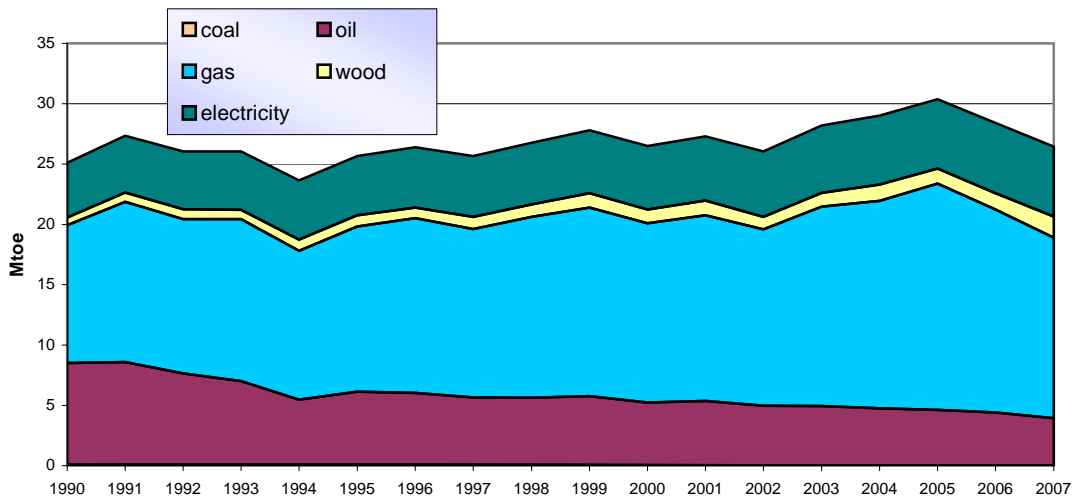
**Figure 3.5: Manufacturing industry: energy intensity, energy intensity at constant structure and structural changes**



### 3.3 Households

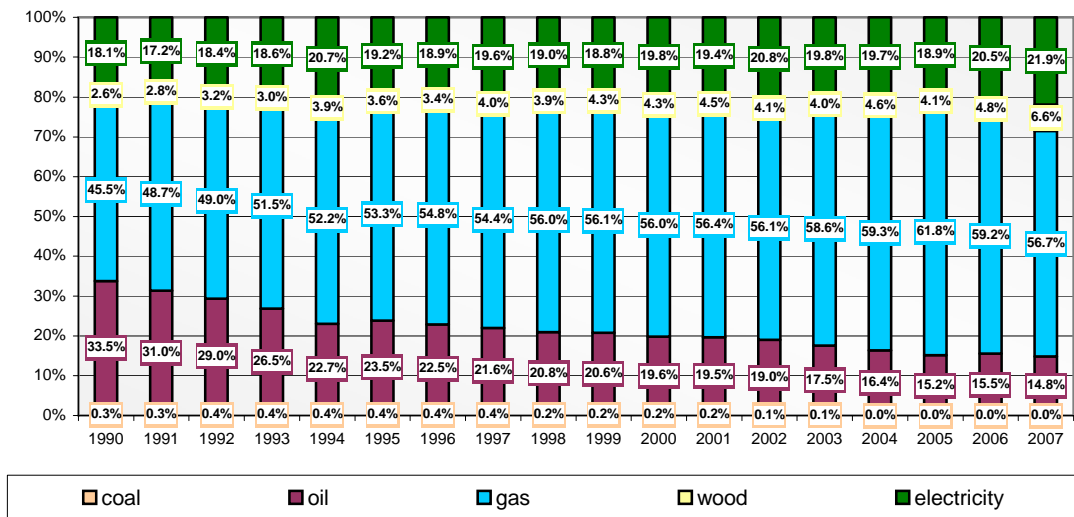
In 2007 the energy consumption of households was 26.4Mtoe, -6.9% compared with 2006. All the energy sources decreased, even the electricity, -0.6%, figure 3.6. The only exception was wood but its consumption is small, 1.7Mtoe in 2007, and non-commercial wood (i.e. the wood not involved in commercial transactions) is not included. The actual total consumption of wood is estimated at about three times of the official statistic value.

Figure 3.6: Energy consumption of households



In 2005 there was a reversal of trend: 1990-2005 was a period of steady growth, +1.4% per year, followed by 2 years of high drop, -6.5%/y. The cut of gas was the main reason: the share of gas decreased from 61.8% in 2005 to 56.7% in 2007 at advantage of electricity that raised from 18.9% in 2005 to 21.9% in 2007 (figure 3.7)

Figure 3.7: Energy consumption of households by sources



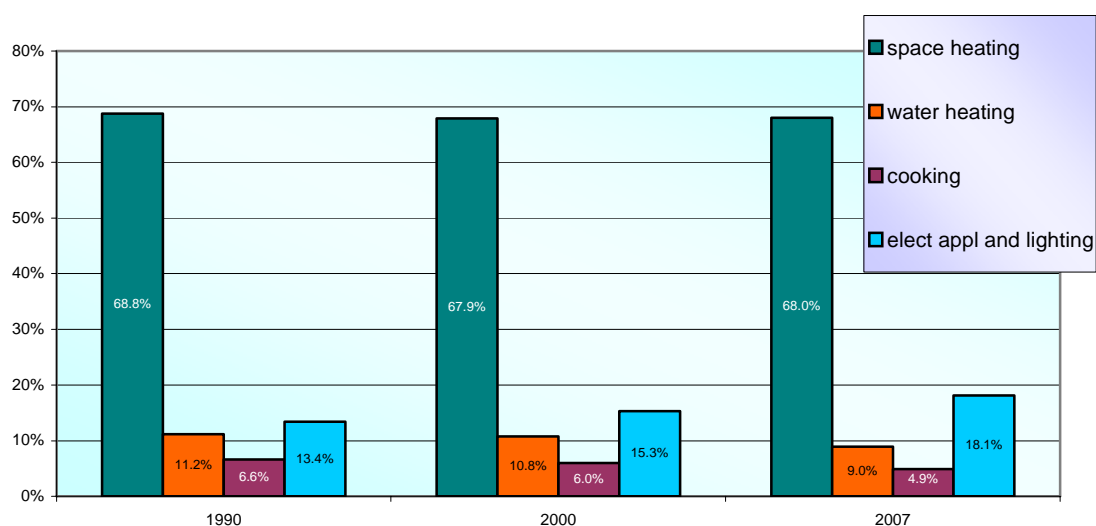
In 2007 all end-uses confirmed the decreasing trend of the previous year: -6.9% for space heating, -8.7% for water heating, -7.5% for cooking and -10.3% for electrical appliance and lighting. Over the period 1990-2007 the energy consumption for space heating grew by 4.1% but it was stable in 2000-2007 (-0.03%), for water heating and cooking dropped by 15.7% and 22.1%, respectively, for electrical appliance and lighting

increased by 42.2% (table 3.2). As consequence, the space heating took up almost 70% of energy consumption followed by electrical appliance, almost 20%, water heating and cooking (figure 3.8).

**Table 3.2: Variations in energy consumption by end-use (%)**

	1999-2000	2000-2007	1990-2007
space heating	4.1	-0.0	4.1
water heating	1.8	-17.1	-15.7
cooking	-4.8	-18.1	-22.1
electrical appliance and lighting	20.6	17.9	42.2

**Figure 3.8: Energy consumption by end-use**



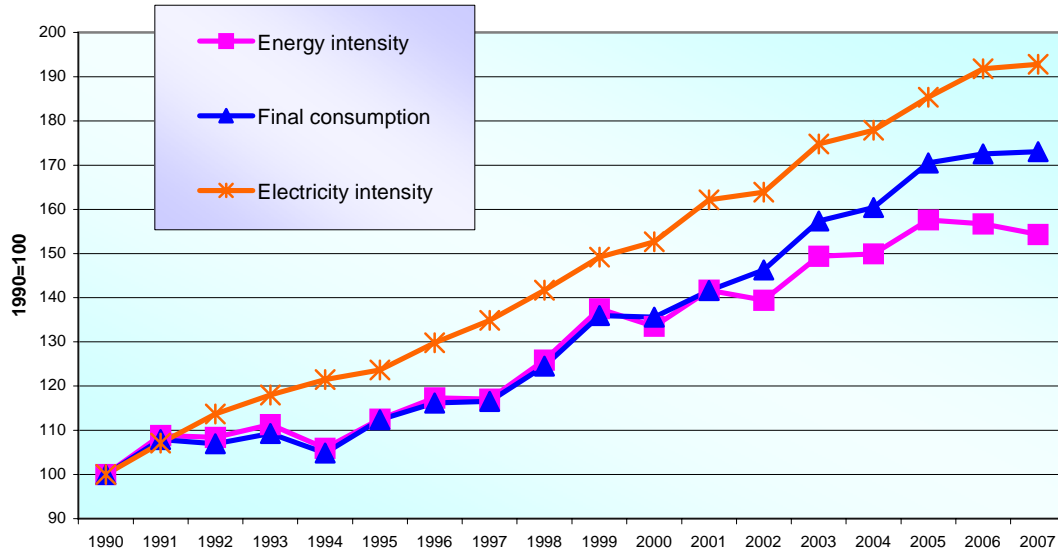
### 3.4 Services

In 2007 the energy consumption of services sector was 16.4Mtoe. In the last years the grow is slowing down compared with the first years of 2000. The main energy sources are gas and electricity that take up around 95% of energy consumption.

Energy intensity, both total and electricity, showed the same trend of final consumption (figure 3.9): a steady growth all over the period, only in the last years there was a slow-

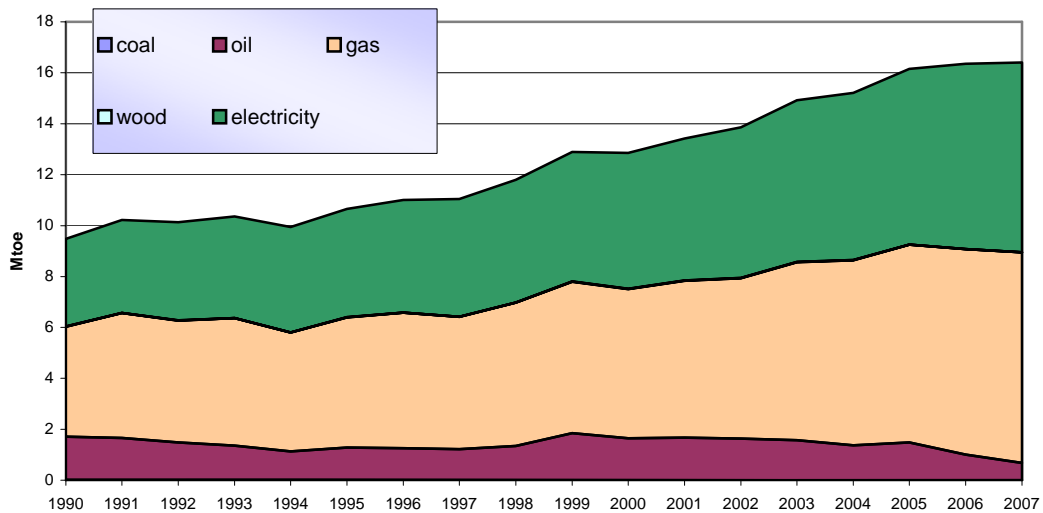
down, +0.5% in 2007 compared with +3.5% in 2006 for the electricity intensity, and a cut, -1.5% in 2007 for the energy intensity.

**Figure 3.9: Final consumption, energy intensity and electricity intensity of services sector (1990=100)**



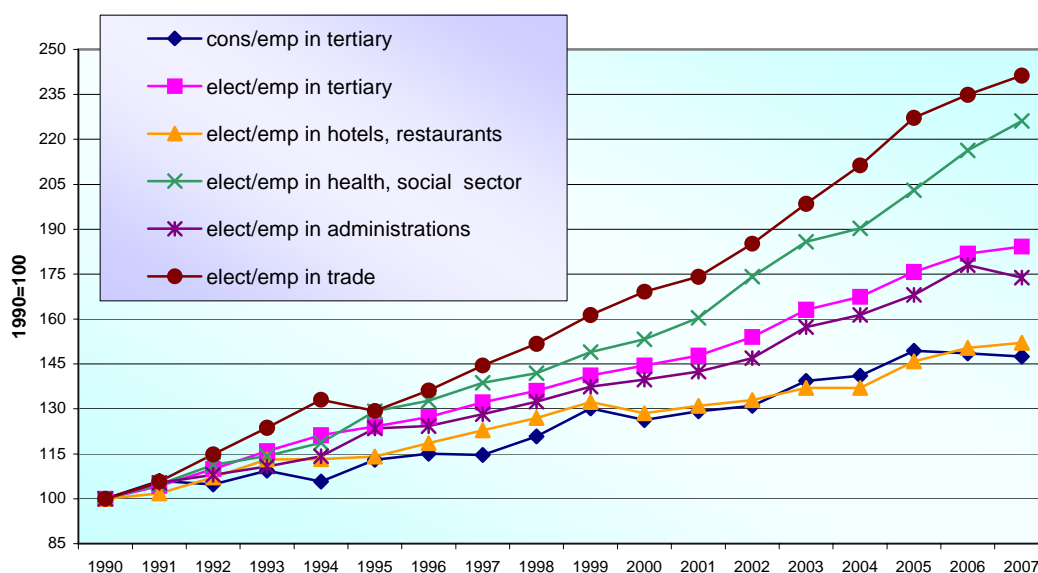
Electricity is the main energy source for growth rate, both for value and speed (figure 3.10). From this point of view, health and social action sector had the highest rise, +11.1% per year, followed by trade, +8.0% per year.

**Figure 3.10: Energy consumption by energy source**



A high and fast increase was also showed in the consumption per employee (figure 3.11).

**Figure 3.11: Energy consumption per employee (1990=100)**



### 3.5 Transport

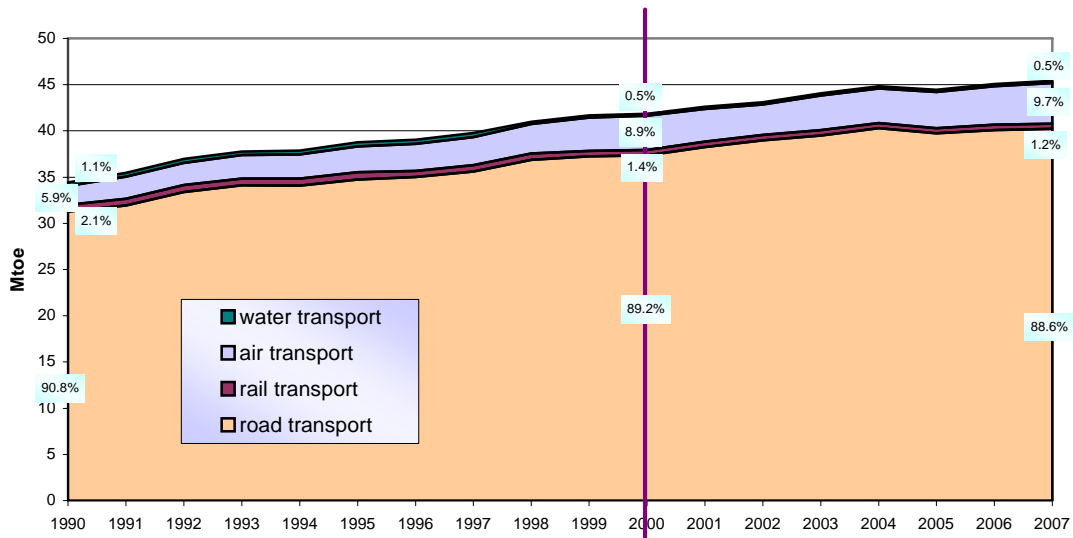
In 2007, the energy consumption of transport sector was 45.3Mtoe, +0.8% compared with 2006. The consumption was increasing all over the period 1990-2007, +31.9%, even if in the last years was less quick (table 3.3).

**Table 3.3: Variations in energy consumption by mode (%/year)**

	1990-1997	1997-2003	2003-2007	1990-2007
Road transport	2.0	1.8	0.5	1.7
Rail transport	-0.9	-2.2	-1.0	-1.3
Air transport	6.7	4.1	4.2	6.7
Total	2.2	1.8	0.8	1.9

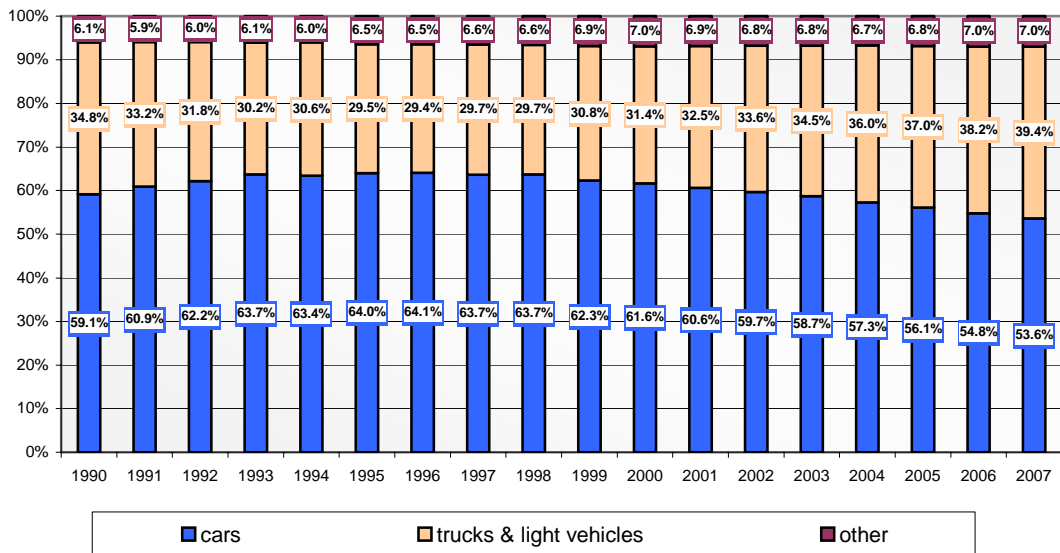
The road transport is the main mode, both for passenger and goods. The road transport absorbed 88.6% of energy consumption of transport sector in 2007, followed by air transport with 9.7% (figure 3.12). The air transport mode showed the highest growth rate while the rail transport is the only mode with a decrease in the consumption and an increase in passenger and goods in the last years.

Figure 3.12: Energy consumption of transport sector by mode



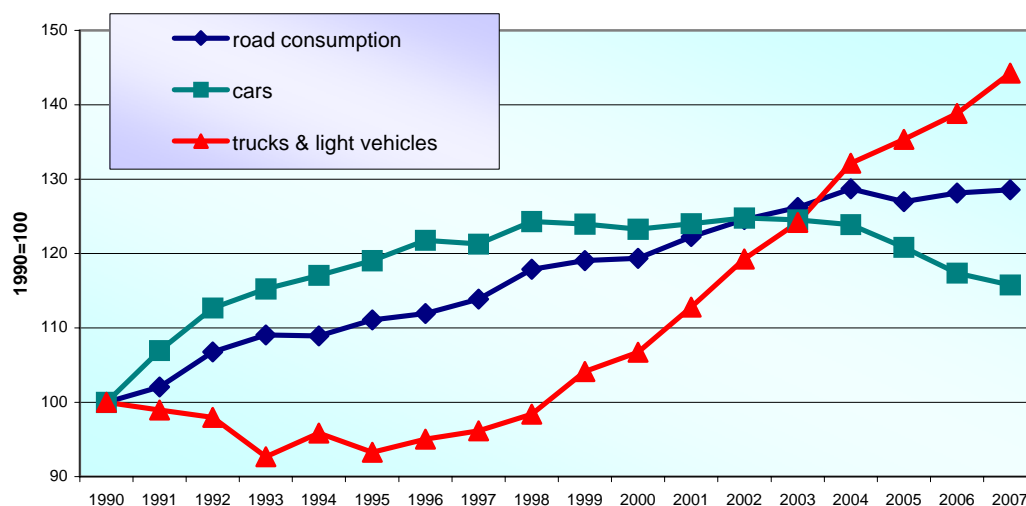
In road transport, cars are the main transport vehicle even if in the last years there was a decrease in the consumption (figure 3.13). This trend is caused by the shift from gasoline cars to diesel cars.

Figure 3.13: Energy consumption of road transport (%)



On the other hand, the consumption by tracks and light vehicles carries on increasing (figure 3.14).

**Figure 3.14: Energy consumption trends of road transport (1990=100)**



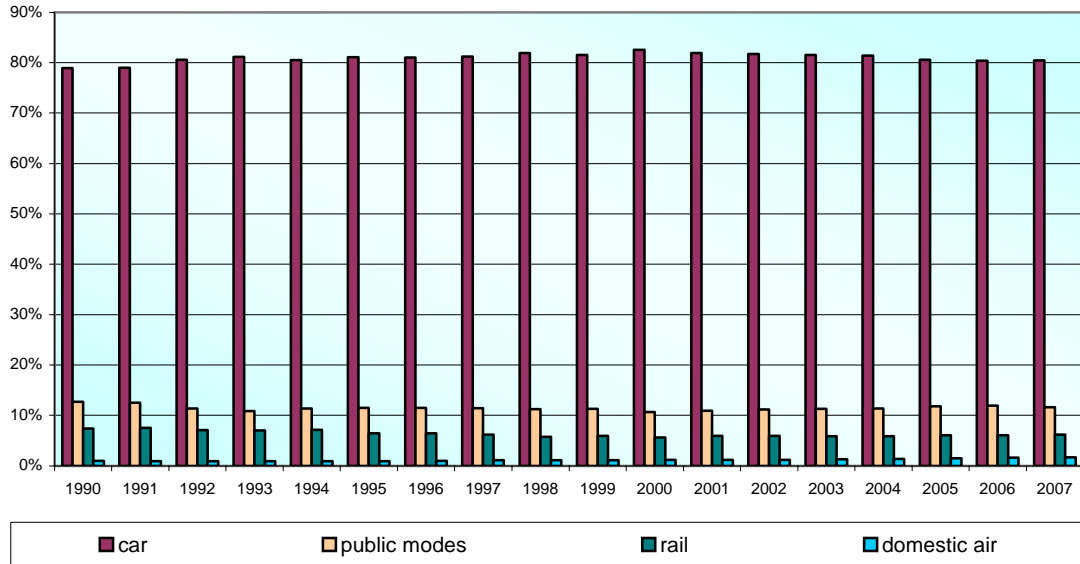
The road transport is the main mode for goods transport: it carries out about 90% of the traffic and it's in continuous growth, especially in the last years (table 3.4 ).

**Table 3.4: Variations in energy consumption of goods transport by mode (%/year)**

	1990-1997	1997-2003	2003-2007	1990-2007
Road transport	-0.4	0.1	7.9	1.7
Rail transport	2.7	-1.5	3.2	1.3
Total	-0.0	-0.1	7.3	1.6

The first mode for passenger transport is road transport, around 90%, and in particular the private transport by car, around 80%, figure 3.15. In the last years the increase by road transport is slowing down while the growth of air transport high and fast, +8.7% per year in 2003-2007, even if his share is small.

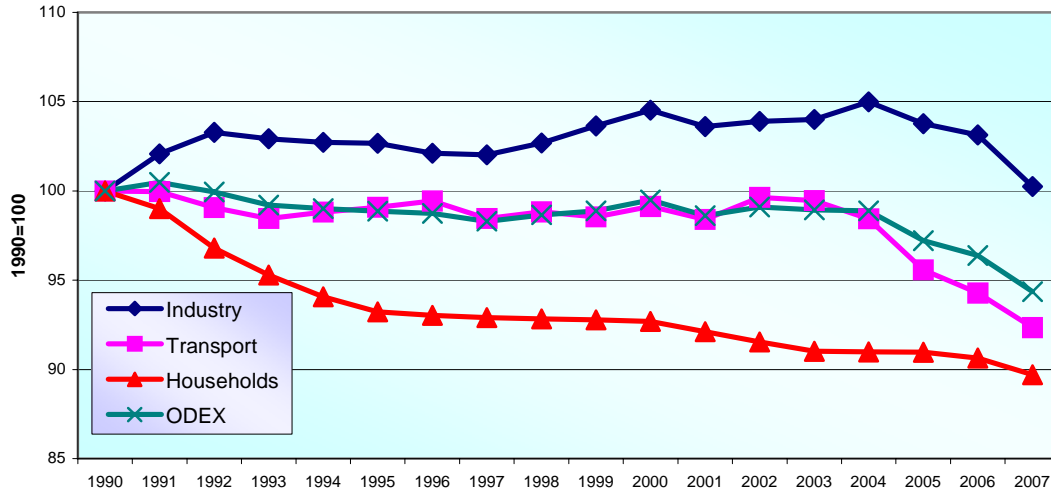
**Figure 3.15: Energy consumption of passenger transport by mode (%)**



### 3.6 Assessment of energy efficiency/savings through ODEX: total and by sector

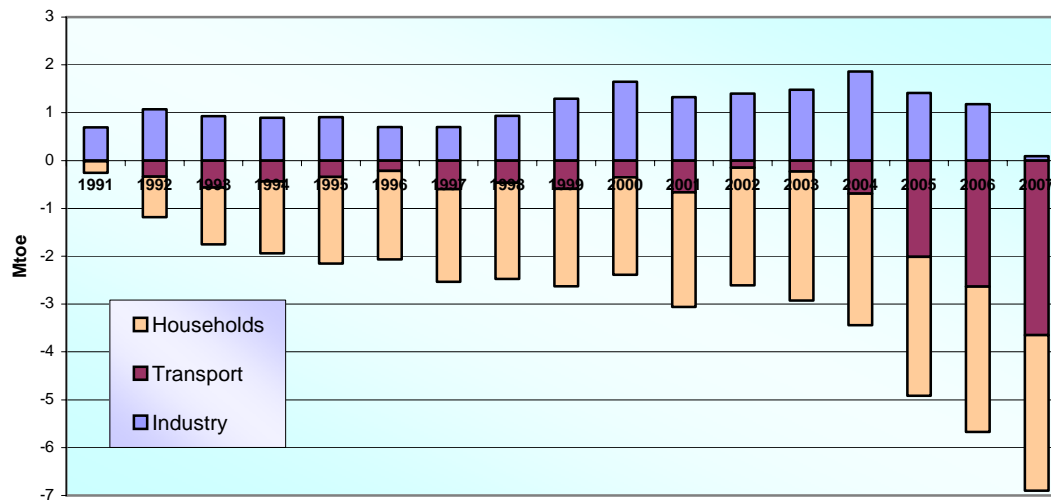
In the 2007 the energy efficiency index for the whole economy amounted to 94.4 which means a 5.6% efficiency improvement from 1990 (figure 3.16). The sectors contributed in different way: households had efficiency improvement every year, transport sector had a significant improvements only in the last years. Industry sector had a worsening in energy efficiency: 105.0 is the index value in 2004 (1990=100), and only from 2004 the energy efficiency is increasing.

**Figure 3.16: Energy efficiency index (1990=100)**



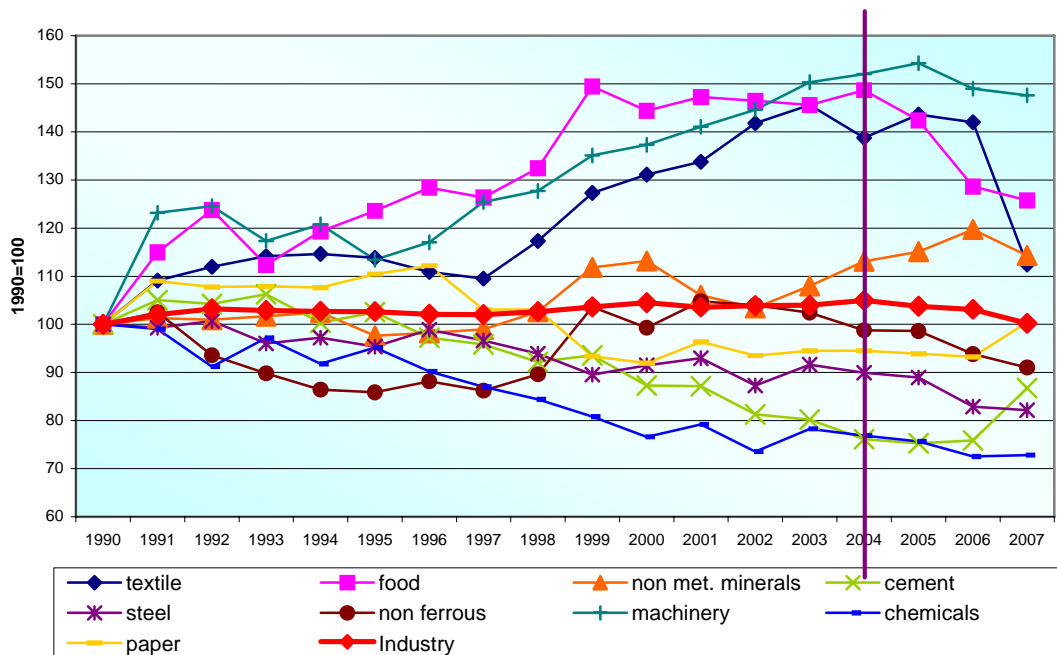
The improvement in energy efficiency led to an energy savings equal to 6.8 Mtoe in 2007 (figure 3.17)

**Figure 3.17: Energy savings by sector**



In the last years the energy efficiency of industry sector is increasing: 4.1% improvement in 2000-2007. All branches contributed to this result: in particular steel, non ferrous metals and chemicals but also textile, food and machinery that showed the worst loss in energy efficiency until the last years (figure 3.18).

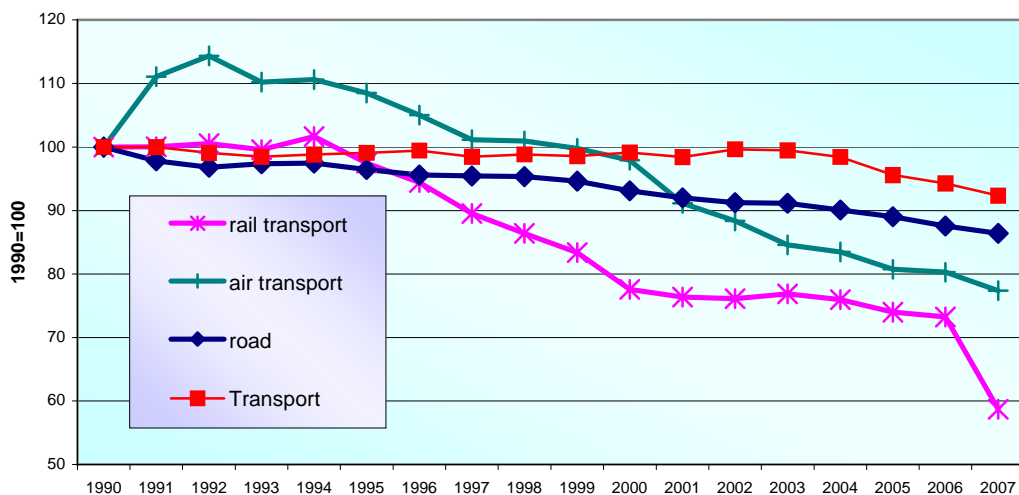
**Figure 3.18: Energy efficiency in industry sector (1990=100)**



The energy efficiency index of transport sector in 2007 was 92.3 with a 7.7% efficiency improvement in 1990-2007. This index has the same trend of efficiency index for road transport (figure 3.19) and in the last years it showed a faster efficiency improvement because of efficiency improvement by cars transport.

The rail and air transport had a great improvement in efficiency but their role in the transport sector is small.

**Figure 3.19: Energy efficiency in transport sector (1990=100)**

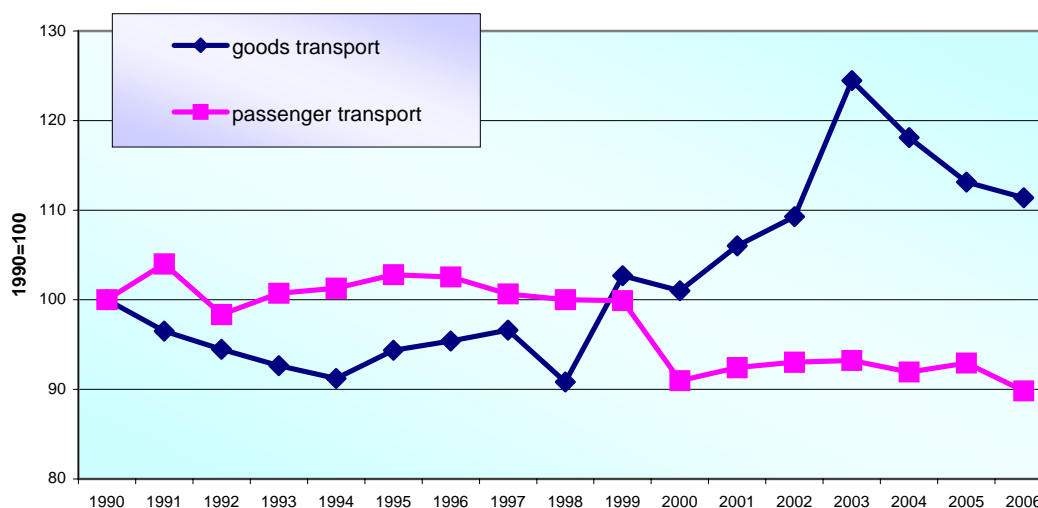


The increase in efficiency of cars is showed by unit consumption variation (table 3.5)  
 The efficiency progress by road transport were also showed by the decrease of the unit consumption of passenger and goods in the last years (figure 3.20).

**Table 3.5: Unit consumption variations by road transport mode (%/year)**

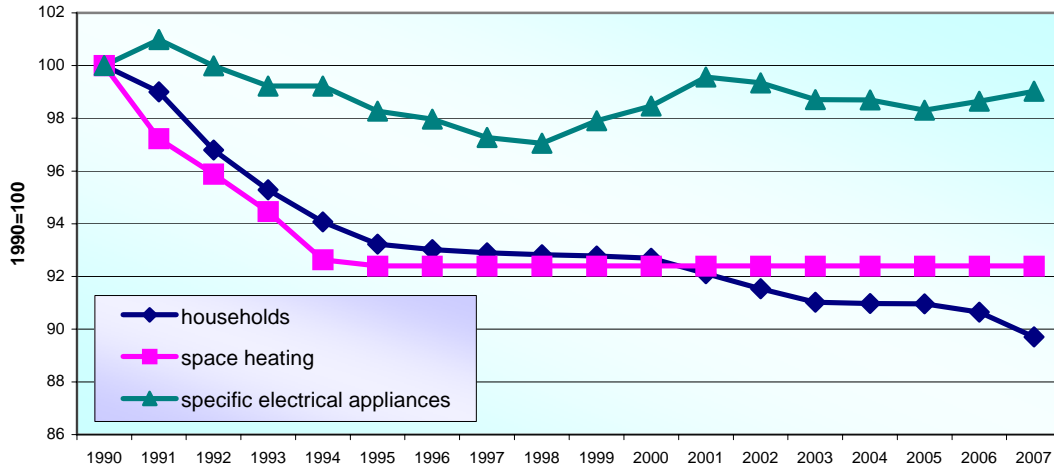
	1990-2000	2000-2007	1990-2007
gasoline cars	1.0	-3.0	-0.8
diesel cars	-1.3	-4.7	-2.4
trucks and light vehicles	-2.6	0.4	-1.4

**Figure 3.20: Unit consumption of passenger and goods transport (1990=100)**



The households sector showed the best result in improvement of energy efficiency, 89.7, even if the trend is slowing down in the last years because of a larger diffusion of electrical appliances such as air-conditioner (figure 3.21).

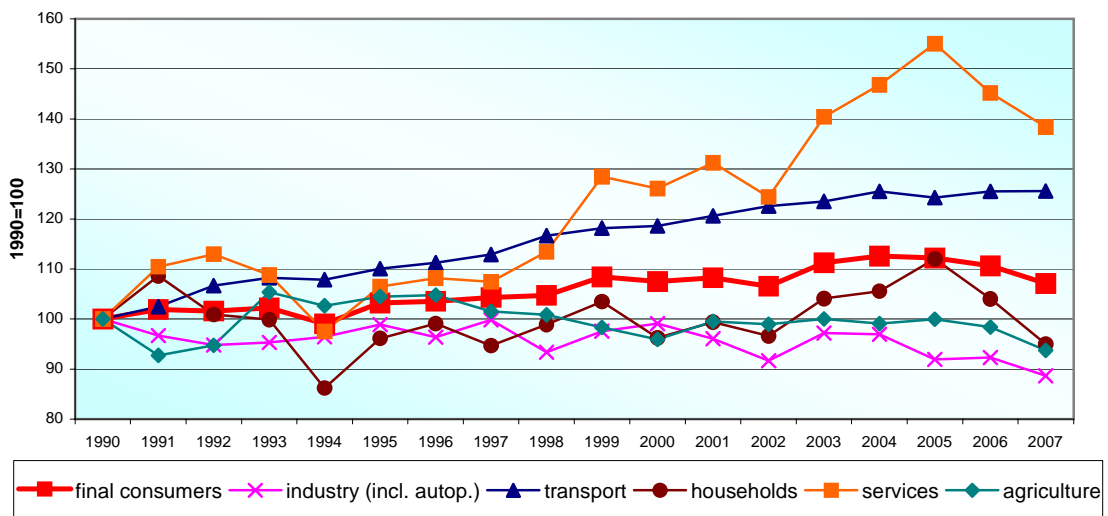
**Figure 3.21: Energy efficiency in households**



### 3.7 CO<sub>2</sub>-emissions trends: total and by sector; role of fuels substitutions and of energy efficiency

In figure 3.22 the CO<sub>2</sub> emissions trends are showed. In 1990-2007 there was an increase of 7.1% but a cut in the last years, -4.9% in 2004-2007. This trend was caused mainly by transport sector, followed by tertiary sector.

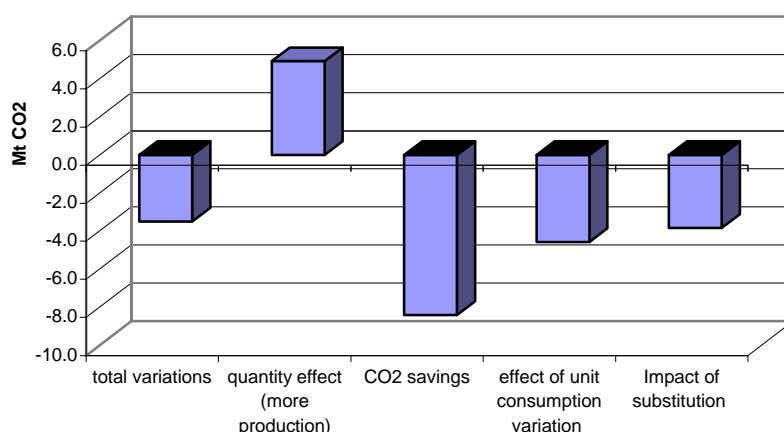
**Figure 3.22: CO<sub>2</sub> emissions by sector (1990=100)**



The CO<sub>2</sub> emissions of transport sector were increased all over the period, +21.1% in 1990-2007, even if in the last years the growth is slowing down, +0.1% in 2004-2007, because of the cut in the emissions from the cars, mainly due to fuel substitution and more efficient cars.

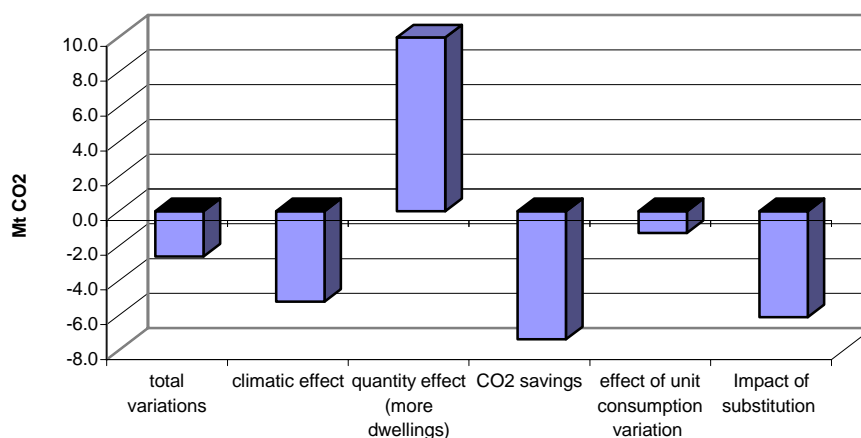
Industry sector showed a cut in CO<sub>2</sub> emissions: -11.3% in 1990-2007 and -10.5% in 2000-2007. Chemicals and steel made the biggest contribution to emission decrease. In particular, in figure 3.23 the emissions variations in steel production in 1990-2007 are showed.

**Figure 3.23: Emissions variations in steel production**



The CO<sub>2</sub> emissions in households decreased by 5.0% in 1990-2007. The trend is affected by the climatic effects and a larger diffusion of electrical appliances, especially from 2000. The emissions variations 1990-2007 are showed in figure 3.24.

**Figure 3.24: Emissions variations in households**



## **4 Energy efficiency measures**

### **4.1 Recent Energy Efficiency Measures**

Most of the recent energy efficiency measures are illustrated in the National Energy Efficiency Action Plan: the target is a 9.6% energy savings by the end of 2016. In order to achieve that savings, it implements 20 energy-saving measures, of which 10 cover the residential sector and 4 the tertiary sector.

#### **Residential Sector**

The energy efficiency measures involve in building, electrical appliances and lighting.

The Ministerial Decree 26 June 2009 sets the guidelines for the energy certifications of the buildings and it's defined the least requirements for energy performance of the buildings and thermic systems.

New buildings must have energy performance index lower than a threshold both for winter and summer air-conditioning, external shielding systems, at least 50% of primary energy consumption for water heating must come from renewables sources, photovoltaic plants are compulsory in order to produce electricity, if there is a district heating net in the space of 1000 meters it's necessary to facilitate the connection to the net. Also restructured buildings of more than 1000 square meters must comply with these rules.

For existing buildings a tax deduction is given of up to 55% of the amount remaining payable by the taxpayer for interventions such as thermal insulation of the opaque building surfaces, replacement of single glazing by double glazing, and the use of efficient boilers and air conditioners. Tax reductions and respective subsidies are allowed for solar panels. In 2007 there were 106,000 interventions with an estimate of primary energy savings of 880 GWh/y and CO<sub>2</sub> avoided of 193,000 t/y, the data for 2008 aren't definitive but there were more than 200,000 interventions with energy savings and CO<sub>2</sub> avoided not yet measured.

In the field of electrical appliances the target is the replacement with high efficiency appliances; from 2010 it's forbidden the sale of electrical appliances of energy class lower than A.

For the lighting, the target is the replacement of incandescent lamps with compact fluorescent lamps through white certificates, information programmes, and incentives for fluorescent lamps.

### **Transport Sector**

The 2007 and 2008 Financial Laws settled the incentives to substitution of park vehicles with vehicles at low consumption and vehicles at LBP or natural gas.

The targets of consumption of biofuel and other renewable fuels in transport sector are increased at 2.5% within 31st December 2008 and 5.75% within 31st December 2010. The obligatory quota that has to be introduced in the consumption is 2.0% in 2008 and 3.0% in 2009.

### **Industrial Sector**

In the recent years the main energy efficiency measures were incentives for replacement with electrical motors and inverters at high efficiency, lighting control systems, high efficiency cogeneration and using mechanical vapour compression.

In the "Industry 2015" Programme to increase the competitiveness of the industry 30 projects to energy efficiency and energy savings were selected through announcement and will be finance by the public funds: 200,000,000€ on 500,000,000€ of total investments . The projects concern:

- energy efficiency: high efficiency materials for buildings and bioclimatic architecture, high efficiency machinery and motors, technologies to improve energy efficiency in the industrial process and high efficiency electrical appliances;
- energy production: photovoltaic solar, thermo-dynamic solar, wind and energy by wastes.

### **Tertiary Sector**

The energy efficiency measures for the tertiary sector are the same for residential sector about buildings, electrical appliances and lighting. The tertiary can also use the incentives for the cogeneration and the white certificates system.

### **Cross-cutting measures**

The energy efficiency measures involve in energy efficiency, energy savings and spread of the renewables. The main measures are market-based: white certificates and green certificates.

The white certificates are documents witnessing that electricity and gas distributors achieved the annual energy saving targets by carrying out projects. This obligation may be honoured either by conducting operations directly or by resorting to related service companies or by purchasing the corresponding white certificates on the market. These certificates, each of which represents the achievement of primary energy savings of one toe, are issued annually by GME (the Electric Market Manager) to each distributor after verification of results achieved.

The green certificates are certificates that certify the production of electricity from renewables. These certificates issued by GME can be exchanged bilaterally or in the market. Using the green certificates the electricity producers and importers with more of 100GWhe/y can comply with the compulsory quota of electricity from renewables. A green certificate is associate with one MWhe/y of electricity produced by a renewable plant and its length depends on the plants type. Also the Renewable Energy Certificate System is starting.

The Law Decree n. 20/2007 puts into effect the 2004/8/CE Directive the for promotion and development of high efficiency cogeneration of heat and power based on useful heat demand and primary energy savings in the internal energy market. The support for the high efficiency cogeneration is carrying out through the exemption of the purchase of green certificates, the priority in the distribution, obtaining the white certificates if the plant was accomplished by ESCo or electricity and gas distributors.

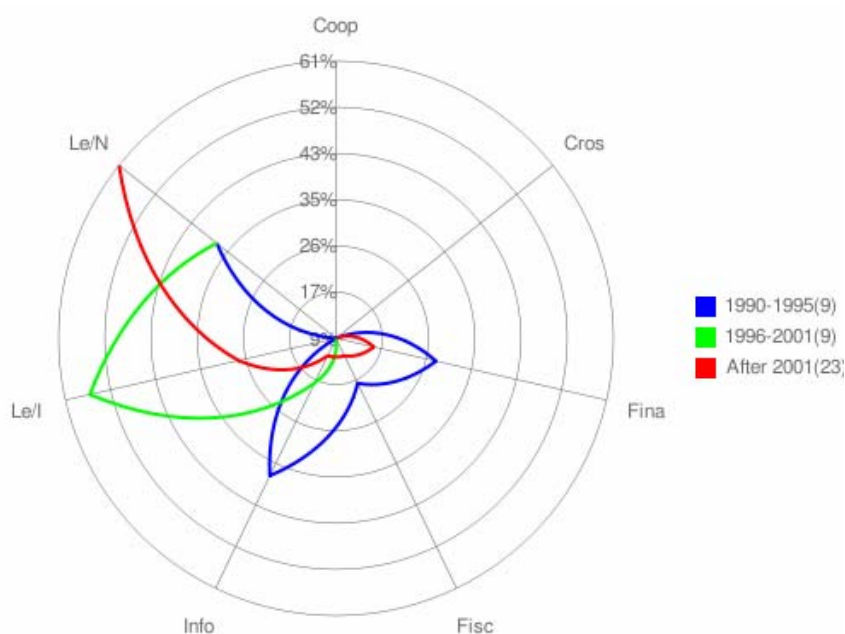
The Ministry of Economic Development with Environment Ministry and State-Regions Conference is settling the regional targets in order to have the 17% of final energy consumption from renewables in 2020. For this aim the diffusion of the renewables by source and region was checked to identify the potentials of development and to go on with the target sharing. Also Confindustria is working to make a proposal on the burden sharing of renewables to submit to the Ministry.

## 4.2 Patterns and Dynamics of Energy Efficiency Measures

### Residential Sector

For the residential sector it's been put a energy efficiency measures mix into action:

- informative and financial in order to awaken families to energy savings and efficiency;
- normative mainly about buildings: solar panels for heating and hot water, energy certification and energy performance minimum requirements, thermal plants and cooling installations.

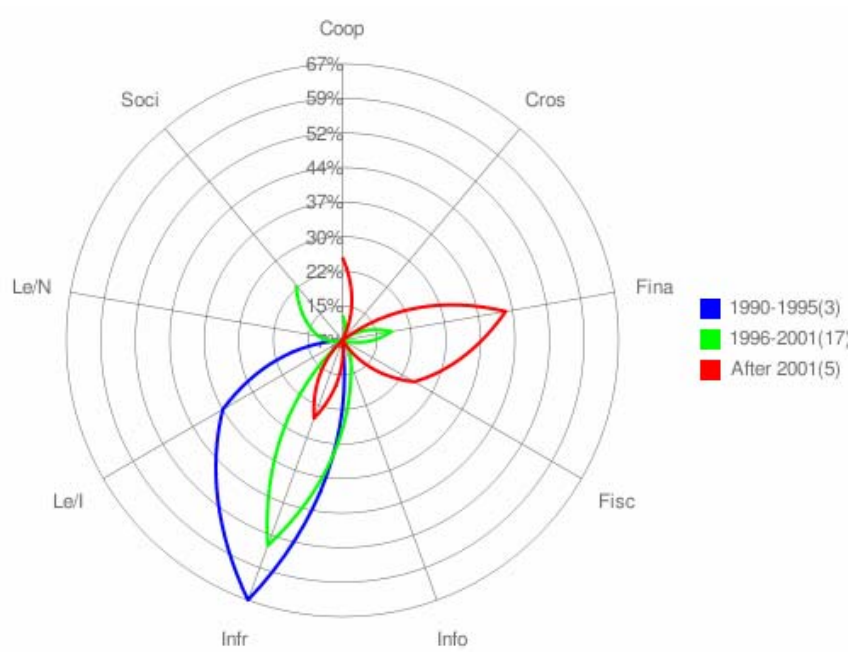


The trend is to put the bases for energy efficiency interventions more complex and structured such as thermal insulation of the opaque building surfaces and photovoltaic plants.

### Transport Sector

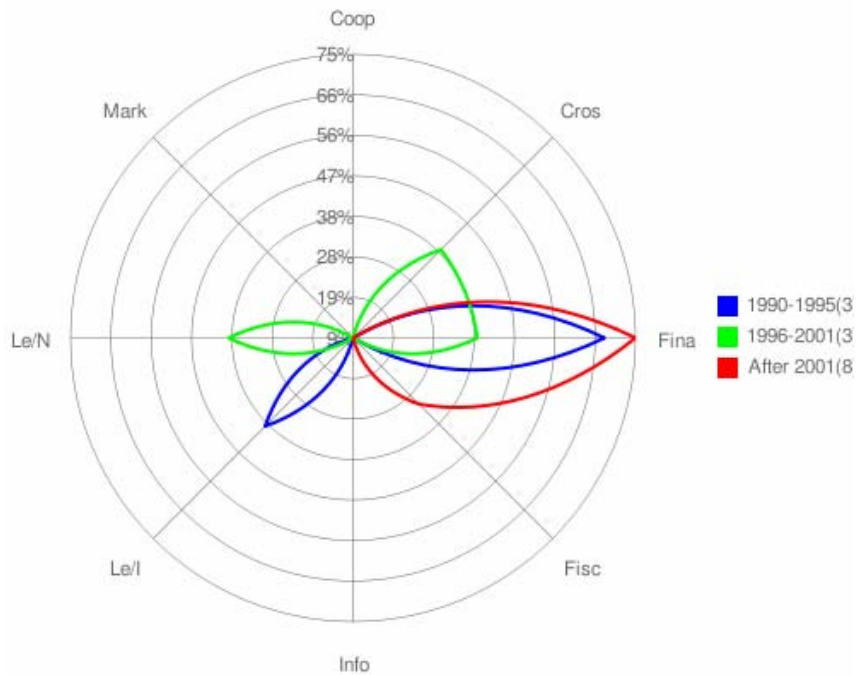
Until 90s years the main measures were infrastructure types, in the last 15 years there were a mix of measures. The first measures types became the financial types (incentives for the shift to LPG or natural gas vehicles and incentives to replace the low efficiency cars), but also fiscal (implementation of EU Directive on use of biofuels), cooperative measures (Voluntary Agreement Ministry of Environment/FIAT/Unione Petroliera for the promotion of Methane Goods Vehicles and Distributors) and infrastructure types.

## Energy Efficiency Policies and Measures in Italy in 2007



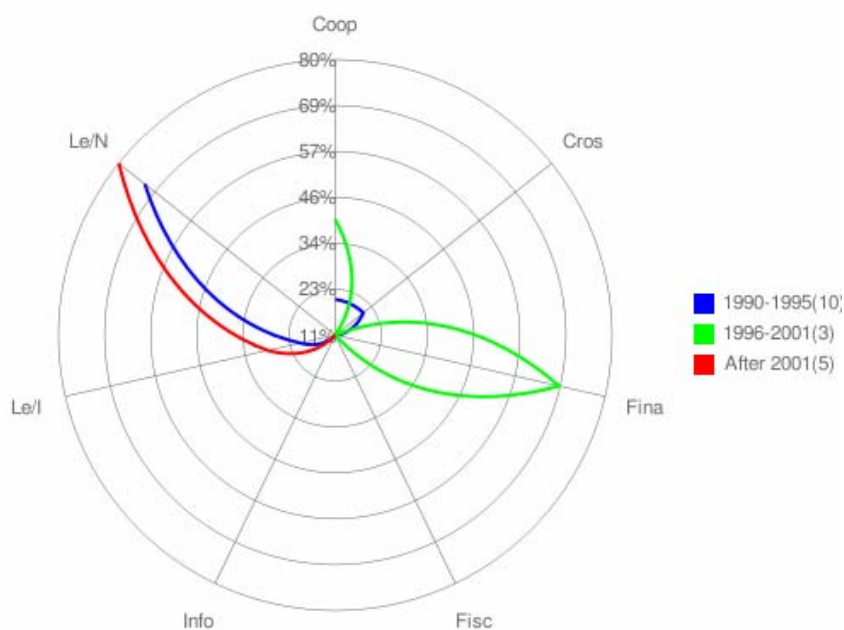
### Industrial Sector

In the last years the measures are only financial and fiscal types: incentives for use of efficient electric motors and inverters, for efficient lighting system and for promotion of cogeneration. White and green certificates aren't recent measures but their weight carries on growing.



### Tertiary Sector

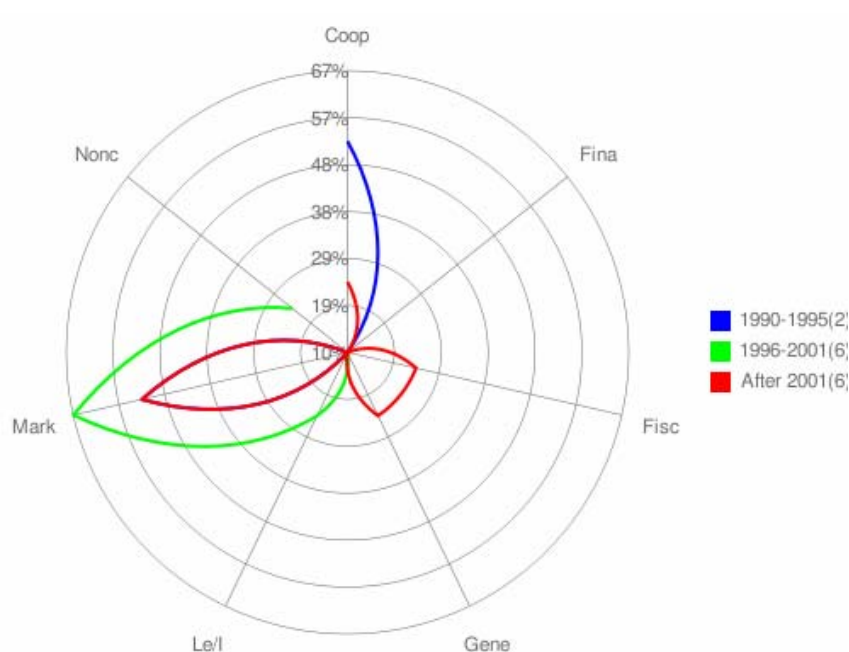
In the last years the measures are only legislative types for buildings (project, installation, working and maintenance of thermal plants in buildings, certification schemes for new and existing buildings) and for energy efficiency (standards for efficient lighting and electrical appliances, fund for energy savings and efficiency).



### Cross-cutting measures

In the last years the energy measures to achieve the targets of energy savings and renewables were marked-based and fiscal types. The marked-based measures are mainly the white certificates for energy savings and green certificates to spread the renewables. The fiscal measures are preferential feed-in tariffs for renewables and CHP.

## Energy Efficiency Policies and Measures in Italy in 2007



To achieve the targets 20-20-20 also energy efficiency measures are put into action.

### 4.3 Innovative Energy Efficiency Measures

The most innovative energy efficiency measure is the Energy Efficiency Certificates, known as white certificates system (Ministerial Decrees 20/07/04 and 21/12/07). Each electricity and gas distributor with more than 100,000 final users has to achieve a target of energy consumption cut. The achieved energy savings in toe are certified by white certificates.

There are 3 types of white certificates: type I for electricity savings, type II for natural gas savings and type III for primary energy savings.

The white certificates are released by GME, after authorization of Regulatory Authority for Electricity and Gas which verifies the achievement of energy savings. The issued certificates can be exchanged bilaterally or in the market of white certificates organized by GME and have to be submitted by the energy companies to Authority in order to attest the achievement of the target and not suffer sanctions.

Also the ESCo can carry out energy efficiency projects and can take part in the market of white certificates.

Some changes were made in the white certificates system (Ministerial Decree 21/12/2007): the threshold for compulsory energy savings is 50,000 final users, higher

targets for 2008 and 2009, new targets for 2010-2012, public and private subjects with energy manager can directly use the incentives for energy efficiency without turning to an ESCo, equality of certificates type I and type II to achieve the targets. A mechanism of automatic absorption of the excess of certificates were also introduced: if there is a certificates supply greater of 5% than demand, the Authority increases the target of a amount equal to the excess.

After 3 years it's possible to identify the trends of white certificates system:

- continuous increase of certified energy savings;
- growth of ESCos both in number and their quota of certified energy savings;
- increase of the exchanges in the market compared with bilateral exchanges;
- increase of share of certified energy savings made by simpler and less expensive interventions.

The Law Decree n. 115/08 introduces important changes:

- connection between the compulsory energy savings for the energy distributors and the national targets of NEEAP;
- gradual introduction of the compulsory energy savings for the companies that sell energy to retail;
- updating of the qualifications to accede to the white certificates system;
- updating of the admissible interventions in order to the issue of white certificates;
- the Energy Efficiency National Agency has the assignment to develop a methodology to quantify the energy savings without a direct measurement;
- the Energy Efficiency National Agency has the assignment to check and monitore the completed projects and the adopted measures.

## 4.4 Energy efficiency measure evaluations

### 4.4.1 Semi-quantitative Impact Estimates of Energy Efficiency Measures

#### Residential Sector

Code	Title	Status	Type	Starting Year	Ending Year	Semiquantitative Impact
ITA1	Promotional Campaign for the Installation of High-Efficiency Bulbs	Completed	Information/Education	1990	1991	Low
ITA2	Energy Labelling for Washing and Drying Machines	Ongoing	Legislative/Informative	1998		Low
ITA3	Labelling of Building Components and Heating Equipment	Ongoing	Information/Education	1998		Low
ITA4	Energy Labelling for Refrigerators and Freezers	Ongoing	Legislative/Informative	1999		Low
ITA5	Additional Explanations for Project, Installation, Working and Maintenance of Thermal Plants in Buildings (update of D.P.R. 412/93)	Completed	Legislative/Normative	2000		Low
ITA6	Financial Package for High-Efficiency Equipment Installation	Completed	Financial	1991	1997	Low
ITA8	Information Campaign for Energy Saving	Completed	Information/Education	1991	1996	Low
ITA9	Information and Education Activity by ENEA	Completed	Information/Education	1991	2001	Low
ITA10	Energy Auditing of Buildings	Completed	Legislative/Informative			Low
ITA12	Limit to the Heating Period of Buildings	Ongoing	Legislative/Normative	1993		Low
ITA13	Energy Labelling for Dishwashers	Ongoing	Legislative/Informative	1999		Low
ITA14	Fiscal Incentives for Energy Saving in the Household Sector	Completed	Fiscal/Tariffs	1992		Low
ITA15	Efficiency Standards and Labelling for New Boilers	Ongoing	Legislative/Informative, Legislative/Normative	1997		Low
ITA16	Design Norms for the Building and Thermal Equipment, Building Shell, and Thermal Plants Regulation and Metering	Completed	Legislative/Normative	1993		Medium

Energy Efficiency Policies and Measures in Italy in 2007

Code	Title	Status	Type	Starting Year	Ending Year	Semiquantitative Impact
ITA16	Design Norms for the Building and Thermal Equipment, Building Shell, and Thermal Plants Regulation and Metering	Completed	Legislative/Normative	1993		Medium
ITA19	Energy Labelling for Air Conditioners and Electric-Fired Ovens	Ongoing	Legislative/Informative	2003		Low
ITA23	New labelling of refrigerators and freezers	Ongoing	Legislative/Informative	1999		Low
ITA24	Energy Performance Minimum Requirements	Ongoing	Legislative/Normative	2006		Low
ITA26	Certification schemes for new and existing buildings	Ongoing	Legislative/Informative	2006		Low
ITA27	Thermal plants and cooling installations: maintenance and inspections	Ongoing	Legislative/Normative	2006		Medium
ITA28	Solar Energy	Ongoing	Legislative/Normative	2009		Low
ITA29	Standard for efficient lighting and electrical appliances	Proposed (advanced)	Information/Education, Legislative/Normative	2011		Medium
ITA30	Fiscal incentives for energy savings in the household sector	Ongoing	Financial, Fiscal/Tariffs	2006	2010	High
ITA31	Thermal plants: installation, working and maintenance	Ongoing	Legislative/Normative	2006		Low

**Transport Sector**

Code	Title	Status	Type	Starting Year	Ending Year	Semiquantitative Impact
ITA1	Urban Traffic Plans [P.U.T. - Piani Urbani del Traffico] and Urban Mobility Plans	Ongoing	Infrastructure	1997		Low
ITA2	Incentives for the conversion of pre EURO 0, EURO 0 and EURO 1 vehicles to GPL or natural gas	Ongoing	Financial	2000		Low
ITA3	Voluntary Agreement between FIAT and Environment Ministry	Completed	Co-operative Measures	1997	2005	Medium
ITA4	Programmes for the Sustainable Mobility Enhancement	Ongoing	Infrastructure, Social Planning/Organisational	2001		Low

Energy Efficiency Policies and Measures in Italy in 2007

Code	Title	Status	Type	Starting Year	Ending Year	Semiquantitative Impact
ITA5	Agreement Protocol between ENEA and Federtrasporti	Completed	Infrastructure	1999	2001	Low
ITA6	Compulsory Inspection for Motor Vehicles	Ongoing	Legislative/Informative	1995		Low
ITA7	Financial Grants for Mobility Managers' Programmes	Ongoing		2001		Unknown
ITA8	Sustainable Mobility in Urban Areas and Mobility Management	Ongoing	Infrastructure, Social Planning/Organisational	1998		Low
ITA9	Development of Cycle Mobility	Ongoing	Information/Education/Training	1998		Low
ITA10	Car-Restricted Areas Planning in Major Towns [Z.T.L. - Zone a Traffico Limitato]	Ongoing	Infrastructure	1993		Low
ITA11	The Blue Label	Ongoing	Legislative/Normative	1998		Low
ITA12	Use of Bio-Diesel for Public and State-Owned Vehicle Fleets	Proposed (advanced)	Co-operative Measures			Medium
ITA13	Financial Packages for Old Vehicles Replacement	Completed	Financial	1997	2003	Low
ITA14	Financial Contributions for the Purchase of Vehicles with a Low Environmental Impact	Completed	Financial	2003		Low
ITA15	Voluntary Agreement Ministry of Environment/FIAT/Unione Petrolifera for the promotion of Methane Goods Vehicles and Distributors	Ongoing	Co-operative Measures	2003		Medium
ITA16	Agreement Protocol between Environment Ministry and Federtrasporti	Ongoing	Infrastructure	1999		Low
ITA17	Roadway Parking Rate in Urban Areas	Ongoing	Infrastructure	1993		Low
ITA18	Improved Mobility in the Smaller Italian Islands (MINIMI Project) [Mobilità Innovativa Nelle Isole Minori Italiane]	Ongoing	Infrastructure	2001	2004	Low
ITA19	Implementation of EU Directive on use of biofuels	Ongoing	Fiscal	2005		Low

Energy Efficiency Policies and Measures in Italy in 2007

Code	Title	Status	Type	Starting Year	Ending Year	Semiquantitative Impact
ITA20	New financial package for old vehicles scrapping	Ongoing	Financial	2008	2009	Low
ITA21	Voluntary Agreement between the Ministry of Environment and the Union of Italian manufacturers of two and three wheeled vehicles	Ongoing	Co-operative Measures	2002		Low
ITA22	Motorways of sea: the Ecobonus	Ongoing	Infrastructure	2007	2009	Low

**Industrial Sector**

Code	Title	Status	Type	Starting Year	Ending Year	Semiquantitative Impact
ITA1	Definition of Energy Prices (Pricing Scheme CIP 6/92)	Ongoing		1997		Medium
ITA2	Energy Manager's Appointment for R.U.E. in Industry	Ongoing	Legislative/Informative	1991		Low
ITA3	Taxation on CO <sub>2</sub> , SO <sub>2</sub> and NO <sub>x</sub> Emissions by Combustion Power Plants [Carbon Tax]	Completed	Cross-cutting with sector-specific characteristics	1999	2005	Unknown
ITA4	Evaluation Criteria for Financial Grants Distribution Concerning Energy Saving	Completed	Financial	1991		Low
ITA8	Financial Package for the Establishment in Municipal Gas Utilities of Low Grade Heat Production Equipment	Completed	Financial	2001	2002	Low
ITA10	Norms for the Design, Installation, Management and Maintenance of Thermal Equipment for Offices	Ongoing		1991		Unknown
ITA12	Financing for energy efficiency and diffusion of renewables	Completed	Financial	2005		Low
ITA13	Market incentives: green and white certificates	Ongoing	Legislative/Normative	2000		Medium
ITA14	Efficient lighting system	Ongoing	Financial, Fiscal/Tariffs	2007		Low
ITA15	Efficient electric motors and inverters	Ongoing	Financial, Fiscal/Tariffs	2007		Medium
ITA16	Promotion of cogeneration	Ongoing	Financial	2007		Medium

Energy Efficiency Policies and Measures in Italy in 2007

**Tertiary Sector**

Code	Title	Status	Type	Starting Year	Ending Year	Semi-quantitative Impact
ITA1	First Financial Package for CHP Plants and District Heating Equipment Installation	Completed	Co-operative Measures	1999	2004	High
ITA2	Unification of Appraisal Criteria and Tools for the Distribution of Financial Grants.	Ongoing	Co-operative Measures	1991		Low
ITA3	Norms for Installation, Management and Maintenance of Thermal Equipment in Offices.	Completed	Legislative/Normative	1991		High
ITA4	Design Norms for Thermal Plant Regulation and Metering	Completed	Cross-cutting with sector-specific characteristics	1993		Low
ITA5	Installation of PV Roofs connected to the Power Grid [Programma Nazionale dei 10.000 Tetti Fotovoltaici]	Completed	Financial	2001	2006	Low
ITA6	Labelling of Building Components and Heating Equipment	Ongoing	Legislative/Informative	1991		Medium
ITA7	Installation of Solar Thermal Equipment in Central and Southern Italy Municipalities [Comune Solarizzato]	Completed	Financial	2001	2008	Low
ITA8	Limit to the Internal Temperature of Buildings	Ongoing	Legislative/Normative	1993		Low
ITA9	Design Norms for Thermal Equipment	Ongoing	Legislative/Normative	1993		High
ITA10	Design Norms for Building Shell	Ongoing	Legislative/Normative	1993		High
ITA11	Design Norms for the System	Completed	Legislative/Normative	1993		High
ITA12	Project, installation, working and maintenance of thermal plants in buildings	Ongoing	Legislative/Normative	2006		Low
ITA13	Thermal plants and Cooling installations: maintenance and inspections.	Ongoing	Legislative/Normative	2006		Medium
ITA14	Energy Performance Minimum Requirements	Ongoing	Legislative/Normative			Unknown
ITA15	Certification schemes for new and existing buildings	Ongoing	Legislative/Informative	2007		Low

Energy Efficiency Policies and Measures in Italy in 2007

Code	Title	Status	Type	Starting Year	Ending Year	Semiquantitative Impact
ITA17	Standards for efficient lighting and electrical appliances, Fund for energy savings and efficiency	Ongoing	Legislative/Normative	2008		Medium

**Cross-cutting measures**

Code	Title	Status	Type	Starting Year	Ending Year	Semiquantitative Impact
ITA1	Incentives for energy production using PV conversion from solar energy	Ongoing	Fiscal Measures/Tariffs	2005		Low
ITA2	New decrees on energy efficiency	Ongoing	Co-operative Measures, General Energy Efficiency / Climate Change / Renewable Programmes, Market-based Instruments	2004		High
ITA3	New Quantitative Targets for the Enhancement of Efficiency in Energy Residential Uses	Ongoing	Market-based Instruments	2001		Low
ITA4	Green Certificates for Energy Production	Ongoing	Market-based Instruments	2000		Low
ITA5	Definition of Energy Prices (CIP 6/92 Pricing Scheme)	Ongoing	Co-operative Measures, Market-based Instruments	1992		Low
ITA6	Energy Efficiency Targets for Electricity and Natural Gas Supply Utilities	Ongoing	Legislative/Normative Measures, Market-based Instruments, Non-classified Measure Types	2001	2006	High

The energy measures types have different impacts on the sectors:

- financial/fiscal measures such as the incentives for energy efficiency interventions are the energy measures with high/medium Semi-quantitative Impact Estimates on residential and industrial sectors;
- cooperative measures, mainly voluntary Agreement, have medium Semi-quantitative Impact Estimates on transport sector;
- the legislative/normative measures to respect energy efficiency standards achieve high/medium Semi-quantitative Impact Estimates.

#### **4.4.2 Lessons from Quantitative Energy Efficiency Measure Evaluations**

A study was realized on the public buildings for developing a methodology of analysis in order to determine the validity of the possible interventions on the building-plant system. This analysis is necessary to define the actions to undertake for an intervention on wide scale.

The target of the study is estimating the energy savings in schools (no universities) and public offices. The first step was to estimate the number of the buildings used as schools or public offices. These buildings have been classified in 6 groups:

- 3 climatic zones: north, 2440 degree days, centre, 1677 degree days, south, 1143 degree days
- 2 periods of construction: before and after Law n. 373/76 on the energy savings in the buildings.

For each of the 6 groups it's been esteemed the energy consumption of a building type, the total consumption was calculated multiplying the consumption of one building for the number of buildings.

The interventions taken in consideration were thermal insulation of the opaque building surfaces, replacement of single glazing by double glazing, replacement of boiler, control of lighting system, new lighting system, solar panes for water heating, new air conditioner system, external solar shielding on the south side.

It's hypothesized to work on the 35% of the schools with prevalence of buildings older and situated in the south than in the north. The analysis highlighted that

greater energy savings take place in the older buildings, independently from climatic zone, and in the heating. The main interventions were replacement of single glazing by double glazing (46%), thermal insulation (22%) and shielding (19%).

For the public office it's hypothesized to work on the 35% of the buildings. The greater energy savings take place in the older buildings, independently from climatic zone, and for the heating and lighting. The main interventions were replacement of single glazing by double glazing (48%), thermal insulation (17%), shielding (14%) and new lighting system(8%).

For all the interventions is esteemed 20% reduction in primary energy, 18% thermic energy savings and 23% electrical energy savings.

## **5 National Developments under the EU Energy Efficiency Directive and the 20% Energy Efficiency Target of the EU**

Directive 2006/32/EC concerning energy end-use efficiency and energy services requires each Member State to achieve a national indicative target of 9% energy savings through measures to improve energy efficiency. For this aim some measures were put into action: Law n. 296/2006, energy efficiency standards in the construction industry, promotion of high-efficiency cogeneration etc.; “Industry 2015” Programme which stabilises the strategic lines for the future development and competitiveness of the Italian production system.

Italy submitted the Energy Efficiency Action Plan in June 2007 to comply with the Directive with the target of 9.6% energy savings in 2016 equal to 126,327 GWh/y. The proposed action plan based on a number of measures which may be summarised as follows:

- raising and extending in time the energy efficiency targets for electricity and gas distributors (white certificates);
- incentives to replace energy-hungry systems and appliances, with stringent time limits for putting them on the market;
- investment programmes to improve the efficiency of public lighting;
- stabilising the prevailing tax concessions (e.g. high-efficiency electric motors, replacement of refrigerators, efficiency in lighting and the construction industry, provided for by the Law 296/2006).

The energy efficiency measures are reported in the table 5.1.

**Table 5.1: Energy efficiency measure in NEEAP**

<b>Energy efficiency improvement measures</b>	<b>Annual energy savings expected in 2010 [GWh/year]</b>	<b>Annual energy savings expected in 2016 [GWh/year]</b>
Residential Sector:		
1) Thermal insulation of opaque surfaces of pre-1980 residential buildings	1) 3489	1) 12800
2) Replacement of single glazing by double glazing	2) 233	2) 930
3) Replacement of incandescent lamps (GLS) by fluorescent (CFL)	3) 1600	3) 4800
4) Replacement of dishwashers by class A appliances	4) 305	4) 1060
5) Replacement of refrigerators and freezers by class A+ and A++ appliances	5) 1210	5) 3860
6) Replacement of clothes washing machines by superlative class A appliances	6) 31	6) 410
7) Replacement by efficient electric water heaters	7) 700	7) 2200
8) Use of efficient air conditioners	8) 180	8) 540
9) Use of efficient heating installations	9) 8150	9) 26750
10) Balanced flues and wood-fired boilers	10) 1100	10) 3480
<b>Total Residential Sector</b>	<b>16,998</b>	<b>16,998</b>
Tertiary Sector:		
1) Use of efficient heating installations	1) 5470	1) 16600
2) Incentives for using efficient air conditioners	2) 835	2) 2510
3) Efficient lamps and control systems	3) 1400	3) 4300
4) Efficient lamps and luminous flux regulating systems (public lighting)	4) 425	4) 1290
<b>Total Tertiary Sector</b>	<b>8,130</b>	<b>24,700</b>
Industrial Sector:		
1) Efficient lamps and control systems	1) 700	1) 2200
2) Replacement of 1-90 kW electric motors by class Eff2 to Eff1 <sub>4</sub>	2) 1100	2) 3400
3) Installing inverters on 0.75-90 kWh <sub>s</sub> electric motors	3) 2100	3) 6400
4) High-efficiency cogeneration	4) 2093	4) 6280
5) Use of mechanical vapour compression	5) 1047	5) 3257
<b>Total Industrial Sector</b>	<b>7,040</b>	<b>21,537</b>
Transport Sector:		
1) Introduction of 140 g of CO <sub>2</sub> /km emissions limit (average for vehicles sold)	1) 3490	1) 23260
<b>Total Transport Sector</b>	<b>3,490</b>	<b>23,260</b>
<b>Total expected energy saving (national target)</b>	<b>35,658 (3%)</b>	<b>126,327 (9.6%)</b>

The energy measures for the residential sector cover the 45.0% of the target and involve in

- buildings: the energy certification defines the criteria, conditions and procedures for improving the energy performance of buildings with a view to encouraging the development, upgrading and integration of renewable energy sources and energy diversification, to helping to achieve the national greenhouse gas emission limitation targets and to promoting the competitiveness of the most advanced segments by technological development.
- electrical appliances.

The 17% of the target will be achieved by industrial sector working on efficient lamps and control systems, replacement of 190-kW asynchronous motors by Eff2 to Eff1, inverters for 190-kW asynchronous motors by Eff2 to Eff1, high-efficiency cogeneration, using mechanical vapour compression.

The tertiary sector contributes to the target of energy savings for 19.6% and involves in efficient heating, conditioning (as regards the portion not assimilated to the residential sector), lighting and public lighting.

In the tertiary sector the interventions concerned electrical appliances, motors/inverters and high-efficiency cogeneration are also included.

The transport sector efficiency depends substantially on the two factors: the growing energy efficiency of means of transport and the profound reorganisation of transport modes. The first is directly affected by improvements in traction technologies, but the second is determined by demand for mobility, network and service development policies and mobility control modalities.

The proposals for limiting energy consumption due to transport have to refer to the relevant Community policies recently reviewed by the “Draft Commission communication to the Council and to the European Parliament for the reduction of CO<sub>2</sub> emissions of cars and light commercial vehicles”. The measure proposed is the compulsory reduction of emissions from new vehicles to 140 gCO<sub>2</sub>/km from 2009. This measure will produce an energy savings of 23,260 GWh/y equal to 18.4% of the target.



## **Annex 1**

### **Energy Efficiency Measure Summary by Country**

**Residential sector**

Code	Title	Status	Type	Since
ITA2	Energy Labelling for Washing and Drying Machines	Ongoing	Legislative/Informative	1998
ITA3	Labelling of Building Components and Heating Equipment	Ongoing	Information/Education	1998
ITA4	Energy Labelling for Refrigerators and Freezers	Ongoing	Legislative/Informative	1999
ITA12	Limit to the Heating Period of Buildings	Ongoing	Legislative/Normative	1993
ITA13	Energy Labelling for Dishwashers	Ongoing	Legislative/Informative	1999
ITA15	Efficiency Standards and Labelling for New Boilers	Ongoing	Legislative/Informative, Legislative/Normative	1997
ITA19	Energy Labelling for Air Conditioners and Electric-Fired Ovens	Ongoing	Legislative/Informative	2003
ITA23	New labelling of refrigerators and freezers	Ongoing	Legislative/Informative	1999
ITA24	Energy Performance Minimum Requirements	Ongoing	Legislative/Normative	2006
ITA26	Certification schemes for new and existing buildings	Ongoing	Legislative/Informative	2006
ITA27	Thermal plants and cooling installations: maintenance and inspections	Ongoing	Legislative/Normative	2006
ITA28	Solar Energy	Ongoing	Legislative/Normative	2009
ITA29	Standard for efficient lighting and electrical appliances	Proposed (advanced)	Information/Education, Legislative/Normative	2011
ITA30	Fiscal incentives for energy savings in the household sector	Ongoing	Financial, Fiscal/Tariffs	2006
ITA31	Thermal plants: installation, working and maintenance	Ongoing	Legislative/Normative	2006

**Industry sector**

Code	Title	Status	Type	Since
ITA1	Definition of Energy Prices (Pricing Scheme CIP 6/92)	Ongoing		1997
ITA2	Energy Manager's Appointment for R.U.E. in Industry	Ongoing	Legislative/Informative	1991
ITA10	Norms for the Design, Installation, Management and Maintenance of Thermal Equipment for Offices	Ongoing		1991
ITA12	Financing for energy efficiency and diffusion of renewables	Completed	Financial	2005
ITA13	Market incentives: green and white certificates	Ongoing	Legislative/Normative	2000
ITA14	Efficient lighting system	Ongoing	Financial, Fiscal/Tariffs	2007
ITA15	Efficient electric motors and inverters	Ongoing	Financial, Fiscal/Tariffs	2007
ITA16	Promotion of cogeneration	Ongoing	Financial	2007

Energy Efficiency Policies and Measures in Italy in 2007

**Transport sector**

Code	Title	Status	Type	Since
ITA1	Urban Traffic Plans [P.U.T. - Piani Urbani del Traffico] and Urban Mobility Plans	Ongoing	Infrastructure	1997
ITA2	Incentives for the conversion of pre EURO 0, EURO 0 and EURO 1 vehicles to GPL or natural gas	Ongoing	Financial	2000
ITA4	Programmes for the Sustainable Mobility Enhancement	Ongoing	Infrastructure, Social Planning/Organisational	2001
ITA6	Compulsory Inspection for Motor Vehicles	Ongoing	Legislative/Informative	1995
ITA7	Financial Grants for Mobility Managers' Programmes	Ongoing		2001
ITA8	Sustainable Mobility in Urban Areas and Mobility Management	Ongoing	Infrastructure, Social Planning/Organisational	1998
ITA9	Development of Cycle Mobility	Ongoing	Information/Education/Training	1998
ITA10	Car-Restricted Areas Planning in Major Towns [Z.T.L. - Zone a Traffico Limitato]	Ongoing	Infrastructure	1993
ITA11	The Blue Label	Ongoing	Legislative/Normative	1998
ITA12	Use of Bio-Diesel for Public and State-Owned Vehicle Fleets	Proposed (advanced)	Co-operative Measures	
ITA15	Voluntary Agreement Ministry of Environment/FIAT/Unione Petroliera for the promotion of Methane Goods Vehicles and Distributors	Ongoing	Co-operative Measures	2003
ITA16	Agreement Protocol between Environment Ministry and Federtrasporti	Ongoing	Infrastructure	1999
ITA17	Roadway Parking Rate in Urban Areas	Ongoing	Infrastructure	1993
ITA18	Improved Mobility in the Smaller Italian Islands (MINIMI Project) [Mobilità Innovativa Nelle Isole Minori Italiane]	Ongoing	Infrastructure	2001
ITA19	Implementation of EU Directive on use of biofuels	Ongoing	Fiscal	2005
ITA20	New financial package for old vehicles scrapping	Ongoing	Financial	2008
ITA21	Voluntary Agreement between the Ministry of Environment and the Union of Italian manufacturers of two and three wheeled vehicles	Ongoing	Co-operative Measures	2002
ITA22	Motorways of sea: the Ecobonus	Ongoing	Infrastructure	2007

**Tertiary sector**

Code	Title	Status	Type	Since
ITA2	Unification of Appraisal Criteria and Tools for the Distribution of Financial Grants.	Ongoing	Co-operative Measures	1991
ITA5	Installation of PV Roofs connected to the Power Grid [Programma Nazionale dei 10.000 Tetti Fotovoltaici]	Completed	Financial	2001
ITA6	Labelling of Building Components and Heating Equipment	Ongoing	Legislative/Informative	1991
ITA7	Installation of Solar Thermal Equipment in Central and Southern Italy Municipalities [Comune Solarizzato]	Completed	Financial	2001
ITA8	Limit to the Internal Temperature of Buildings	Ongoing	Legislative/Normative	1993
ITA9	Design Norms for Thermal Equipment	Ongoing	Legislative/Normative	1993
ITA10	Design Norms for Building Shell	Ongoing	Legislative/Normative	1993
ITA12	Project, installation, working and maintenance of thermal plants in buildings	Ongoing	Legislative/Normative	2006
ITA13	Thermal plants and Cooling installations:maintenance and inspections.	Ongoing	Legislative/Normative	2006
ITA14	Energy Performance Minimum Requirements	Ongoing	Legislative/Normative	
ITA15	Certification schemes for new and existing buildings	Ongoing	Legislative/Informative	2007
ITA17	Standards for efficient lighting and electrical appliances, Fund for energy savings and efficiency	Ongoing	Legislative/Normative	2008

**Cross-cutting**

Code	Title	Status	Type	Since
ITA1	Incentives for energy production using PV conversion from solar energy	Ongoing	Fiscal Measures/Tariffs	2005
ITA2	New decrees on energy efficiency	Ongoing	Co-operative Measures, General Energy Efficiency / Climate Change / Renewable Programmes, Market-based Instruments	2004
ITA3	New Quantitative Targets for the Enhancement of Efficiency in Energy Residential Uses	Ongoing	Market-based Instruments	2001
ITA4	Green Certificates for Energy Production	Ongoing	Market-based Instruments	2000
ITA5	Definition of Energy Prices (CIP 6/92 Pricing Scheme)	Ongoing	Co-operative Measures, Market-based Instruments	1992
ITA6	Energy Efficiency Targets for Electricity and Natural Gas Supply Utilities	Ongoing	Legislative/Normative Measures, Market-based Instruments, Non-classified Measure Types	2001

## **Annex 2**

### **Country Profile**



# Energy Efficiency Profile : Italy

October 2008

## Energy Efficiency Trends

### Overview

The improvement in energy efficiency is slow compared to EU average: 3.4% in the period 1990-2005. The index reflects the negative performance in industry, specially in years 1990s, and the quite good results achieved in transport and households in the period.

### Industry

The industrial sector showed a loss of 3.5% in energy efficiency index in the period 1990-2005. The loss in efficiency was steady until 2000 but in the last years it seems an improvement (1.2% in 2005 and 0.6% in 2006 compared with the previous year). The bad result in industry is because of the different performances of industrial branches: the increase in the energy efficiency of some branches as chemicals, steel and cement, wasn't enough to counterbalance the cut in machinery and fabricated metals, textile and food. In the last years it seems there is a reversal of trend, specially in food (improvement of 7.8% in 2000-2006).

### Households

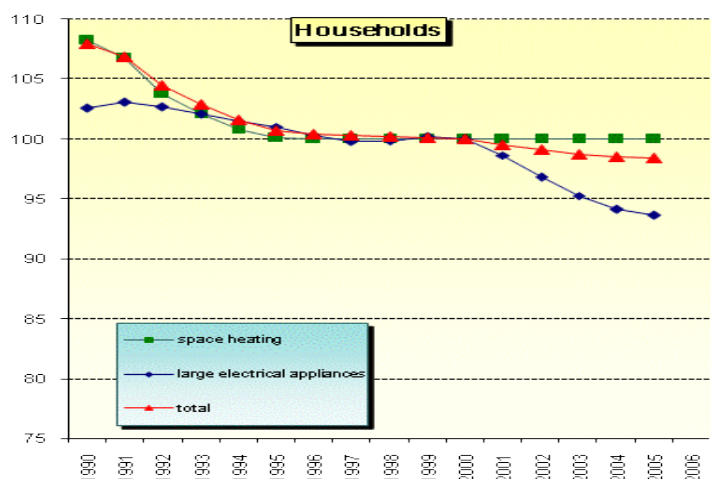
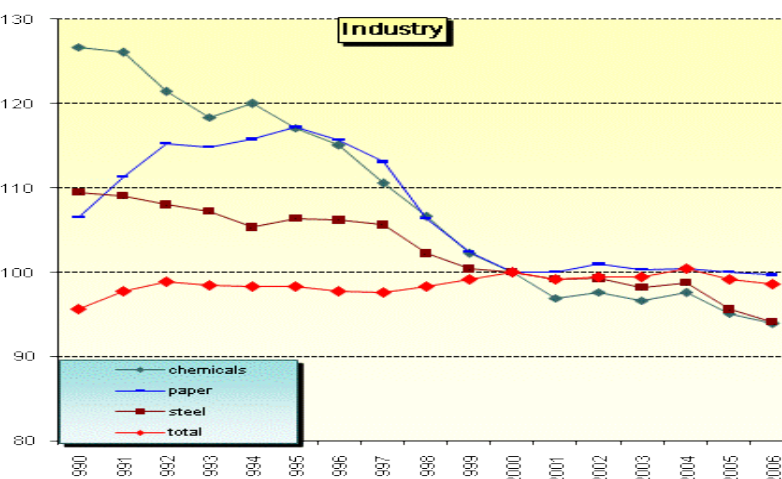
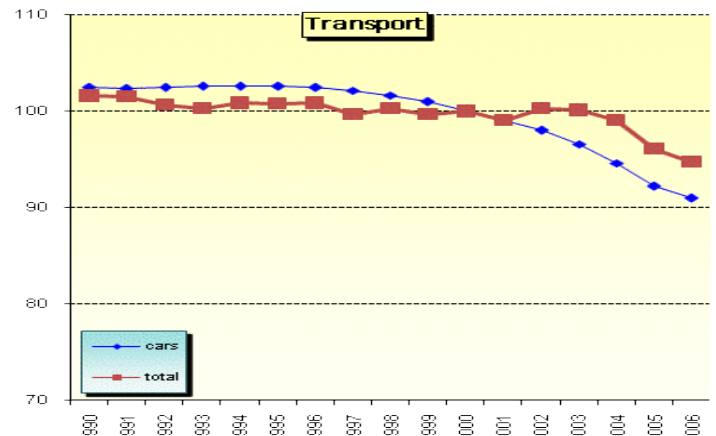
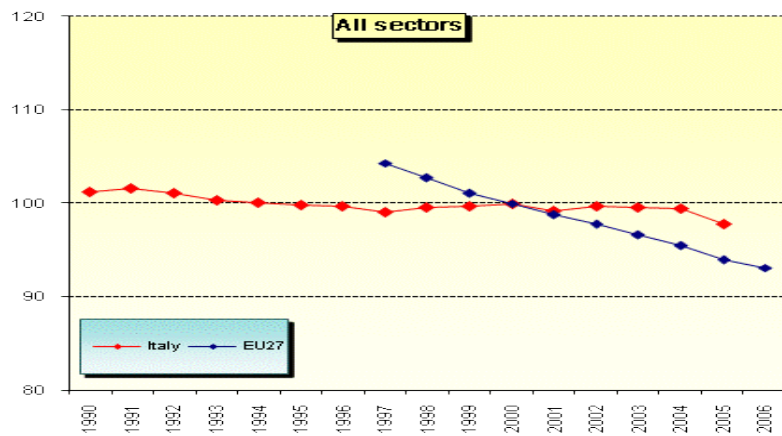
Households is the sector showed the best result in the improvement in energy efficiency: 9.6% in the period 1990-2005. In the first years 1990s there was the most increase

in energy efficiency, in the period 1996-2000 the improvement was slower. From the 2000 it's faster again because of a larger diffusion of electrical appliances with higher efficiency and increase in the use of fluorescent compact lamps. New measures are set to install the technologies for the efficient use of energy in the end-users such as interventions for the thermal isolation of the buildings, renewables for winter and summer air-conditioning. From 2000 the increase in the energy efficiency of large electrical appliances was 6.3% while it was 8.9% in the period 1990-2005.

### Transport

In the last years the energy efficiency in transport is improving more quickly: 5.5% in the period 1990-2005, but 3.9% in 2000-2005 and 1.4% in 2006 compared with 2005. This result is due principally to an increase in efficiency of cars (10.3%). The other transport modes show greater improvements in efficiency but they represent a little part of the transport sector. These good performances are counterbalanced by a decrease in the efficiency of trucks, even if in the last years some improvements seem to be carried out.

Energy efficiency index , base 100=2000



# Energy Efficiency Policy Measures

## Institutions and programmes

Italy submitted the action plan to achieve an energy savings of 9% in 2016 (directive 2006/32/EC). The plan shows the current and future actions sectors with an expected energy savings of 35.7 TWh/y in 2010 and 126.3 TWh/y in 2016.

From 2008 a fund of 40M€/y is established to promote renewable sources and energy efficiency.

New incentives are settled to increase the electricity generation from renewables (green certificates).

## Industry

Inside the "Industry 2015" programme (1,020 M€ in 2007-2009) to increase the competitiveness of the industry, the industrial innovation project on energy efficiency is settled. This project's aim is energy savings in industrial production and final uses and utilization of renewable energy sources. The actions concern investments in the sector of renewables, in new products with low environmental impact and capable of savings energy, in manufacturing processes to cut the energy intensity. The current actions involve the high efficiency co-generation, the mechanical compression of steam, the use of high efficiency electrical engine and inverters and high efficiency fluorescent lamps with automatic control on the basis of the natural light.

## Households, Services

The Laws n. 296/06 and n. 244/07 sets the principles and the methods to improve the energy efficiency in households. New buildings can be built only if they have a renewables system to produce electricity with a power at least of 1 kW of electricity for each dwelling (for industrial buildings larger than 100 m<sup>2</sup> the limit is 5 kW) and they have to be built to realize water savings. For the existing buildings the law settles a tax deduction equal to 55% of the costs for actions in energy savings in buildings (high efficiency boilers, high efficiency glasses, installation of solar panels, insulation...), a tax deduction equal to 20% for the purchase of electrical appliances at least of A+ class (from 2010 the sale of electrical appliances of energy class lower than A is forbidden) and a tax deduction equal to 36% for the substitution with high efficiency lighting appliances in commercial buildings. In 2007 there were 106.000 interventions with an estimate of primary energy savings of 880 GWh/y and CO<sub>2</sub> avoided of 193,000 t/y.

## Transport

To promote the use of biofuel and other renewable fuels, the objectives of consumption in transport sector are increased at 2.5% within 31<sup>st</sup> December 2008 and 5.75% within 31<sup>st</sup> December 2010. The obligatory quota that has to be introduced in the consumption is 2.0% in 2008 and 3.0% in 2009.

The action plan set the limit of emission equal to 140g CO<sub>2</sub>/km (average vehicles sold).

## Selected Energy Efficiency Measures

Sectors	Title of Measure	Since
All	Incentives for energy production using PV conversion from solar energy	2005
All	New decrees on energy efficiency	2004
All	Energy Efficiency Targets for Electricity and Natural Gas Supply Utilities	2001
All	Green Certificates for Energy Production from Renewable Sources	2000
Households	Energy Auditing of Buildings	2006
Households	Implementation of EU Directive 2002/91/CE on energy efficiency in buildings	2005
Transport	Implementation of EU Directive on use of biofuels	2005
Transport	Voluntary Agreement Ministry of Environment/FIAT/Unione Petrolifera for the promotion of Methane Goods Vehicles and Distributors	2003
Transport	Programmes for the Sustainable Mobility Enhancement	2001
Industry	Financing for energy efficiency and diffusion of renewables	2005
Tertiary	Installation of PV Roofs connected to the Power Grid [Programma Nazionale dei 10,000 Tetti Fotovoltaici]	2001
Tertiary	Installation of Solar Thermal Equipment in Central and Southern Italy Municipalities [Comune Solarizzato]	2001

Source: MURE data base

[www.mure2.com](http://www.mure2.com)

