Not Just Energy Savings: Emerging Regulatory Challenges from the Implementation of Tradable White Certificates

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ABSTRACT

White certificates have become very popular in the international debate as one of the most effective policy tools to promote investments in energy-efficiency technologies. The literature has developed quite rapidly in the last few years, around three broad research areas: a) the analysis of the major design options of such a tool (e.g.: choice of targets, target actors, eligible projects, M&V); b) the comparison of different existing national schemes; and c) the theoretical analysis of the inter-relationships with other policy instruments.

The implementation and monitoring of white certificates trading schemes confirms the relevance of some regulatory choices concerning 'traditional' technical questions extensively debated in this literature, but also draws attention to further regulatory issues: trading rules, cost-recovery and enforcement mechanism, the possible inter-relations among these components and the associated regulatory trade-offs. The paper focuses on these regulatory issues via a critical assessment of the results achieved to date by the Italian white certificates scheme and a discussion of the latest developments in the legislative and regulatory framework.

Introduction

White certificates have become very popular in the international debate on effective policy tools to promote investments in energy efficiency technologies. The number of studies, seminars and conferences on the theory and practice of white certificates has grown remarkably over the last five years, initially in the European Community and, more recently, outside Europe's borders [Bertoldi, 2006; CRS 2007; EuroWhiteCert; Nadel 2006].

In this debate, the definition of white certificates includes various forms of Energy Efficiency Obligations even if they do not relate to fully tradable certificates. In other words, the defining feature is the obligation of energy companies to improve the efficiency with which final customers use energy, rather than the trading mechanism itself. One likely reason for this is that, to date, few *tradable* white certificates mechanisms have been put in place, and even fewer of the existing schemes integrate energy efficiency obligations and a 'genuine' (i.e. managed by a Market Operator) trading platform, where certificates can be traded according to specific market rules and procedures.

On a theoretical ground, this integration may combine the certainty of results from "command and control" approaches (CAC) with the economic efficiency (both static and dynamic) of market-based policy tools. In practice, the ability of these schemes to deliver this "double dividend" is strictly dependent on a number of conditions been met, some of which stem from specific design choices of the various elements of the policy package, e.g. 'reasonableness' of the target, definition of the commodity being traded, scale of the market in terms of diversity of cost-options and market actors, lack of market failures.

The implementation of certificates trading to the promotion of end-use energy efficiency poses a number of technical challenges and trade-offs, only some of which are common to other,

more widespread trading schemes (i.e. green certificates and emissions trading scheme). In particular, the development of a market for energy efficiency improvements is complicated by several factors, including the need to define the energy savings (i.e. something that does not exist, in the sense that is avoided consumption) as a commodity, and the fact that savings need to be measured relative to a counterfactual baseline. The inclusion in the policy package of elements of tariff regulation such as cost-recovery mechanisms for parties in the scheme, as well as of a proper certificates market may add further complexity.

The Italian Tradable White Certificates Scheme

The Italian white certificates scheme (otherwise called "Energy Efficiency Certificates" EECs) entered into force in January 2005. The CAC component of the scheme, i.e. the Energy Efficiency Obligation (EEO) raised on distribution companies, was introduced with the implementation of the first EU directives on the liberalization of the electricity and natural gas market,. The market-based component, the trading of certificates, was introduced by the Government in mid-2001 [MICA, 2001] together with the definition of the level of the obligation and of the other elements of the policy package. In the following three years the Italian Regulatory Authority for Electricity and Gas (AEEG) designed the implementing technical and economic regulation governing the system through an extensive public consultation. During the same period, a revision of some of the basic elements of the scheme was also implemented to take into account some institutional changes (i.e. shared responsibilities between the Government and Regional administrations in the energy policy field), as well as some improvements suggested by AEEG [MSE, 2004; Pavan 2006]. In December 2007, some components of the mechanism were updated on the basis of the results achieved and the critical issues that emerged during its implementation [MSE, 2007]. The basic design elements of the scheme are summarized in Table 1.

Table 1. Synthesis of the Basic Elements of the Scheme

National target	▪ 2.9 million tons of oil equivalent (Mtoe) /year in 2009 (cf. Table 2). ▪ Compliance period: annual. ▪ Regulatory period: 2005-2009. ▪ Banded: at least 50% of savings to be delivered on electricity and natural gas uses.
Obliged parties	▪ Major electricity and natural gas distributors. ▪ Apportionment rule: respective share of the national distribution market.
Eligible projects and measures	▪ All end-use sectors plus small PV plants and some intermediate natural gas uses. ▪ Only 'hard' measures (i.e. technology change); information campaigns only if add-on to specific 'hard' measures. ▪ Early actions: projects developed as early as 2001 provided they have not been granted government, regional or local funding. ▪ Other restrictions: projects that have access to other Government incentives (e.g.: CHP plants with access to green certificates, PV plants with access to feed-in tariffs). ▪ Minimum project size, but bundling of project allowed with some restrictions.
Eligible parties	▪ a) all electricity and gas distributors; b) companies controlled by electricity and gas distributors; c) energy service providers (including, but not limited to ESCOs).

In the following, we briefly summarize the main regulatory choices made before the start of the scheme and their rationale. We then present the results achieved in the first two years of implementation and focus on the critical issues that have driven the latest policy debate, as well as the legislative and regulatory measures introduced in December 2007. These measures are summarized in the last paragraph.

Table 2. Initial National Energy Saving Targets (Mtoe/Year)

Year	*Electricity distribution sector*	*Natural gas distribution sector*
2005	0.10	0.10
2006	0.20	0.20
2007	0.40	0.40
2008	0.80	0.70
2009	1.60	1.30

Technical Regulation: Measurement, Verification and Accreditation of Energy Savings

Energy savings are always accredited after they have been produced. The crediting lifetime, i.e. the period over which certificates are generated by a project, is fixed at five years, with the exception of heating and air conditioning projects that have an impact on energy consumption, whose crediting lifetime is set at eight years.

Three types of M&V methods have been defined by AEEG: deemed savings; a so-called engineering method; and so-called energy monitoring plans [Pavan, 2002, 2004, 2005a]. Deemed savings are used for proven technologies, for which expected savings are reasonably well understood, and direct measurement would therefore be not cost-effective or necessary. The approach is totally *a priori*, i.e. no on-field measurement is needed. Rather, for each type of project a specific amount of saved energy is defined *ex-ante* for each installed unit (unit/toe/year). The technological baseline is always fixed equal to the average technology sold on the market, unless technical legislative requirements exist (in which case, these requirements are taken as the baseline).

The engineering method is used for projects whose energy savings impacts are quite well understood but vary depending on a limited number of known factors (e.g. working hours, production levels). For each project a specific evaluation algorithm is defined, with pre-defined values for some parameters while other parameters have to be measured on a case-by-case basis. As in the case of deemed savings, the choice of the baseline is embedded in the algorithm while the persistence of energy savings over time is directly measured.

Both methods are developed by AEEG following public consultation. Where they are not applicable, because the energy performance of projects depends on factors that change from case to case, then the third approach is used. This is based on the comparison of measured consumption before and after the project, with adjustments made for conditions that impact on consumption trends and that may vary from the pre to the post-project scenario[1]. Additionality has to be demonstrated via a careful selection of the baseline, which should be the average technology currently used at the national level to produce the energy service(s) being considered, or the technology that meets existing legislative requirements. A complete methodological proposal tackling all the above M&V issues has to be presented and approved by AEEG.

[1] Where measured consumption is not available because of technical constraints or because it would be not economic, the use of calculated consumption may be considered as eligible by the Regulator.

The verification and certification of the energy savings realized by each project is made by AEEG through a thorough monitoring of the reporting documentation. Inspections at the project site(s) are randomly carried out.

Economic Regulation: Trading Rules, Enforcement and Cost-Recovery Mechanism

The EECs market. Certificates (EECs) are issued by the Electricity Market Operator (GME) upon authorization of AEEG. There are three different markets (one for each of the three types of certificates generated by the '50% constraint': electricity EECs, natural gas EECs and EECs attesting savings of other forms of energy). Un-restricted banking is allowed thorough the 2005-2009 period. This is expected to increase the scope for costs savings and help reduce the risk of price volatility, which is particularly high with annual saving targets.

Certificates can be traded either on a spot market and/or over the counter (OTC). The spot market and the 'Registry' are administered by GME according to rules approved by AEEG.

Any interested party can operate in the spot market and have an account in the Registry to record certificates traded via bilateral contracts, provided standard legal and technical requirements are met. Each market operator has to pay a fee that covers the costs borne by GME to administer the Registry and market sessions. The fee has a fixed annual charge plus a variable charge for each certificate transaction, including those via bilateral contracts.

Market sessions are organised at least once a month during the year, and at least once a week in the four months prior to the annual compliance check. Market rules include procedures to ensure the positive conclusion of market deals both to sellers and to buyers: each operator is allowed to sell only the EECs that are actually registered on his account (net of any deal concluded during the same market session), and can buy EECs up to a total monetary value equal to the sum he has deposited before the opening of the market session; in addition, certificates are transferred from the property account of the seller to that of the buyer only once the payment of the total value of the deal has been made.

The enforce cement mechanism. Compliance with targets is assessed by AEEG[2], who also sets the penalty for non-compliance. The criteria set by the Government state that this has to be *proportional and in any case greater than the investments required to compensate the non-compliance*. This criterion has to be applied in the framework of the more general criteria that preside over the definition of financial penalties in the national law, e.g.: the effort devoted to meet the target, the 'gravity' of the non-compliance, the state of affairs of the non-compliant party. These criteria call for a case-by-case assessment and prevent the Regulator from defining the value of the penalty totally *ex-ante*. This means that the sanction will not act as a reference price for the trading of certificates, which, in turn, guarantees that the market will send correct signals as to the real cost of saving energy. As a general guideline, AEEG has indicated that the unit value of the sanction (€/toe not saved) will be set, *inter alia*, with reference to the average market price of certificates and to the average cost of saving energy. Sanctions proceeds are used to finance information and training programs on energy efficiency.

Until the December 2007 revision a two-year grace period[3] applied if the share of the target not fulfilled by the obliged distributor was equal or higher than the ratio between the

[2] At the end of each year obliged distributors have to surrender a number of certificates equal in volume to their annual energy savings target, taking into account the "50% constraint".

[3] In other words, the distributor that fall short of target must make up the shortfall in the two subsequent years.

number of EECs issued during the compliance period and the national target for that period. This ratio had to be computed annually by AEEG and was meant to act as a sort of 'benchmark' in the compliance assessment, as it should have represented the concrete possibility for obliged distributors to meet their target (via the purchase of certificates). Although appealing in principle, this benchmark was not useful for a number of reasons. For example, as a result of the possibility of banking EECs, the actual number of certificates available on the market for purchase could have been lower (or higher) than the amount issued during the compliance period; in these (likely) cases the above mentioned ratio was a flawed indicator of the possibility of meeting the target. This potentially distorting effect could have been partially reduced by imposing restrictions on banking. However, further difficulties in computing the above 'benchmark' stemmed from the '50% constraint' as well as from the fact that, while the targets for electricity and natural gas distributors were separate, there were three types of EECs on the market, only partially fungible.

The cost-recovery mechanism. The mechanism is designed and administered by AEEG[4]. Only obliged distributors can benefit from it, the rationale being that non-obliged parties decide to develop energy savings projects because they see in this a business opportunity linked, *inter alia*, to the possibility to trade certificates.

The system only applies to costs related to electricity and natural gas savings, and only up to the occurrence of the distributor's target. Both choices originate from the fact that the mechanism is financed via a small charge integrated in the tariffs paid by all electricity and natural gas consumers. The first element is therefore based on equity considerations, while the second one is driven by the need for the Regulator to control the total impact of the mechanism on the electricity and natural gas tariff system.

"Standard allowed costs" related energy efficiency measures are the basis to determine the level of the cost-recovery, as opposed to a pass-through of the actual costs borne and documented by distributors. This is driven by the regulatory goal of providing incentives for distributors to look for the more cost-effective options to meet their obligation(s). AEEG determines an average standard cost per unit of primary energy saved. In the first two years of implementation this has been set equal to 100€/toe, equivalent to roughly 2,2c€/kWh saved and 8,2 c€/cubic meter of natural gas saved. This sum is paid once distributors have handed over EECs to the Regulator for the compliance check. It follows that the costs of purchasing EECs are eligible, in addition to the costs linked to the direct development of projects. As a matter of fact, allowing the recovery only for the latter type of costs would have inevitably jeopardised the development of trading and, ultimately, the economic efficiency of the entire policy package.

The 'standard allowed cost' is flat and project (i.e. technology) neutral, in order to avoid interfering with the operations of the certificates market. As a matter of fact, differentiating the 'allowed cost' on the basis of the type of project that generates the energy savings would require certificates to be labelled (e.g. by technology), thus restricting the fungibility of certificates, reducing the scope for cost savings, and increasing administrative costs. The need for labelling EECs could be avoided by paying the cost-differential before the accreditation of certificates. However, this would inevitably require the mechanism to also include non-obliged parties, since the cost-differential could not be paid to (technology-neutral) certificates purchased by third parties. Of course a flat 'standard allowed-cost' implies the risk of windfall profits, which is

[4] AEEG is responsible for setting tariffs in the non-competitive segments of the electricity and natural gas market.

greater the larger the scope of the system in terms of eligible projects[5]. The challenge is to fix the 'standard allowed cost' so that, *on average*, it allows obliged distributors to cover the costs of meeting the energy savings target.

Overall Progress and Emerging Issues at the End of the Second Year

The assessment of the scheme at the end of the second year of implementation showed a system that, overall, was working fairly well but, at the same time, highlighted some critical issues that called for remedial legislative and regulatory actions.

Compliance with Targets and Measures Delivered

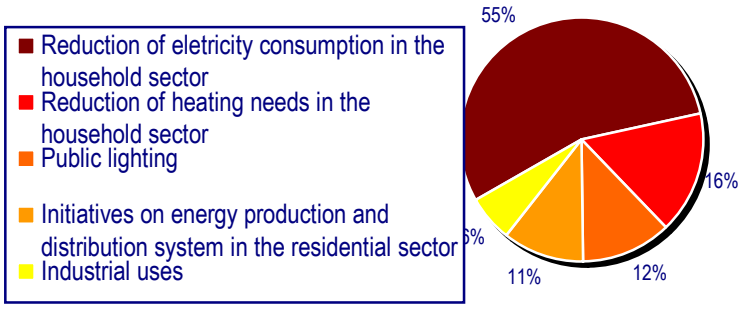
The overall target allocated to obliged distributors for 2005 and 2006 was approximately equal to 468.000 toe. The amount of energy savings certified by AEEG exceeded this target by more that 90%.

Type I (electricity) EECs accounted for 78% of the total issued, type II (natural gas) EECs for 18%, and type III (other fuels) for 4%. The very low portion of type III EECs issued was clearly the result of the lack of tariff contribution for measures that reduce consumption of fuels others that electricity and natural gas.

The largest share of EECs (72,3%) had been issued to energy service providers, followed by non-obligated distributors (12,2%) and obligated parties (15,5%). While the picture looked quite diverse for different distributors, these figures reveal that the dominant strategy of obligated parties to date has been to rely on trading to cover a substantial part of their targets.

The breakdown of energy savings certified by AEEG is shown in Figure 1[6].

Figure 1. Major Categories of Certified Energy Savings



AEEG 2007

[5] The same risk of windfall profits exists if (as it is most likely) obliged distributors have access to sources of funding others than the cost-recovery mechanism (e.g. State, regional, local or European incentives, payments by end-users participating in the project). Taking into account these extra-sources of funding for energy efficiency would require a case-by-case analysis of each project budget, which in turns would greatly increase the administrative costs of the whole system.

[6] For additional details on the specific types of measures implemented please refer to AEEG, 2007.

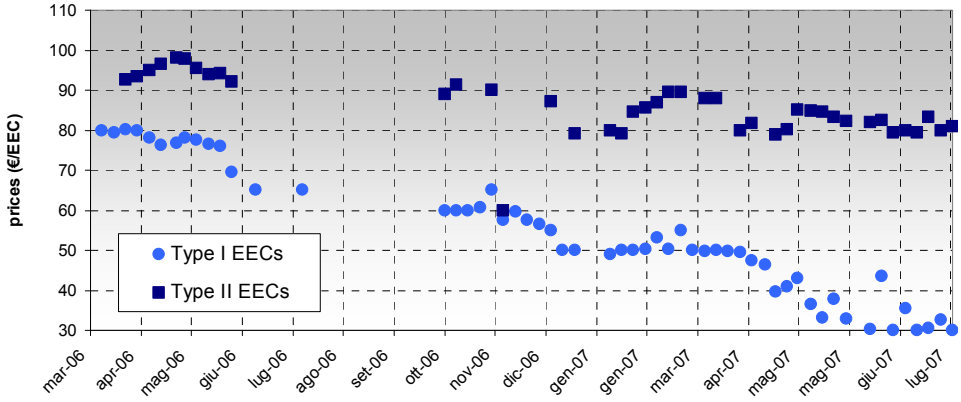
Trading

Both, the number of parties on the Registry and of market operators, has been constantly increasing with the share of energy service companies growing faster.

A total of nearly 472,500 EECs have been traded in the two-year period, a quantity slightly larger than the target, corresponding to roughly half the total certificates issued during the same period. The volume of certificates traded over the counter (OTC) has been markedly higher than the volume bought and sold on the trading platform (78% versus 22%), with a slight increase of the portion traded via the electronic exchange-place in the second year.

Figure 2 shows the development of market prices over the two years: the weighted average price of type I EECs traded in the spot market drop from about 77 € to approximately 47,7 €, while for type II EECs the average price decreased from 94 € to around 84.

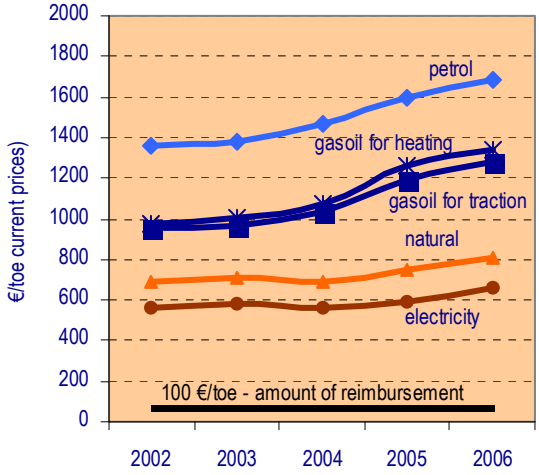
Figure 2. Trends in EECs Market Prices in the First Two Years



Avoided Energy Costs

A comprehensive cost-benefit analysis of the scheme will be carried out at the end of the first implementation period. Some preliminary considerations can be made comparing the avoided energy cost for consumers that profited from the installation of more efficient technologies, with the tariff contribution granted to obliged distributors and with the average market prices of certificates. Figure 3 shows the trends in the final prices of different energy carriers (€/toe). As it is shown, the energy cost avoided by consumers widely exceeded both the amount of the tariff contribution and the average market prices of certificates.

Figure 3. Avoided Energy Cost for a Domestic User (Gross of Taxes)



AEEG, 2006. For natural gas the gross average national tariff was considered; for electricity the gross D2 tariff applied to standard consumers (2700 kWh/year and 3 kW) was taken

The Risk of Windfall Profits

Against this background, AEEG proposed to lower the tariff contribution to obliged distributors for the year 2008 in the event that no short-term legislative action had been developed in order to rebalance the EECs market. The proposal was aimed at avoiding the risk of windfall profits for obliged distributors, as well as the inefficient use of public money, i.e. of the proceeds from the small surcharge applied on electricity and natural gas tariffs to finance the scheme.

Analysing the Supply Surplus and Possible Corrective Regulatory Measures

The supply surplus in the EECs market was the first and key element that drew the attention of the Regulator. Although this is unquestionably an index of success of the policy package itself, particularly if one considers the inevitable difficulties that are typical of the early stages of operation of any new mechanism, it requires some qualifications.

The first qualification pertains to early actions: energy savings delivered by measures implemented as early as the year 2001 represented roughly 27% of the total issued certificates. The contribution of early actions to the achievement of the targets was potentially under-estimated when these were introduced as an element of graduality in the implementation of the scheme. However, it is worth noting that this contribution will constantly decline, as these measures reach the end of their crediting lifetime.

The second qualification relates to the assigned targets: the apportionment criteria initially set by the Government (size-threshold and market share), coupled with the structure as well as the dynamic of the electricity and natural gas markets, resulted in about 22% of the national target not being allocated. In other words, the demand for EECs driven by the obligation had been 22% lower that it could be. Moreover, this gap would have inevitably grown in absolute terms, in proportion to the growth in the national targets envisaged in the coming years. The total elimination of the size-threshold would have totally removed this gap; however, as a

result of this, the administration of the mechanism would have become far more complex (and costly), since the number of obligated parties would have grown nearly 20 times their current levels. Possible ways out included lowering the size-threshold to an intermediate level and redistributing the remaining credits to distributors over this size, on a pro-quota basis. If some form of size-threshold does remain in place, looking at a more recent snapshot of the market than the situation in 2001 would have allowed taking into account the structural developments in the two obligated sectors to the advantage, once again, of the integrity of the national targets.

Analysing the Drop in Market Prices and Possible Corrective Regulatory Measures

The supply surplus resulted in gradually declining average market prices of certificates (particularly for Type I EECs) and, thus, in dropping incentives to new investments[7].

Understanding the reasons behind this trend entails to go beyond the simple ratio between the overall short-term demand and the total supply of EECs. The more immediate consideration that one could make is that the growing stringency of the annual targets, together with the possibility to bank certificates, should have at least limited this effect. In our view, what happened is that an array of factors precipitated the eventual outcome, including (but not limited to): expectations of market operators regarding the persistence of a supply surplus over the longer term; uncertainty over the future, given the lack of targets for the post-2009 period; prevailing short-term strategies on the supply-side (which, in turn, is at least in part the outcome of the characteristics of this market); possible market power on the demand-side which, again, is the result of the structure of the two reference markets; and lack of confidence in the penalty mechanism, due to its complexity.

If the above factors have had a major role in determining the observed price trends, then those coupled with the decrease in the level of incentives to investments in new energy efficiency measures, require a number of regulatory actions. Some of those actions could be taken reasonably in the short term, while others could eventually be undertaken over the longer term and following a deeper analysis and political discussion, since they might concern some design elements of the scheme. Suggested short-term actions included:

- broadening of the scope of the EEO to include smaller distributors;
- revision of the apportionment rule to allow the entire national target to drive the demand for certificates;
- increase in the targets for the coming years, possibly via a temporal redistribution of the overall target already set, so as to keep this change politically acceptable;
- extension of the time frame of the EEO in order to give more certainty to investors;
- simplification of the penalty system and the strengthening of the enforcement mechanism;
- improvement of information publicly available on expected savings from approved measures. To this respect, however, one should notice that the inclusion in the system of measures for which energy savings have to be measured ex-post facto inevitably limits the completeness of this information.

[7] As already mentioned, OTC trading has represented the largest share of the overall trading activity in the first two years Although there were signals that OTC prices had decreased less than the prices in the marketplace, most of the bilateral contracts have a multi-year time span and that, as a consequence, the prices at which EECs have been or will be sold reflect the use of these contracts to hedge against the risk of price volatility in the coming years.

Spot Market Versus OTC Trading

The preference for OTC as opposed to spot market trading is not a failure of the system; rather it is a weakness from a regulatory point of view, since it reduces the transparency of trading both for market operators and for the Regulator. Indeed, market signals (if not distorted) are important to monitor the costs incurred by the system to meet the energy saving goals, and are one of the possible reference parameters to update the tariff contribution to obligated parties, as well as to define the penalty for non-compliant parties.

The overwhelming preference for OTC has been observed despite the implementation of market rules specifically designed to ease access to the market, to grant transparency of market deals, to enhance security of market transactions, as well as to promote market liquidity. One possible explanation includes the opportunity to conclude forward (bilateral) contracts to hedge against the risk of price volatility. In addition, according to the major obliged distributors, bilateral contracts allow them to limit transaction costs by purchasing large quantities of certificates 'in one shot' as compared to the small quantities being offered during market sessions. The nature and characteristics of some of the actors on the supply-side of the market (e.g. limited human and financial capacity) has certainly had a role in driving these actors on the OTC market. Finally, trading between energy service providers and obliged parties which are part of the same company inevitably occurs under OTC.

A number of regulatory actions can be taken in order to enhance the transparency of the overall trading activity; these include: the introduction of price transparency in OTC trading or, alternatively, of an obligation to trade via the marketplace a certain percentage of the total traded quantities; the introduction of measures to promote the aggregation on the supply-side; the promotion of training initiatives specifically targeted at energy service providers and aimed at improving their knowledge of market rules, procedures, use of the electronic platform.

Recent Legislative and Regulatory Changes

The above picture together with the viable policy options to tackle these above-mentioned concerns, have been at the centre of the policy debate.

In order to increase the transparency of OTC trading, in December 2007 AEEG introduced an obligation for obliged distributors to register the price at which each OTC trade is concluded, together with an obligation to provide the Regulator with information on the main content of each bilateral contract concluded to meet their targets e.g.: overall contracted volumes, criteria for price formation and update (in the case of multi-year contracts).

In the same month, the Government issued a new bill in which some revisions as well as integrations of the scheme were introduced, with the aim of rebalancing the EECs market, promoting an upsurge of EECs market value and, thus, an upsurge of the incentives to the development of new investments in energy efficiency measures. The major changes can be summarized as follows:

- the targets for the year 2008 and 2009 have been increased and the 50% constraint removed;
- new targets have been set for the period 2010-2012;
- a mechanism for 'automatic adjustment' of future targets in case of significant supply surplus was introduced;

- the energy efficiency obligation was extended to all electricity and natural gas distributors that serve at least 50,000 customers in the year t-2;
- the apportionment rules have been revised so as to allow the entire national target to be allocated to obliged parties;
- certain industrial and non-industrial customers (e.g. public bodies, commercial customers) have been granted access to EECs for measures developed to reduce their own energy consumption and provided they have an "energy manager";
- the enforcement mechanism has been simplified and reinforced.

Further Regulatory Issues

While the latest legislative and regulatory intervention will certainly help to address the questions outline above, two additional issues deserve further attention.

Simplified M&V methods. The overwhelming preference for measures for which simplified M&V methods have been developed by AEEG together with streamlined (electronic) accounting procedures, confirms the importance of having reliable but simplified calculation approaches and verification rules in order to ease the functioning of such a policy scheme by lowering its administrative burden. While every effort needs to be devoted to increasing the number of stipulated and engineering methods, whenever feasible and cost-effective, it is important to underline that the extensive sector coverage of the mechanism prevents from covering a significant share of the total eligible measures. More generally, the development of simple M&V rules requires the availability of constantly updated market studies and national statistics on the technological baseline, at least in those end-use sectors that are most likely to participate in the scheme. Official labeling schemes and minimum energy efficiency requirements are also very useful in this respect, since they greatly contribute to the identification of the technological baseline and, thus, to ensure the additionality of EECs.

Complementary measures. Despite the positive results delivered so far, including the gradual development of new partnership formats among the various actors, the mechanism would greatly profit from the development of complementary, structural initiatives, aimed at facilitating the access of consumers to information on energy saving opportunities, as well as access to credit. In the first two years of operation, a number of information and awareness-raising campaigns were launched by obliged distributors through public funding specifically earmarked for this purpose. Consumer associations and environmental NGOs have set up some information clearinghouses targeted at consumers. However, much more is required in this respect at both the national and local levels, and measures should be designed with a longer term prospective if they are to support the further development of the EEC market. Finally, further effort should be made to encourage the financial sector to play an active part in the development of energy saving projects. This includes the definition of rules to enhance the use of third party financing, as well as the development of security mechanisms for credits towards customers.

Summary and Conclusions

The above quantitative as well as qualitative analysis confirms the relevance of basic design and regulatory choices in determining the outcomes of a white certificates scheme: the

choices of the obliged parties and the structure of the energy efficiency obligation; the scope of the mechanism in terms of eligible projects; the number and characteristics of the actors that are granted access to the market on the supply side; the nature of the enforcement mechanism; the technical (i.e. M&V rules) and economic regulation (e.g. cost-recovery mechanism, market rules and procedures) governing the system.

The analysis also confirms the need to look for a balance between apparently conflicting policy goals when making regulatory decisions, for example: economic efficiency demands a diversity of technological and cost options and, thus, a broader scope in terms of eligible projects and eligible parties; but a broad scope inevitably entails high(er) administration costs for both the regulator and the various market actors; efficacy in terms of energy savings delivered calls for accurate M&V rules and procedures, but this may conflict with the need to keep these rules and procedures as simple as possible in order to limit transaction costs. In other words: the combination of "command and control" policy tools with market-based ones does not guarantee, *per se*, the achievement of both efficacy (in terms of targets) and economic efficiency.

Finally: EECs are not a panacea, nor do they work in a vacuum: they need to be complemented (and supported) by other policy actions aimed at overcoming the obstacles to the development of a market for energy efficiency products and services, e.g. information campaigns and clearing houses, energy labeling, minimum energy efficiency requirements, market studies to help identify the technological baseline and, thus, to give incentives where they are needed.

In turn, the coexistence of different policy tools to promote end-use energy efficiency gains and the related public benefits, require a strong policy coordination effort at the institutional level in order to avoid over-incentives and alterations of market forces and signals, the latter being a key input for fine-tuning and updating the regulatory framework.

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