

Renewable Energy Sources – The Italian Scenario: Opportunities and Limits

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The dynamic processes involving the energy sector are characterized by the need to identify adequate ways of dealing with the challenges resulting from increased dependency on imports, concerns over supplies of fossil fuels worldwide and clearly discernable climate change.

For some years now, numerous community and national programmes have been underway, favoured by the process of liberalization and transformation of energy markets, supporting - by means of technological innovations, the evolution of the energy generation system, in particular electricity – an effective transition from the current energy model to a different scheme that envisages the widespread use of renewable energy sources (res).

Renewable energy sources or (res) could effectively claim a central role in reducing both greenhouse gas emissions as well as European Union (EU) dependence on imports of fossil fuels (in particular oil and gas).

Renewable energy, however, remains on the fringe of the European energy mix; it still costs more than conventional energy – despite the fact that costs have been falling steadily for the last 20 years – owing to the investment required and the fact that negative consequences, particularly the long-term impact on health or the environment - have not been fully taken into account.

To promote the use of renewable energy sources, the EU has devised a Renewable Energy Roadmap, setting an objective of increasing the proportion of renewable energy in its energy mix to 20% by 2020.

This ambitious plan will make it possible to cut CO₂ emissions by 600-900 million tonnes per year, thus generating savings of between 150 and 200 billion Euros, if the price of CO₂ rises to 25 €/tonne.

To reach this target, advances need to be made in the three main sectors where renewable energies are used: electricity (increasing the production of electricity from renewable sources and consenting the sustainable production of electricity from fossil fuels, principally by means of CO₂ capture and storage systems), bio-fuels, estimated at 10% of vehicle fuels by 2020 and finally, heating and cooling systems.

The Road Map provides for Member States to set mandatory targets and put in place Action Plans in line with their potential capacity. The Map also specifies measures to be implemented on a national scale and relevant objectives for each of the three sectors, at the same time ensuring a flexible approach which leaves Member States sufficient room for manoeuvre.

However, the direction energy policy is taking – delineated at the European level – has been the object of wide debate in terms of the difficulties in achieving the targets, not only in the renewable energy sector, but also in those sectors affected by greenhouse gas emissions and to increasing energy efficiency. The aims specified in the recent energy-climate Package, approved in December 2008, confirm the European Union's sustainable energy policy commitment and consolidates its leadership in the context of international negotiations for a post Kyoto¹ agreement.

In particular, with this Package there are binding commitments both for reducing greenhouse gas emissions and for increasing the role of renewable energy sources in satisfying energy demand in Europe, the so-called 20-20 by 2020. Even the renewable sources for transport, much criticized in the recent past in terms of their potential impact on agricultural markets and on the prices of foodstuffs, have been maintained at the level proposed initially by the European Commission, i.e., 10%.

The measure imposes new and binding commitments on Italy which imply the need to reinforce a national strategy of renewable energy source development, by means of a coordinated regulatory framework that envisages a range of initiatives for promoting more energy produced from renewable sources. This will enable the target to be reached in terms of gross domestic consumption of energy from renewable sources equal to 17%, and to produce about 30% of electricity from res.

There is no doubt that this is an extremely difficult goal to achieve, given the scarce diversification of energy sources available. Recognizing the progressive transition from oil to natural gas over the last few decades as well as the deep rooted and systematic dependence of the Italian energy system on imports, both of primary sources and of electricity, its structural peculiarity and rigidity may not allow, in the short term (2020) the essential reforms envisaged.

From an analysis of the data set out in Table 1, it is clearly seen that the res contribution to satisfying national energy consumption has increased from slightly more than 8 Mtoe (1990) to over 14 Mtoe (2007), covering about 7% of Italian energy demand, an increase of 75% in two decades. This increase, in the

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See footnote at end of text.

face of a growth in energy consumption of 18% in the same period, albeit significant, still has far to go to reach an effective “take off” of res in Italy.

	1990	1995	2000	2005	2007	Δ% 1990-2007
Solid fuels	15.8	12.5	12.8	17.0	17.2	8.9
Natural gas	39.1	44.8	58.4	71.2	70.0	79
Net electricity imports	7.6	8.2	9.8	10.8	10.2	34.2
Oil	92.5	95.7	91.5	85.2	82.5	-18.8
Renewable sources	8.4	10.4	12.9	13.6	14.3	70.2
Total	163.4	171.7	185.2	197.8	194.2	14.1

Table 1 – National Trends in Energy Consumption (millions of Toe)

In particular in the electricity sector, despite the fact that over the last few decades the quantity of electricity obtained from renewable sources has increased slightly - from 48 TWh in 1960 to 49 TWh in 2007 - its contribution to meeting domestic demand has diminished significantly, declining from over 80% in 1960 to nearly 16% in 2007, above all by

virtue of the progressive reduction in the contribution from hydro-electric sources and of the predominant role of fossil fuel (Table 2).

The reasons for this are to be found in the growing demand for electricity stimulated in the first place, by progressive industrialisation and later by the increased demand in the service sectors, including areas with scarce water supplies, which necessitates the extensive use of fossil fuels.

As regards renewable sources, hydro-electric energy plays a predominant role (70%), followed by energy produced by biomass (13%), geothermic (11%) and wind (6%).

	1960	1965	1970	1975	1980	1985	1990	1995	2000	2007
Thermoelectrics	8,030	33,874	70,222	98,474	133,350	131,440	178,590	196,123	220,455	265,764
Renewable (Hydro., Geothermal, Wind and Photo- voltaic)	48,210	45,584	44,025	45,059	50,183	47,276	35,038	41,618	51,380	48,124
Nuclear	-	3,510	3,176	3,800	2,208	7,024	-	-	-	-
Total	56,240	82,968	117,423	147,333	185,741	185,740	213,628	237,741	271,835	313,888

Table 2 – Production of Electricity in Italy (GWh)

However, over the last fifteen years, an increase has been recorded mainly for wind but above all, for sources linked to biomass and waste (Table 3).

It should be noted, however, that the contribution of res to domestic electricity production has certainly been stimulated by the many different initiatives in support of “renewable source generation of electricity” introduced over the last few decades in Italy. In particular, fiscal, investment and R&D funding measures have been devised. Furthermore, ‘sector’ measures have been introduced – in other words, a system of incentives to promote the use of specific technologies by building micro generation plants - mini-hydroelectric, photo-voltaic and solar – to promote favourable and stable conditions for invest-

	1990	1995	2000	2007	Δ% 1990-2007
Hydro	31,626	37,781	44,200	32,815	4
MW					
0→1	1,088	1,411	1,553	1,416	30
1→10	4,855	6,029	6,577	5,684	17
>10	25,683	30,341	36,070	25,715	0.1
Geothermal	3,222	3,436	4,705	5,569	73
Wind	-	10	563	4,034	40,240*
Photovoltaic	-	4	6	39	875*
Biomass and waste	190	387	1,906	6,954	3,560
- Solid	190	284	1,340	5,507	2,798
- Biogas	-	103	566	1,447	1,305
Total	35,038	41,618	51,380	49,411	49

Table 3: Gross Maximum Capacity of Renewable Electric Power Plants in Italy (GWh) [7]

*These values have been calculated for the period 1995-2006

ment. Special forms of recognition have been devised for energy produced from res, such as the Guarantee of Origin (GO) and the Renewable Energy Certificate System (RECS) based on specific objective, transparent and non-discriminating criteria, to promote both the capacity for generating and consumption of green energy.

The schemes do not envisage the attribution of direct economic incentives, but can be used as marketing tools on the part of producers – whose strategic deci-

sion making is aimed at creating “environmental value” – so as to offer options to users showing greater awareness of environmental issues.

However, the introduction of the White Certificates Scheme constitutes the tool which has radically changed strategies in terms of incentives for meeting the demands of a liberalised energy market.

On the basis of this scheme, regulated by the Legislative Decree 79/99 together with the subsequent applied regulations (Ministerial Decrees dated: 11th November 1999; 18th March 2002 and 24th Oc-

tober 2005), starting from 2001, producers and importers of electricity from conventional sources are obliged to have a quota of electricity from res. Producers can decide to invest in plants utilizing res or purchase green certificates (GC) on the organized market.

Green Certificates, the value of which is 1MWh, can be traded freely, separately from the corresponding “green electricity”, in favour of plants utilizing renewable sources.

Recently the Green Certificate incentives scheme has undergone extensive change to eliminate the uncertainties that have always characterized the renewables sector and, consequently, to insure the generation of renewable energy is headed in the right direction.

Despite the launching of the GC system and the many measures undertaken on a national scale for promoting the development of renewable resources, results are not satisfactory. This is especially so if the Italian results are compared with those of other European countries such as Germany, Spain and Denmark.

Simply implementing Green Certificates and other schemes will not be sufficient in the short term to increase the demand for renewable energy and consequently to increase its supply.

To satisfactorily increase production of energy from renewable sources and to develop the domestic market, the synergic integration of the various support tools are needed.

Conclusion

More initiatives are needed to increase renewables use in Italian production and throughout the country, however, the effective “take off” of renewable energy sources necessitates not only support incentives, but also policies and industrial strategies that go beyond financial factors.

There is a need to deal with the critical elements of the res scheme in order to promote its use. These critical elements include factors that hinder investments such as authorization procedures, inertia in the administrative processes, slow bureaucratic performance, hostile attitudes of local communities and the difficulties of dealing with multiple levels of government. Also such factors as the instability of res generation and the low density level of energy produced per plant area, need to be considered.

The issues which have up to now limited the development of renewable sources, if not timely and adequately resolved, will impede Italy from achieving her - albeit not binding - goals established by the new European Union environment and energy policy for 2020. The achievement of these goals is a challenge of management, organization and technology, requiring credible and realistic policies and realistic incentives.

Footnote

¹ The legislative package envisages a multiplicity of proposals in Directives on issues of Energy and environmental policy; they range from modifying the EU Emission trading system (EU-ETS) to the capture and storage of CO₂ (Carbon Capture and Storage - CCS) and from the environmental quality of the fuels, to renewable energy sources.

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