PEER-REVIEWED PAPER

Italian white certificates scheme: the shift toward industry

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Abstract

The Italian white certificates scheme (WhC) has been in place for nine years and a lot of experience has been gathered. More than this, it has become an effective mechanism, mostly based on measured energy savings, to promote and implement energy efficiency in industry.

The scheme is based on an energy efficiency obligation, imposed on electricity and gas distributors, and on a tradable market for certificates, thus acting as an incentive for medium and large end-users and energy service companies (the voluntary parties).

The WhC targets started from 0.2 Mtoe/year in 2005 and shall reach 7.6 Mtoe/year in 2016, covering more than 60 % of the national target set by the 2006/32/EC directive. After the first phase dominated by deemed saving projects – in particular CFL lamps and other civil sector applications – "progetti a consuntivo" (a.k.a. monitoring plans) in the industrial sector have started to rise under the effect of the "*tau*" coefficient, the multiplier introduced in 2011 that adds to the yearly additional savings the discounted future savings for technologies with a lifespan of more than 5 years (WhCs are usually released for a lifetime of 5 years).

The result has been dramatic: in 2013 around 95 % of the certificates due to new projects has been related to energy efficiency in the industrial sector. An interesting point is that all this projects are monitored and savings are effectively measured through on-site metering.

The paper shows in detail this transformation and how a WhC scheme has been able to become effective for industrial energy efficiency projects. The paper is based on an extensive research carried on from FIRE on monitoring plans, showing what kind of interventions have been implemented, how they performed compared to the expected savings, and what kind of advice can be given to other countries that are considering the introduction of an energy efficiency obligation (EEO) scheme according to the 2012/27/EU directive.

Contents

The paper shortly explains how the Italian White Certificate scheme works, its basis and market dynamics, with emphasis on the modifications introduced in the recent years. It then focuses on the results and in particular on the progressive shift towards monitoring plans, among which the industrial sector is playing the leading role, with a share of more than 90 % of the issued certificates in 2013.

The main results from the analysis of the monitoring plan projects are illustrated in the paper, considering the breakdowns in term of sectors, technology classes, project dimensions, etc. Some considerations about the ratio between the incentive and the capital cost of the energy efficiency investment are given, together with the confrontation between the expected savings indicated in the PPPM and the monitoring results communicated through the RVCs.

The analysis of the Italian WhC is principally based on a detailed study about monitoring plans realized by FIRE in 2012–

2013 [1], on three surveys recently implemented by FIRE[1] among energy managers and ESCOs [2][3][4][16][19], on studies realized by FIRE in recent years [e.g. 5], and on information, views, experiences, and issues communicated by policy makers, institutional officials, FIRE's members, and energy managers at FIRE's workshops, conferences, and training courses [e.g. 6].

The Italian WhC scheme

THE BASIS OF THE ITALIAN SCHEME

Here the main points on this topic are given. For further information we suggest [1] and [20]. The Italian WhC scheme[2] was created in 2001 and started in 2004. Its purpose is to promote energy efficiency among end-users and also to strengthen the ESCO market. The scheme has entered in its third phase[3] in 2013. The system is based on the obligation, imposed on electricity and natural gas DSOs with more than 50,000 customers, to meet specific targets, expressed as primary energy savings and increasing over the years as shown in Figure 5. These savings can be achieved through energy efficiency actions among end-users and are assessed using tons of oil equivalent (toe) as measurement unit[4].

Figure 1 shows how the scheme works. An obliged or a voluntary subject may apply for WhC by presenting an energy efficiency project according to the rules set by MSE and GSE. Since the beginning of 2013 GSE has become the main institutional counterpart in the WhC mechanism, substituting AEEG in providing for the activities of management, evaluation and certification of the savings associated with energy efficiency projects.

If the project is approved the proponent receives from GME a number of WhC corresponding to the recognized savings (one White Certificate equals to one toe of additional[5] savings) on its account.

All parties with WhC on their account can then trade the certificates either on the real time GME market[6], which usually is held once a week, or over the counter (OTC) through bilateral contracts registered on the GME's platform. Operators that cannot present WhC projects may join the market as traders. The scope of WhC trading is to allow obliged DSOs to obtain a WhC amount sufficient to reach their targets if they are not able to do it with direct action[7] and to let the system work as an incentive for the voluntary parties. The certificates should be presented to GSE by May 31st of the year that follows the obligation.

Almost every project involving an improved efficiency in the final consumption of energy is eligible under the scheme – from boilers to lighting systems, from solar thermal to cogeneration, from electric motors to industrial process projects – with the exception of projects aimed at increasing efficiency in electricity generation. Each of the eligible projects is expected to issue white certificates for a period of five years (eight years for building envelope related projects).

The scheme used to recognise only additional yearly savings. With the EEN 9/2011 delibera[8], AEEG introduced a multiplier (the *tau* coefficient) that integrates energy savings by taking into account the technical life of the action, discounting them with a 2 % coefficient to consider wear and other causes of performance reduction over the years. So, for example, if an energy efficiency measure saves 100 toe/year and has an expected life of 15 years, the basic multiplier will be 15/5=3 (five is the number of years in which WhC are obtained), which becomes 2.65 once discounted, and the integrated savings will be 265 toe/year (see Figure 2). In this example the energy efficiency measure will get in its "WhC life" 265×5=1,325 toe VS 100×5=500 toe/year of the previous rules considering only yearly savings. The coefficients vary with the considered solution, ranging from 1.00 to 4.58.

One of the main issues with WhC is the calculation of energy savings, since in many cases it is not feasible or practical to use meters[9]. That is also the reason why alternative measurement approaches have been introduced.

There are three methods to evaluate the savings:

- Deemed savings projects (DSP) are projects that don't require meters because the savings are recognised depending on the number of installed units (e.g. number of lamps or small boilers, square meters of solar thermal collectors, kW of installed high efficiency engines, etc.). The corresponding savings are indicated in the related file issued by the GSE, which also set the baseline for the additionality, the corrective factors (e.g. geographical location, climate zone, etc.), and the documentation that shall be presented by the proponent.
- Simplified monitoring projects (SMP) are projects that require one or more meters and whose savings are granted based on the monitoring plan indicated in the related file issued by the GSE, which also set the baseline for the additionality, the algorithm to calculate the savings, and the documentation that shall be presented by the proponent;
- Monitoring plans projects (MPP) are projects for which deemed savings and simplified monitoring projects are not

1. FIRE, the Italian Federation for the Rational Use of Energy, is a no-profit association established in 1987 that manages the Italian energy manager network on behalf of the Ministry for the Economic Development and promotes energy efficiency supporting professionals and operators that work in the energy field. It deals with the Italian white certificate scheme since 2001.

2. The scheme is also known as TEE, acronym of the Italian legislative definition "titoli di efficienza energetica", meaning "energy efficiency certificates".

3. The second phase was initiated by D.M. 21 December 2007 and set the targets from 2008 to 2012. D.Lgs. 30 May 2008 No. 115 and D.Lgs. 28 February 2011 No. 28 introduced then some important news, but the implementing decree is still to come. To help understanding the Italian legislative terminology, D.M. is the abbreviation for ministerial decree, a legislative second rank act that is issued in accord to a law or a legislative decree (D.Lgs.). The white certificate scheme was in fact provided for in the electricity and gas markets liberalization laws.

4. With the Italian production mix, one toe is about 1,200 m^3 of gas or 5,350 kWh of electricity. That means that a 0.187 toe/MWh_e and 0.086 toe/MWh_t coefficients are used.

5. The Italian WhC scheme considers only additional savings (also referred to as "additionality"). It means that a market and regulatory baseline is defined for every technology. Savings are first evaluated as difference between the *ex-ante* and the *ex-post* situations and then reduced if *ex-ante* level is below the baseline. See [16] and [19] for more information.

6. It is possible to participate in "viewer mode" to the sessions by following the directions given at the following link: http://www.mercatoelettrico.org/En/Mercati/AccessoTEE.aspx.

7. An issue that is particularly strong when DSO are chosen as obliged parties.

8. The main AEEG's decisions are called "delibera" and are classified by a number and an acronym that indicates the involved field of action. EEN stands for decision related to WhC.

9. Either because it would be too expensive or because it would be difficult or impossible to isolate the effects of the energy efficiency solution (e.g., for buildings thermal insulation).

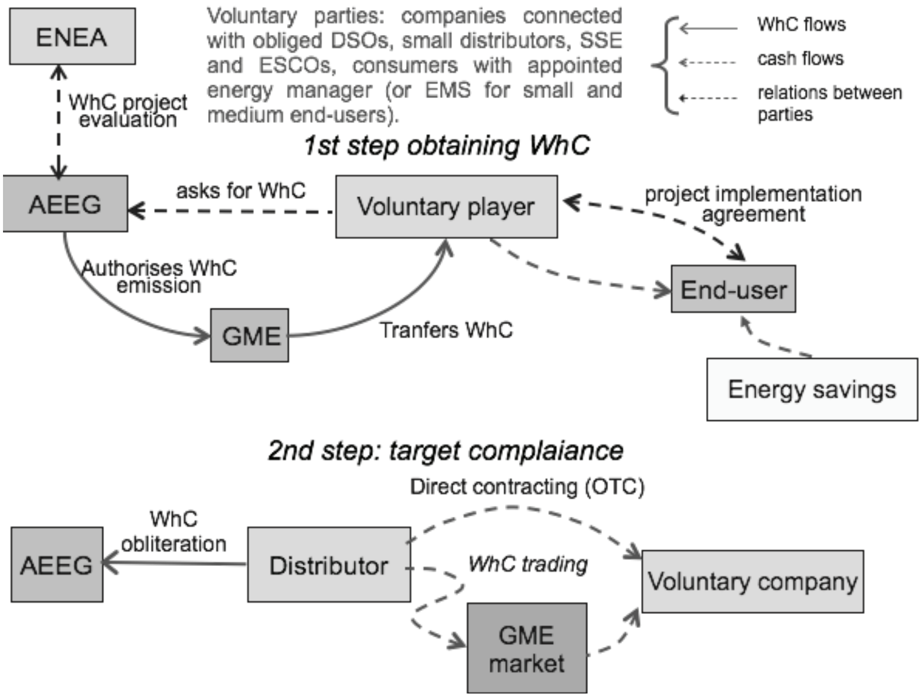

Figure 1. WhC schematics for ESP (source: FIRE).

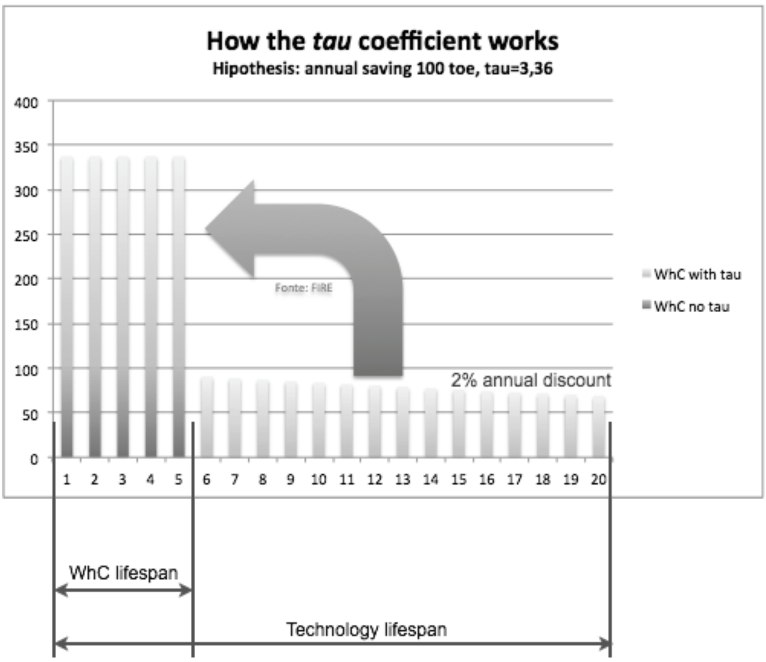

Figure 2. Effect of the tau multiplier on energy savings (source: FIRE).

applicable. In this case the proponent shall previously present a PPPM[10]. After the PPPM is approved by GSE the proponent can ask for WhC with an RVC[11].

10. The PPPM is a proposal that defines the baseline for additionality, the algorithm to evaluate the savings, the required meters, and the documentation to be presented for the energy efficiency project.

11. RVC is the name of the demand presented to the GSE by the proponent to obtain WhC. Deemed savings projects require only one RVC, whereas simplified monitoring plans and monitoring plans need at least one RVC per year.

All the evaluation methods have been used during the years. If in the first and second phases DSP and SMP were by far the most used procedures, like in most of the white certificates schemes around the world. In the third phase, which started in 2013, MPP became the driving force of the Italian scheme.

Figure 3 shows GSE data related to the 2013 that clearly illustrate how around 90 % of the projects presented in 2013 are industrial MPP. This demonstrates that deemed savings are very important in the first years of a WhC, but then they are

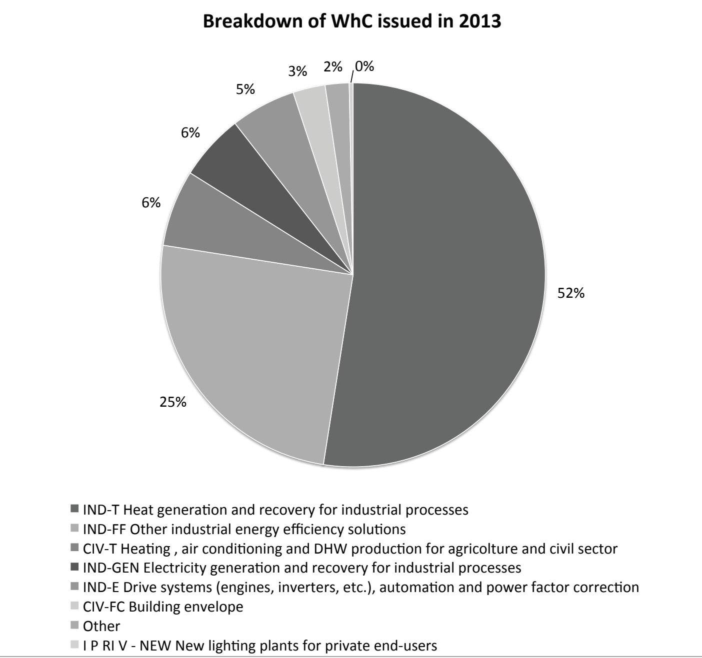

Figure 3. Issued certificates in 2013. Source: FIRE on GSE data.

Table 1. Percentage of proposals evaluated by ENEA that presented issues during the approval procedure. Source: ENEA [18].

	% of proposals with issues on evaluation			
Type	2010	2011	2012	2013
PPPM	38 %	58 %	46 %	32 %
RVC-SMP	29 %	20 %	11 %	6 %
RVC-MPP	3 %	8 %	6 %	4 %
RVC-DSP	87 %	13 %	10 %	1 %

not capable of nourishing the scheme in the long term, unless the targets are quite low if compared with the national consumption[12].

The main consequences of having a high number of MPPs are:

- savings are measured and monitored, thus giving useful indication about the real use of technologies and also ensuring that the incentive is correctly quantified;
- ESPs involved in the presentation of projects, even if only as consultants to prepare the RVC, acquire a know-how on industrial process and energy efficiency that favours the transformation in ESCO[13];
- the information included in the PPPM can be very valuable for policy makers in order to understand modifications in industrial processes and in technology uses;
- the increased complexity linked to MPP requires an effort in terms of information and training actions to overcome the access barrier.

The complexity is related to the request a proponent should address to get a PPPM approved. The following points must be addressed:

1. process description;
2. description of the energy efficiency solution;
3. identification of the baseline, and thus of the additional savings;
4. definition of the algorithm to calculate the energy savings;
5. description of the M&V system.

Points 3 to 5 are not easy to manage, for different reasons, and represent the main difference with DSP and SMP, for which they have been determined by the policy maker.

In Table 1 the results of the proposals with issues in the evaluation procedure are shown (e.g. problems due to an incorrect presentation, lack of required information, etc.). Considering PPPMs, it appears that there is still place for improvements and that the percentage of issues is decisively high if compared with RVCs. More in detail, [1] shows that 308 proposals out of 607 were approved at the first attempt, thus almost 50 % of the approved PPPMs required at least a revision from the proponent before they were accepted and the savings counted.

It is worth noticing the importance of information campaigns due to this complexity. More than half of all proposal have been presented in the last two years, and 2011 accounts for approximately one third of the total number. Presentation of energy monitoring plans started to increase when FIRE and ENEA undertook a series of activities (conferences, workshops, training courses, guidelines, FAQs) to illustrate, in detail, how to present such proposals with many practical examples[14]. Before then, the complexity of the process put off potential proponents to the WhC scheme, notwithstanding that the incentive flowing from the white certificates for industrial energy efficiency measures was already significant before the introduction of the tau multiplier.

ITALIAN WHC: AN EEO AND AN INCENTIVE FOR ENERGY EFFICIENCY

The Italian scheme is both an EEO, with the DSOs acting as obliged parties, and an incentive for the voluntary parties (energy service providers and medium and large consumers) based on the possibility to trade white certificates on the market.

As an EEO, the WhC scheme contributes to the 2020 energy efficiency targets (Figure 4). The global target in Italy has been set around 23 Mtoe/year, of which from one third to one half is expected to be linked to the WhC scheme (those targets are set till 2016).

As an incentive, it is working well especially where the energy efficiency project is fully additional, as it happens many times in the industrial sector for process enhancements. This is helping end-users to implement forgotten or set aside projects

12. Or unless it is accepted that savings are estimated very roughly for large projects.

13. There is presently no official statistics about this phenomenon, but there are many ESCOs that started as consultant and used the cash flows generated by WhC and the mentioned know-how to evolve and even get the Italian ESCO certification UNI CEI 11352.

14. This delay in the campaign launch was due to the fact that ENEA has become responsible for the evaluation of the proposal in 2006 and has not been awarded economic resources to carry on information activities in the beginning.

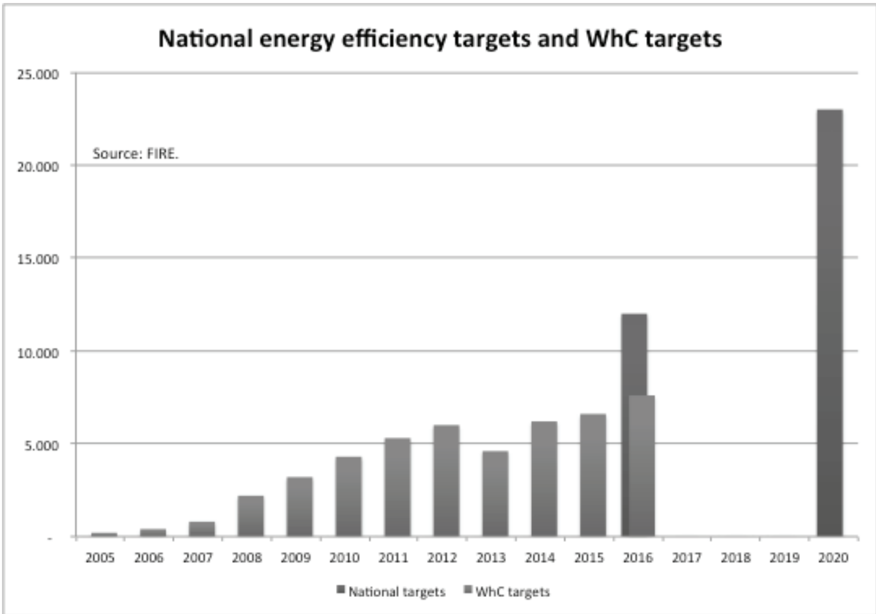

Figure 4. National WhC primary energy saving targets (in toe) VS 2016 and 2020 target (source: FIRE).

and ESP to strengthen and evolve toward the ESCO model. Nevertheless it won't be easy to reach the intended targets, considering that the end of the 5 years lifespan[15] of WhC can double the step increase of the targets represented in Figure 5 by the dark bars.

The capability of the scheme to promote the implementation of projects that otherwise would not be realised varies a lot depending on the economic performance of the considered technology and its additionality, as discussed for deemed savings in [21] and in the dedicated chapter in this paper.

An important issue with tradable WhC is the price of the certificates and its trend during the years. The Italian experience can be divided in four phases. During the first one the mix of low targets and availability of DSP for compact fluorescent lamps determined a strong excess of certificates on the market and thus a fall of the WhC price that reached its minimum at around 30 euro/toe.

Then, after three years of substantial equilibrium, there was the crisis of the sixth year. The effect of deemed savings was tampered by the elimination of the most favourable technologies, and the system was not yet ready to devote to MPPs. The situation would probably have been deadly for the scheme, had not the AEEG decided to introduce the *tau* coefficient without modifying the WhC targets[16]. The multiplier saved the scheme, but not the difficulties in respecting the old targets. The fourth phase started in 2013 with a target reduction and allows a correct confrontation between WhC and the targets.

The price o WhC has been of course influenced by the ratio between demand and supply of certificates[17]. The trend is shown in Figure 6, in which the dashed line represents the value of the tariff reimbursement that is provided for the DSOs[18]. Its rise in the recent years is due to the difficulties in fulfilling the targets. The mechanism doesn't have an explicit ceiling price[19].

THE MAIN RESULTS FROM THE PPPMS ANALYSIS

FIRE conducted on behalf of ENEA a deep analysis of the PPPMs presented from the beginning of the WhC scheme till July 2012. The reasons behind the study were the lack of information about PPPMs, mainly due to the structure of the proposals database (DB). The DB in fact is not structured in order to make an automatic analysis of PPPMs feasible. To help evaluating PPPMs GSE is presently working on a improvement of the DB, but the process will require some time. Thus, in order to obtain more information about the PPPMs projects ENEA commissioned a first survey to cover PPPMs presented between 2005 and July 2012.

Due to the poor structure of the PPPM database, FIRE had to create a new excel database in order to breakdown the information included in the DB and be able to confront and analyse the content. The results, which are not easy to summarise, are available in [1]. Here a synthesis is provided.

15. WhC are recognized for 8 years in case of projects related to the building envelope and for 10 years in case of high efficiency cogeneration.

16. The introduction of the *tau* coefficient multiplies the certificates received by a project by keeping into account future savings. This would have required a redefinition of the targets, theoretically to be multiplied by the global average *tau* factor. This has been done by the D.M. 28 dicembre 2012 that indicated a target expressed in toe (to be used for energy statistics and policy targets) and a corresponding target expressed in number of certificates (used by the market to verify the fulfilment of the obligation and derived from the first one by referring to an estimated global average *tau*).

17. D.M. 28 dicembre 2012 provides that in the case the number of issued certificates overcomes the national target of 5 %, this excess is converted as an additional target for the following year

18. DSOs receive the reimbursement for every certificates presented to fulfil their obligations. It is important to notice that they cannot transfer to the end-users the costs incurred for the WhC. This is the reason while a tariff reimbursement exists. DSOs that limit their action to buying the certificates on the market see a net balance loss every year if the tariff is lower than the WhC price. DSOs with an active role (usually through an owned ESCO) can compensate this loss and even present a profit. AEEG delibera 13/2014/R/Efr changed the rules to calculate the value of the tariff linking it both to the price of energy and the WhC market price in previous years.

19. The amount of the fines for the DSOs that don't respect their targets will be set by AEEG on case by case approach.

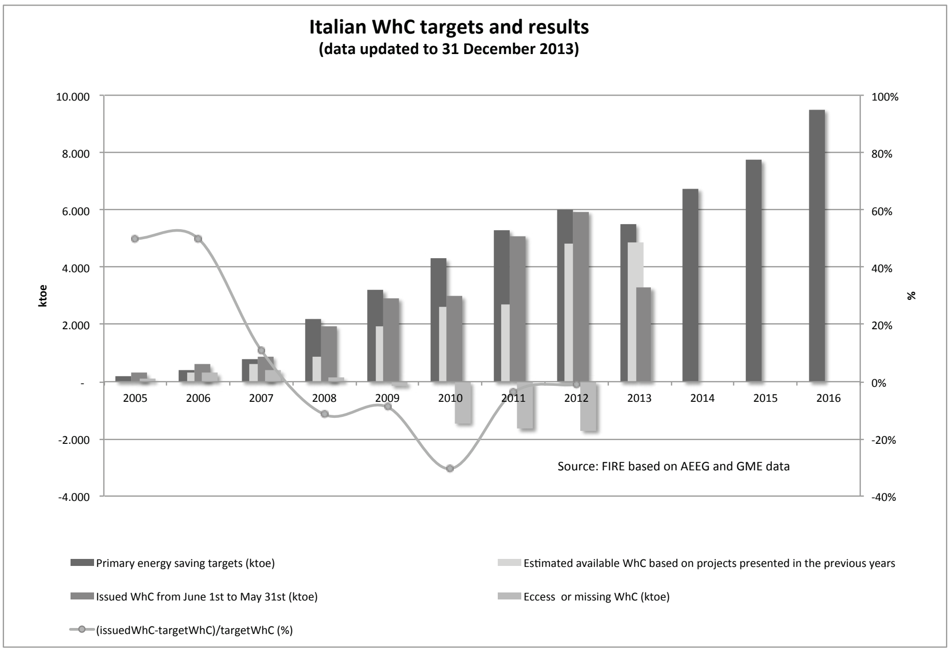

Figure 5. Yearly DSOs' targets (in number of white certificates since 2013) and issued certificates (source: FIRE).

Figure 6. White certificates price trend on the GME market (source: FIRE).

Table 2. Breakdown of presented PPPMs with respect to the proponent (source: FIRE).

Proponents	Presented PPPMs	Expected savings (ktoe)	Average project size (toe)
ESP	524	924	1,700
EM	47	396	8,000
DSO	36	30	800
	607	1,350	2,225

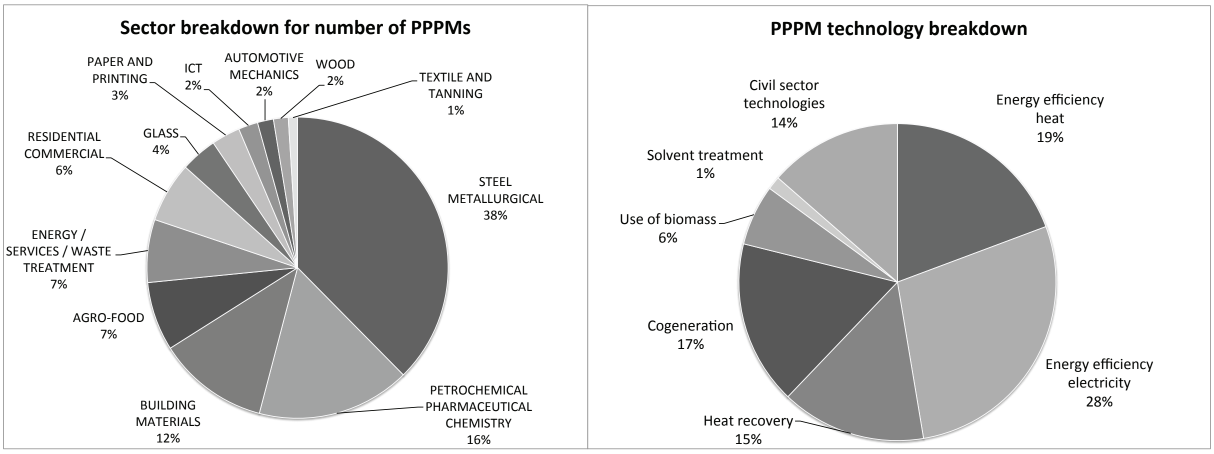

Figure 7. Sector and technology breakdown in terms of presented PPPMs (source: FIRE).

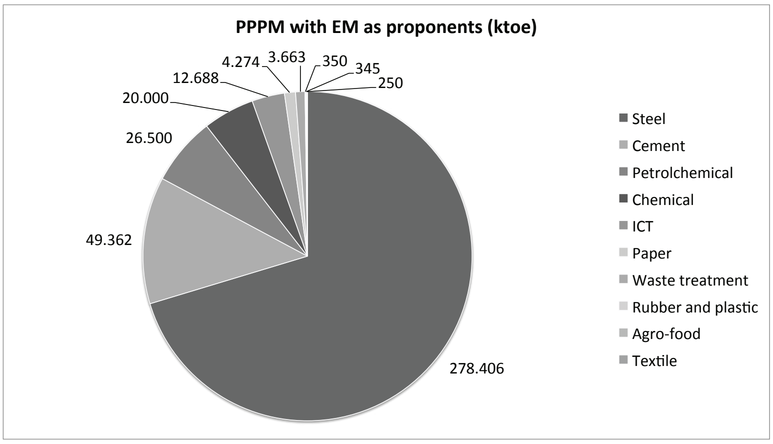

Figure 8. Sector breakdown in ktoe for EMs proposals (source: FIRE).

Table 2 shows that ESPs play the main role in presenting PPPMs, with an 86 % quota. Projects presented by EMs are larger, with an average size of 8,000 toe. This suggests that the end-user company prefers to act directly only when the forecasted cash flow is quite high and it is considered convenient to train their personnel to act without the involvement of an ESP or a DSO. There are nevertheless EMs that presented directly the project, but asked for the support of an ESP to prepare it. This confirms the complexity of the PPPM procedure and the need of information and training activities aimed at facilitating the preparation of a proposal.

The sector breakdown shows a wide application, with all the energy intensive sectors represented. Petrolchemical, building materials and agro-food are characterised by larger project sizes.

The technology breakdown shows an homogeneous situation, with most of the available solutions presented. Energy efficiency involving heat consumption tends to have a larger project size, as it can be expected.

Figure 8 shows that among EMs the steel industry is the larger one in terms of expected savings. It is worth noticing that 92 % of the 278 ktoe are linked to nine large PPPM presented by one proponent.

The analysis of regional and local projects showed a typical prevalence of the northern regions, due to the larger presence of industry, service, and inhabitants. The situation for the province with the larger number of PPPM, Provincia di Milano, is illustrated in Figure 9 to show how both industry and the civil sector are represented. Among the results concerning single technologies clusters, the following ones are worth mentioning:

- heat recovery plays an important role, with around 100 PPPMs for 104 ktoe, mostly due to projects in which the recovered heat is used for other internal processes and not on the same process from which is recuperated;
- solvent treatment systems are a typical case of synergy between environmental requirements and energy efficiency, another benefit that can be triggered by WhC;
- the use of biomass shows industrial uses alongside the ones in the civil sector and in agriculture, demonstrating the flexibility of this energy source.

An interesting point when analysing PPPMs is whether the expected savings will be achieved. It wasn't possible to determine this for many PPPMs, since most of them were presented in the last year and a half and no RVCs were available. But for larger projects in terms of savings available RVCs and PPPMs were compared. The same was done for the other projects as a test sample. The result is shown in Table 3, which covers 610 ktoe for PPPMs against the total of 1,350 ktoe of the available PPPMs. Thus 45 % of the savings have been subjected to this analysis.

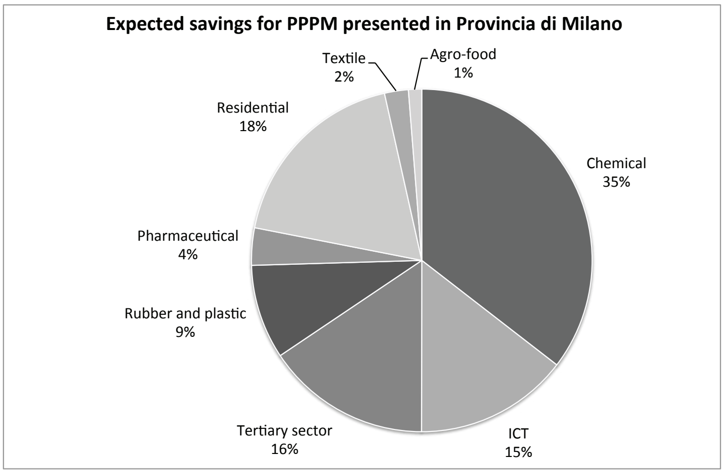

Figure 9. Project breakdown for Provincia di Milano (source: FIRE).

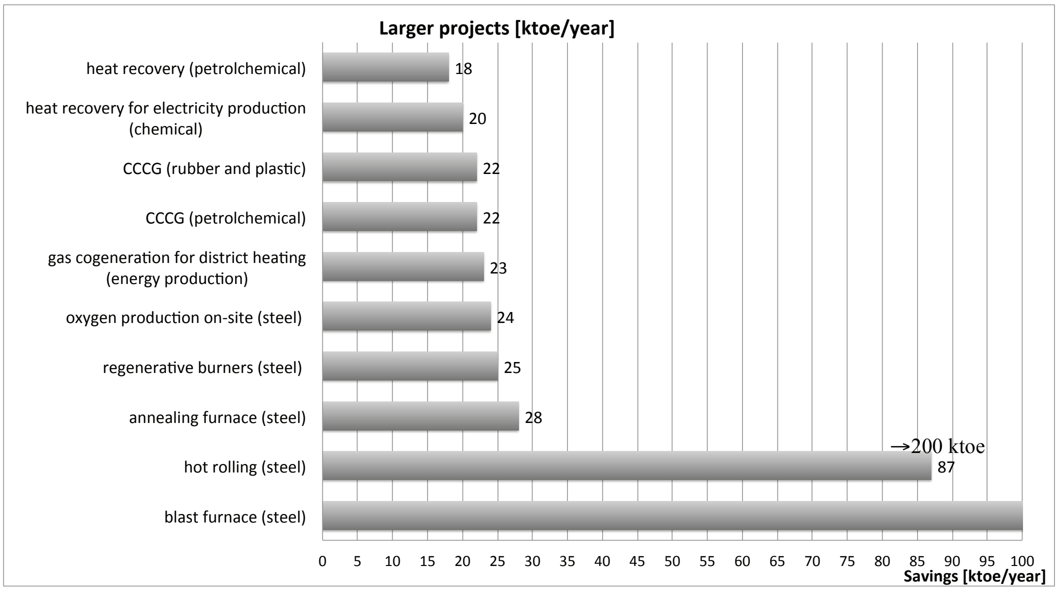

Figure 10. Larger projects (source: FIRE).

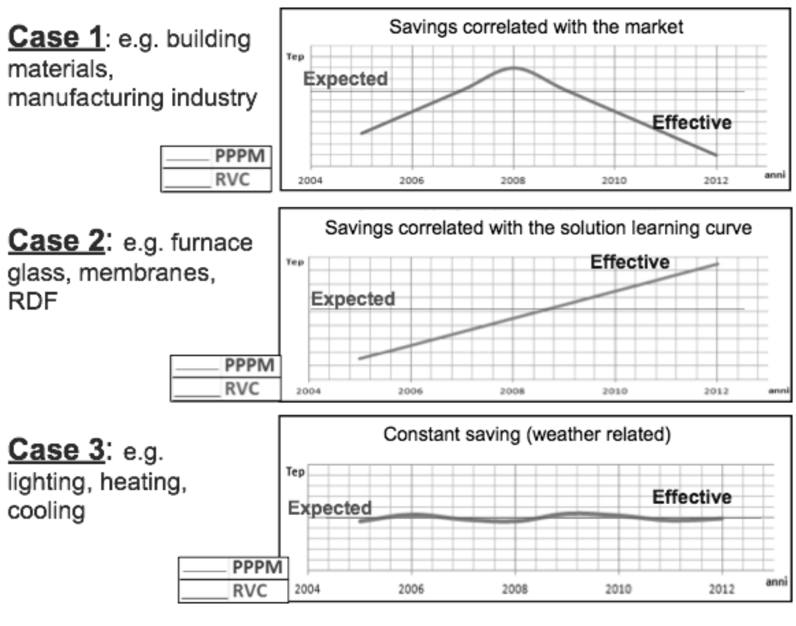

Figure 11. Comparison between expected and effective savings (source: FIRE).

Table 3. Comparison between expected and effective savings (source: FIRE).

Data in ktoe	Electricity savings	Gas savings	Other fuel savings	Total
Expected savings (PPPM)	240	268	102	610
Effective savings (RVC)	244	246	118	608
Difference	1,4 %	-8,3 %	16,6 %	-0,3 %

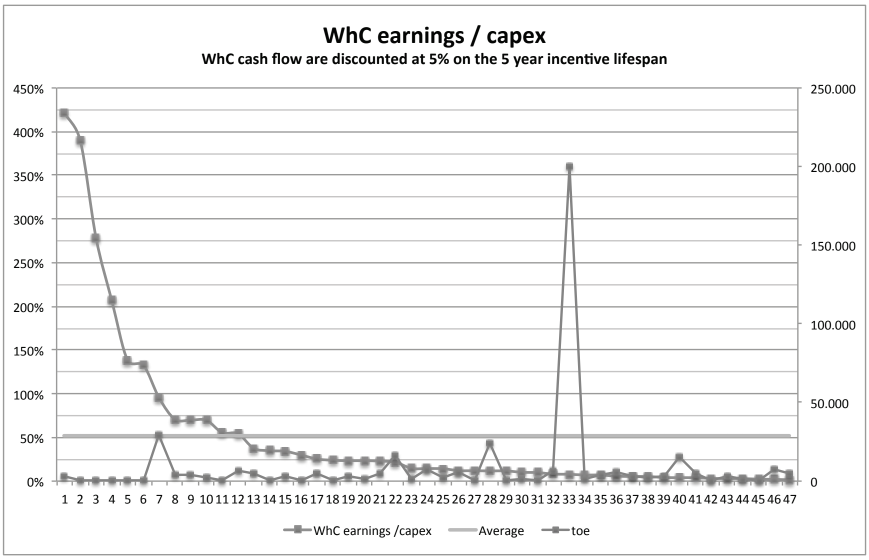

Figure 12. WhC earnings / CAPEX ratio for the 47 PPPMs that report the investment costs (source: FIRE).

From a more detailed analysis, the greatest variation between the expected and the effective savings was found in the predictions of thermal efficiency (Table 3) and three typical situations have been identified, as shown in Figure 11.

Case 1 refers to projects in sectors that were affected by the financial crisis, such as building materials and the manufacturing industry. After an initial increase of the savings, the reduction of the production determined a reduction in the savings, mostly due to the rising weight of fixed costs. Process modifications, like the ones included in Case 2, showed a continuous rise of the savings, most probably due to the step by step improvement of the projects settings, strictly linked to the industrial process[20]. The last case refers to typical horizontal solutions, such as lighting, heating, and cooling, for which the results are usually more predictable and the settings of the plants easier. Thus Case 3 shows effective savings in line with expected results.

This comparison shows the effective savings don't differ much from the expected ones, unless important variations in the industrial production occurs. In any case the WhC scheme rewards only effective savings (even if with the *tau* premium).

WHITE CERTIFICATES VS CAPITAL COST OF INVESTMENTS

The ratio between the incentive cumulated on the 5 years lifetime and discounted at 5 % and the capital cost of the energy efficiency investment (CAPEX) can be quite interesting, especially where full additionality is recognised to the project. As [5] and [16] show, this indicator is usually in the range 5 %–20 % for interventions in the civil sector. It is usually low both for the typical medium term pay-back time of the investments in this sector and since minimum standard requirements, ecodesign criteria, and legislative obligations set a high baseline for energy efficiency and thus a low additionality.

For industrial processes, on the other hand, pay-back times are often short and the baseline often coincides with the *ex ante* situation, apart from typical horizontal solutions (e.g. high efficiency engines, inverters, etc.) or process modifications that already became current practice. In addition, the cost of energy is usually lower and the load factor higher than in the civil sector. All this implies

Unfortunately, the investment cost field in the PPPMs has been optional till now, so there are no enough data to determine the ratio on a solid basis[21]. The following figure is based on the available data and should not be considered exhaustive, but it shows how the economic weight of WhC can vary and thus affect investment decisions.

It is important to observe that if the analysis is limited to the sectors that have at least 20 % of PPPMs with a reported CAPEX the average ratio is quite reasonable, as shows Figure 13. It is also worth noticing that in market mechanism it is possible that the incentive is higher than the capital cost for particular solutions. This happens when the additionality is full and the economic performance of the adopted technology or process modification is excellent.

20. Lines in Figure 11 are indicative, since it was impossible and meaningless to build an average curve.

21. Only 8 % of the PPPMs analysed in this study indicates the capital cost.

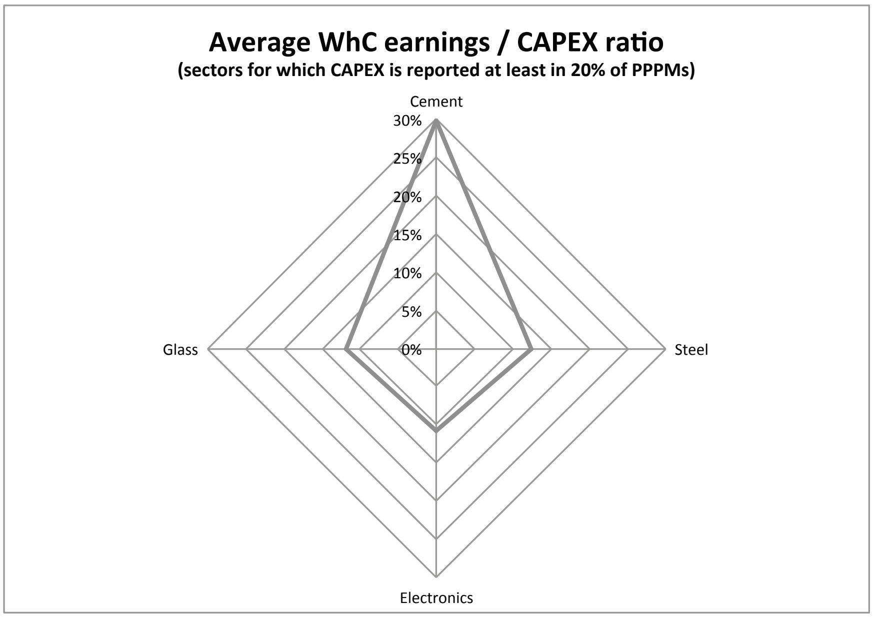

Figure 13. WhC earnings/CAPEX for the most indicative sectors, with at least 20 % of PPPMs with the CAPEX indicated (source: FIRE).

A brief example can be useful. The value of a saved toe for a medium or large industry in Italy can be between 400 and 600 euro. Let's assume is 500 euro/toe and consider a project with a pay-back time equal to 3 years (a typical threshold for industrial investment outside the core business). This means an investment of 1,500 euro per saved toe. If fully additional, this project will than get 1 × *tau* × 100 euro/year. That is 100 × 4.33 × *tau* = 433 × *tau* euro in five years if discounted at 5 %. A 15 years lifespan project will then get 433 × 2.65 = 1,147 euro, that is 76 % of CAPEX.

Of course it could be advisable for policy makers to monitor such situations and to throttle or exclude such interventions from access to WhC, especially if they do not represent limited cases.

The general economic performance of WhC is thus helping industrial companies in investing in energy efficiency and is building capacity among the consultant companies that usually present WhC proposals, some of which are becoming ESCOs and making an enhanced contribution to energy efficiency promotion in industry. This is one of the important achievement of the Italian scheme, a result that was expected when the scheme was designed, but that became a fact not as a consequence of having initially limited the presentation of WhC project to ESP[22], but of having an interesting economic return coupled with the complexity of the PPPMs[23].

Conclusions

The study carried on by FIRE on behalf of ENEA shows how the Italian WhC scheme has been successful on several fronts, such as:

- Progressive evolution of ESPs to ESCOs (although presently limited to a small part of ESPs). As explained in the paper, this has not been globally quantified or deeply investigated, but it has been shown for specific ESPs at FIRE conferences [6], while the reasons behind this evolution are linked to the complexity of PPPMs and the need to thoroughly understand the presented projects in terms of operation, required meters, algorithm, baseline, and additionality.
- Development by ESPs and DSOs of financial instruments dedicated to energy efficiency project financing (illustrated for example in [6]). It is a consequence of the high value of the incentive compared with the investment CAPEX, together with the relative stability of WhC prices in the last years.
- Effective promotion of energy efficiency investments and of integrated industrial projects, especially after the introduction of the *tau* coefficient, as illustrated in the paper.
- Delivering of around 6 Mtoe of additional savings at a cost in the order of 600 million euro/year (DSO tariff reimbursement multiplied by the yearly target).

Among the benefit linked to PPPMs and MPPs the following can be indicated:

- PPPMs give interesting information on the industrial processes, the technologies used and market trends;
- ESPs gradually acquire expertise on industrial processes, which can be replicated on other companies with clear benefits for the market;
- this process helps energy efficiency to become more integrated in industrial processes, since ESCOs can diffuse the industrial best practice and since energy renovations present a high additionality;
- end-users are stimulated to evolve towards a smart approach to the use of energy, such as that promoted by ISO 50001 energy management systems and, more generally, by the 2012/27/UE directive on energy efficiency.

22. Companies with energy manager were admitted only at the end of 2007.

23. Were it easy to present a PPPM, the role of EMs would have been the prominent one, whereas ESPs represent around 70 % of the market even nowadays.

From now on the main challenge will be to ensure the targets fulfilment, considering their annual increase, the impossibility to present – starting from 2014 – projects already started up, and the end of the 5 years cycle for many projects.

A final important aspect: the real trigger to success of the scheme and of the involvement of industry is information and training. It is fundamental to devote sufficient economic and personnel resources to these activities. The advantages for the system in general are enormous compared with the cost of implementing these actions.

Main abbreviations and definitions

EEO (energy efficiency obligation): policy scheme that provide energy efficiency or energy saving mandatory targets for a certain category of operators or end-users (usually DSOs or energy traders)[24].

WhC (white certificates): in this paper this acronym both refers to the scheme in general and to the issued certificates.

DSO (distributed system operator): an electricity or gas distributor with more than 50,000 end-users.

ESCO (energy service company): energy service company that offers energy services with energy performance contracting and third party financing in line with the definition of 2012/27/EU directive.

ESP (energy service provider): company that can present projects to obtain WhC. ESCOs are a subsystem of ESPs.

EM (energy manager): end-user – usually of medium or large dimensions – with an appointed energy manager, which is allowed to present projects and obtain WhC without the intervention of a DSO or an ESP.

MSE: Ministry of economic development.

AEEG (Autorità per l'energia elettrica, il gas e i servizi idrici): the Italian Regulatory Authority for Electricity, gas and water services.

GSE (Gestore dei servizi energetici): the state-owned company that promotes and supports renewable energy sources (RES) in Italy. Since 2013 it also manages the WhC scheme.

GME (Gestore dei mercati energetici): the state-owned company that manages the Italian Power Exchange and the Emission Trading, Green Certificates and WhC markets.

ENEA (Agenzia nazionale per le nuove tecnologie, l'energia e lo sviluppo economico sostenibile): the public agency that within the WhC mechanism supports GSE in the evaluation of energy efficiency projects and is in charge of information activities.

RSE (Ricerca sul sistema energetico): public company that supports GSE in the evaluation of energy efficiency projects.

FIRE (Italian federation for the rational use of energy): private association funded by ENEA that promotes energy efficiency and manages the Italian energy manager network on behalf of the MSE.

RVC: request for verification and certification of savings.

DSP: deemed savings projects ("progetti standard").

SMP: simplified monitoring projects ("progetti analitici").

MPP: monitoring plans projects ("progetti a consuntivo").

PPPM: monitoring plan project proposal.

24. The energy efficiency directive 2012/27/UE specifically asks for such schemes at article 7. An EEO scheme can be based on WhC, but other options are available as well.

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a. FIRE workshop – Rimini – 8 November 2013 – "Nuovi obiettivi per i certificati bianchi".
b. FIRE conference – Roma – 7–8 March 2013 – "Certificati bianchi: titoli di efficienza a portata di mano".
c. FIRE workshop – Rimini – 8 November – "Nuovi obiettivi per i certificati bianchi".
d. FIRE conference – Milano – 22–23 March 2012 – "Certificati bianchi: titoli di efficienza a portata di mano".
e. FIRE workshop – Rimini – 10 November 2011 – "Le nuove regole per i certificati bianchi".
f. Older workshops not listed here but available on the indicated web page.

[7] AEEG's annual reports about white certificates, www.autorita.energia.it/it/pubblicazioni_ee.htm.

[8] GME's monthly newsletters, www.mercatoelettrico.org/It/Tools/newsletter.aspx.

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Useful links

Links of institutions and associations related to white certificates in Italy

MSE, Ministry of Economic Development, www.sviluppoeconomico.gov.it

AEEG, Italian electricity and gas authority, www.autorita.energia.it

GSE, Italian energy services operator, www.gse.it

ENEA, Italian Agency for new technologies, energy and environment, www.enea.it

GME, Italian energy market operator, www.mercatoelettrico.org

RSE, Energy System Research center, www.rse-web.it

Federutility, Federation of DSOs, www.federutility.it

Agesi, www.agesi.it, Assoesco, www.assoesco.org, Federesco, www.federesco.org, ESCOs associations

FIRE, Italian Federation for the Rational Use of Energy, www.fire-italia.org