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Incentives for renewable energy

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Incentives for renewable energy

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Abstract

This paper carries out a critical analysis of the current mechanism of incentives by comparing the expected results and the results that have actually been reached. For the case of Italy, renewable sources for heating and electricity and the effect of incentive schemes on the cost of energy paid by final customers are analysed. Average fair prices for all renewable sources, obtained by comparison with conventional production, are found. They can be taken as reference prices for an incentive market based scheme, valid for all technologies and alternative to the current one, based on feed-in tariffs.

Authors Keywords: CO2 abatment costs, Incentive schemes, Renewable energy development

JEL classification: Q42 (Alternative energy sources), Q48 (Government policy), Q52 (Pollution Control Adoption Costs; Distributional Effects; Employment Effects)

1. Introduction

This paper analyses the current support schemes for Renewable Energy Sources (RES) in Italy. The literature on the assessment of different type of incentives is quite vast. Menanteau et al. (2003) compare different support scheme for RES. In particular price based incentives (feed in tariffs) are compared with quantity based incentives, i.e. Tradable Green Certificates (TGC). The efficiency of the different support schemes both from a theoretical and a practical point of view are examined. They highlight the theoretical advantages of a green certificate system, although they did not have a practical confirmation.

Using data from the Italian certificate market for wind energy, Falbo et al. (2008) prove that an incentive system based on certificates rather than feed in tariffs is more consistent with a "grid parity" objective, i.e. the equality between the expected profit from energy production from a renewable and a conventional plant. In Bürger et al (2008) an overview of different policy instruments for supporting heating RES is presented. In particular some instruments are selected and evaluated, comparing them qualitatively and quantitatively for the case of Germany. Based on different criteria, the so-called Bonus Model received the best evaluation. Using data from the Swedish TGC market, Bergek and Jacobsson (2010) show that a market based incentive could help minimizing the social costs of reaching the EU targets for renewables. Aune et al. (2012) analyse the effect of a tradable green certificates market on the costs of reaching the EU targets. In particular, the implemented numerical model shows that the presence of a TGC market may cut the EU's total cost of fulfilling the renewable target by as much as 70%, compared with a situation of no trade in green certificates. Connor et al (2013) focus on policies to support heating renewables. Different types of support options are analysed with a discussion of advantages and disadvantages. Pablo-Romero et al. (2013) analyse the incentives for heating RES in Spain. Those incentives have been given in the form of tax incentives, non-refundable grants and favourable lines of finance. All the measures applied have proved insufficient and other type of measures should be adopted. Fagiani et al. (2013) analyse the effect of investors' risk aversion on the performance of support schemes. In particular, a comparison is made between a feed in tariff and a certificate market system. Results obtained show that a certificate market

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allows to reach the desired level of renewable energy with a good cost-efficiency as long as risk aversion is moderate. Moreover, a certificate market is preferable when future cash flows are discounted by a higher social discount rate.

In this paper we show that substantial savings could have been done in Italy by developing policies to support more RES for heating, instead of supporting RES for electricity, in particular PV technology. Moreover, in the light of a future new plan for supporting RES, the average fair price for incentives is found for each RES, both for electricity and heating, according also to their potentiality. The results show that some technologies do not need any incentives, while for other technologies a substantial support is necessary.

Section 2 describes the European Directives and the general objectives and illustrates the current situation as far as reaching the objectives for Italy. Section 3 assesses incentives according to the various supported technologies and according to what it could have been done if RES technologies for heating had been considered in the supporting scheme. Section 4 revises the incentive mechanisms all over Europe. A fair price for a possible market trading mechanism is computed here for heating and electricity RES. Conclusions are in Section 5 followed by references.

2. Achieving the targets

On 12 December 2008, the European Council approved the Climate-Energy package (the so-called 20-20-20) that established, for EU countries, a 20% reduction of greenhouse gases emission from the levels of 1990, an increase of energy efficiency and a target of 20% on the use of energy from renewable sources on total energy production. The following European Directive 2009/28/CE set as a target for Italy that by 2020, energy produced from renewable sources should be equal to 17% of total energy consumption. Taking into account the efficient scenario, according to a total energy consumption of 133.0 Mtep, the energy consumption from RES should be equal to 22.62 Mtep, divided by energy sectors, according to Fig. 2.1 (MiSE, 2010).

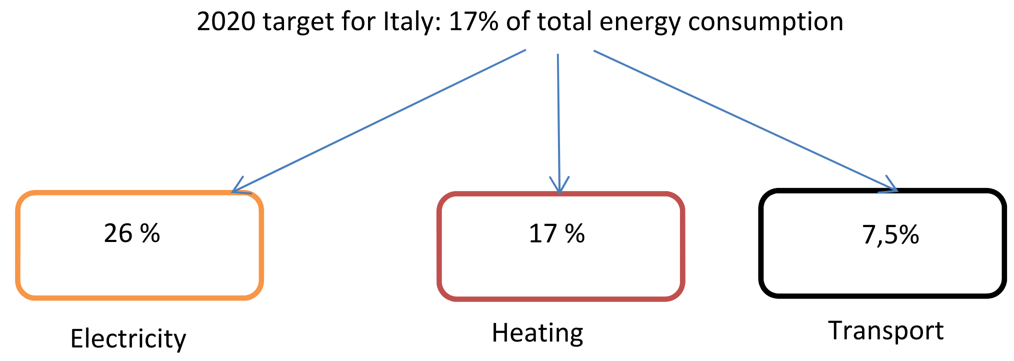


Fig. 2.1 PAN targets

In setting these targets, the aim of the European Council can be summarized in three points:

1. Combating climate changes through CO_2 emission reduction
2. Limiting the EU dependence on energy import
3. Promoting the creation of new jobs and stimulating GDP growth

1. Combating climate changes through CO_2 emission reduction

The incentive strategy adopted by Italy (and also by other countries) has focused mainly on the electricity sector, neglecting the heating sector. Figure 2.2 shows CO_2 abatement costs (€/t) for the different technologies, computed using a yearly discount rate of 5%. These costs cover a wide range and for some technologies turn out to be negative. Unfortunately, in the past years most of incentives were distributed to the most expensive technologies, like PV.

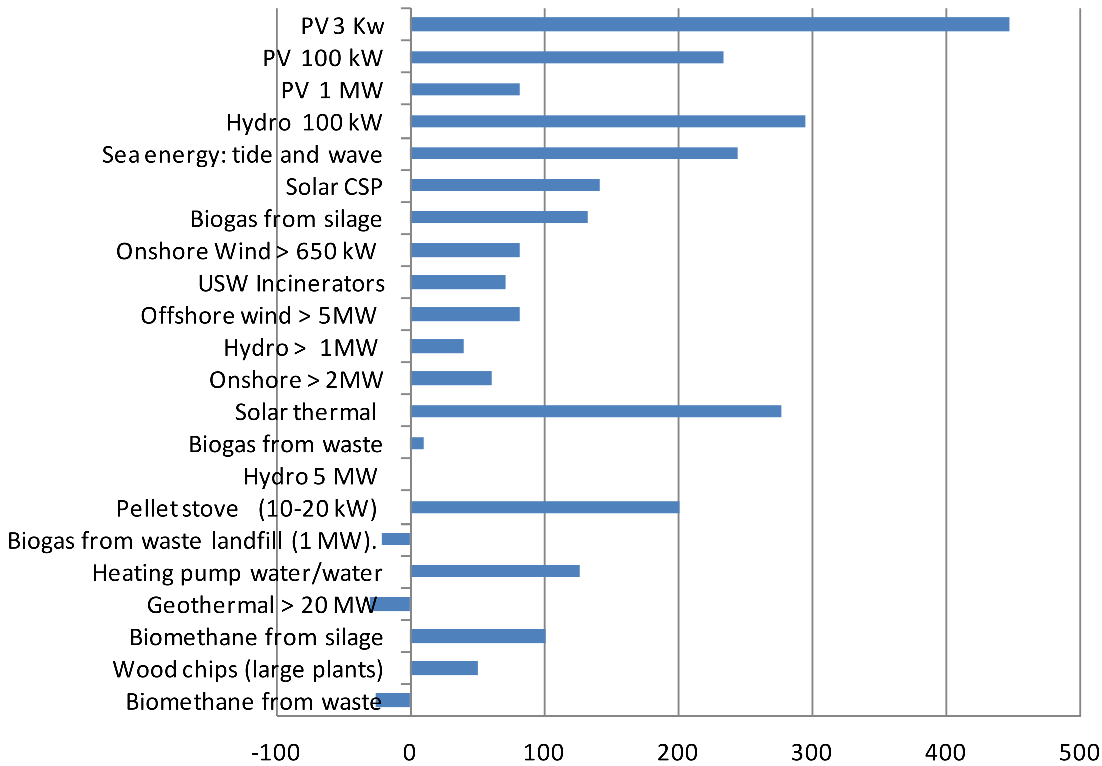


Fig. 2.2 Abatement costs for different technologies (€/CO2t). Source: authors' elaboration

2. *Limiting the EU dependence on energy import*

Fossil fuel imports have been reduced (Table 2.3), but this is probably partly due to the economic crisis.

Imported fuels [Mtoe]					
	2008	2009	2010	2011	Δ(2011-2008)
Coal	16.77	12.73	14.60	15.53	-1.24
Gas	62.95	56.72	61.72	57.63	-5.32
Oil	101.73	94.29	97.00	89.94	-11.79
Renewables	0.81	1.35	1.83	2.17	1.36
Electricity	9.55	10.36	10.12	10.45	0.90

Tab. 2.3 – Savings on imports. Source: authors' elaboration on MiSE (2013) data

3. Promoting the creation of new jobs and stimulating GDP growth

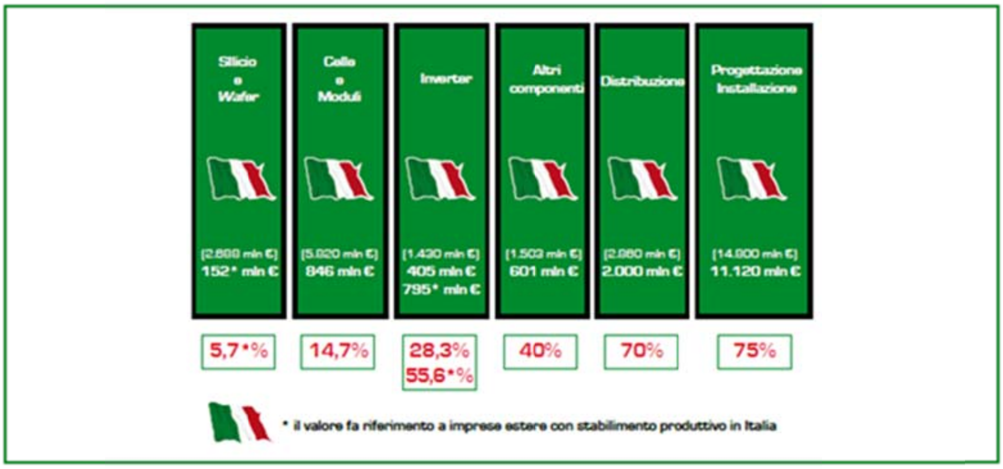
The effect on increase of jobs is very uncertain. So far, there are no clear-cut studies making clear the effect of RES introduction on the labour market. In fact, an EU standard method to identify the number of "green" jobs created and to aggregate them by RES typology has not been given yet. Thereby, it is very difficult to assess the effectiveness of the huge incentive program on RES for electricity upon the creation of new jobs. In particular we cannot state if they are really new jobs, or they are simply a shift from other sectors. This problem is highlighted in Table 2.4, where discordant data from different sources are reported (Lavecchia and Stagnaro, 2010).

	Source	direct	indirect	total	ref year
PhotoVoltaic Energy	CNES			5700	2008
	CENSIS			15000	2009
Geothermal Energy					
	CENSIS			3000	2009
Biofuels					
	CENSIS			700	2009
WIND Energy	Nomisma Energia			10000	2009
	ANEV/UIL	3544	13630	17174	2007
	EWEA	2500			2007
	CENSIS	6300	21800	28100	2009

Tab. 2.4 Estimates of green jobs in Italy. Source: Lavecchia e Stagnaro, 2010

According to the same study, from now until 2020 and depending on the scenarios, between 55,000 and 112,000 new jobs could be created through the development of wind and PV. However, in order to obtain such a result a huge amount of funding is needed and this amount, if left to the market, could generate a number of new jobs in the economy, respectively five and seven times bigger than the estimated number of green jobs.

In the case of PV, a strongly supported technology, MiSE estimated a remarkable increase of jobs only in the installation process, while the effects on the production of silicon and wafers, cells, modules and inverters are negligible. However, recent studies (Energy Strategic Group, 2012) show some evidence of a stronger participation of Italian companies in the various sectors for PV production (Table 2.5).

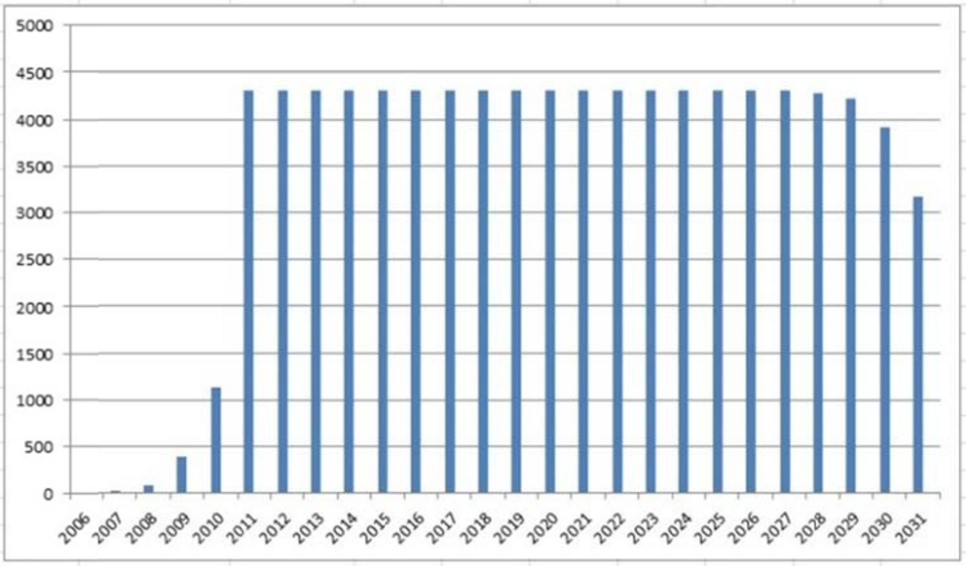


Tab. 2.5 – FV: Business Area and business volume in Italian companies in 2011.
Source: Energy Strategic Group, 2012

3. Assessment of incentives

The currently adopted support schemes for RES (in Italy, "Conto Energia" and "tariffa omnicomprensiva") will involve a cumulative burden of 170 billion €, to which 70 billion € should be added (MiSE, 2013).

For PV only, at the end of 2011 the cumulated cost amounts to 4.5 billion € to which we should add the effects of 2012 incentives (see Fraunhofer EmployRES, 2009 for an analysis of the German case). In Table 3.1 we report, for each year, the costs for incentives from 2000 to 2011, until 2031. Note that those costs add up to the bill paid by all consumers.



Tab. 3.1 PV incentives (M€) for the cohorts 2000-2011. Source: authors' elaboration on GSE data.

This policy of strong incentives for the most expensive RES technologies has been pursued by all European Countries and not only by Italy. Table 3.2 reports the incentives in Europe by technology.

Member State	Weighted average support level (on electricity supported) by technology (€/MWh)					Total (€/MWh)
	Wind onshore	Wind offshore	Hydro	Geothermal	Solar PV	
Austria[18]	31.05		5.05	80.45	523.55	59.71
Belgium	95.28	107.00[19]	48.71		465.39	106.79
Czech Rep.	30.47		22.56		464.32	45.91
Denmark	33.90	25.55				31.21
France	41.48		19.46	31.50	449.97	36.83
Germany	19.14	81.07	9.64	129.79	411.04	74.85
Great Britain	58.78	76.38	58.87		62.59[20]	61.34
Hungary	44.67		40.98			39.07
Italy	77.66		82.03	80.48	432.70	103.00
Lithuania	41.99		30.41		408.10	40.53
Luxembourg	27.98		97.65		525.18	117.97
Portugal	49.11		42.86		282.81	50.57
Spain	42.58		42.78		429.37	76.27
Sweden	30.71		30.71		30.71	30.71
The Netherlands	64.77	84.21	91.49		119.81	73.37
Minimum support	**19.14**	**25.55**	**5.05**	**31.50**	**30.71**	**30.71**
Maximum support	**95.28**	**107.00**	**97.65**	**129.79**	**525.18**	**117.97**

Tab. 3.2 Incentives for electricity renewables in EU by technology. Source: CEER 2011

We can see that the value for Italy (103 €/MWh) is exceeded only by Belgium and Luxembourg. Looking again at Italy, we can compute that in about 20 years a cumulative burden of about 240 billion € will be discharged on the electricity system and in general on the bill paid by Italian consumers, with a dramatic effect on the bill itself: as far as 2011 is concerned, 25% of the bill is due to support RES technologies (MiSE 2012, 2013).

The strong commitment for RES support has produced some positive results: the target for electricity RES has been reached in 2012, i.e. 8 years before the expected term (MiSE, 2012). However, incentives for thermal energy are still under discussion. Also considering a national strategy that is expected to overcome the European targets or that the European targets may be updated and become more ambitious, it is fundamental to identify a support scheme that is fair for every RES technology.

An analysis of the current situation projected to 2020 (Table 3.3) shows that 50.5% of the incentives is assigned to PV, which represents only 10% of electricity production. In the same table we notice that more than 90% of total incentives are distributed to electric FER, which represents only 41.75% of total energy production from RES.

RES	GWh	Cumulated Incentives [G€]	% Energy	% Cost of incentives
Wind	20000	22.9	7.12	9.00
Solar	29700	150.6	10.58	59.22
Solar PV	28000	140	9.97	55.05
Solar concentration	1700	10.6	0.61	4.17
Geothermal	6750	1.1	2.40	0.43
Hydro	42000	15.5	14.96	6.09
Biomass	18780	45	6.69	17.69
Solid	7900			
Biogas + bioliquids	10888			
Sea Energy: tides, waves, oceans	5	0.02		
Total Electricity	**117235**	**235.12**	**41.75**	**92.44**
Geothermal energy (geothermal heat at low temperature in the application of heat pumps excluded)	3489	0.2	1.24	0.08
Solar	18445	9.2	6.57	3.62
Biomass	65942	3.6	23.48	1.42
Renewable Energy from heat pumps	42079	6.2	14.98	2.44
Total Thermal	**129955**	**19.2**	**46.28**	**7.55**
Transportation	**33628**	**n. a.**	**11.98**	
Total (electric + thermal + transportation)	**280818**	**254.32**	**100.00**	**99.99**

Tab. 3.3 Expectations for 2020 from current situation for incentives. Source: authors' elaboration

A "what if" analysis shows the possible achievement if a "cap" to PV production (11350 GWh) had been set (Table 3.4). In this case the heating sector, which represents 49.51% of energy, would have received only 10.03% of total incentives.

We can conclude that the ratio cost/benefits for the production of electricity from RES is extremely high (especially in Italy).

Furthermore, it has to be considered that the European Directive 28/2009 considers as equal every form of energy and it does not reward the generation of electricity with respect to heating, while so far the policies to support RES have been focused mainly on the electricity sector. Some distinctions have been made only about the use of RES in the transportation sector.

RES	GWh	Cumulated Incentives [G€]	% Energy	% Cost of incentives
Wind	20000	22.9	7.62	11.96
Solar	11350	87.8	4.32	45.84
Solar PV	9650	77.2		
Solar concentration	1700	10.6		
Geothermal	6750	1.1	2.57	0.57
Hydro	42000	15.5	16.0	8.09
Biomass	18780	45	7.16	23.5
Solid	7900			
Biogas + bioliquids	10888			
Sea Energy: tides, waves, oceans	5	0.02		
Total Electricity	**98885**	**172.32**	**37.68**	**89.96**
Geothermal energy (geothermal heat at low temperature in the application of heat pumps excluded)	3489	0.2	1.33	0.10
Solar	18445	9.2	7.03	4.8
Biomass	65942	3.6	25.12	1.88
Renewable Energy from heat pumps	42079	6.2	16.03	3.24
Total Thermal	**129955**	**19.2**	**49.51**	**10.03**
Transportation	**33628**	**n. a.**	**12.81**	
Total (electric + thermal + transportation)	**262468**	**191.52**	**100.00**	**99.99**

Tab. 3.4 A simulation: PV production limited to 11350 GWh – Projections to 2020
Source: authors' elaboration

4. The incentive mechanism

The feed-in tariff mechanism, which has been adopted in almost all EU countries (see Table 4.1), gave a huge contribution to costs increase. This has been acknowledged both theoretically and practically (Falbo et al., 2008; Bergek and Jacobsson, 2010; Aune et al., 2013) and recently also by the Italian Ministry of Economic Development (MiSe, 2012). In fact, the rigidity of feed-in tariffs does not take into account the reduction of production costs (in particular for PV). In Falbo et al (2008) an analysis performed on wind incentives showed that the market priced somehow correctly TGC, while feed-in tariffs were excessively high. In Italy in particular, the incentive schemes are complicated, as they are different for different technologies.

Member State	Wind onshore	Wind offshore	Hydro (mainly small scale)	Geothermal	Solar PV	Biomass, Biogas and Waste, others
Austria[7]	Feed-in tariff		Feed-in tariff	Feed-in tariff	Feed-in tariff	Feed-in tariff
Belgium	GC	GC[8]	GC		GC	GC
Czech Rep.	Feed-in tariff Feed-in-premium		Feed-in tariff Feed-in-premium		Feed-in tariff Feed-in-premium	Feed-in tariff Feed-in-premium
Denmark[9]	Feed-in-premium	Feed-in tariff				Feed-in-premium
France[10]	Feed-in tariff Call for tenders		Feed-in tariff	Feed-in tariff	Feed-in tariff Call for tenders	Feed-in tariff Call for tenders (biomass)
Germany	Feed-in tariff	Feed-in tariff	Feed-in tariff	Feed-in tariff	Feed-in tariff	Feed-in tariff
Great Britain	GC	GC	GC		GC	GC
Italy	Feed-in tariff GC		Feed-in tariff GC	Feed-in tariff GC	Feed-in premium GC	Feed-in tariff GC
Hungary	Feed-in tariff		Feed-in tariff			Feed-in tariff
Lithuania	Feed-in tariff		Feed-in tariff		Feed-in tariff	Feed-in tariff
Luxembourg	Feed-in tariff Feed-in-premium		Feed-in tariff Feed-in-premium		Feed-in tariff Feed-in-premium	Feed-in tariff Feed-in-premium
Norway	Investment grants[11]					

Table. 4.1 RES Support schemes for electricity production. Source: CEER 2011

The supporting policy has been progressively reduced by almost all European countries (Fig. 4.2).

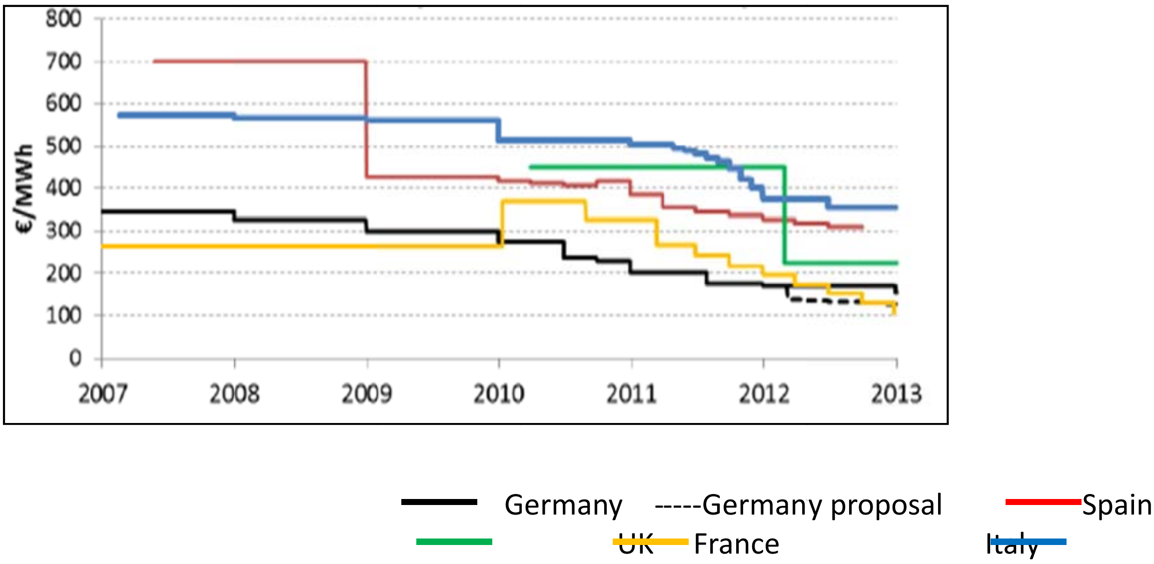


Fig. 4.2 Incentives in EU. Source: MiSE (2012)

According to the former analysis, the results achieved by the adoption of the schemes for RES development are quite disappointing. Support schemes have proved very expensive and overall not efficient. The increase of energy produced from RES did not lead to the expected results in terms of energy independence and in terms of increase of occupation and emission reduction.

The incentives to RES for electricity should definitely be substantially revised or even cancelled, given the amount due that will last until 2032.

However, in order to achieve an efficient revision of the mechanism, the following considerations must be taken into account:

- the requirement to keep the share of RES at 17% even when old plants have to go out of service;
- the possibility that by 2020 an increase of RES share may be decided at European level;
- the possibility that a higher growth rate could require an increase of the final consumption of energy as compared with the current forecast of 133.4 Mtep (1551 TWh);
- the potentiality of renewables that can be considered more significant in the Italian context;
- the costs of shifting from conventional to renewable;
- the demand of energy (electricity, low temperature heat, high temperature heat).

To this end, a first evaluation comes from Table 5.1. As of 2012 data (the last officially available), the average costs per MWh are reported for different RES technologies. Costs are computed at a discount rate of 5%, extended to the whole plant life. By assuming as reference costs (after tax) for thermal RES and bio-methane the cost of natural gas (35 €/MWh) and, for electric RES, the average electricity price (75 €/MWh), we calculated the difference between renewable and conventional energy costs (column ∆cost1). ∆cost1 is the differential of cost sustained by an industrial consumer switching from conventional to renewable energy. Then, we computed the weighted average tariffs paid by final consumers (76 €/MWh for natural gas and 153 €/MWh for electricity) and we calculated the difference between the costs of renewable energy and conventional energy for a hypothetical final user (small generators, in particular for heating), for private use (column ∆cost2). We then estimated the yearly potentiality for each RES and we computed the overall cost difference that should be supported in order to switch from conventional sources to renewable sources. Note that some technologies (unfortunately with low potentiality) show a negative ∆cost1: it means that the current renewable costs are already lower than conventional, bringing to a saving if using renewable sources. We end up with a total cost of 3137 M€ for switching. Since, according to PAN expectations, the expected level of 17% that has to be reached by 2020 should be equal to 264 TWh, the amount of total energy by renewables (317 TWh) would be well over this threshold. The burden for the Country is relevant, as it exceeds 3 billion €, but it is still modest if compared to the current level of incentives to electric RES, which in 2012 has been equal to approximately 9 billion € and it is expected to reach a peak of about 12 billion €.

In the suggested hypothesis, more than 200 TWh are produced through low or medium temperature thermal RES. As the demand for this type of energy amounts in Italy, only for the civil sector, to 400 TWh, the production would be completely absorbed by the demand.

Finally, the development of biogas generation from solid waste, to produce bio methane for transportation use, together with the conversion to biomethane production of the existing fermenters, is enough to satisfy the European constraints regarding the use of RES in transportation sector.

5. The approach for a new tax incentive policy for renewable energy

Before proposing a new mechanism to support the Renewable Energy Sources, able to significantly reduce the burden on users and more generally for all taxpayers, we need to analyse the issue according to four main items:

- the expenses already accumulated;

• the need to maintain 17% of gross end use of renewable energy even when the older plants have to go out of service;

• the possibility that by 2020 the EU decides to raise the share of renewable energy sources;

• a greater rate of growth, even if desirable, would increase the energy consumption compared to the expected total energy consumption in 2020 of 133.4 Mtoe (1551 TWh).

To design new support schemes for renewables it is necessary to assess:

- the potential of the renewable energy technologies that are currently significant in Italy;

- the cost of such technologies and the increased cost compared to traditional sources;

- the quantity of energy needed in Italy by each proposed technology (electricity, heat: low and high temperature).

To this end, with the aim of a preliminary evaluation, Table 5.1 was built, which shows the average cost per MWh produced by different types of RES. The costs were calculated using a DCF, with a discount rate of 5% during the lifetime of the plant which is also indicated in the table. The cost of natural gas (without taxes) equal to 35 €MWh was assumed as a reference cost for renewable thermal and bio-methane. For RES electricity generation the single price of purchase of the electricity exchange (assumed to be equal to 75 €/MWh) was used. The difference of the costs was then calculated between conventional and renewable energy. Using the AEEG 2012 data, weighted average tariffs for end-users were calculated, resulting equal to 76 €/MWh for natural gas and 153 €/MWh for electricity. The difference of costs was then applied to a hypothetical end-user consuming the energy produced on its own. This assumption works quite well for small generation, especially for thermal, much less for large size electricity systems. The annual potential of the RES taken into account was therefore estimated and the delta costs to be incurred in order to replace conventional sources with renewables were calculated.

Technology	RES Type	Plant's life (years)	Cost (€/MWh)	Δ cost 1	Δ cost 2	P TWh	M€
Electricity from landfill biogas; investment includes uptake plant	Electricity RES	12	65	-10	-88	1	-10
Electricity from geothermal (o.h. 8000 h/y)	Electricity RES	20	70	-5	-83	7	-35
USW incinerators including revenues from waste transfer (o.h. 7000 h/y)	Electricity RES	20	90	15	-63	20	300
Electricity from onshore wind plant (o.h. 1800 h/y)	Electricity RES	15	106	31	-47	18	558
Biomethane production from waste for traction/heating (o.h. 800 h/y)	Chemical RES	20	30	-5	-42	15	-75
Electricity from PV > 200 kW (o.h. 1250 h/y)	Electricity RES	20	115	40	-38	10	400
Electricity form offshore wind plant (o.h. 3000 h/y)	Electricity RES	15	117	42	-36	2	84
Heating from biomethane through large boilers for industrial use (o.h. 8000 h/y)	Heating RES	20	37	2	-35	70	140
Electricity from mini and micro hydro <1MW	Electricity RES	25	120	45	-33	2	90
Heating production through small size (10-20 kW) stoves with flue gas treatment (o.h. 2500 h/y)	Heating RES	15	44	9	-28	70	630
Solar thermal for civil uses (o.h. 1250 h/y)	Heating RES	15	50	15	-22	17	255
Biomethane from silage (o.h. 8000 h/y): traction	Chemical RES	20	55	20	-17	15	300
Heat pumps for air conditioning for civil uses (o.h. 3000 h/y)	Heating RES	15	60	25	-12	20	500
Electricity from large and medium hydro [1]	Electricity RES	30				50	0
Total						**317**	**3137**
Reference costs in €/MWh							
Electricity for industrial customer 75							
Natural gas without taxes 35							
Electricity for final customer 153							
Natural gas for final customer 76							
P= potentiality							
M€= Δ cost 1 * P							
[1] Δ cost for this technology was not computed as it is considered historically competitive							

Tab. 5.1 - Average costs €/MWh for RES technologies

We can see that the only resources taken into account could, without excessive cost increases, substantially exceed the expected level of 17% of end use of renewable energy, equal to 264 TWh (PAN 2010 target). The total amount of costs is significant: though exceeding 3 billion €, it is quite modest if compared to the current scheme of incentives for electricity RES which reached approximately 9 billion € in 2012 and is expected to peak at 12 billion € for sharing only 6% of end use of renewables.
Moreover, all the selected RES show lower costs than those currently supported by the end user, obviously depriving the state of the tax revenue. Therefore, a coordinated work on the regulations, on the information and on the development of appropriate services should foster the advancement of these energy sources.
In the reported example more than 200 TWh are attributable to RES heat generation at low or medium temperature. The potential demand for this type of energy amounted in Italy, just for the civil sector, to more than 400 TWh: hence there should not be any problem to use them.
Finally, the development of biogas generation from waste to produce biomethane for transportation as well as the gradual conversion to the production of biomethane from existing fermenters fed with crops would be more than enough to meet the European constraints on the use of RES in transportation.

6. Conclusions

A cold analysis of the actions taken and the results achieved to foster and support the development of renewable energy leads to the conclusion that we are facing a matryoshka of failures. The adopted support schemes have proved to be very expensive and generally little efficient. Besides that, the increase of renewable energy sources has not met the expected objectives as to energy independence, increase of employment and reduction of emissions.
The development of RES has been pursued with a centrally oriented policy thinking that the Ministry can decide, trough the incentive modulation, which would be the best technology for the growth of renewables.
The analysis of past experience characterized by sometimes very complex incentive schemes, regarding not only renewable energy, but also energy efficiency, resulted in a cost of 500 €/MWh to foster electricity generation and 180 €/MWh to save thermal energy.
The only incentive schemes that provided quite good results, although with serious limitations, were the Green Certificates for RES and the White Certificates for energy efficiency. The estimated costs were around 85 €/MWhe and 9 €/MWht, respectively. Both instruments can be considered as market- trade mechanisms
The market should be allowed to decide which renewable energy is more convenient and efficient as well as the policy making energy efficiency more competitive, putting aside the distinction between RES electricity and heat generation that according to Directive 28/09 is meaningless.
Two types of solutions can be proposed:
The first approach would consist in a quite similar mechanism as the one of Green Certificates, where the value of the incentive is created on the stock market without any exception or with a quite limited number of them.
A second approach, perhaps more effective, to increase the use of RES with low costs could be as follows:

- all operators, mainly distributors and the energy industry regardless of size, must reach a fixed share of RES in order to meet international commitments;
- the renewable energy can be made on its own or purchased from third parties;
- the item A3 of the Italian electricity bill has to be frozen and will cover only the commitments already negotiated.

Table 5.1 shows that there are enough RES available in Italy at reasonable costs and the wide list of technologies allows any operator of any size to carry out the appropriate actions.
Of course, even in this case, the operators will charge the end user with the additional burden, but this can be estimated around 30-40 €/MWh.
According to these considerations we can conclude that it is possible to use all the elements available to overcome the incentive scheme to foster energy renewables.

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