

**The new Italian Energy Policy:
a forecast by the CEPRIG Model[®]**

by

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Abstract

The aim of the paper is two-fold: i) to provide a picture of the future scenarios of GHGs emissions in Italy, as forecasted by the CEPRIG model; ii) to illustrate and discuss the new Italian energy policy, in particular the Government proposal for GHGs emissions reduction. CEPRIG (Calculation of Emissions and Policy Reduction of the Italian GHGs) is a new dynamic model that is the basis of the new Italian energy and GHGs forecast. Its key features are the combination of different approaches (e.g. statistics and economic theory) and the high degree of flexibility in performing sensitivity analysis. The paper describes the CEPRIG methodology and structure of CEPRIG and analyses its main findings for future emissions scenarios. In its second part, the paper discusses the document by CIPE (Joint Government Committee for Economic Planning), approved in December 2002, containing the Italian guidelines for the reduction of GHGs emissions to 2008-2012. The paper discusses the CIPE guidelines, their general strategy, the interplay between domestic policies and resort to Kyoto mechanisms in GHGs abatement.

Italy and Kyoto: ambitions and reality

The year 2002 was a very important one for the Italian energy and environmental policies and their connection with the Kyoto Protocol. First of all, in June 2002 Italy ratified the Protocol; secondly, it established a new set of policy actions which should lead the country to meet its Greenhouse Gases (GHGs) target. Such policies are contained in a new document issued by CIPE (Interministry Committee for Economic Planning; CIPE 2002) which updates a former CIPE resolution published in 1998 (CIPE 1998). The new resolution, besides introducing substantial news in the Italian energy and environmental policy, proposes new GHGs emissions scenarios to 2010. The context in which the new resolution is issued in one is which GHGs emissions are increasing a lot and, according to the base scenarios of many models, will overcome Italy's target (1990 GHGs -6.5%) by about 20%. In fact, notwithstanding the improvements which occurred in the industrial sector in the last ten years, pushed by the transport and energy sectors, GHGs emissions are running out of control. Thus, fast and effective actions are necessary in order to establish such a control and lowering the business as usual trend. Certainly, this risky situation already stimulated a large set of proposal and legislative actions. Among the most important at national level, there are the following:

- Law 39/2002, which applies the EU Directive 2001/77/CE concerning the promotion of electricity produced by renewables.
- National Plans for: the development of agricultural and forestry biomass; information about Climate Change; research on Climate Change.

Some other measures, such as national voluntary agreements (e.g. in the transport sector) as well as the European Directives (e.g. the ones on Emissions Trading and the doubling of the renewables share) complete the set of policy maker efforts aiming at meeting the Kyoto target. Will this occur? To a large extent, the answer to such a question will depend on the quality of the contents of the new

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CIPE document and their degree of implementation. All the actions there proposed, especially those concerning the carbon emissions by fuel combustion, are thought on the basis of an energy and emissions scenario elaborated by the CEPRIG model.

The CEPRIG model

The main purpose of this section is to give a global and concise outlook of the CEPRIG model (Calculation of Emissions and Policy Reduction of the Italian GHGs). The CEPRIG model provides:

- Forecasts of GHGs emissions for the period 2000-2020 in Italy.
 - A framework for the assessment of alternative emission reduction paths.
- The model refers to the Italian energy system. It provides forecasts at the overall system level as well as sectorial forecasts for: electric generation industry, eleven industrial sub-sectors, agriculture, services, transportation and households. Forecasts are also disaggregated by energy source.

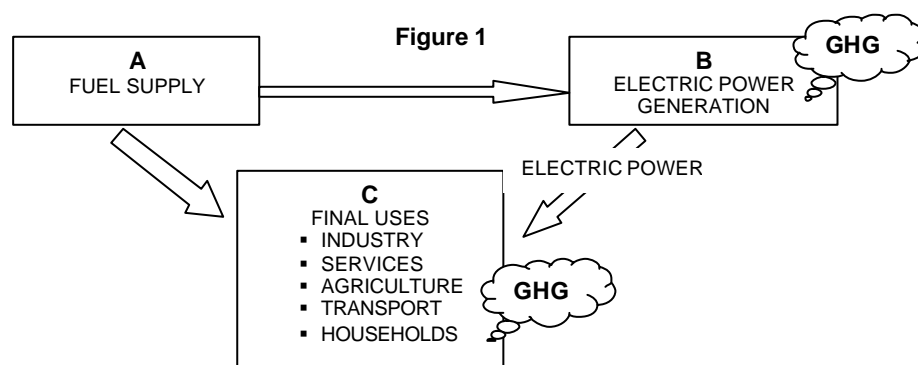
Basic structure and properties

Figure 1 shows the basic building blocks and relationship characterising the CEPRIG model. Fuels are supplied by block A directly to block B (Electric power generation) and to block C (Final Users). In turn, block B supplies electric power to block C. Both blocks B and C generate GHGs emissions. Emissions from final users are disaggregated between energy and non-energy related emissions.

The modelling techniques differ across blocks. Block A (fuel supply) is modelled in a very concise and indirect form. The only information we take into account is user-specific fuel prices (coal, oil, fuel oil, natural gas) which influence the demand for energy and the fuel mix. Price forecasts are exogenous to the model. At the given prices, we assume that supply is infinitely elastic, so that actual levels of fuel use are demand-determined.

As for Block B, CEPRIG provides a highly detailed representation (plant level disaggregation) of the existing electricity generation capacity. About 200 plants with a power of at least 100 MW are explicitly modelled¹. Additional data on generation capacity in Italy have been taken into account, based on estimates published in the 1998 Yearly Report by Enel. Moreover, the model embodies forecasts on future capacity expansion. Data are then grouped in 14 classes according to the technological characteristics of the plant. Given demand coming from block C, the model then allocates production across plants by simulating an electric exchange mechanism, whose design is analogous to the one currently in operation in the UK. More details are contained in a Technical Report, available on request.

Block C includes all final users of fuels and electricity, namely, industry, services, agriculture, transportation and households. Although due care is taken of sectorial specificities, all sub-sectors are dealt with within a common framework. The basic assumption here is that the demand for each energy source is the outcome of a stochastic process, whose properties are estimated on the basis of past observation and projected in the future. Experts' judgment is taken into consideration especially in assessing the possibility that the stochastic properties of the demand of energy may break down in the next future, thus making past observation an unreliable predictor of future events. Although the model is not micro-founded in strictly economic terms, economic choice in block C is also present in a form to be specified in next subsection, which is entirely devoted to exposing in some technical detail the modelling technique adopted for block C.



¹ Belonging to companies such that Enel, Edison, Sondd, Eni, local authorities and other independent producers.

Modelling final energy users

Suppose that there exist n sectors, m energy sources and T time periods. For the sake of simplicity, we temporarily consider just one greenhouse gas. Let E_i^{ht} be the direct² gas emissions at time t ($t=1,2,\dots,T$), related to the use of source h ($h=1,2,\dots,m$) in the i -th sector ($i=1,2,\dots,n$). Then the following relation holds by definition in the i -th sector:

$$(1.1) E_i^{ht} = c^h R_i^t s_i^{ht} Y_i^t$$

where:

- c^h : emission coefficient, related to the use of the h -th source (time- and sector-independent)
- R_i^t : overall energy intensity in sector i -th at time t
- s_i^{ht} : share of the h -th energy source in sector i -th at time t ($\sum_{h=1}^m s_i^{ht} = 1$)
- Y_i^t : activity level of the i -th sector at time t

Total emissions from the i -th sector are:

$$\sum_{h=1}^m E_i^{ht} = \sum_{h=1}^m c^h R_i^t s_i^{ht} Y_i^t = E_i^t$$

and block C overall direct emissions are:

$$\sum_{i=1}^n E_i^t = E^t$$

Given the emission coefficients, CEPRIG specifies for each sector:

- two autonomous linear difference equations:

$$(1.2) Y_i^t = (1 + a_i) Y_i^{t-1}$$

$$(1.3) R_i^t = (1 + b_i) R_i^{t-1}$$

- a time path for shares

$$(1.4) \begin{matrix} s_i^{11}, s_i^{21}, \dots, s_i^{m1} \\ s_i^{12}, s_i^{22}, \dots, s_i^{m2} \\ s_i^{1T}, s_i^{2T}, \dots, s_i^{mT} \end{matrix}$$

Under (1.1)-(1.3) and exogenous initial values Y_i^0, B_i^0 (time 0 being the year 1999), an entire path for energy consumption and gas emissions is then determined, for every choice of a_i, b_i and of (1.4).

In the next paragraph the technique for determining a_i, b_i and (1.4) is presented.

Forecasting shares and intensities

Let g_i^{ht} be the yearly growth rate of the flow of the h -th energy source employed in the i -th sector at time t . We assume that g_i^{ht} is normally distributed with mean \bar{g}_i^h and standard deviation σ_i^h . The sample mean (\hat{g}_i^h) and sample standard ($\hat{\sigma}_i^h$) of g_i^{ht} have been computed for the 1985-1999 period for every h and i . Let us then define:

$$\hat{F}_i^{ht} = F_i^{h1998} (1 + \hat{g}_i^h)^t, \quad t=1, 2, \dots, T$$

i.e. the flow of the h -th source which would be used by the i -th sector at various times in the future, if the (constant) growth rate equalled the mean growth rate estimated in the 1985-1999 period. Then we computed the i -th source shares:

² We include electric power among the energy sources, but with a zero emission coefficient. All emissions from electric power generation are attributed to block B (and they are indirect emissions from the viewpoint of block C)

$$\hat{S}_i^{ht} = \frac{\hat{F}_i^{ht}}{\sum_{r=1}^m \hat{F}_i^{rt}}$$

We then get, for each collection of estimated mean growth rates

$$\hat{g}_i^1, \hat{g}_i^2, \dots, \hat{g}_i^m$$

a percentage distribution of the demand for energy over sources, for every year of the 1-T period (and for every sector). We refer to this distribution as the Baseline Share Scenario (BSS).

Forecasting activity levels and energy intensities

For industry and industrial sub-sectors, agriculture and services, the variable measuring the activity level is value added at constant prices (source: ISTAT)³. For the household sector, the variable used is dwelling space (square meters).

The estimation procedure for value added is largely similar to the one used for shares forecasting. Let a_i^t be the yearly growth rate of value added in the i -th sector at time t . We assume that a_i^t is normally distributed with mean \bar{a}_i and standard deviation σ_i^a . The sample mean (\hat{a}_i) and sample standard deviation ($\hat{\sigma}_i^a$) of a_i^t have been computed for the 1985-1999 period for every i .

We then get the path:

$$Y_i^t \circ Y_i^0 (1 + \hat{a}_i)^t, \quad t=1, 2, \dots, T$$

which we refer to as the Baseline Growth Scenario (BGS), where Y_i^t is value added for sector i at time t and Y_i^0 is the base-year sectorial value added.

Energy intensity is the ratio between the flow of energy used and the flow measuring the activity of a given sector (value added for industry, agriculture and services; km² of dwelling space for the household sector). We estimated the rate of change of sectorial energy intensity (b_i , $i=1,2,\dots,n$) by a procedure identical to the one exposed in the previous subsection, with respect to a_i .

We then computed a sample mean \hat{b}_i and the forecasted path:

$$EI_i^t \circ EI_i^0 (1 + \hat{b}_i)^t, \quad t=1, 2, \dots, T$$

We called it the Baseline Intensity Scenario (BIS).

Transportation

As for the transportation sector, CEPRIG distinguishes among road, railway, air and water transports. As regards road transportation, forecasts on the flows of energy consumption and emissions are based on an explicit representation of the stock of vehicles (cars and heavy vehicles), disaggregated by fuel type (gasoline, diesel, natural gas). For motorcycles and buses, flows energy consumption and emissions are forecasted independently of the stock, simply taking into account the sector's energy consumption.

Non-energy related Greenhouse Gases emissions

CEPRIG also forecasts GHGs emissions originated by non-energy uses. Specifically, we consider

- agriculture (methane, NO_x),
- metal production (HFC),
- production and consumption of HFC, PFC, SF6
- industrial processes (CO₂, methane, NO_x),
- waste (CO₂, methane, NO_x)

For each sector, the IPCC classification is adopted. Forecasts are based both on time series and on qualitative information, given the lack of sufficiently long series⁴.

³ There also exists a version of CEPRIG using production indices (for industry), but the present one has been preferred because of the greater ease of aggregation.

⁴ Although CEPRIG forecasts non-energy GHGs, the forecasts adopted for the CIPE document (CIPE 2002) were elaborated by experts of the National Environmental Protection Agency (ANPA).

Investigating Italy's energy future

Italy is engaged in a 6.5% emissions reduction with respect to the 1990 level. Since CO₂ emissions in the base year were about 521 Mt., the target is 487 Mt. CO₂ eq./year in the period 2008-2012. This amount was by far overcome in 2000, when CO₂ emissions reached 546.8 Mt. The CEPRIG base scenario forecasts an increase to about 580 Mt. in the year 2010. This means, if the scenario is correct, that Italy will have to abate 92.6 Mt. CO₂ eq./year. But what are the hypotheses of this base scenario? And what is the detail of each economic sector? Being CEPRIG a very flexible model, it allows several experiments with alternative assumptions. The CEPRIG base scenario (BS) considers a GDP medium annual growth of 2%, a stationary trend for population and incorporates the law in force, as they are reflected in the time series which represent the fundamental basis for the CEPRIG forecast. Table 1 shows the situation in the base year (1990), in 2000 and the forecasted trends for the next 20 years (BS). It is possible to notice that the total emissions after 2005 increase more than 5% every five years, i.e. about twice the growth rate of the historical trend since 1990 to 2000. Generally speaking, almost 80% of the overall emissions come from energy uses (see Fig. 2). In the base year they were about 425 Mt. and they increased by 6.4% in the next decade. The major responsible for this growth was the raise in the level of activity, not completely covered by significant improvements in energy efficiency or switch towards a greener fuel mix. The highest growth rate was registered in the transport sector (+20.4%), whilst emissions from manufacturing and constructions decreased by 9.7%. During the period 2000-2010 the model estimates a further 7% increase in emissions from energy uses. Even if the model incorporates a certain kind of saturation trend for the vehicles fleet, the transport sector still shows the higher growth rate (+14%). The manufacturing and constructions sector registers an increase by around 3%.

Figure 2: GHG emissions from energy use, Mt. CO₂ eq.

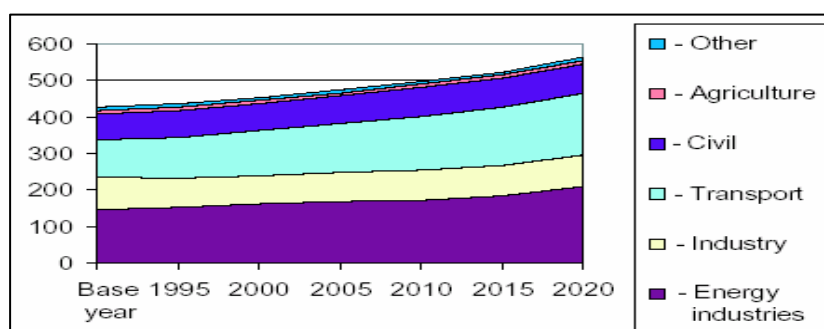


Table 1: Italy GHGs emissions by sector from 1990 to 2020 (Mt CO₂ eq.)

BASE SCENARIO	1990	2000	2005	2010	2015	2020
FROM ENERGY USES of which	424.9	452.3	456.0	484.1	513.1	553.9
- Energy industries	147.4	160.8	150.9	170.4	186.4	201.9
- Manufacturing and construction	85.5	77.9	79.1	80.2	84.2	88.2
- Transport	103.5	124.7	134.8	142.2	150.0	166.8
- Households and services	70.2	72.1	74.3	74.1	75.3	79.8
- Agriculture	9	9	9.1	9.6	9.5	9.4
- Other	9.3	7.8	7.7	7.6	7.8	7.8
FROM OTHER SOURCES of which	96.1	94.5	92.4	95.6	101.2	106.3
- Industrial processes	35.9	33.9	30.1	30.4	30.4	30.4
- Agriculture	43.4	42.6	42.0	41.0	41.0	41.0
- Waste	13.7	14.2	11.0	7.5	7.5	7.5
- Other	3.1	3.8	9.3	16.7	22.4	27.5
TOTAL	521.0	546.8	548.3	579.7	614.4	660.3

Energy sector

As far as the energy sector (power generation and refineries) is concerned, the annual growth rate of the electricity demand is expected to be nearly 2%. This increase will be satisfied by a growth in installed power, mainly due to new combined cycles, with an increase in power supply from 319 in 2000 to 385 TWh in 2010.

The basic scenario of the energy sector considers the effects of the measures implemented before 2002. Regarding to renewable sources, production should increase from 7 TWh in 2000 to 12 TWh in 2010, with doubled capacity, from 1700 to 3700 MW. This growth substantially reflects the 2% target set by the Decree 79/99 on renewable sources. The reference scenario also assumes a development in the cogeneration production from 60 TWh in 2000 to about 90 in 2010.

Industry

The industrial sector is composed of 11 sub-sectors. In particular, calculations include the emissions directly resulting from the industrial sector, with the exception of emissions from industrial process (separately specified).

The industrial sector is going through a period of slow down in the efficiency improvement, already exploited in previous years. Thus CEPRIG assumes that in a few sub-sectors (e.g. mechanical, food and paper) energy intensity will be constant in the next years, whilst further decrease (around -1%) is assumed for sub-sectors where energy intensity level is still high (e.g. chemicals, iron and steel, glass). The growth in the activity level varies among the sub-sectors, with food and paper among the most increasing sectors. A rather common feature of the sectors is the overall penetration of natural gas: as a whole, consumptions are set to increase by more than 2%/year between 2000 and 2005. At the same time the reduction of fuel oil consumption plays an important role in slowing down carbon emissions.

Transportation

CEPRIG's scenarios about car and truck fleets are reported in table 2.

Table 2 : Italian car and trucks fleet, 2000-2010 (number of vehicles)

	Total cars	Gasoline cars	Diesel cars	Gas cars	Trucks
2000	32,296,848	27,356,786	3,521,166	1,418,897	684,335
2005	34,927,130	29,317,097	3,929,416	1,680,617	818,638
2010	37,312,093	30,936,481	4,384,999	1,990,613	979,299

Policies and measures included in the base scenario can be divided into four categories: efficiency (mainly low-consumption vehicles), fuel optimization, modal optimization and infrastructures extension and modernization.

Households and services

The main feature in these sectors for the next decade is an increase in the level of activity with a consequent strong increase in gas (especially for heating purposes) and electricity consumption. The CEPRIG model evaluate the activity level of the residential sector through the area of dwellings: total square meters are supposed to increase by 1.4% per annum till 2015.

Agriculture

In the agricultural sector we assumed a moderate growth (0.6% year), and a modest penetration of gas, even if fuel oil will continue to be the main energy source.

Other sectors

This set includes emissions from the military activities, gas transportation and fugitive emissions. Between 1990 and 2000, they decreased and their trend is forecasted to be stable in the next years.

Emissions from non energy uses

These emissions, after a decrease in 1990-2000 by 1.7%, are expected to rise by about 1.1% in the next decade. Almost 45% of the overall emissions come from agriculture, but the trend is substantially stationary. Emissions from industrial processes, accounting for more than 35%, seem to be under control and will remain constant at around 30 Mt. CO₂ eq. in spite of the increase in some critical productions (such as glass and lime).

The new climate change policies

The new policy guidelines contained in the document by CIPE (CIPE 2002) represents a substantial step ahead with respect to the analogous document issued by CIPE in 1998 (CIPE 1998). One of the merits of the old resolution was in the fact that it pointed out, sector by sector, a set of actions to be done and the related carbon abatement. In other words, it found areas of possible fuel greening and energy efficiency improvements within the Italian energy system. Nevertheless, two main limits affected this document: firstly, it was more focused on general actions and carbon abatement targets rather than specific tools for attaining those targets. Secondly, it contained no obligation for the sectors' emissions. Thus, in spite of the good screening of the possible areas of intervention, it was weakened by its neglecting tools and obligations. The new document tries to overcome such limits. It is based on the following logic:

- it provides CO₂ emissions scenarios to 2010 for the main sectors, distinguishing between carbon emissions by fuels combustion and not
- Two kinds of scenarios are provided: base scenario (BAU) scenario and reference scenario. The latter is built by subtracting to the former a set of already located measures, both domestic and not (CDM-JI).
- The CO₂ emissions estimated in the reference scenario represent a binding cap for each sector. In particular, the energy and the industry sectors are constrained not to exceed their cap. If this occurs, they will have to compensate their surplus by acquiring either CERs (Certified Emissions Reductions) or ERUs (Emissions Reduction Units) through CDM-JI projects. Alternatively, they can buy CO₂ credits on the carbon market. In regards to the transportation sector, since emissions are the effect of the behaviour of millions of people and, thus, their control is very difficult, a compensation mechanism based on taxation and revenue recycling is supposed. Starting in 2004, the revenues coming from a tax of 1 Cent. Euro per fuel litre will be addressed to carbon storage measures in forestry Mt. CO₂/year.
- In spite of the inclusion of the already located measures, the reference scenario gives rise to a surplus in CO₂ emissions over the Kyoto target (+ 41 Mt.). This surplus will be compensated by a set of other possible actions, as well as by CDM-JI and/or ET.

The emissions of the reference scenario are presented in table 3 while a synthetic balance of emissions is given in table 4. This latter shows that a surplus in emissions equal to 41.0 Mt. CO₂ is expected. The set of possible, further measures hypothesised to cope with such a surplus is very wide. The only transport sector could host actions which stimulate an annual reduction in CO₂ emissions between 13.3 and 19.1 Mt. The reduction in the industrial sector is in the range 5.1-9.6 Mt., while about 3.8-6.5 Mt. could be abated as a result of the new Decrees on energy efficiency (Ministero dell'Industria 2001), establishing a program of "white certificates" for the residential sector. Finally, besides other additional actions which focus on industrial processes, agriculture and wastes, strong CO₂ abatement are estimated for CDM and JI projects: in the field of energy efficiency, renewables, gas flaring and venting, the reduction is in the range 15.5-38 Mt., while in the field of sinks it is in the range 5-10 Mt.

Table 3 : Italy reference scenario

REFERENCE SCENARIO	2010 (Mt. CO₂ eq.)
FROM ENERGY USES of which:	444,5
- Energy industries	144,4
- Manufacturing and construction	80,2
- Transport	134,7
- Households and services	68
- Agriculture	9,6
- Other	7,6
FROM OTHER SOURCES of which:	95,6
- Industrial processes	30,4
- Agriculture	41
- Waste	7,5
- Other	16,7
CDM-JI Carbon Credits	-12
TOTAL	528,1

Table 4 - Italy Emissions Balance (Mt. CO₂ eq.)

Base scenario	579.7
Reference scenario	528.1
Kyoto target	487.1
Surplus in emissions (base scenario)	92,6
Surplus in emissions (reference scenario)	41.0

The investment and the net costs of such interventions are given in table 5.

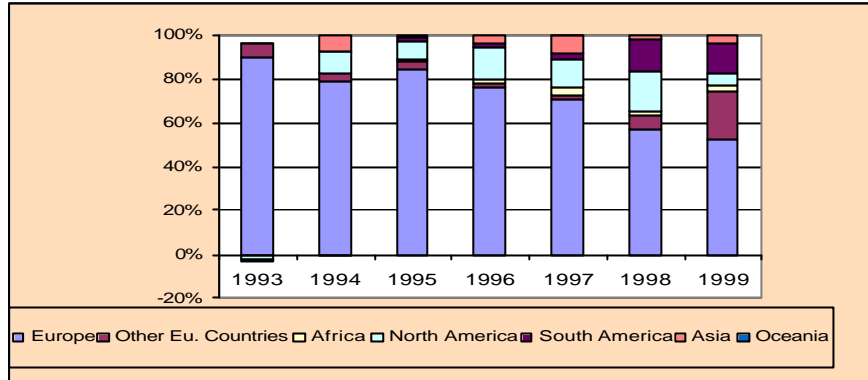
Table 5 - Investment and net costs for the Italian measures (Millions Euro)

	Investment (Mil. Euro)	Net Costs (Mil. Euro)
Measures in the reference scenario	8,940 - 10,450	1,170 - 1,603
Land use and forestry measures	526,7	526,7
Other measures	7,300 - 14,500	300 - 800
Total	16,766.7 - 25,476.7	1,996.7 - 2,929.7

The CIPE document refers also to some financial mechanisms for implementing some of the planned measures by aiding firms in their effort to comply with their caps. In particular, besides the above mentioned 1 cent Euro/litre tax, some money will be available due to the "Fund for the reduction of emissions in the atmosphere and the promotion of energy efficiency and sustainable energy" established in 2000. These funds will help the private sector in its effort to meet its target. Nevertheless, the major part of the burden remains on the private sector. Now, a question arises: will the private sector able to meet its targets? In other words, are the caps established by the government right? Or, if the government was wrong in the definition of the sectors' caps, are they too much strict or too much wide? In the first case, the private sector would be obliged to have performances in emissions beyond its possibility, and this would cause an excessive burden in terms of costs. In the second case, all the potential in emissions reduction of the private sector would not be exploited. In both cases, the behaviour of the sectors will be crucially dependent on the CO₂ price on the carbon market. A very low price would induce the firms not to respect their caps, the purchase of CO₂ credits being more convenient. In this case, even if the abatement is not domestically realised, the nation target would be met, and at a low cost. On the contrary, if the CO₂ price on the international market is high, the firms would find convenient to abate by their own. Nevertheless, if the cap set by the government is too strict, this would imply very expensive purchases of carbon credits by the firms.

In synthesis, the international carbon market will influence the degree of abatement domestically implemented as well as the cost of abatement. In any cases, if the scenario figures are close to reality, once the sectors have met their obligations, 41 Mt. CO₂ must still be abated. Will Italy be successful in doing it? Are the other, additional measures listed by the CIPE document realistic? Are the estimated CO₂ credits obtained through CDM and JI project realistic? An answer to such questions is very difficult; nevertheless some hint can be quite easily inferred by Italy's energy history. This history shows a rather different picture, one in which CO₂ emissions increase and firms have a quite low propension to invest abroad. As table 1 shows, CO₂ emissions are increasing and thus, if the future imitates the past, there is no reason why the other actions contained in the CIPE document should occur. Moreover, as Fig. 3 shows, the Italian Foreign Direct Investment outflows are mainly directed towards developed countries (especially inside the EU) and in the service sector (financial intermediation firstly). In particular, a wide share of the Italian FDI flows inside the European Union and towards financial intermediation. In other words, till now the FDI strategy followed by the Italian industry did not consider the wide and promising CDM and JI opportunities available in appropriate sectors and areas. So, both for the additional policies and CDM-JI, the past experience points out just an opposite picture compared to that designed in the CIPE resolution.

Fig. 3: % of Italian FDI outflows by area in 1993-1999 (source: Eurostat 2001)



So, the key question becomes: which policies and measures could stimulate new and additional actions and induce investors to CDM and JI projects? An answer to such question is not contained in the CIPE resolution. As its ancestor, the CIPE document issued in 1998, the new document is silent about this point. On the hand, its merit is in pointing out binding caps to the sectors emissions. This is also coherent with the new EU Directive on emissions trading. Nevertheless, on the other hand, it disregards the tools area, ignoring which means should be activated in order to meet the final targets. This is a substantial limit which should be quickly overcome if a reduction in CO₂ emissions must be obtained.

Conclusions

The main conclusions of this paper can be summarised as follows:

- the forecast by the CEPRIG model shows that the Italian CO₂ emissions are running out of control. In the year 2010, in a base scenario, a surplus of 92.6 Mt. CO₂ over the Kyoto target is estimated. This means about 20% more than the Kyoto target.
- The new policy guidelines set CO₂ emission caps at sector level. If these caps are met, the surplus falls to 41 Mt. CO₂.
- Additional policies and measures, as well as CDM and JI projects, could compensate such surplus. Nevertheless, when the Italian energy history is considered, many doubts about their feasibility emerge.
- If, on the hand, the new policy guidelines represent an important step ahead due the setting of emission caps to sectors, on the other hand, other steps ahead are needed in order to translate the policy actions from hypothesis to reality. Quick interventions are needed.

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