Case Study 3: Italy

3.1 Context

Italian White Certificates have been in place in Italy since January 2005. The obligations were originally placed on 10 electricity distributors and 20 gas distributors in Italy and covered 79% of final energy distributed. However, in practice Enel had ~90% of the electricity target and Italgas had over 30% of the gas target. In 2008, the coverage of White Certificates was extended to all companies distributing to more than 50,000 customers (previously 100,000 customers). The obligation now covers 14 electricity distributors and 61 gas distributors in Italy; furthermore the target now is representative of final distributed energy as the individual obliged distributor targets by volume are scaled upwards from their market share of energy distribution covered by the obliged companies to the total energy distributed. Enel now has ~87% of the electricity obligation and 3 gas distributors have ~45% of the gas obligation\(^1\).

The Italian Government was responsible for setting the size of the obligation and in the Italian National Plan, it is expected that one third of the expected carbon dioxide savings by 2012 will come from the White Certificate activities.

3.2 Objective

The White Certificates have always been driven by the Italian Kyoto commitments and were designed to be coherent with the framework that Italy would be expected to meet under the EU Directive of Energy End Use Efficiency and Energy Services. Another important objective was to encourage the development of an energy services market.

The White Certificates cover all energy end users. Although in principle any fuel can be saved, in practice to October 2009, electricity accounted for 74.7%, gas for 21.9% and other fuels for only 3.4% of White Certificates issued by AEEG.

3.3 Main Characteristics of the Programme

Under the current Italian White Certificates scheme, all electricity and gas distributors servicing more than a 50,000 customers have targets which are based on their market share of the distribution market served by the obliged distributors. The target is a primary energy savings target expressed in tons of oil equivalent (toe)\(^2\); one White Certificate equals 1 toe saving. A White Certificate is equivalent to the average annual electricity consumption of between 1-2 Italian households.

The target is based on annual energy savings in 8 year periods till 2012 inclusive. The target is set such that by the end of 2009 cumulative annual primary energy savings of 3.2 Mtoe primary energy were to be achieved; these have been extended such that by

\(^1\) Italgas has the largest share (23%) of the gas distributors’ obligation.

\(^2\) Effectively this multiplies the end use savings of electricity by a factor of 2.5 so that a 1 kW of electricity end use saving is equivalent to 2.5 kW of gas end use savings. 1 toe is equivalent to 11,630 kWh.
the end of 2012, there must be 6 Mtoe primary energy savings attained for the first time or 22.4 Mtoe cumulative annual savings\(^3\). Additional energy savings above the target can be carried forward to the next period.

There is no prescription on how distributors should attain these energy efficiency improvements. However, there is an illustrative list of eligible projects. As well as energy efficiency measures, distributors can also use supply options such as cogeneration, solar water heating and PV panels. Energy savings from projects contribute to the achievement of targets for up to 5 years (up to 8 years in case of energy efficiency measures addressing building envelopes). The deemed energy savings were revised in 2008 (lowered) and this had a marked impact on the price of White Certificates in the market place (increased).

Obliged distributors have four options to comply with their White Certificate obligation:

- They can develop “in house” energy efficiency projects
- They can develop projects either jointly or contact with other third parties such as product manufacturers, retailers, installers, ESCOs, etc.
- They can buy tradable energy efficiency certificates from the market which attest energy savings achieved by third parties via the implementation of energy efficiency projects; these third parties can include subsidiaries of the obliged distributor or other distribution companies or energy service providers.
- Alternatively the companies can pay the sanction for non-compliance with the obligation.

Although distributors are allowed to carry out energy efficiency measures and subsequently monitor them to determine the energy savings, to date nearly all the projects have been based on deemed (ex-ante) energy saving estimates\(^4\) or scaling of engineering estimates for commercial and industrial projects. Obliged energy distributors have to submit to the Italian regulator sufficient White Certificates to meet their target.

The Italian Regulator (AEEG) is responsible for the development and definition of technical rules, administration, monitoring and enforcement of the whole mechanism. It also issues the “White Certificates”. Carrying forward White Certificates from one year to the next is permitted.

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\(^3\) Note the 2012 cumulative target is more stringent than appears at first sight since the “scoring” mechanism only counts savings for a maximum of 5 or 8 years depending on the measure installed and so by 2012, some of the 5 year saving measures will no longer be counted towards the 2012 cumulative target.

\(^4\) Deemed savings apply to technologies for which energy savings are well known e.g. CFL, m² of insulated wall, small PV applications and high efficiency boilers. The minimum project size for deemed energy savings is 25 toe per year
3.4 Monitoring and Verification of Certificates

Measurement and verification is crucial to the efficient functioning of a tradable certificates mechanism so that players in the market can have confidence in the certificate. This is achieved by AEEG having a rigorous monitoring and verification system so that the Italian White Certificates can serve as an accounting tool and thus prove the corresponding amount of energy has been saved.

AEEG provides specific guidelines on the preparation, measurement and evaluation of individual projects. Subsequently documentation has to be transmitted to the Regulator to allow verification and validation on a project by project basis before the Italian White Certificates are issued. As most of the activity is related to be deemed or scaling of engineering estimates, then this effectively becomes verifying that the energy efficiency measures were installed and are in place. This process is subject to a random audit by the Regulator.

The Regulator AEEG makes an allowance in the distribution price formula to cover the costs of the Italian White Certificates. In the first phase, this cost was assumed to be €100/toe of primary energy saved. AEEG has estimated that the break down of where energy savings were achieved is as shown in Figure 3.1 for 2005-8.

![Figure 3.1: Breakdown of where the Italian White Certificates were generated in the period 2005-8 inclusive (source AEEG)](image)

To May 2009, 85% of the energy savings achieved were done through the deemed energy savings method with the 2% being engineering estimates and 13% from large energy saving projects which were monitored.

81% of the savings were attained by registered “ESCOs” (energy saving Companies). However, it should be borne in mind that The Italian registered ESCO definition includes installers of energy efficiency equipment and so there are not necessarily any of the usual attributes of a traditional ESCO e.g. energy supply, shared savings or
shared risk or guaranteed energy savings. Compared to the more traditional EU definition\(^5\), there has been little development of such “genuine ESCOs”. Public lighting has been the most popular non residential measure (but now is decreasing in activity) and while electricity savings in households through CFLs and appliances have been significant, it is noticeable that the most common measures in the UK programmes of improving heating efficiency through insulation and also the installation of more efficient boilers are not so prevalent in Italy. In the industrial and commercial sector, other important energy efficiency measures include motors and drives, inverters, air conditioning in the service sector, schools, hospitals and offices.

3.5 Evaluation and Impact of Italian White Certificates

The Italian White Certificate obligation has been in a great success in meeting annual targets.

For the first year (2005), nearly 90% more certificates were issued than required to meet the target. This was in part due to the delays in actually implementing the White Certificate mechanism; energy savings from projects dating back to 2001 are included and these accounted for 62% of the total White Certificates issued.

In the period 2005-08 inclusive, cumulative energy savings of 3.7 Mtoe were saved against a target of 3.2 Mtoe. Overwhelmingly, the energy savings were from electricity – 77% electricity, 19% natural gas and 4% other fuels.

3.5.1 Energy and Carbon Savings

In Italy the cumulative energy saving targets for 2008 were equivalent to >8 TWh electricity saving and >18 TWh gas savings (both figures in delivered units). The Italian regulator has reported that the combined target was easily exceeded but as mentioned earlier, the contribution from electricity savings was much greater than expected. The 2008 annual savings target (2.2 Mtoe/year) corresponds to 1.8% and 1.4% of Italian electricity and gas consumption respectively\(^6\).

The 2008 target of 2.2 Mtoe/year with the above mix of fuels saved implies that the carbon dioxide savings are over 4 Mt CO2/year\(^7\).

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\(^5\) For example as defined in the EU Directive on End-Use Energy Efficiency and Energy Services.

\(^6\) It is interesting to note that since the start of the Italian White Certificate scheme, there has been no growth in residential electricity demand to the end of 2007; in the equivalent period 2001-4 prior to the scheme, growth was averaging 2% per year (source Eurostats: Electricity consumption of households). As most of the electricity savings were in the household sector (78%), then as a percentage of residential electricity consumption the savings from White Certificates would be of the order of 6-7%.

\(^7\) This is higher than the 3.9 MtCO2/year expectation of the original target due to the higher contribution from electricity savings than originally expected (electricity CO2 content/kWh in Italy is more than a factor of 2 higher than the equivalent figure for natural gas).
3.5.2 Financial Benefit

The regulator AEEG will publish detailed information on the financial benefits to end use consumers at the completion of the first phase in 2012. AEEG has published annual reports and it is clear that the financial benefits are very positive. For example, the amount allowed in the distribution price formula of €100/toe to the end of 2008 and €89/toe since then is at least a factor of six less than the price of electricity and natural gas to residential customers. The €100/toe initial allowance is the equivalent to a cost of 2.2 eurocent/kWh saved of delivered electricity and 0.9 eurocent/kWh saved of delivered gas being recovered from residential customers. This compares favourably with the then prices to residential customers of 16.6 €cents/kWh for electricity and 4.3 €cents/kWh for gas.

The latest AEEG Annual Report on the results achieved by the mechanism was published in December 2009. It compared the private cost of the system for an average household to some of the public benefits linked to one toe saved: the cost for an average household in 2008 was 2.8 €/year (based on the tariff charge) and could amount to 6.4 €/household/year in 2012. The benefits for the country were: in terms of avoided CO2 emission costs, they range from 46 €/toe to 350 €/toe (with an emission allowance priced at 20 €/toe and 100 €/toe respectively); in terms of avoided renewable costs (again associated with the EU 20-20-20 target), they range from 72 to 237 €/toe; this mean that the public benefits associated only to the 20-20-20 package range from 118 to 587€/toe against a cost of 89-100 €/toe and are additional to the already positive private benefits of the Italian WCs.

3.6 Deadweight/Additionality

Deadweight is taken here to mean the subsidising or support for those measures which would have happened anyway. This is tackled in the Italian system in a variety of ways. For example, for energy efficient appliances, a baseline of the average energy efficiency sold is used and it is acknowledged that as the baseline is dynamic, there is a need for regular updating. In general, the determination of additional savings are tackled by the use of market averages for the baselines from which energy efficient savings from lighting, appliances and boilers are determined or, in the case of new buildings, from the energy savings from measures which exceed the building regulation requirements. For other areas, default factors can be used to account for deadweight which cannot be controlled, but the most common approach to date in addressing additionality is via baseline setting.

For projects not covered by deemed savings or engineering methods, project developers have to demonstrate additionality within their methodological proposal, that has to be approved by the regulator before it can be applied. The accepted technological baseline is the average technology sold at the national level to produce the same level of energy service (unless more stringent legislative requirements exist).

While this approach tackles additionality at the energy efficiency measure level, it does not tackle policy additionality (see section 3.8).
3.7 Cost Recovery

In Italy cost recovery is allowed for every certificate delivered by the distributor as long as that distributor's total saving target for the year under consideration has not been achieved. Starting from 2009, the cost recovery rate for all obliged distributors is adjusted annually to take into account the average reduction (or increase) in electricity, gas and fuel for transport gross sale prices relating to small energy end-users; the higher the average price reduction the lower the cost recovery rate granted. Cost recovery is also allowed when the energy savings are from the customer base of another distributor. The cost recovery is net of any contribution from other sources. Finally, cost recovery is allowed for all fuels saved except fuel for transport.

Until 2009, the rate was fixed in the distribution price formula at €100/toe and in 2009 it is €89/toe.8

3.8 Trading

Full trading of the certificates is allowed under the Italian White Certificate programme. Any accredited party can achieve savings provided they satisfy the Regulator that they have installed energy efficiency measures appropriate to the savings claimed9. The White Certificates are traded on a specific market place, organised and administered by the Electricity Market Operator (GME) according to rules approved by the Regulator, or through bilateral trading (over the counter). GME also operates the “Power Exchange” and the “Green Certificates” market for renewable energy. The market was opened in March 2006.

Figure 3.2 shows the prices of White Certificates for both electricity and for gas since the inception of the market. Over the first few years of the market, it is noticeable that the gas price was higher than the electricity price. During this period, only 20% of White Certificates were traded on the market and most White Certificates were done as bilateral or subcontract arrangements with the energy distributors. One of the reasons why the gas prices might have been higher was that the (then) twenty gas distributors collectively argued that it is harder for them to meet their targets as they do not know the customers.

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8 €100/toe corresponds to about 2.2 eurocent/kWh in case of savings of delivered electricity savings or 0.9 eurocent/kWh for savings of delivered gas.
9 Since 2008, large end-users (companies with an energy manager) have also become accredited bodies.
Figure 3.2: Market price of Italian White Certificates; tipoI are electricity certificates, tipoII are natural gas certificates and tipoIII are other fuel certificates.

By 2007 White Certificate prices were on average around €40 for electricity, €77 for gas and €22 for other fuels.

Following the reforms by the energy regulator at the end of 2007, the market for White Certificates has operated more actively. From mid-2008 both quantities and prices of bilateral deals (i.e. of over the counter trades) have to be registered. The obligation to register bilateral prices has been introduced by AEEG in order to increase the transparency of trading, to the advantage both of market operators and of the Regulator. Market signals, if not distorted, monitor the costs incurred by the system to meet its energy efficiency goals, and they are one of the possible reference parameters for updating the tariff contribution and defining the penalty for non-compliant parties.

The prevalence of bilateral trading is linked to an array of factors, including the opportunity to conclude (bilateral) forward contracts to hedge against the risk of price volatility and, for the major obliged distributors, obtaining large quantities of certificates “in one shot” as compared to the smaller quantities of certificates being offered so far during market trading sessions.

Between June 2007 and May 2008 Italy has seen buoyant trading (mostly bilateral, but an increasing share of spot market trades). Indeed in 2007, 304,932 certificates were traded on the spot market and 556,742 certificates were traded bilaterally against an actual saving target of 633,382 certificates. More than 80% of the certificates were issued for energy efficiency projects implemented by non energy obligated parties.

In January 2009, four white certificate types have been introduced in order to distinguish among electricity, gas, fuel for transport and other energy savings. Type I certificates relate to electricity savings, type II certificates relate to gas savings, type III certificates relate to other energy savings and type IV certificates relate to savings of fuel for transport. It is expected that the volumes of Type IV certificates issued will be

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10 The total amount of certificates traded amounted to 136% of the 2007 target: the spot market trades represented 48% of the saving target whereas bilateral trades represented 88% of this target.
low because of the lack of cost recovery for obliged parties. This happened previously with Type III certificates when prior to 2009, energy savings other than electricity and gas savings were not eligible for cost recovery.

3.9 Reduction in Peak Electricity Demand
A precise evaluation is beyond the scope of this paper, not least because of the different technologies which reduce the peak demand in different seasons. Eyre et al\textsuperscript{11} attempted a similar broad estimate by assuming that the energy savings followed the load curve. This can be either an over or underestimate depending on which season the peak demand occurs and the energy efficiency measures itself.

The present analysis has reviewed that work and concluded that the peak reduction for Italy due to electricity savings in the period 2005-2007 is likely to be <0.3 GWe. This is lower than the Eyre et al estimate due to the dominance of CFLs in the Italian scheme which will have a poor correlation with summer peaks.

3.10 Areas for Improvement

The initial five year fixed period was perceived as a problem as it did not provide long term continuity for Energy Efficiency Obligations. However, the extension and expansion to 2012, has seen a marked increase in activity. Activity beyond 2012 will need to be addressed soon to ensure that momentum is not lost.

One of the issues that Italy will need to examine again is how the life time issues of the individual projects are addressed. For example, insulation measures which can save energy and carbon dioxide for at least 30-40 years are not awarded their full benefits under a scheme which only counts savings from a few years.

Over the period 2001-2007, almost 21 million CFLs were delivered to comply with the obligations for the period 2005-2007. This confirms the driver for distributors to focus on primary energy and short measure lifetimes that discourage thermal envelope measures in buildings which would save gas or other primary energy sources. Prior to the legislative changes of 2008, distributors could get €7.3 per CFL (€3.65 per CFL distributed as a free token) compared to a CFL cost for distributors by the end of that period of less than €2 per CFL which also explains the interest in lighting measures.

After the legislative changes of 2008, distributors will receive at most 2.1 Euro/CFL, but as CFL prices have continued to decrease, it is likely that they will continue to be a favoured option until the incandescent light bulbs are banned from the market.

Other issues that should be addressed in the coming period are to re-examine the policy additionality issues in the light of the availability of tax breaks as well as White Certificates.

\textsuperscript{11} N J Eyre et al at eceee summer conference 2009
http://www.eceee.org/conference_proceedings/eceee/2009/Panel_2/2.164/