

1.0 Introduction

The program of the new Italian government, which has been in charge since May 2006 and includes the Green Party, provides for several measures aimed at improving and encouraging the deployment of renewable energy sources (RES). For the time being, however, the wind sector is awaiting new concrete actions, particularly those devoted to overcoming non-technical barriers ensuing from bureaucracy, authorization procedures, and so on—not to mention the opposition to generating plants (particularly new wind farms) often shown by regions.

The promising trend that started in 2004 was partially confirmed in 2006, thanks to the completion of many wind farms at the end of the year. In fact, until mid-November 2006, less than 170 MW of new wind-power capacity had been installed, and the largest contribution, more than 240 MW, was added only in the last forty days of 2006. This result cannot be considered a full success, in that the 2006 growth was slightly lower than the previous year. Nevertheless, considering that many additional turbines have already been erected and are only waiting to be connected to the grid—and taking into account the other work in progress and the new major orders placed for turbine supply—one could say that the very optimistic forecasts for 2007 and 2008 have a good chance of becoming a reality (Table 1).

In addition to the average lengthy time required to connect wind turbines to the grid, the shortage of turbine components is a serious constraint. Now and in the near future, this shortage is likely to noticeably affect the growth of the sector. However, the main problem still remains the negative approach of many regions toward wind energy. At the moment, only the Apulia and Campania regions (where the commercial phase of the wind sector started in 1996) and Sicily have shown confidence that wind power could be an actual opportunity for their territory.

Nevertheless, at the end of December 2006 a more restrictive regulation about new-plant permitting, partly involving wind projects already approved but for which construction had not yet started, also came up in Sicily. This worried many investors on the island. It is worth noting that in Sardinia, the energy and environment plan issued in late 2005 set a ceiling of 550 MW of wind capacity.

The news is better from the Apulia region, where a new energy and environmental plan has been approved. This regional plan now considers wind energy as a strategic option and thus ends a moratorium on authorizing wind plants. Consequently, many wind projects have been presented, and more than 800 MW of new capacity has already been authorized. It is estimated that about 60% of that capacity will be completed by the end of 2007.

Table 1 Key Statistics 2006: Italy

Total installed wind generation	2,123 MW
New wind generation installed	417 MW*
Total electrical output from wind	3.215 TWh
Wind generation as % of national electric demand	1%
Formal wind target:	2,500 MW by 2008-2012
Decree 387/2003:	22% of electricity from RES by 2010
Government's Current Target:	25% of electricity from RES by 2011
* 417-12MW = Net increase 405	



Even in the mountain areas, the three-year trend toward the use of larger machines was also confirmed during 2006, notwithstanding the greater complexity of such installations. In fact, just a little less than 50% of new wind-power capacity was set up with turbines in the range of 1.5 MW to 2 MW. The remainder consisted of 850-kW machines.

According to Italy's 2006 provisional electricity statistics set out by the grid operator TERNA, domestic net electricity production in 2006 was 302 TWh, an increase of 3.8% over the previous year's production. At 46 TWh, the share of imported electricity was 7.8% lower than in the previous year. Electrical demand on the domestic grid (including customer loads and grid losses) was 338 TWh, 2.2% more than in 2005. On the whole, Italy's 2006 gross electricity consumption (gross domestic production plus the balance between import and export) can be put at about 360 TWh.

Thermal production of electricity, with 263 TWh net production, increased by 4% in 2006, keeping its place as the most important energy source. Fuel for thermal generation was almost completely imported. Gas from Russia, the Netherlands, and Algeria replaced several oil plants and continuously increased the contribution of gas to electricity generation.

As usual, hydropower, with 43 TWh produced in 2006 (just 0.2% more than in 2005), was the most important RES (although this figure also includes the production of pumped-storage plants), followed by geothermal plants with 5.5 TWh, 3.8% more than the previous year. Electricity generated from wind rose by 37% in 2006, with a total production of 3.22 TWh. Wind is the renewable resource that most increased its electricity production over 2005 levels, but its share of total electricity generation is still limited to a low 1%.

2.0 Progress toward national objectives

Legislative Decree 387 of 29 December 2003 was aimed at implementing EU Directive 2001/77/EC, and it actually confirmed the previous target of 76 TWh/yr to be achieved in 2008–2012 from RES. This target was first established in 1999 in the National White Paper for Exploitation of Renewable Energy to comply with the Kyoto Protocol. The target was subsequently included in the EU directive as well, which stated that Italy would increase the contribution of RES to gross electricity consumption from 16% in 1997 to 22% in 2010.

Against this background and despite the growing demand for electricity, the absolute target

fixed for wind energy for the period 2008–2012 has remained the same as in the 1999 White Paper—that is, 5 TWh/year, corresponding to about 2,500 MW capacity. Such a capacity target is now likely to be achieved in mid-2007. According to ENEA, on the basis of work currently in progress, newly placed orders for wind turbines, and the current energy and environment plan (PEAR) of the Apulia region, another 2,500 MW could be added by 2010. This would bring the overall capacity up to about 5,000 MW, with an energy contribution from wind of around 10 TWh/yr.

2.1 Commercial development

As 2006 ended, wind-power capacity in Italy had reached 2,123 MW, with 417 MW of new capacity added in the year. This amount was just a little less than in 2005. Despite delays that occurred in connecting several wind farms to the grid, which reduced the 2006 annual growth rate to less than 25% from rates of 39% and 35% the previous two years, the installation trend is expected to rise again in 2007 and 2008. This rising trend is thanks to the renewed attention likely to be paid to the wind sector at the political, industrial, financial, and commercial levels. In particular, it is estimated that 2007 will become a record year, and cumulative wind capacity very close to 3,000 MW is likely to be achieved by year's end. Uncertainty remains about what will happen in the medium and long term. It will depend on the willingness of the national and regional governments to take additional measures.

In 2006—following a trend that started in 2002 with the construction of Italy's first wind farm composed of large wind turbines in Sardinia—some 200 MW, corresponding to nearly 50% of the year's new wind capacity, was installed with turbines in the range 1.5 MW to 2 MW. The remaining capacity was mostly achieved through 850-kW machines, which are also very common in Italy.

In all, new wind capacity added in 2006 was 417 MW, with the installation of 363 units. This brought the cumulative wind capacity to 2,123 MW, up from 1,718 MW in 2005. It must be taken into account that 46 machines totaling 12 MW were dismantled in 2006 (Figure 1 and Figure 2).

The southern regions—Sicily with 137 MW and Apulia with 125 MW, followed by Basilicata with 67 MW—had an active role in the growth of the sector. Other regions such as Tuscany and Calabria, which had only one small wind farm each until the beginning of 2006, finally gained more significant installations. This trend will largely continue in

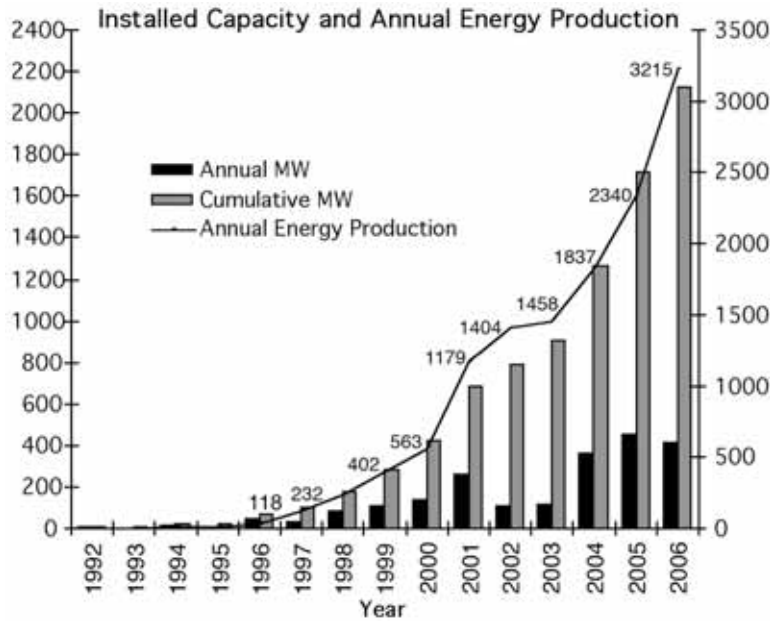


Figure 1 Trend of annual and cumulative wind turbine capacity and electricity production from wind in Italy.

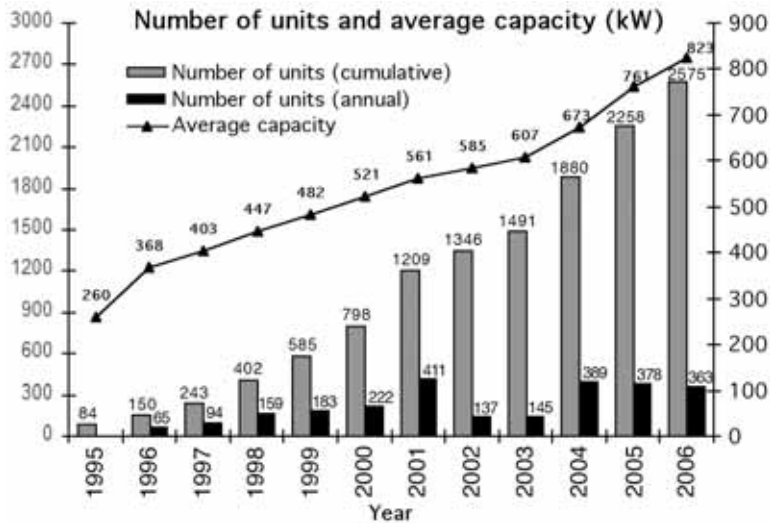


Figure 2 Trend of cumulative and yearly added numbers of wind turbines in Italy and average on-line unit capacity.

2007–2008, especially in Calabria, where some 100 MW are anticipated.

Some repowering of old wind farms also took place. Thirty-six old single-bladed turbines at Enel’s demonstration wind farm Collarmele were replaced by four GE 1.5-MW units, with another to be added shortly. In this case, total plant capacity was reduced

from 9.1 MW to 6 MW for the time being, and it will later be raised to 7.5 MW. However, this does not lessen energy output, and uses less of the land for the turbines and equipment. On the whole, in 2006 a total of forty-six wind turbines ranging from 200 kW to 450 kW were replaced by fifteen larger machines in the range of 800 kW to 1.5 MW.



This increased total in-field capacity by 4 MW but had a larger benefit in terms of energy production. Apart from these few cases, widespread repowering of smaller and older machines has not yet started in Italy. Soon, however, Italy's largest developer, IVPC (to which the country's oldest commercial turbines belong) is planning to replace several old turbines in Apulia and Campania.

Gamesa, which installed more than 200 MW in 2006, has taken the second largest share of the Italian market, with 20% of total capacity. Only Vestas Italia has a higher share, having maintained the highest portion of the Italian market since 1996 (Vestas's 2006 cumulative capacity share was 57%). Both manufacturers will be widely involved in wind energy development in Italy in the coming years, as shown by important commitments already obtained from Enel and IVPC totaling some 330 MW.

Among Italian wind plant developers, in 2006 FRI-EL and Moncada installed just a little less than 100 MW each, increasing their respective shares of total on-line capacity to 9% and 5%. Larger developers include IVPC with 31% of total on-line capacity and the two main utilities Enel and Edens that have on-line capacities of 14% and 13%, respectively.

IVPC is completing its first wind farm with large turbines (a 30-MW plant in the Apulia region) and has planned to build another 138 MW in 2007–2008. Vestas will supply turbines for these two projects. In particular, two wind power plants, Fortore and Irpinia, are to be set up in the Campania region of southern Italy. The Fortore project is located near the city of Benevento and consists of eighteen V90 units (3 MW each), fifteen V90 units (1.8 MW), and two V90 units (2 MW) to be installed at the sites of Baselice, Foiano, Molinara, and San Marco dei Cavoti. The Irpinia project is located near the

city of Avellino and consists of nineteen V90 units (2 MW), two V90 units (1.8 MW), and thirteen V52 units (850 kW) at the sites of Bisaccia, Lacedonia, and Greci.

New, relatively large companies such as Alerion Industries and Sorgenia are entering the Italian market. Alerion has acquired several projects in southern Italy totaling 192 MW already authorized and an additional 200 MW in the pipeline. Sorgenia is developing and building wind farms of its own. Sorgenia (the former Energia S.p.A. and one of the first Italian energy operators) is acquiring growing importance in the Italian wind sector. The company's industrial plan is based on investments in combined cycle gas turbine (CCGT) power plants and on electricity generation from RES—namely hydroelectric, photovoltaic, and wind plants. Sorgenia acquired the wind company Anemon and a wind farm placed in Fossato di Vico, in the Umbria region, for 1,500 kW installed capacity. The company then obtained authorizations to build three new wind farms—in Castelnuovo di Conza, San Gregorio Magno (Campania), and Minervino Murge (Puglia)—for 70 MW installed capacity overall. The 2007–2010 business plan of the Sorgenia Group sets the target of 450 MW of wind capacity.

Figure 3 and Figure 4 depict the overall situation at the end of 2006 regarding market shares of wind turbine manufacturers and wind energy producers expressed as percentages of overall on-line capacity. Figure 5 shows the annual growth rate and Italy's cumulative wind capacity since 1997.

The electrical energy produced from wind in 2006 equaled 3,215 GWh, an increase of less than 40% over wind electrical energy produced in 2005. This yield was lower than expected for two main reasons: First, as we have already said, most of

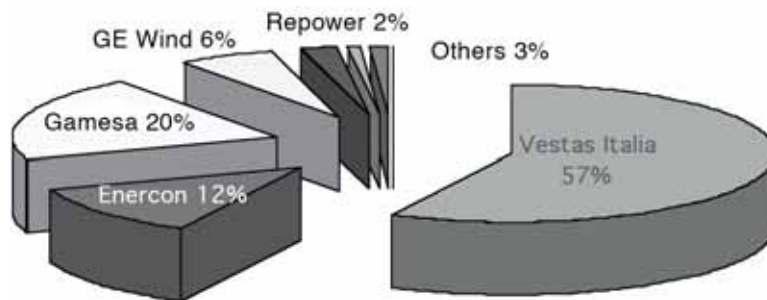


Figure 3 Market shares of wind turbine manufacturers at the end of 2006 (percentages of total on-line capacity).

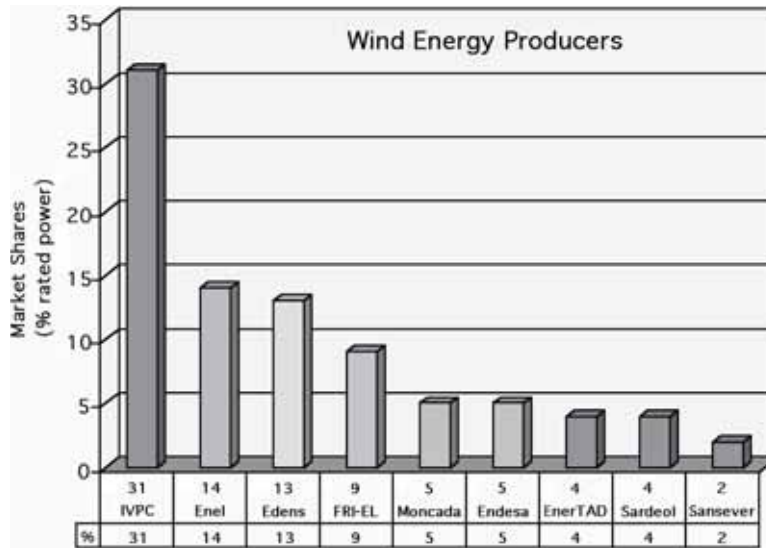


Figure 4 Market shares of wind plant developers at the end of 2006 (percentages of total on-line capacity).

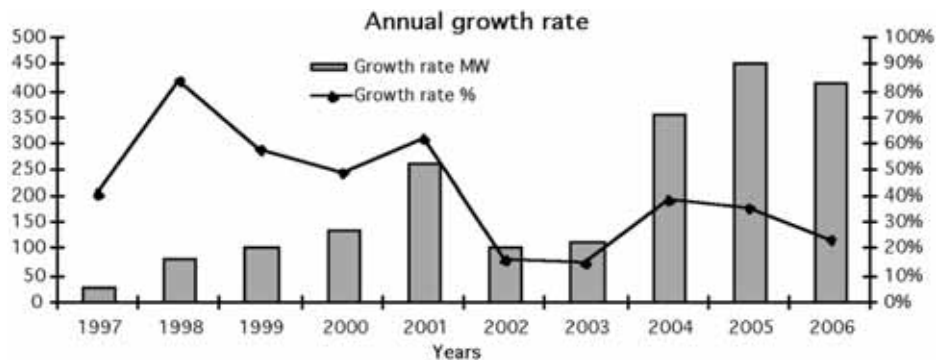


Figure 5 Trend of annual growth rate (absolute and as a percentage) of Italy's cumulative wind capacity.

the 2006 added capacity came on line only in the last few months of the year; secondly, the generally windiest months, November and December, were affected by a heavy drop in available wind energy owing to persistent high pressure over the country. Until November 2006, the forecast had been for a 60% energy increase.

2.2 Constraints

The lack of nationwide plant permitting guidelines, which were called for by Article 12 of Decree 387/2003 on RES, continues. As a result, the various regions are proceeding autonomously, issuing guidelines or establishing rules to manage wind plant authorization procedures that differ remarkably among regions. This situation clearly poses

undue hindrances to wind plant deployment. Some help, however, came from the Italian state in 2006. For instance, the Constitutional Court repealed the wind energy moratorium established by the Apulia region. This prevented other regions (for example, Basilicata and Molise) from establishing their own moratoriums, which would have stopped wind deployment, at least temporarily.

Difficulty connecting wind plants to the electrical grid quickly enough, has been a frequent complaint in years past. It seems to have bothered some developers in 2006 as well, despite new rules issued by the Regulatory Authority for Electricity and Gas at the end of 2005 (Provision 281, 19 December 2005). Actually, the completion of several wind farms originally planned by the end of 2006



has not yet happened due to major unexpected delays in the grid-connection process. Of course, the implementation of new grid-connection procedures takes some time, and some aspects of the authority's new provision still require clarification and fine-tuning. With this in mind, one could expect that in coming years, outstanding grid-connection issues may be settled and time lags become more acceptable to investors.

Another obstacle is the prejudice that some regional and local decision makers seem to bear against wind technology. This prejudice generally ensues from a lack of knowledge and could easily be overcome through better information currently available from various sources and by visits to existing wind farms, particularly in the southern regions.

3.0 Benefits to national economy

3.1 Market characteristics

In 2006, according to the national wind energy association ANEV the number of employees involved in wind energy in some way, was about 4,500. Of this number, some 1,000 were engaged in project development, consultant work, and plant operation and maintenance. The total economic turn-

over of the year attributable to wind energy activities was about 500 million €, more or less the same as in 2005. ENEA and ANEV anticipate that this figure should increase substantially in 2007.

The wind capacity distribution pattern over the country shows (Figure 6) that the wind business mostly benefits Italy's southern regions, thus helping to solve the problem of local unemployment. Manufacturing of wind turbines and components is concentrated mainly in the Apulia, Campania, and Sicily regions, where wind capacity is highest.

The share of wind-power capacity held by the main developers IVPC, Enel, and Edens at the end of 2006 totaled less than 60%, about 11% less than their share a year earlier. This means that new investors such as Moncada have appeared, and older ones such as FRI-EL (Figure 7) have grown in size. Another utility, Endesa Italia (Figure 8), considerably increased its share in 2006 through the acquisition of three wind farms, bringing its total capacity up to some 100 MW.

The strong presence of utilities on the market (one-third of total wind capacity) is mainly due to their obligation to comply with the RES quota established by the law (3.05% for 2007) and to their wish to demonstrate willingness to diversify energy production using a clean source. In Italy, unlike in



Figure 6 Wind capacity at regional level in Italy at the end of 2006 in MW. Wind capacity added in 2006 is indicated in bracket.



some other countries, private citizens, farmers, and co-operatives have not entered the wind market so far. This more diverse ownership pattern has been detained by medium-sized wind energy companies and a few utilities. However, there are prospects that larger energy and insurance groups, too, may join in shortly.

The most important utility, Enel, has further confirmed its interest in RES, energy efficiency, distributed generation, hydrogen, and zero emissions through new investments. Its investments for 2007 to 2011 total 4 billion €, both in research and commercial deployment (double its previous investment). Some 3.3 billion € will be devoted to renewable plants; 1.6 billion € of this amount will be used to build plants in Italy. This would mean adding 1,700 MW of new generating capacity, of which 1,500 MW would be wind, 100 hydro, and 100 geothermal plants.

3.2 Industrial development and operational experience

In 2006, Vestas Italia, located in Taranto (where 50% of the turbines installed in Italy as of the end of 2006 were produced), increased the number of its employees by about 20%; there are now 600 employees. Its sales of 850-kW machines equaled a total capacity of about 440 MW. More than 60% of these machines were exported to China. Vestas

in Italy comprises two production units, Vestas Nacelles Italia S.r.l. and Vestas Blades Italia S.r.l., and a sales unit, Vestas Italia S.r.l., which is responsible for the Italy and Eastern Mediterranean markets. All three units are located in Taranto. Vestas produces some 550 wind turbines per year.

It is worth mentioning that Vestas Italia had strong growth between 2003 and 2006, increasing both wind capacity and employment by 200%. In the spring of 2007, Vestas will complete the first two wind farms comprising 3-MW turbines ever installed in Italy; their total capacity will be 108 MW.

Manufacturers of smaller wind turbines received a boost to the sector in 2006. The Regulatory Authority for Electricity and Gas issued Provision 28 of 10 February 2006 regulating the energy exchange (net metering) between the network and RES plants up to a capacity of 20 kW. Thanks to this measure and the reduction to 50 MWh of the threshold energy amount for obtaining green certificates, the industry comprising manufacturers of smaller wind turbines is expected to grow more significantly in 2007 than in previous years.

Several developments in the small wind sector took place in 2006. Jonica Impianti has concentrated its production on the unit JMP 20. It has a total capacity of sixty units per year. Since January 2007, it has also improved this 20-kW model through the adoption of a new 10-m rotor, increasing the energy



Figure 7 Vestas V90 3-MW turbines at Ricigliano in the Campania region, a 36-MW wind farm developed by FRI-EL



Figure 8 Gamesa G90 2-MW turbines at Scansano in the Tuscany region, a 20-MW wind farm developed by Endesa.

generated. A new company, BluMiniPower, has recently entered the market with the 20-kW BMP 20 model and has established its factory at Olbia in Sardinia. The turbine has a rotor diameter of 8 m, a rated wind speed of 12 m/s, and a synchronous permanent magnet generator (Figure 9). Other companies that have recently entered the small-turbine sector include the Tozzi Group and Cepa. Their entrance is a response to the adoption of the net-metering system and to the simplified authorization procedure enforced in the Tuscany and Apulia regions.

3.3 Economic details

Total plant costs of wind installations were significantly higher in 2006—20% to 30% more than in the two previous years—so that the average investment cost can now be put at around 1.2 million €/MW installed. Maintenance and operational costs remained, on the contrary, about the same as in 2005, averaging roughly 10 €/MWh. The increase in the cost of wind turbines was caused by factors that were unpredictable a few years ago—for example, insufficient wind turbine production. This in turn was caused mainly by a shortage of components due to fast-growing demand, rising costs of raw materials, technology innovation (particularly concerning blades), and use of larger blades for less windy sites.

In addition to turbine cost, the cost of electrical and civil works is estimated to be around 30% of total investment cost for plants with smaller turbines (capacity <1 MW) and 20% of total investment cost for plants with larger turbines (capacity >1 MW). A sort of compensation for increasing plant costs is now given by higher market prices of green certificates issued for the 2006 RES electricity production, around 125 €/MWh. Income from selling green certificates adds, as is known, to the wholesale market price of wind-generated electricity, which averages around 60 €/MWh. Since 2006, the availability

term of green certificates has been extended from eight to twelve years from the beginning of plant operation.

4.0 National incentive program

4.1 Major RES support instruments

In 2006, too, a good number of RES plants were still benefiting from the feed-in tariffs granted by CIP Provision 6 of 29 April 1992. These tariffs are different for the various technologies and are updated every year. They are paid to entitled plants for all the energy they can feed into the grid and consist of two items:

- The avoided cost, granted over the full lifetime of the plant as a reward for avoiding production from conventional sources, and
- The incentive, granted over the first eight years of plant operation only.



Figure 9 BMP 20, the 20-kW prototype developed by BluMiniPower srl.



In 2006, several wind plants were still within the eight-year term and therefore got the full feed-in tariff. In the most favorable case of plants yielding all their energy to the grid, the tariff was 149.4 €/MWh.

Unlike these older plants, all new wind plants now come under the current support scheme, which is based on a compulsory quota for electricity from RES and on tradable green certificates (TGCs). This scheme was set up and regulated by Decree 79 of 16 March 1999 (restructuring the electricity market) and the subsequent Decree 387 of 29 December 2003 (implementing EU Directive 2001/77/EC on RES promotion). Further implementation measures were then taken in 2005 and 2006.

Since 2001, the RES electricity quota obligation has been laid on operators who, in the reference year, have produced or imported electricity from non-renewable sources exceeding 100 GWh/yr (electricity from CHP plants, auxiliary service consumption, and exports of energy are excluded from this computation). These operators must feed into the Italian grid, before the end of the subsequent year, an amount of RES electricity equaling a minimum quota of this non-renewable electricity. The RES electricity quota was originally 2% but was subsequently raised by 0.35% a year to 2.35% in 2005, 2.70% in 2006, and 3.05% in 2007. No quota has yet been set for subsequent years.

To show compliance with the quota, operators can either hand in TGCs from their own RES plants or can buy TGCs from other RES producers. To reduce their obligation, they are also allowed to feed imported RES-generated electricity into the Italian grid, but this energy must be certified by a Guarantee of Origin. The market price of TGCs should thus be determined on the basis of demand by obligated operators versus supply by qualified producers. Qualified RES electricity producers get one TGC for each 50 MWh of their production over a term that was formerly eight years but has, since 2006, been extended to twelve years of plant operation. The sale of TGCs brings them income in addition to the proceeds from the sale of energy on the wholesale electricity market.

It must be pointed out, though, that, to avoid double benefit, TGCs that would be due to plants already getting CIP 6/92 feed-in tariffs are retained by GSE (the body managing all RES support schemes). GSE must sell them at a price fixed every year on the basis of current CIP 6/92 feed-in tariffs, among other things. Since the number of these TGCs is still fairly large, qualified RES producers actually have to

sell their own TGCs at a price close to, but obviously not greater than, the price fixed for the GSE certificates. As compared with TGC schemes in other countries, the Italian TGC price is therefore not left to the mere interplay of supply and demand but is controlled in a way that gives RES investors more guarantees of enough income.

Actually, the price of TGCs sold by GSE has been growing steadily in the past few years. Specifically, the price of GSE's TGCs relating to 2006 RES production was fixed at 125.28 €/MWh. The GSE price has kept up the TGC market price as well, thus bringing a reasonably rewarding income to investors in addition to the sale of electricity on the wholesale market. This of course holds especially for more mature RES technologies, including wind, while other technologies such as photovoltaics have had to be granted special feed-in tariffs to help fund their development.

In spite of these financial conditions, which look very favorable in principle, investors in RES have still been complaining about the way some aspects of Italy's support policies have been implemented. Particularly, they have long been complaining of delays in issuing measures regarding, for example, the fixing of electricity quotas for RES to be produced from 2008 onward, the setting of regional targets, establishing a single national procedure for plant permitting, and other actions required by Decree 387 of 29 December 2003. Settling these pending issues would bring more clarity and certainty to the framework within which investors have to work. Some investors have even stated they would be content with lower energy and TGC prices in exchange for better-defined boundary conditions for their businesses in the long term.

5.0 R, D&D activities

5.1 National R, D&D efforts

Several companies tested prototype turbines in 2006. The Leitner Group continued its demonstration tests in the Alps on its recently developed 1.2-MW and 1.35-MW prototypes, and it is now ready to enter the international market. Also, Moncada Costruzioni, which completed four wind farms in 2006, has been conducting experimental tests on its 750-kW prototype in Sicily and has also been developing a smaller (20-kW) turbine.

Among Italian universities involved in wind research activities, Bologna University has been particularly concerned with lightning protection and offshore foundations, Trento University with cold-



climate applications and the development of small wind turbines, and Milan Technical University (Polytechnic) with integrated aeroelasticity simulation software. Genoa University is still involved in the study of wind potential onshore and offshore, as well as the simulation of wind flow.

In the field of small turbines, new interest was shown by a few entrepreneurs engaged in the development of innovative models, one of which is intended for use in the urban environment. In particular, the Tozzi Group has been developing, with scientific support by Trento University and Milan Polytechnic, a project devoted to the design and construction of two classes of turbines: vertical-axis turbines with a power <math>< 3\text{ kW}</math> to be located in urban areas, and horizontal-axis turbines up to 80 kW for suburban, rural, and industrial applications. The solutions adopted for these two models will be assessed and then industrialized through extensive testing of prototypes, both in a test field operated in Trento by Tozzi Nord and in public research structures such as wind tunnels and laboratories for materials tests.

Italy's first offshore wind applications are being planned. A large project (around 300 MW) planned by Gamesa off the northern Apulia coast and other initiatives are under consideration in the Calabria and Sicily regions. Enel is also considering offshore as a possible option in its research plan. In particular, it has been drafting a new design for a wind platform off the Tuscany coast, the most ambitious research project disclosed in this sector to date.

Research activities performed in the interest of Italy's electricity system were taken over from CESI in 2006 by the new company CESI RICERCA. The staff of CESI RICERCA has resumed work on the Wind Atlas of Italy developed with CESI between 2000 and 2002. As described in the IEA Wind Energy Annual Reports of 2002 and 2003, this atlas was intended to provide a general picture of Italy's wind resources and to be used as a tool for singling out windy areas mainly for the purposes of regional energy planning and wind farm siting. The work was initially based on the simulation of wind flow through models in co-operation with Genoa University. The resulting maps were then adjusted by comparison with data recorded by wind-measuring masts scattered all over Italy. The new version of the Wind Atlas features several improvements, the most noteworthy of which are the following:

- Four series of wind-speed maps and four series of specific energy production maps at the heights of 25 m, 50 m, 75 m, and 100 m above ground;
- Extension of all maps from on-land areas to a sea strip of 40 km width from the coastline;
- Further validation of maps by additional measuring data collected especially at coastal and offshore locations;
- Easier access by users, who can now avail themselves of interactive consultation facilities including a computation module to evaluate the technical and economic performance of a wind farm of given characteristics at any chosen spot on the maps;
- Text providing a brief but thorough overview of the main topics of wind energy exploitation for the convenience of readers who may not be fully familiar with all aspects that bear on the feasibility of a wind project.

The new version of the Wind Atlas of Italy will be posted on a dedicated Web site now being prepared.

In 2006, CESI RICERCA also conducted research aimed at going deeper into the technical and economic aspects of offshore wind farms along the Italian coasts, especially with an eye to foundations and supporting structures. The application of innovative models to the analysis of wind conditions at "mixed" locations (namely areas comprising both sea and land stretches) was also the subject of investigation.

5.2 Collaborative research

Italy, through Trento University, is participating in the IEA Wind Task 19, Wind Energy in Cold Climates.

6.0 The next term

The positive trend of wind plant deployment started in 2004 will, in all likelihood, continue at least for the next two years through the completion of large projects already authorized and partly underway at their sites. Some 1,000 MW to 1,500 MW in new wind-power capacity could be added by the end of 2008.

It is more difficult to anticipate what will happen in 2009 and later, as it will largely depend on the



national and regional targets to be set and the policy measures that will be adopted to achieve them. However, a total wind-power capacity of 5,000 MW on line by the end of 2010, with a production of about 10 TWh/year, could be considered a feasible goal. That would double the official target of 2,500 MW and 5 TWh/yr established for 2008–2012 by the 1999 White Book.

These figures are, on the other hand, in good agreement with the likely exploitable wind potential that can be estimated from the Wind Atlas of Italy developed by CESI RICERCA.

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