4th REPORT pursuant to Article 3(3) of Directive 2001/77/EC

1. Introduction

Article 3(3) of Directive 2001/77/EC of 27 September 2001 lays down that *'Member States shall publish, for the first time not later than 27 October 2003 and thereafter every two years, a report which includes an analysis of success in meeting the national indicative targets taking account, in particular, of climatic factors likely to affect the achievement of those targets and which indicates to what extent the measures taken are consistent with the national climate change commitment'*.

Article 3(2) of the Directive lays down that *'not later than 27 October 2002 and every five years thereafter, Member States shall adopt and publish a report setting national indicative targets for future consumption of electricity produced from renewable energy sources in terms of a percentage of electricity consumption for the next 10 years. The report shall also outline the measures taken or planned, at national level, to achieve these national indicative targets. To set these targets until the year 2010, the Member States shall take account of the reference values in the Annex and ensure that the targets are compatible with any national commitments accepted in the context of the climate change commitments accepted by the Community pursuant to the Kyoto Protocol to the United Nations Framework Convention on Climate Change'*.

The report published by Italy pursuant to Article 3(2) of Directive 2001/77/EC (hereinafter *'the 3.2 Report'*) illustrated that the national indicative targets set out therein for future consumption of electricity produced from renewable sources were consistent both with the reference values for 2010 in the Annex to the Directive and with the national commitments accepted in the context of the climate change commitments accepted by the Community pursuant to the Kyoto Protocol.

The analysis in this document makes reference to the above targets as these have not been amended during the period since their publication.

Table 1 - Capacity of power plants in Italy using renewable sources

Installed capacity of power plants in Italy using renewable sources (MW) **Final data**														**Summary data** **(Italian White Paper 1st *3.2 Report*)**
Source	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009***	**2008-2012**
Hydro														
Geothermal														
Wind														
Biomass, biogas and waste														
Solar														
Total														

* Provisional data - Terna/GSE

[For figures please see the original.]

Figure 1 - Capacity of power plants in Italy using renewable sources

Legend:

Italian	**English**
Idrica	Hydro
Geotermica	Geothermal
Eolica	Wind
Biomassa, biogas e rifiuti	Biomass, biogas and waste
Solare	Solar
Dati provvisori Terna/GSE	Provisional data - Terna/GSE

Figure 2 - Trend in the total installed capacity of HYDROELECTRIC power plants

Legend:

Italian	**English**
Potenza idroelettrica installata totale	Total installed hydroelectric power capacity
Trend lineare	Linear trend
Dati provvisori Terna/GSE	Provisional data - Terna/GSE

Figure 3 - Trend in the total installed capacity of GEOTHERMAL power plants

Legend:

Italian	**English**
Potenza geotermoelettrica installata totale	Total installed geothermal power capacity
Dati provvisori Terna/GSE	Provisional data - Terna/GSE

Figure 4 - Trend in the total installed capacity of WIND power plants

Legend:

Italian	**English**
Potenza eolica installata totale	Total installed wind power capacity
Trend esponenziale	Exponential trend
Dati provvisori Terna/GSE	Provisional data - Terna/GSE

Figure 5 - Trend in the total installed capacity of BIOMASS, BIOGAS and WASTE power plants

Legend:

Italian	**English**
Potenza biomasse, biogas e rifiuti installata totale	Total installed capacity from biomass, biogas and waste
Trend lineare	Linear trend
Dati provvisori Terna/GSE	Provisional data - Terna/GSE

Figure 6 - Trend in the total installed capacity of PHOTOVOLTAIC power plants

Legend:

Italian	**English**
Solare	Solar
Trend esponenziale osservato tra il 2005 e il 2009	Exponential trend observed between 2005 and 2009
Dati provvisori Terna/GSE	Provisional data - Terna/GSE

Table 2 - Output of power plants in Italy using renewable sources

Gross output of renewable electricity in Italy (GWh) Final data														Summary data (Italian White Paper 1st *3.2 Report*)
Source	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009****	**2008-2012**
Hydro														
Geothermal														
Wind														
Biomass, biogas and waste														
Solar														
Total														

* The figures in the table do not include the non-biodegradable element of the waste, accounting for 4 TWh. The total target in the White Paper, including the non-biodegradable element, is 76.1 TWh.
** Provisional data - Terna/GSE

[For figures please see the original.]

Figure 7 - Output of power plants in Italy using renewable sources

Legend:

Italian	**English**
Idrica	Hydro
Geotermica	Geothermal
Eolica	Wind
Biomassa, biogas e rifiuti	Biomass, biogas and waste
Solare	Solar

Figure 8 - Output of HYDROELECTRIC power plants: trend in the gross output of hydroelectric power plants with natural input compared with the figure envisaged in the Italian White Paper on renewable sources (referred to in the *3.2 Report*) for the 2008-2012 period.

Legend:

Italian	**English**
Idroelettrica	Hydroelectric power
Valore riferito alle previsioni del libro bianco	Figure from the White Paper
Dati provvisori Terna/GSE	Provisional data - Terna/GSE

Figure 9 - Output of GEOTHERMAL power plants: trend in the gross output of geothermal power plants compared with the figure envisaged in the Italian White Paper on renewable sources (referred to in the *3.2 Report*) for the 2008-2012 period.

Legend:

Italian	**English**
Geotermoelettrica	Geothermal power
Valore riferito alle previsioni del libro bianco	Figure from the White Paper
Dati provvisori Terna/GSE	Provisional data - Terna/GSE

Figure 10 - Output of WIND power plants: trend in the gross output of wind power plants compared with the figure envisaged in the Italian White Paper on renewable sources (referred to in the *3.2 Report*) for the 2008-2012 period.

Legend:

Italian	**English**
Eolica	Wind power
Valore riferito alle previsioni del libro bianco	Figure from the White Paper
Dati provvisori Terna/GSE	Provisional data - Terna/GSE

Figure 11 - Output of biomass, biogas and waste power plants: trend in the gross output of biomass, biogas and waste power plants compared with the figure envisaged in the Italian White Paper on renewable sources (referred to in the *3.2 Report*) for the 2008-2012 period.

Legend:

Italian	**English**
Biomassa, biogas e rifiuti	Biomass, biogas and waste
Inclusa la parte non biodegradabile dei rifiuti	Including the non-biodegradable element of the waste

* The figures for the 2008-2012 period refer to the figures in the Italian White Paper on renewable sources. More specifically, the target for biomass, biogas and waste power plants was set at 17 800 GWh, including all output from the non-biodegradable element of the waste, which was estimated at approximately 4 TWh. However, as laid down in Directive 2009/28/EC, and in line with the statistical definitions, only the biodegradable element of the waste is included in the calculation of gross output from renewable sources. Accordingly, the graph shows both situations.

**Provisional data - Terna/GSE

Figure 12 - Output of photovoltaic power plants: trend in the gross output of photovoltaic power plants compared with the figure envisaged in the Italian White Paper on renewable sources (referred to in the *3.2 Report*) for the 2008-2012 period.

Legend:

Italian	**English**
Solare	Solar
Valore riferito alle previsioni del libro bianco	Figure from the White Paper
Dati provvisori Terna/GSE	Provisional data - Terna/GSE

Figure 13 - TOTAL output of power plants using renewable energy sources: trend in total gross output of power plants using renewable energy sources compared with the figure envisaged in the Italian White Paper on renewable sources (referred to in the *3.2 Report*) for the 2008-2012 period.

Legend:

Italian	**English**
Prod. FER	Output from renewable energy sources
Inclusa la parte non biodegradabile dei rifiuti	Including the non-biodegradable element of the waste

* The figures for the 2008-2012 period refer to the figures in the Italian White Paper on renewable sources. More specifically, the target total national output was set at 76.1 TWh, including all output from the non-biodegradable element of waste, which was estimated at approximately 4 TWh. However, as laid down in Directive 2009/28/EC, and in line with the statistical definitions, only the biodegradable element of the waste is included in the calculation of gross output from renewable sources. Accordingly, the graph shows both situations.

**Provisional data - Terna/GSE

Figure 14 - Trend in total installed CAPACITY in Italy: percentage contribution of the various renewable sources

Legend:

Italian	**English**
Solare	Solar
Biomassa, biogas e rifiuti	Biomass, biogas and waste
Eolica	Wind
Geotermica	Geothermal
Idrica	Hydro

Figure 15 - Trend in OUTPUT from renewable sources in Italy: percentage contribution of the various renewable sources

Legend:

Italian	**English**
Solare	Solar
Biomassa, biogas e rifiuti	Biomass, biogas and waste
Eolica	Wind
Geotermica	Geothermal
Idrica	Hydro
Dati provvisori Terna/GSE	Provisional data - Terna/GSE

2. Analysis of success in meeting the national indicative targets

Tables 1-2 and Figures 1-13 illustrate the trends over time in installed capacity and electricity produced by power plants powered by the various renewable sources in Italy. The trends observed are compared with the targets set in the Italian White Paper on renewable sources. As argued in the *3.2 Report* referred to in the Introduction, under certain hypotheses these targets are consistent with the national indicative target for consumption of electricity from renewable sources identified in Directive 2001/77/EC.

Table 1 clearly illustrates, as proof of the effectiveness of the policies adopted by Italy when transposing Directive 2001/77/EC and the measures introduced to achieve these policies, that many of the goals set for the 2008-2012 period are close to achievement or have even already been exceeded.

Between 2000 and 2009, total installed capacity increased from 18 335 MW to over 26 000 MW, a rise of 43%. The percentage increase was even greater if large hydroelectric power plants are not included, as their potential had already been almost completely exploited before the beginning of the last decade.

Particularly excellent growth trends have been observed in wind power (Figure 4) and photovoltaic power (Figure 6), with installed capacity of 4 850 MW and 1 000 MW respectively. Both technologies have easily exceeded the targets set for them in the Italian White Paper for 2008-2012, namely 2 500 MW and 300 MW respectively.

As far as solar power plants are concerned, it should be noted that the wide margin by which the target has been exceeded is the result of a targeted policy of incentivising photovoltaic power plants with a feed-in tariff, which was launched in 2005 pursuant to one of the provisions of Legislative Decree No 387 of 29 December 2003 (with which Italy transposed Directive 2001/77/EC) and has subsequently been updated several times over the years.

By contrast, the introduction in 2008 of a measure to incentivise electricity production from thermodynamic solar power plants has not yet borne fruit, but the entry into operation of the first projects is expected in 2010.

The biomass sector, including biogas and waste (Figure 5), is the only one that still does not appear close to achieving the targets set for the 2008-2012 period. An analysis of trends in installed capacity nevertheless show the high growth levels recorded in the last two years: after five years where the average growth rate was less than 10%, the 2008 and 2009 figures were 16% and 22% respectively.

There is reason to believe that the recent positive trends can continue in future. Indeed, apart from the photovoltaic sector which has its own dedicated incentivisation system, biomass is the other renewable source for which the Italian authorities have recently revised the incentives system in order to make it more effective and support supply chains and small plants, which are more easy to incorporate into local areas thanks to a virtuous circle that may involve the agricultural sector.

Looking now in detail at the innovations introduced to support this sector, mention can be made of the increase in the coefficient for calculating the number of green certificates granted for each MWh of electricity produced and the possibility of particularly advantageous feed-in tariffs for plants with capacity up to 1 MW powered by solid biomass, biogas and pure vegetable oils that are traceable by means of the integrated

administration and control system under Council Regulation (EC) No 73/2009 of 19 January 2009.

To sum up, therefore, we believe that the target of 3 100 MW for biomass, biogas and waste power plants can be achieved by the end of the 2008-2012 period.

Estimated energy output for 2009 was around 66 TWh, set against a target of 72.1 TWh for 2008-2012.

The figure is influenced by climatic factors affecting hydroelectric output, which, after a period of relatively scarce precipitation, were especially good last year.

Water is still the main renewable source exploited in Italy, accounting for over 70% of renewable output in 2009 (Figure 7).

An analysis of Tables 1 and 2 and Figures 2 and 8 shows that, in a situation of constant (though limited) increase in installed hydroelectric capacity, the ability to maintain output at target levels depends highly on the presence of favourable climate conditions[1].

However, it should be noted that the 2008 Finance Law introduced an incentive mechanism, the feed-in tariff, for plants not exceeding 1 MW. The purpose of this was to encourage the building of small hydroelectric plants for which, unlike large plants, there is still ample room for exploitation.

Account must also be taken of a technical factor regarding the time needed to fully exploit newly installed capacity, namely that, for all sectors affected by large-scale expansion, the capacity figure recorded at the end of a calendar year obviously does not mean annual output in line with full exploitation of that capacity. In other words, owing to the ongoing entry into operation of a significant number of plants over the year, not all the installed capacity as at 31 December could be used in full over the previous 12 months.

In such cases, it thus seems more relevant to carry out an assessment not of output actually achieved but of that calculated on the basis of installed capacity and the average possible output of each specific form of technology.

For wind power plants, assuming a number of equivalent hours of 2 000, as assumed in the Italian White Paper, the 4 850 MW installed as at the end of 2009 would give theoretical output of 9.7 TW. It is estimated that the actual possible output of the average Italian wind farm is around 1 800 equivalent hours, giving a theoretical output for 2009 of 8.7 TWh. Both figures - 9.7 TWh and 8.7 TWh - are far higher than the 6 TWh actually produced in 2009, which in turn is higher than the target of 5 TWh envisaged in the White Paper.

[1] The reasoning expressed here is independent of whether the hydroelectric output data are normalized.

Figure 16 - Percentage distribution of the number of hours of use of wind power plants in Italy from 2004 to 2008 (the graph shows the cumulative percentage of wind power plants whose hours of use are lower than each equivalent hours figure)

Legend:

Italian	**English**
% impianti	% plants
Ore equivalenti di utilizzazione	Equivalent hours of use

Following a similar line of reasoning for biomass, biogas and waste power plants, and assuming 4 500 equivalent hours as in the White Paper, the 6.3 TWh of actual output in the last year corresponds to 8.5 TWh.

Applying a similar approach to photovoltaic power plants allows us to conclude that the 1 000 MW installed at the end of 2009 could potentially give rise to output of at least 1 TWh from next year onwards on the basis of the 1 000 average hours of possible production envisaged in the White Paper. This figure is more than three times greater than the target set for the 2008-2012 period.

The situation is different for geothermal power plants (Figures 3 and 9), for which installed capacity has not changed significantly over the last five years. It can thus be deemed that the actual output of electricity from geothermal sources, which for the last five years has varied in and around 5.5 TWh, reflects the real potential of the plants in operation. However, the target of 5.9 TWh is close to being achieved.

Attention should also be drawn to the recent issuing of a measure reorganising the legislation on prospecting for and exploiting geothermal resources. In particular, this aims to simplify the authorisation procedures for building new plants.

To conclude, we feel we can confirm that the target set in the Italian White Paper of producing 76 TWh in Italy from renewable sources (including from waste, or 72 TWh including only biodegradable waste) in 2008-2012 can be achieved. However, it will be necessary to maintain the recent positive development trends, particularly as regards technologies for exploiting biomass, so as to be able to make the trend less dependant on meteorological conditions, specifically precipitation (rain and snow), which led to a reduction in hydroelectric output in the years prior to 2009.

Table 3 and Figures 17 and 18 show the changes over time in the contribution of electricity produced from renewable resources to gross domestic electricity consumption.

In 2009, the 66 TWh of electricity produced in Italy from renewable sources allowed for the achievement of coverage very close to 20%. This figure would increase to 31% if account were taken of imports of electricity certified as having been produced from renewable sources.

Table 3 - Trends in gross output from renewable sources and imports certified as having been produced from renewable sources; Comparison with gross domestic electricity consumption

Year	**Gross Domestic Consumption (GDC)**	**Gross output from renewable sources**		**Foreign from renewable sources**	**Gross output from renewable sources + Foreign from renewable sources**	
	TWh	**TWh**	**% of GDC**	**TWh**	**TWh**	**% of GDC**
2002						
2003						
2004						
2005						
2006						
2007						
2008						

[For figures please see the original.]

Figure 17 - Trend in gross output from renewable sources and imports certified as having been produced from renewable sources

Legend:

Italian	**English**
Importazione riconosciuta rinnovabile	Imports certified as having been produced from renewable sources
Produzione Lorda Rinnovabile	Gross output from renewable sources

Figure 18 - Trend in percentage of gross domestic consumption satisfied from renewable sources

Legend:

Italian	**English**
Produzione Lorda Rinnovabile / Consumo Interno Lordo	Gross output from renewable sources / Gross domestic consumption
(Produzione lorda rinnovabile + Importazione riconosciuta rinnovabile) / Consumo Interno Lordo	(Gross output from renewable sources + Imports certified as having been produced from renewable sources) / Gross domestic consumption

It is worth recalling that imports of electricity from renewable sources are governed by the national legislation on green certificates.

Production and imports of energy from non-renewable sources are subject to a requirement to input into the grid a minimum percentage of energy from renewable sources, which translates into a requirement to purchase green certificates.

For imports from Member States of the European Union, an exemption from this requirement is granted only if the renewable origin of the imported energy has been certified by a guarantee of origin issued by the country where the power plant is located.

With regard to the targets set in Directive 2001/77/EC, it should be remembered that, according to Communication COM(2004) 366, *'A Member State can only include a contribution from import from another Member State if the exporting state has accepted explicitly, and stated on a guarantee of origin, that it will not use the specified amount of renewable electricity to meet its own target and thereby also accepted that this electricity can be counted towards the importing Member State's target'*.

However, none of the Member States that export to Italy have agreed to give up the quantity of exported energy and not count it towards its own target.

A situation thus continues whereby, on the one hand, importers have applied for an exemption from the requirement after submitting guarantees of origin but, on the other hand, in the light of the aforementioned Community guidelines, it is not possible to include the imports that have been declared to be from renewable sources in the proportion of energy initially envisaged for achieving the targets identified in Directive 2001/77/EC.

3. The guarantee of origin system introduced in Italy

The guarantee of origin system for electricity produced from renewable sources was introduced in Italy by Legislative Decree No 387 of 29 December 2003, Article 11 of which laid down that the guarantee of origin could be issued, at the producer's request, for electricity produced from plants powered by renewable sources and the output from hybrid plants attributable to renewable sources.

Responsibility for issuing guarantees of origin lies with GSE Spa (*Gestore dei Servizi Energetici* - Energy Services Operator), which was already responsible for administering the green certificates system.

GSE thus drew up a *'Procedure for identifying plants powered by renewable sources and for issuing the guarantee of origin'*, which was approved by Ministerial Decree. This *'Procedure'* identified the types of power plants powered exclusively by renewable sources (thus excluding non-biodegradable waste) that can apply for the guarantee of origin. The mechanism is based on prior confirmation that the plant is powered by renewable sources and a later check that, in a given year, the plant actually produced a given quantity of electricity. The guarantee of origin is thus issued with respect to that electricity output figure.

Table 4 - Plants identified for issuing of the guarantee of origin (situation as at December 2008)

Source	**Number**	**Capacity (MW)**	**Output (GWh)**
Hydro			
Wind			
Biogas			
Total			

[For figures please see the original.]

The situation set out in Table 4 refers to 2008. During 2009, for which detailed data are still not available, the system continued not to attract great interest for the purposes of exploiting the 'green' nature of the energy on the electricity market.