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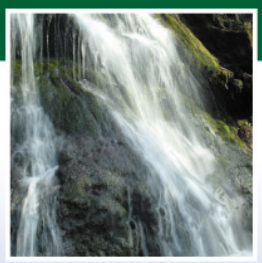

Chapter 15
Country Report – Italy

TIPPERARY INSTITUTE

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15 Country Report - Italy

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15.1 Policy and Legislation

Learning objectives

This section should provide you with key national policy and legislation relevant to renewable energy in Italy. After studying this section you should be able to answer the following questions:

- Do national targets for renewable energy exist? Is there one global target or do sector-specific targets for electricity, heat and biofuels exist? Are the targets short- or long-term? Does something like a national strategy for renewable energy exist?
- What kind of support instruments are in place for the different sectors? Feed-in or premium tariffs, quota obligations, investment subsidies or tax reliefs?
- What is in brief the status of the renewable energy market?
- Which are the key institutions relevant to the renewable energy sector?

Background

The Italian renewable policy uses an obligation for the use of renewable energy in combination with a tradable green certificate system. In 2001 the green certificate system has replaced the former main support programme CIP6/92 which generated certificates for eligible renewable electricity plants. A separate fixed feed-in tariff system applies for photovoltaic power plants.

The initial target of the green certificate system to have 2% of the electricity production from renewables was not reached in the first full year of operation (2001) and over the past years the market has always been short, although the tendency is that this shortage is decreasing.

A recent draft law for a system change towards technology-specific feed-in tariffs is currently under discussion. RES-E producers currently benefiting from the green certificate system will have the option to choose between their existing support and the feed-in tariffs.

Renewable energy targets

According to the European Directive 2001/77/EC "on the promotion of electricity produced from renewable energy sources in the internal electricity market" the reference value for the Italian national indicative target for the contribution of electricity produced from renewable energy sources is 25% of gross electricity consumption by 2010.[1]

At national level, there is no official target for the contribution of electricity to the gross electricity production. Electricity producers and importers are obliged to feed in a given proportion of electricity from renewable sources into the power system. The Decree n.79/1999 implementing the European Directive 96/92/EC concerning common rules for the internal market in electricity sets obligations for electricity producers or importers to supply a certain percentage of renewable electricity to the market each year. For the years 2001, 2002 and 2003 the obligation established a minimum share of 2%.

The Decree 387 of December 2003 implementing the European Directive 2001/77/EC increases overall targets for electricity producers and importers by 0.35% annually. Therefore the targets for the years after 2003 have been set as follows: 2.35% in 2004, 2.70% in 2005 and 3.05% in 2006. The Decree also states that targets for the coming years should continue to increase by 0.35% each year; however targets for future years have not yet been confirmed.

The official target for the use of biofuel was set by the Decree 128/2005: 1% by 1st of December 2005 and 2.5% by 31st of December 2010, both targets being below the indicative target set by the EU Biofuel Directive.
A recent budget law[2] has increased the above mentioned target as follow: 1% by 31st of December 2005, 2. % by 31st of December 2008 and 5.75% by 31st of December 2010.

[1] When taking into account the reference value set out in the directive 2001/77/EC, Italy has stated that 22% would be a realistic figure, on the assumption that in 2010 gross electricity consumption will be 340 TWh. See Annex to the Directive 2001/77/EC
[2] Law 296/2006, article 1 point 367

Main supporting policies

Renewable electricity

The main supporting policies for electricity generation from renewables are: (i) a tradable green certificate scheme applying to electricity generated from sun, wind, water, geothermal, wave, tides and biomass, (ii) a fixed feed- in tariff system for photovoltaic power plants, (iii) priority access to the electricity grid for electricity produced from renewable sources and CHP plants, (iv) an energy efficiency certificate scheme (also called white certificates) which indirectly promotes the use of renewable energy.

The main support mechanism for renewable electricity is the tradable green certificates system. The electricity generated by renewable energy plants which have been commissioned or repowered after 1 April 1999, are eligible for Green Certificates for the first 12 years of operation of the specific plant[3].

Eligible sources for green certificates are wind, solar thermal electricity, geothermal resources, tides, waves, hydro, biogas, biomass and organic and biodegradable waste. CHP plants associated with district heating [4].were also considered eligible for green certificates. Regulation established that Green certificates generated by CHP could be used for compliance purposes only after the demand of green certificates generated by RES installation had been fulfilled[5]. This possibility for CHP plants feeding a district heating grid to be eligible for green certificates has been heavily contested by the renewable energy producers, and has never come into force operatively. A budget law[6] has recently abolished this possibility completely. The mentioned budget law has also abolished the opportunity to consider inorganic and not biodegradable waste as eligible sources for green certificates.

[3] The recent "Decreto Ambientale" which came into force in April 2006 extended the validity period from eight to twelve years. (article 267)
[4] Only for CHP plants feeding a district heating grid and only to a reduced amount of the electricity corresponding to the end-use thermal heat produced.
[5] See "Decreto Ambientale" 152/2006 article 267
[6] Law 296/2006

Green certificates are issued by Gestore deI Servizi Elettrici S.p.A (GSE) on the basis of producer's reports of renewable electricity generation in the previous year, or expected generating capability in the current or following year. One certificate is issued for each production of 50 MWh7. The certificate is issued as soon as the production exceeds 25 MWh.

GSE is also responsible for the redemption of green certificates. In case of non-compliance, the operator underlying the renewables obligation has thirty days to compensate the amount of missing certificates before the Regulatory Authority is informed.

Producers and importers may also fulfil their renewable obligations by purchasing green certificates which have been generated by other producers. Green certificates can be traded either through the market organised and managed by the GME or over the counter through bilateral agreements.

When the market is "short" (demand for green certificates higher than supply) the GSE sells green certificates from the former CIP 6/92 support scheme at fixed prices. When the market is "long" (supply higher than demand) GSE buys the exceeding green certificates. Over the past years the market has always been "short". In 2005 the GSE issued 88,200 green certificates which are 47% more than the volume issued the year before. In 2005 green certificates have been issued to the following technologies: 38.44% for hydro; 32.82% wind; 12.72% geothermal; 6.99% biomass; 5.70% biogas; 3.3% waste, 0.02% solar.

The price for green certificates (excluding VAT) has been 108.92 €/MWh in 2005 and is the same for all technologies under the green certificate scheme. A recent draft law for a support system change towards a feed-in system is currently under discussion.

For photovoltaic power plants a fixed feed-in tariff already applies which is regulated by the Decree July 28th, 2005 and Decree February 6th, 2006 and

[7] Law 239/2004 has reduced the value from 100 MWh to 50 MWh

the National Regulator Authority‘s measures 188/05 and 40/06. The incentive applies to photovoltaic plants with a capacity between 1 kW to 1000 kW which have been commissioned or repowered after 30 September 2005. Feed-in tariff are guaranteed for twenty years adjusted every year for increases in retail good prices. The feed-in tariffs are given in Table 15.1 below.

Technology	Capacity in kW	€/kWh
Photovoltaic	≤ 20	0,445
	20 - 50	0,46
	50 - 1.000	Max 0,49
Building integrated PV	≤ 20	0,489
	20 - 50	0,506
	50 - 1.000	Max 0,49 + 10%

Table 15.1 Feed-in tariffs for photovoltaic

A new Ministerial Decree incentivising PV solar generation is expected to be issued soon. The following changes can be foreseen:

a) tariffs will be increased with special attention to integrated building panels associated to energy savings in the buildings;
b) the national target for PV will be increased (the drafts under discussion are considering to establish a national target between 1000 MW and 2000 MW by 2015);
c) the regulatory barriers will be lowered and procedures at the administrative level expedited: while the existing permitting procedure requires the project developer to submit the request for feed-in tariffs to the competent authority (GSE) before the commencement of the construction work, the new system requires the notification to the GSE only after commissioning.

Renewable heat

At present there are no specific policies for renewable heat. A draft law is currently under examination which might particularly address solar thermal heat. However, incentive schemes for solar thermal heating and obligation for new buildings to generate hot water with solar thermal panels are already adopted at local and regional level. These are mainly investment subsidies.

Biofuels

The Italian government is currently working on the promotion of biofuel. So far biofuels are mainly supported through tax exemptions, which also apply to blends of biofuels. The European Biofuel Directive has been implemented by the Legislative Decree 128/2005.

Relevant institutions

Main governmental organisations active in the RES electricity sector are:

Gestore Servizi Elettrici[8] (GSE)

Former Italian Independent System Operator - it plays a significant role in the organisation of the renewable electricity support scheme. It sells the certificates produced under the previous CIP6/92 support scheme; it issues the guarantee of origin, the green certificates and verifies compliance of producers and importers; manages the fixed feed-in tariff applying for photovoltaic.
http://www.grtn.it/eng/index.asp

Gestore del Mercato Elettrico (GME)

Organises and manages the green certificates market exchange platform ensuring its liquidity, transparency and security.
http://www.mercatoelettrico.org/GmeWebInglese/Default.aspx

Ministry for the Economic Development and Ministry of Environment
http://www.attivitaproduttive.gov.it/
http://www.minambiente.it/st/default.aspx

Italian Regulatory Authority for Electricity and Gas

An independent body established under Law 481 of 14 November 1995 to regulate and control the electricity and gas sectors. The task of the Regulatory Authority is to pursue two main objectives as laid down in Law 481/95: "guaranteeing the promotion of competition and efficiency" while "ensuring adequate service quality standards" in the electricity and gas sectors. Its main functions are: a) to set basic tariffs for the regulated sectors; b) to set qualita-

tive standards for the production and distribution services; c) to refer to the Italian antitrust authority any suspected infringements of competition law; d) to pursue court dispute settlement between consumers and gas service providers. http://www.autorita.energia.it/inglese/index.htm

ENEA

ENEA is the Italian National Agency for New Technologies, Energy and the Environment. It is a public undertaking operating in the fields of energy, environment and new technologies in order to support competitiveness and sustainable development.http://www.enea.it/com/ingl/default.htm

15.2 Overview of RE Technologies

Learning objectives

This section should help you to become more familiar with the specific national situation of the different renewable energy technologies. After studying this section you should be able to answer the following questions:

- Which are the relevant technologies in terms of current production and future potential?
- Which technologies have the potential to contribute significantly to an increase of renewable energy use? Which problems need to be overcome to realise this growth?
- What are the key characteristics of the different technologies?

15.2.1 Renewable energy technologies

This section provides an overview of the installed capacity and the potential of all technologies used for the production of renewable electricity (RES-E), renewable heat (RES-H) and biofuels. Interpretation and details can be found in the technology-specific sections.

[8] (Previously known as GRTN)

RES-E Technology	1997 [GWh]	2004 [GWh]	Av. Annual growth [%]
Biogas	330	1,170	20%
Solid Biomass	195	400	11%
Biowaste	411	1,139	16%
Geothermal electricity	3,905	5,437	5%
Hydro large-scale	33,475	33,885	0%
Hydro small-scale	8,124	8,860	1%
Photovoltaics	6	17	15%
Wind on-shore	118	1,832	48%
Total	**46,564**	**52,740**	**2%**
Share of total consumption [%]	16.0%	16.17%	

Table 15.2 Renewable electricity production in Italy in 1997 and 2004 in GWh

	Penetration 1997 (ktoe)	Penetration 2004 (ktoe)	Av. Annual growth [%]
Biomass heat[9]	1994	2393	3%
Solar thermal heat	7	18	14%
Geothermal heat incl. heat pumps	213	181	-2%

Table 15.3 Production of renewable heat in Italy in 1997 and 2004 in ktoe

	Penetration 1997 (ktoe)	Penetration 2005 (ktoe)	Av. Annual growth [%]
Liquid Biofuels	45	353	29%

Table 15.4 Production of Biofuels in Italy in 1997 and 2005 in ktoe

Sources: Member State reports, EUR'Observer, Eurostat, national statistics, industry associations and other sources

Figure 15.1 below compares the achieved potential in 2003 to the feasible potential until 2020. For the feasible potential it is assumed that those RES support policies that have shown in the past to be the most effective ones, are applied throughout the EU. The feasible potential is below the technical potential as it takes into account barriers to potential growth. Barriers are for example grid extension constraints, non transparent markets or lack of societal acceptance for new plants.

[9] Non-commercial biomass heat production is not considered within the figures

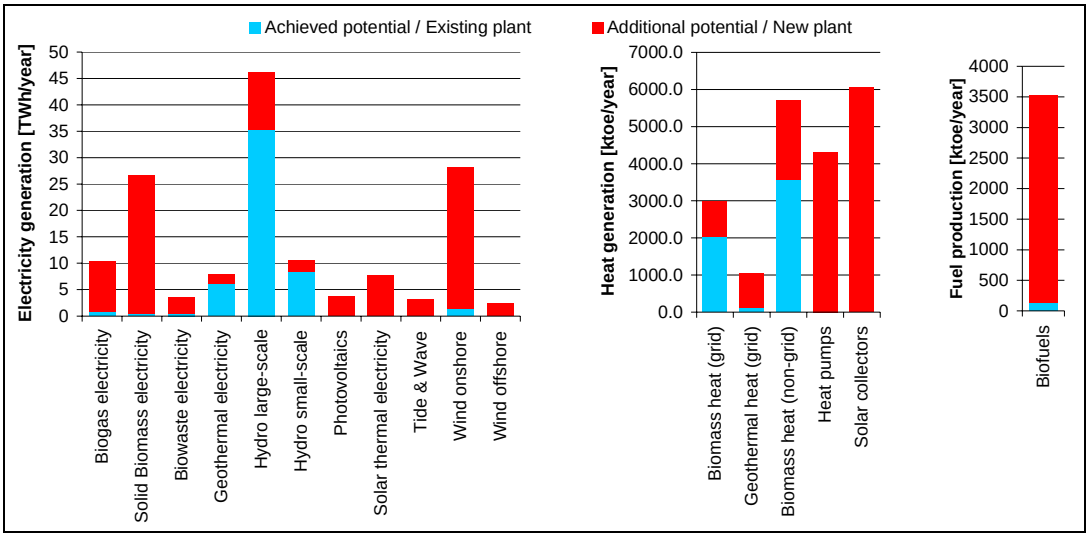


Figure 15.1 Figure Achieved potential in 2003 compared to additional potential up to 2020 Solar Heat
(FORRES)

Background

In spite of the favourable climatic conditions, solar thermal panels are rarely used (about 8 m^2 per 100 inhabitants – ENEA 2005a). However market development can be foreseen in the coming years. Currently most solar thermal heat is generated by small size domestic panels with a surface of less than 30 m^2.

National potential

The potential for solar thermal heat to 2020 is estimated to be about 6,000 ktoe/year. The solar thermal heat production in 2004 was 18 ktoe, which is less than 1% of the national potential. Figure 15.2 below provides an overview over the solar radiation in different parts of Italy.

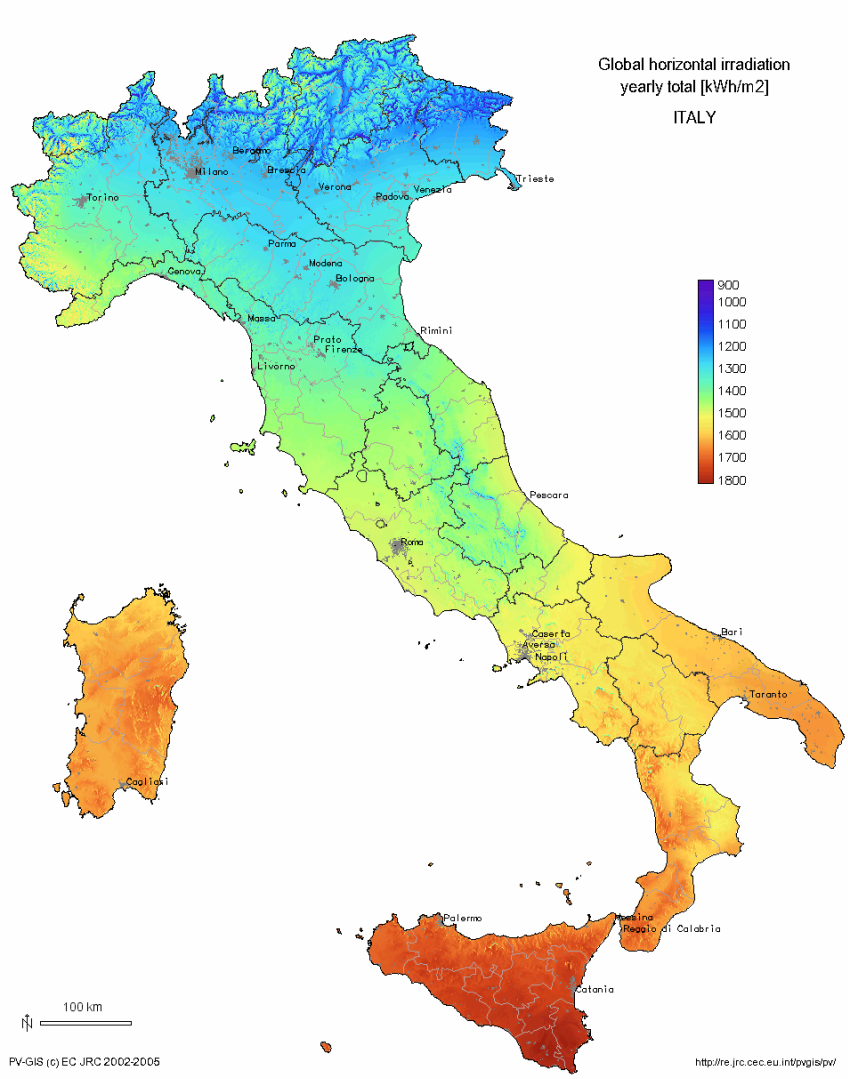


Figure 15.2 Yearly sum of global irradiation in Italy (PVGIS)

National installed capacity

Characteristic features of the technology in the particular country

Currently, the use of solar panels is not widespread. Small size panels for domestic purposes prevail at the moment.

Barriers to adoption

Main barriers to the adoption of solar thermal panels are social and administrative in nature. Major obstacles are customers lacking information, lack of experienced personnel for installations and complicated permitting procedures in case of new buildings. Moreover lack of a common national support policy causes a dispersed support system.

This technology is still affected by the consequences of a false start in ‘80s: During those years local incentives were available, but several plants of poor quality were installed, thus spreading the wrong perception that this technology is not reliable.

Relevant policy and legislation at the national level specific to the technology

There are no specific national policies for solar thermal heating. A draft law is currently under examination which might address solar thermal heat.

Regional and local authorities are competent for regulation. Some local authorities (among which some important regions like Tuscany) require compulsory installations of solar panels in new or renovated buildings.

Government supports

Currently, there are no national support mechanisms specifically addressed to solar thermal heating. However, incentive schemes are adopted at local and regional level.

Regions most active in the field are: Friuli Venezia Giulia, Lazio, Liguria and Bolzano (Autonomous Province) and Tuscany while Lombardia is about to issue a regulation. Investment subsidies between 25% up to 75% of the initial investments are available.

As another example of a regional incentive schemes, the Region of Piemonte is working on a draft law requiring 60% of the domestic hot water demand to be produced from solar thermal panels. This rule would apply to new buildings with a surface of more than 1000m^2.

Future regulation will particularly promote the use of solar thermal panels.

15.2.2 Solar Thermal Electricity

In 2004 ENEA launched the “Archimede" project consisting of a large solar thermal plant producing electricity (even at night or under cloudy conditions) thanks to a heat storage and liquid sodium and potassium salts as heat carri-

ers. Due to administrative barriers only a small size prototype of the project has been realised in Italy.

The potential for solar thermal electricity production to 2020 is estimated to be about 7 TWh/year.

15.2.3 Photovoltaic

Background

Photovoltaic panels are widespread in Italy. However during the last years the growth of this technology was lower than in other countries such as Germany and Spain which have taken over the leading position in Europe.

National potential

The potential for photovoltaic in Italy to 2020 is estimated to be about 4 TWh/year.

Due the geographical position of Italy, extending from North to South over about 1,000 km, the same photovoltaic panels will have different performance in the different areas. If we take as an example a system of 1 kWp nominal power in the same conditions of orientation and inclination the production is on average:

- regions in Northern Italy 1.100 kWh/year
- regions in Central Italy 1.300 kWh/year
- regions in Southern Italy 1.500 kWh/year

Figure 15.2 on page 321 gives an overview over the solar radiation in different parts of Italy.

National installed capacity

Electricity production from photovoltaic in 2004 was about 17 GWh, which is less than 1% of the national potential. Growth in the last years was small compared to some other European countries.

Characteristic features of the technology in the particular country

Generally, photovoltaic panels are owned by small and medium enterprises which have the necessary roof surfaces at their disposal.

Electricity generated from PV modules is mainly fed into the power system and partially employed for local use.

Recently, due to the launch of the national feed-in tariff for PV, a considerable number of investors have entered the PV market.

Future increase in the use of modules for building integration can be foreseen.

Barriers to adoption

Besides the high cost of this technology, main barriers to the deployment of PV are of an administrative nature. Problems that are encountered more often are the lack of coordination between the public authorities responsible for the permitting and for the granting of the incentive. A project developer can be granted with the financial support scheme without being issued the necessary construction permit by the competent public body. This may reduce the effectiveness of the national financial support mechanism.

Relevant policy and legislation at the national level specific to the technology

The Ministerial Decree July 28th 2005 and the Ministerial Decree February 6th 2006 are the legal basis applying to PV. The National Regulatory Authority‘s resolutions 188/05 and 40/06 concern arrangements for the application of feed-in tariffs for photovoltaic. However, some changes in the legislation are currently under discussion.

Government supports

Photovoltaic power plants benefit from a fixed feed-in tariff scheme. The incentives are addressed to PV systems with a capacity between 1 kW to 1000 kW which have been commissioned or repowered after 30 September 2005.

According to the current law the feed-in tariff is available for an additional capacity of 500 MWp, of which 360 MWp for systems with a capacity below 50 kWp. Regulation also included annual limits: from 2006 to 2012 this limit will be 85 MWp per year, of which 60 MWp for systems with a capacity below 50 kWp. The feed-in tariffs for PV are given in Table 15.1 on page 316. An overview of PV plants granted by the Gestore Servizi Elettrici with the feed-in tariff can be found on the following website:
http://atlasole.grtn.it/viewer.htm

Financial viability

Financial viability of several RES-E technologies in all EU countries has recently been analysed in an EU funded research project. When comparing costs and support levels among the countries, one has to make sure to deal with comparable quantities. In particular, the support level in each country needs to be normalised according to the duration of support in each country, e.g. the duration of green certificates in Italy is only twelve years compared to twenty years for guaranteed feed-in tariffs in Germany. The support level under each instrument has therefore been normalised to a common duration of 15 years. The conversion between the country-specific duration and the harmonised support duration of 15 years is performed assuming a 6.6% interest rate.

Figure 15.3 below shows price ranges (average to maximum support) for direct support of photovoltaic electricity in EU-15 Member States (average tariffs are indicative) compared to the long-term marginal generation costs (minimum to average costs). The figure shows that the most efficient photovoltaic projects might be financially viable.

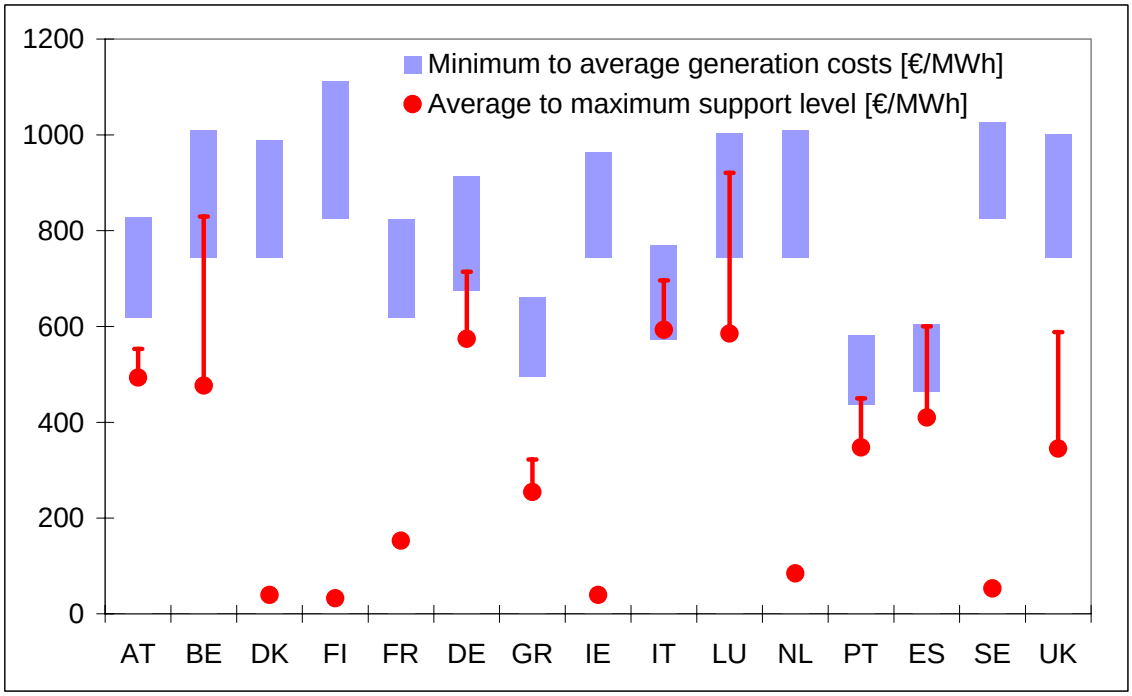


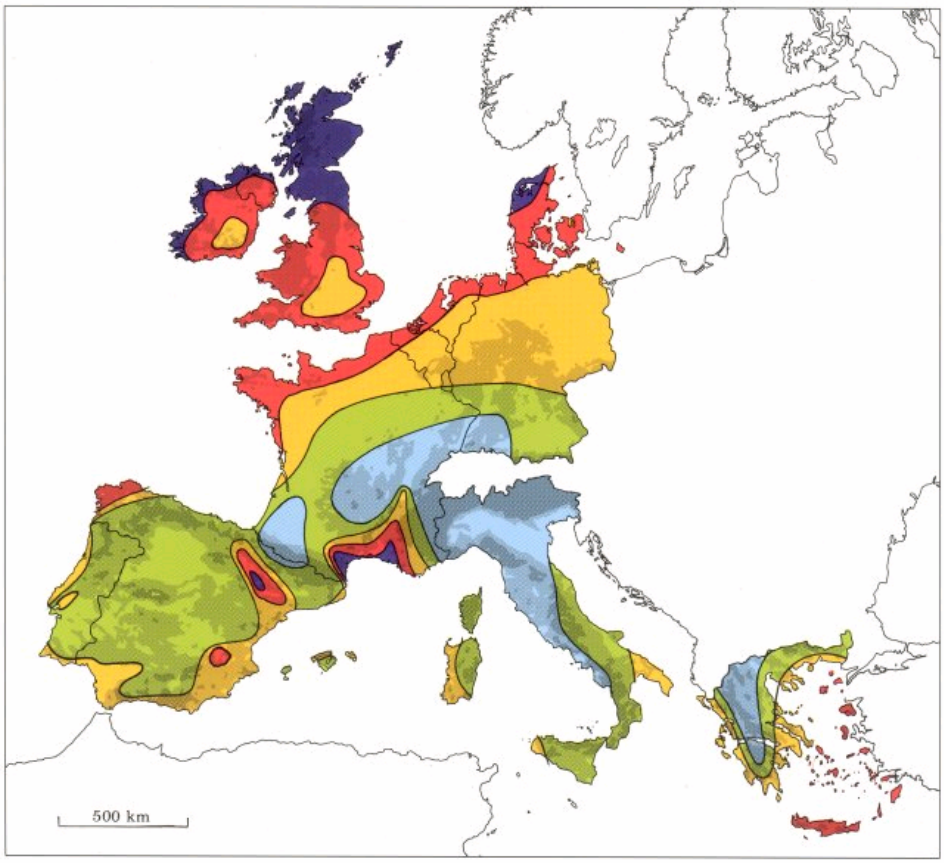
Figure 15.3 Price ranges for photovoltaic in EU-15 Member States compared to support levels Wind
(European Commission 2005)

Background

Wind power production has increased constantly since 1995. However, production is still small compared to the leading wind power producing countries in Europe.

National potential

The estimated potential for wind power production to 2020 is about 28 TWh/year. The northern and central western parts of Italy have less favourable wind conditions. Those parts are among the European regions with the lowest average wind speed as can be seen from the figure below. However the southern and central eastern part of the country has more favourable wind conditions.



Wind resources[1] at 50 metres above ground level for five different topographic conditions

	Sheltered terrain[2]		Open plain[3]		At a sea coast[4]		Open sea[5]		Hills and ridges[6]	
	$m\,s^{-1}$	Wm^{-2}	$m\,s^{-1}$	Wm^{-2}	$m\,s^{-1}$	Wm^{-2}	$m\,s^{-1}$	Wm^{-2}	$m\,s^{-1}$	Wm^{-2}
	> 6.0	> 250	> 7.5	> 500	> 8.5	> 700	> 9.0	> 800	> 11.5	> 1800
	5.0-6.0	150-250	6.5-7.5	300-500	7.0-8.5	400-700	8.0-9.0	600-800	10.0-11.5	1200-1800
	4.5-5.0	100-150	5.5-6.5	200-300	6.0-7.0	250-400	7.0-8.0	400-600	8.5-10.0	700-1200
	3.5-4.5	50-100	4.5-5.5	100-200	5.0-6.0	150-250	5.5-7.0	200-400	7.0- 8.5	400- 700
	< 3.5	< 50	< 4.5	< 100	< 5.0	< 150	< 5.5	< 200	< 7.0	< 400

Figure 15.4 Wind potential in Western Europe
(European Wind Atlas)

National installed capacity

Electricity production from wind power in 2004 was 1,847 GWh. Installed capacity and production showed high growth rates during the last years as can be seen from the Figure 15.5 below.

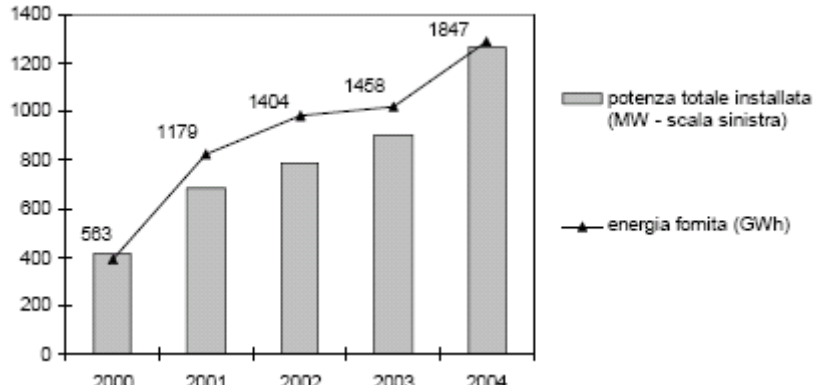


Figure 15.5 Cumulated installed wind capacity (columns-left axis) and electricity production (line with figures)
(ENEA 2005b)

In Italy there are 2,322 wind turbines. More than half of them are situated in the South of Italy. They are spread over the following regions: 558 in Campania, 472 in Puglia, 401 in Sicilia, 357 in Sardegna, 243 in Abruzzo, 155 in Basilicata, 95 in Molise, 10 in Emilia Romagna, 6 in Liguria, and 25 in other regions. The Figure 15.6 below shows the density of wind turbines in different regions of Italy in 2002 (each bullet is equal to 1 MW).

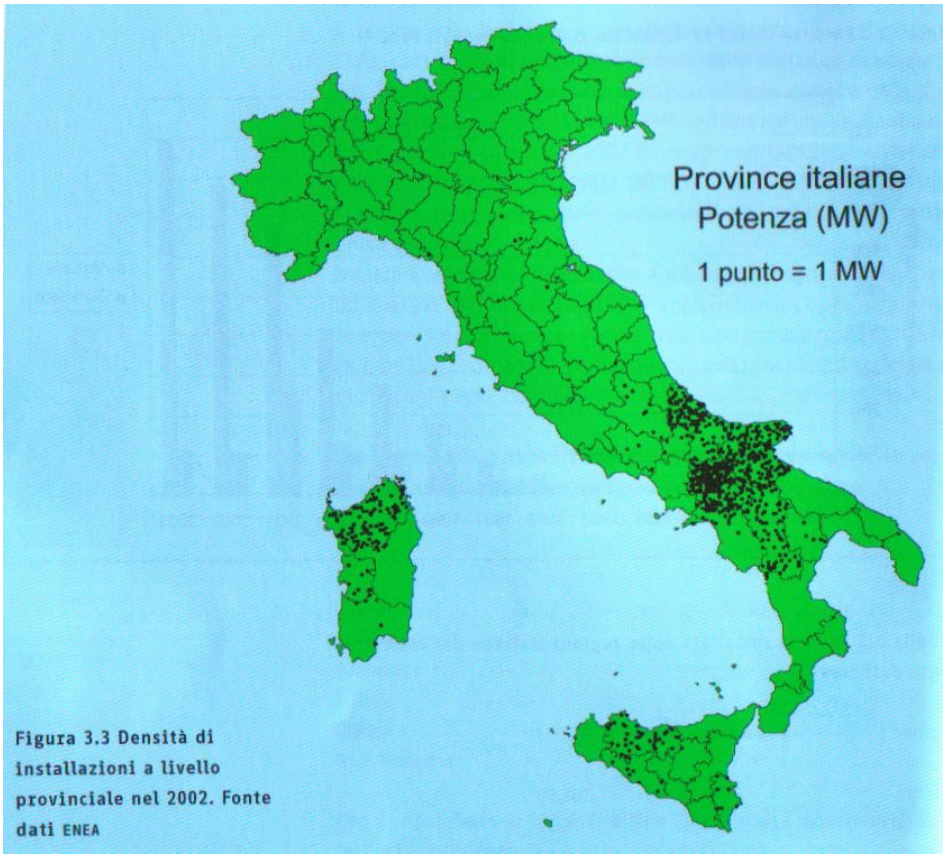


Figure 15.6 Regional distribution of installed wind capacity in Italy

Characteristic features of the technology in the particular country

Wind parks are often owned by private enterprises or local authorities. Electricity is mainly produced to be fed into the grid. In Italy there are up to now no offshore wind parks. Due to the more favourable wind conditions the vast majority of the onshore plants are concentrated in the south of the country.

Barriers to adoption

Possible barriers to development of wind parks are of social and administrative nature. Administrative procedures can be rather complex due to an extensive involvement of several public authorities at different hierarchical levels (central, regional and local government). Planning law, noise disturbance law, biodiversity law and environmental impact assessment must be taken into account. Electricity law governing transmission, distribution and supply is involved as well. Grid connection might be expensive and procedures are not always transparent.

Lack of support by the local population for the development of wind parks due to landscape and nature protection purposes is also a barrier. Unfortunately the more windy regions are often either hills or mountain areas or tourist sites.

Government supports

Wind is eligible for the green certificate scheme. The support system does not differentiate tariffs according to wind conditions. Thus development focuses on regions with favourable conditions. In some areas the requests were so high, that the region stopped all initiatives for a period, in order to avoid a disordered implementation of too many wind parks.

Financial viability

Figure 15.7 below shows price ranges (average to maximum support) for direct support of wind onshore in EU-15 Member States (average tariffs are indicative) compared to the long-term marginal generation costs (minimum to average costs). Support schemes are normalised to 15 years. See section on financial viability of photovoltaic projects for an explanation of this figure.

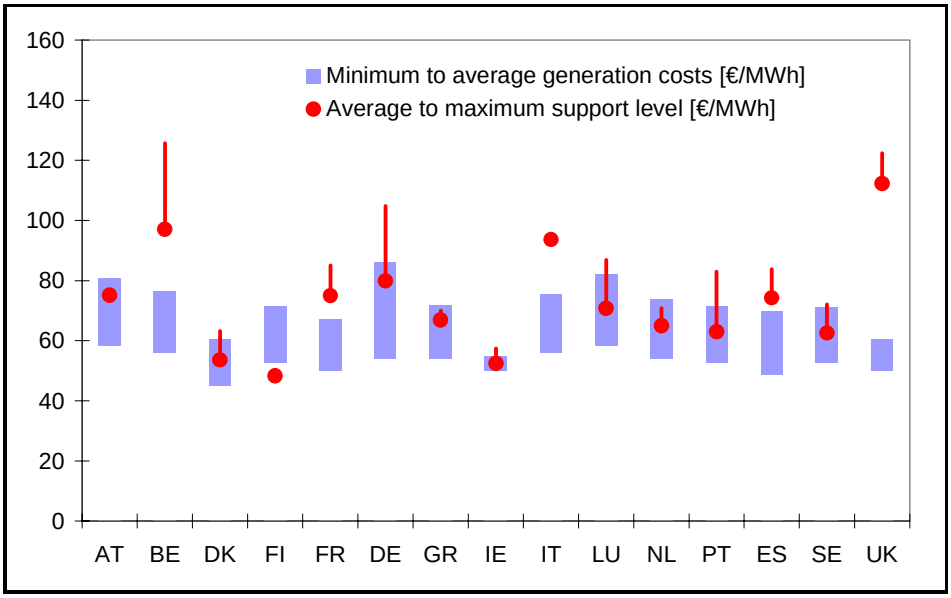


Figure 15.7 Price ranges for wind power in EU-15 Member States compared to support levels

(European Commission 2005)

Figure 15.7 shows that it is possible to operate wind projects profitably under current green certificate prices. However, historic certificate prices are not reliable forecasts for future support levels, especially as the support system will most likely be adapted in the near future.

The Italian financial support system does not differentiate tariffs according to the volume of electricity generated (annual full load hours). Consequently wind parks with different sizes and at different sites benefit from the same support per kWh.

15.2.4 Hydro

Background

Hydropower represents about 75% of renewable electricity in Italy and it is one of the most important national energy sources, being responsible for the high share of renewable electricity in Italy.

However, hydropower production has not been growing during recent years. It currently satisfies about 12% of the national electricity demand. Due to possible negative environmental impacts and limited unexploited potential of big

plants future development will focus on small size installations (below 10 MW) and refurbishment of existing large plants.

National potential

The national potential to 2020 is about 45 TWh/year for large hydro and 11 TWh/year for small hydro. Three quarters of the potential is currently exploited.

National installed capacity

In 2004 about 34 TWh were produced from large hydro and almost 9 TWh from small hydro.

Characteristic features of the technology in the particular country

Existing installations have often been built with a water basin system. Currently, due to environmental considerations more run-of-the-river plants are built. Due to sites for large plants becoming scarce, the focus in the future will be on smaller installations for local use.

Barriers to adoption

Main barriers to development of hydropower plants are often of administrative nature. Procedures can be rather complex due to a large involvement of several public authorities at different hierarchical levels (central, regional and local government). Planning law, biodiversity law and environmental impact assessment must be taken into account. Electricity law governing transmission, distribution and supply is involved as well. Grid connection might be expensive and procedures not always transparent.

On the other hand the development or restructuring of small installations might be less complicated and more profitable due to the possibility to receive green certificates.

The perception of big installations by the local population is affected by tragic incidents, e.g. the disaster at the Vajont Dam in Northern Italy which caused an enormous number of victims in the 1970's.

Government supports

Hydropower is eligible under the green certificate scheme for new plants, or for reactivation or major repowering of existing plants.

Financial viability

The Figure 15.8 below shows price ranges (average to maximum support) for direct support of small-scale hydro in EU-15 Member States (average tariffs are indicative) compared to the long-term marginal generation costs (minimum to average costs). See section on financial viability of photovoltaic projects for an explanation of this figure.

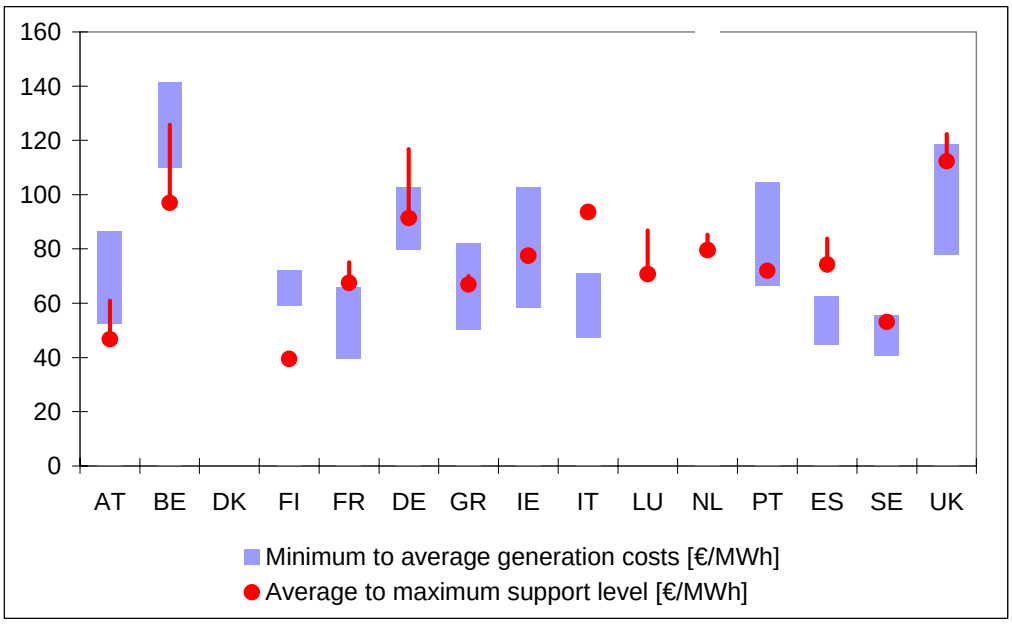


Figure 15.8 Price ranges for electricity from small hydro in EU-15 Member States compared to support levels

(European Commission 2005)

Figure 15.8 shows that it is possible to operate small hydro projects profitably under current green certificate prices. However, historic certificate prices are not reliable forecasts for future support levels, especially as the support system will most likely be adapted in the near future.

15.2.5 Anaerobic Digestion

Background

Local biogas production is currently getting more attention. Changes in legislation may improve its development and the permitting process may be facilitated due to local governments favouring this technology.

Moreover growth of this technology may be positively influenced by some provisions of a recent Legislative Decree (152/2006) which regulates waste management.

National potential

The estimated potential for electricity production from biogas is about 11 TWh/year until 2020.

National installed capacity

In 2004 about 1.1 TWh were produced from biogas, which represents about 10% of the national potential. Growth rates were on average 20% during the last years.

Characteristic features of the technology in the particular country

In Italy landfill gas is the principal source currently being exploited. It represents almost 90% of the produced gas in 2005.

A particular characteristic of biogas plants in Italy is the use of covered lagoons operating at psychrophilic temperatures. Covered lagoons are particular artificial lagoon (big extension and small deep) covered by a gas-proof plastic coat. They're used in case of waste flows with a low share of solid waste and low flow adduction. They can produce biogas easily at the temperature of 10-20°C (psychrophilic temperature) but need a digestion time of up to 30-45 days. The biogas plants are generally associated to large industrial pig farms, to dump installations and to water treatment and purification systems.

Barriers to adoption

Permitting barriers - especially NOx emission related issues - are the main barriers. Also feedstock storage is confronted with administrative and logistic barriers. Difficulties are also encountered in arranging a long term fuel supply. However biogas is positively seen by the local authorities and thus it could be facilitated in the authorisation processes. On the other hand regional and local differences in regulation or interpretation might create future complexity. Electricity law also plays a role as grid connection might be expensive and not always transparent.

Government supports

Electricity production from biogas is eligible under the green certificate scheme.

Financial viability

The Figure 15.9 below shows price ranges (average to maximum support) for direct support of agricultural biogas in EU-15 member states (average tariffs are indicative) compared to the long-term marginal generation costs (minimum to average costs). See section on financial viability of photovoltaic projects for an explanation of this figure.

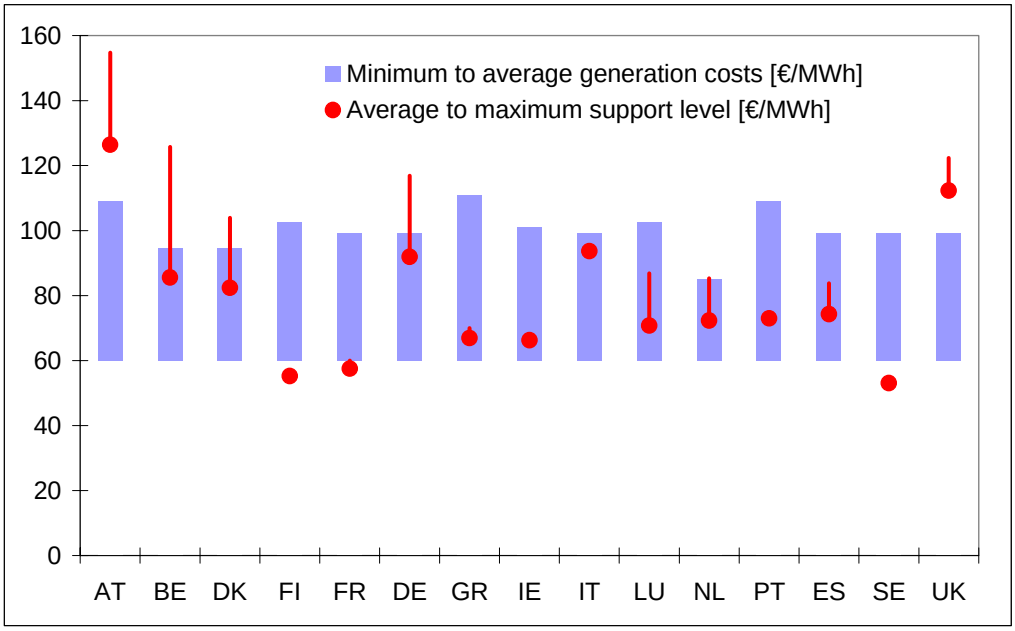


Figure 15.9 Price ranges for electricity from biogas in EU-15 Member States com-pared to support levels

(European Commission 2005)

Figure 15.9 shows that it is possible to operate biogas projects profitably with current green certificate prices. However, historic certificate prices are not reliable forecast for future support levels, especially as the support system will most likely be adapted in the near future.

15.2.6 Wood Fuel

Background

Wood fuel is currently the solid biomass sources with the highest installed capacity for electricity production. However, electricity production from biomass is still very limited. Currently, wood fuel is used mainly for heating purposes. Pellet production and consumption is concentrated in the northern regions of Italy. Local district heating companies using wood are especially located in the northern regions: Alto Adige, Lombardia, Veneto and Piemonte.

National potential

The national potential for electricity production from biomass is 27 TWh/year until 2020. For heat production this figure is estimated to be almost 9 ktoe/year. The potential is concentrated in the northern parts of Italy.

National installed capacity

Electricity production from biomass experienced some growth during recent years and increased to 0.4 TWh in 2004, which is less than 2% of the potential. Heat production was about 2.4 ktoe in 2004, which is almost 30% of the potential, but during recent years there has been only minor growth.

Characteristic features of the technology in the particular country

Wood fuel is mainly used by district heating companies located in the North of Italy and for domestic heating purposes. Generally, raw material for pellet production is supplied on a local/national basis and is not imported from other countries. A large amount of pellet is sold by stove vendors to the customers.

Barriers to adoption

Permitting barriers, especially NOx and dust issues, stand out as one of the main barriers. Difficulties are also encountered in arranging a long term fuel supply based on national production. During permitting procedures the idea of using imported wood (e.g. from Switzerland or Brazil) is not favoured by authorities, thus limiting the total size of the approved installations.

However biomass is positively seen by the local authorities and thus it could be facilitated in the authorization processes. On the other hand regional and local differences in regulation or interpretation might create future complexity.

Electricity law also plays a role as grid connection might be expensive and not always transparent.

Government supports

Electricity production from solid biomass is eligible for the green certificate scheme.

Forest fires are a big issue during summers in Italy. To increase prevention, there is a need of more regulation for forest cleaning. This could increase additional incentives to provide wood fuel.

The recent proposal to create a separate incentive for plants using only local biomass sources could increase the viability of sustainable solid biomass plants.

Financial viability

The Figure 15.10 below shows price ranges (average to maximum support) for supported biomass electricity production from forestry residues in EU-15 member states (average tariffs are indicative) compared to the long-term marginal generation costs (minimum to average costs).

See section on financial viability of PV projects on page 305 for an explanation of this figure.

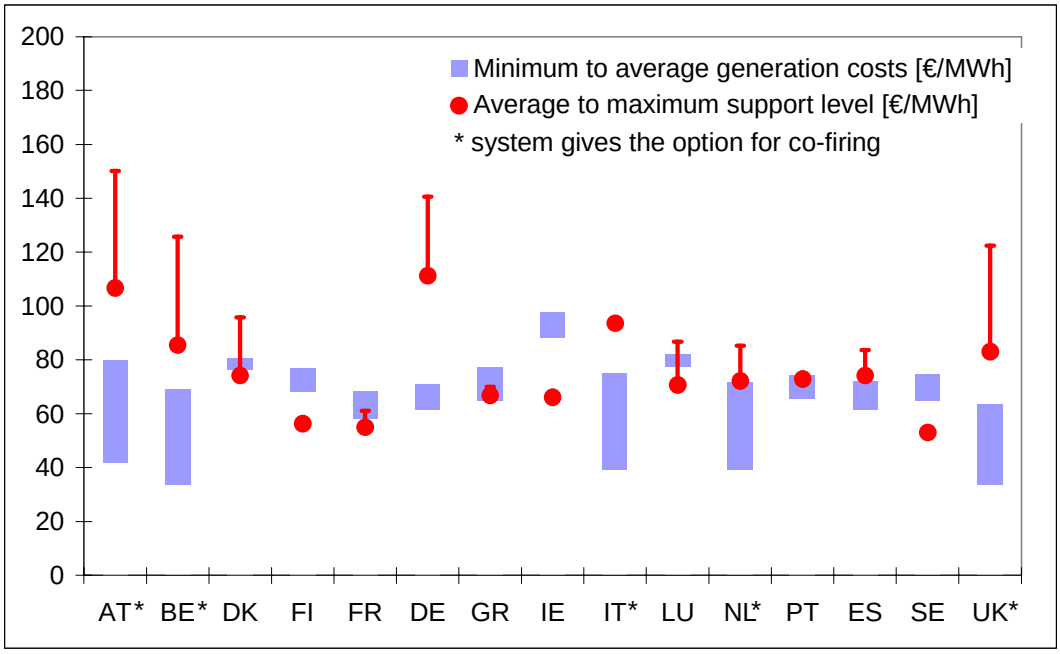


Figure 15.10 Price ranges for electricity from forestry residues in EU-15 Member States compared to support levels
(European Commission)

Current green certificate prices are sufficient in order to produce electricity from biomass profitably. It should be noted that certificate prices can fluctuate and that the support system will most likely be adapted in the near future.

15.2.7 Liquid Biofuels

Background

Italy is among the largest producers of biodiesel in the EU.

National potential

The estimated national potential for biofuel production to 2020 is 3,500 ktoe/year.

National installed capacity

In 2004 about 350 ktoe of biofuels were produced, which is about 10% of the national potential. Production was exclusively biodiesel, no bio-ethanol is produced.

Characteristic features of the technology in the particular country

General problem related to biofuel is the difficulty to arrange a long term feedstock supply. Future regulation may try to promote the growing, the conversion and the utilization of energy crops on a national basis to enhance sustainable development of the agricultural sector.

Barriers to adoption

One of the problems of developing new production capacity is the granting of administrative permits. Usually the procedure takes between 2 and 3 years. Furthermore investment insecurities exist due to availability and security of feedstock supply and lack of price stability. Agricultural associations and other stakeholders in this sector are strongly lobbying for the use of energy crops.

Relevant policy and legislation at the national level specific to the technology

At national level the Legislative Decree 387/2003 and the related Ministerial Decree apply to this technology.

Moreover Italy has implemented with the Legislative Decree 128/2005 the European directive 2003/30/EC on the promotion of the use of biofuels or other renewable fuels for transport. The Decree has set a national target of 1% by December 2005 and 2.5% by December 2010, which is well below the reference value of 5.75% set by the European Directive.

Government supports

The Italian government is currently working on the promotion of biofuel. So far biofuels are mainly supported through tax exemptions, which also apply to blends of biofuels. Investment subsidies for growing, conversion and utilization of energy crops can be foreseen.

15.3 Planning and Consultation

This section provides an overview of the administrative procedures for renewable energy projects.

Learning objectives

After studying this section you should be able to answer the following questions:

What are the main steps in obtaining the necessary permits for realising a renewable energy project?

Which institutions are/should be involved?

How is the public involved in planning procedures? How can project developers contribute to policy relevant to renewable energy projects?

Background and responsible authorities

The competence for energy is shared between central and local governments. Based upon the Legislative Decree 112/1998 Regional Authorities are given competences for energy matters. Accordingly Regional Authorities have issued regional laws consistent with the European and national legal framework.

The governments involved in energy matters can be divided into four layers:

- National authorities;
- Regional authorities (Regions);
- Provincial authorities (Provinces);
- Local authorities (Municipalities).

National Authority

Ministries involved in renewable energy are:

The Ministry of Economic Development sets up the RE target and takes care of regulation regarding subsidies and fiscal measures;

The Ministry of the Environment, Land and Sea Protection is responsible for spatial planning and environmental issues such as the Kyoto agreement.

Regional Authority

The Regional Authorities have to elaborate the energy regional policies. The regional government decides, based on spatial criteria, on which locations RES energy development is possible. On the other hand, environmental

issues are also taken into consideration by the responsible authorities. Regional competence is summarised in below.

Issuing the Regional energy programme
Administrative functions for energy matter, including renewable resources
Spatial planning related to power generation plants
Management of incentive schemes
Involvement in the implementation of European energy policies

Table 15.5 Competences of the Regions

Provincial Authority

below summarises the competence of the provincial authorities.

Implementation of the spatial planning carried out by the regional authorities
Involvement in the permitting procedures with special attention to air quality, waste management and water protection
Promotion of the use of renewable sources

Table 15.6 Competences of the Provinces

Local Authority (Municipality)

Initiators of a new project always have to deal with the Local Government at first. below summarises the main competence of the municipalities.

Management of the application for building and environmental permits
Authorization for productive activities
Elaboration of the local energy program

Table 15.7 Competences of the Provinces

Procedures from the project developer's point of view

With regard to the authorisation procedure the Legislative Decree 387/2003 implementing the European Directive 2001/77/EC, aims:

- to reduce the regulatory and non regulatory barriers;

- to expedite procedures at the administrative level;
- to ensure that rules are objective, transparent and non discriminatory.

The national legislation defined RES electricity projects to be of special importance, which allows them to make use of faster permitting procedures. Regulation imposes that the permitting procedure is carried out by a single public authority, i.e. often the Region, which cooperates with the other involved subjects managing their opinions during the entire procedure. Environmental impact assessment is included in the procedure as well. The administrative tool to achieve collaboration of all involved public bodies is called *Conferenza dei Servizi*.

In respect to the access of information and public participation in decision making in environmental matters Italy has transposed the Aarhus Convention adopted on 25th June 1998 through the Law 108/2001.

Italy has transposed on August 2005 the European Directive 2003/4/EC on public access to environmental information confirming the right of everyone to receive environmental information that is held by public authorities.

The Decree 387/2003 lays down that RES-E has priority access to the grid system. Moreover the Decree sets an obligation upon distribution system operators or transmission system operators to purchase electricity produced by plants connected to their grid. Obligation to purchase occurs when the producer chooses not to sell the power through bilateral contracts or in the power exchange.

Measures adopted by the National Regulatory Authority regulate: (i) conditions for the delivery of the connection service to electricity networks; (ii) arrangements and economic conditions for the withdrawal of electricity; (iii) connection fees for electricity transmission; (iv) technical and economic conditions concerning the on-the-spot trading of electricity generated by plants fed by renewable sources and with nominal power no higher than 20kW.

Table 15.8 below summarizes the legal framework and its content for the most significant phases of a project development (ENEA 2005b).

	Legal source	Content in brief	Scope of application
Authorisation procedure	Legislative Decree 387/2003	Permit application and issuance	Renewable sources
Connection to the grid	Legislative Decree 387/03	Priority access to the grid system	Renewable sources
	AEEG resolutions 281/05	Conditions for grid connection (nominal voltage > 1kV) operators subject to obligatory third-party connection requirements	Renewable and conventional sources with special conditions for RES-E production
Transportation	AEEG resolution 05/04	Connection fees for electricity transmission	Renewable and conventional sources
Transfer of electricity	Legislative Decree 387/03	Arrangements and economic conditions for the withdrawal of electricity	Renewable and conventional sources
	AEEG Resolution 34/05	Arrangements and economic conditions for the withdrawal of electricity	Renewable and conventional sources
	AEEG resolutions 28/06	Technical and economic conditions concerning the on-the-spot trading of electricity	Electricity generated by plants fed by renewable sources (nominal power < 20kW)
Support mechanisms	Ministerial Decree 24.10.2005	Green certificates	Renewable sources
	AEEG resolution 188/05; Ministerial Decrees 28.07.2005 & 06.02.2006	Terms and conditions for subsidised tariffs for solar energy	PV panels with capacity between 1kW and 1000kW.

Table 15.8 Legal framework for different phases of project development

Largest barriers in planning procedures

In general permitting procedures are complex (composed by several steps) protracted for about two years and involve several public authorities. Re-

gional, provincial and local authorities are involved in the permitting procedures.

Local regulation can be very detailed and differs between regions, causing a non-homogeneous picture of the country and increasing the complexity of the administrative system. Permit granting especially involves air quality regulation: NOx and dust issues can stop the permitting procedures. Technologies depending on the transport and storage of biomass additionally face legal and logistic barriers.

National law lays down the priority access to the grid system for electricity produced from renewable energy sources and CHP plants. However there is no time frame for the grid connection of renewable power plants and grid connection costs can be expensive.

Opportunities to influence policies

All plants with a capacity of more than 50MWe have to conduct an impact assessment procedure at national level. This includes a consultation period for the public.

For plants under 50MWe and in the range of 50 to 300 MWth, the competent authority is the region (In some regions responsibilities are delegated to the province). In that case there is the need for an environmental feasibility study that in most of the cases includes a consultation period. For small plants at least the municipality is always involved into the authorization procedure.

Land use is regulated by the municipality which integrates all different legislations and directives, and rules the land use according to its own local policy. In this case the public can only participate in specific cases through local citizen groups or committees specifically created.

The energy and electricity regulator (AEEG) is systematically opening new decisions and regulations to public consultation. Also the Ministry of Environment includes public consultation periods for development of some legislation.

15.4 References

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