

# Energy saving obligations and tradable white certificates: comparative analysis of experiences in the European Union

CERTIFICATI BIANCHI

Titoli di Efficienza Energetica a portata di mano

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- A rather strict focus on savings in **energy end-use**;
- **Binding and meaningful energy saving targets** expressed in energy units;
- Provisions to ensure that certified energy savings are **additional** to a well specified baseline;
- Extensive **monitoring and verification** systems by independent organisations;
- Inclusion of **penalty systems** for breaching regulation and non-achievement of targets;
- Provisions to promote or even mandate **transparency and harmonisation** in energy efficiency project and programme assessments, thereby paving the way for the tradability of certificates;
  - Certificates are **tradable** or could be made tradable with a limited set of additional regulations.

## Justification/rationale for implementing TWC schemes

In countries where TWCs are already in place it is found that justification/rationale for implementing TWC schemes (as an alternative to other energy efficiency policy instruments) typically is:

- Higher cost-effectiveness in the achievement of given saving targets
- Creation of incentives to privately finance energy efficiency (ESCOs, etc.)
- Saving of public money (if compared with subsidies for energy efficiency)
- Avoidance of energy price distortion between sectors (if compared with energy taxes)
- Avoidance of the very high transaction costs typically caused by the introduction of energy performance standards
- Higher consistency with liberalized energy markets

Nevertheless a lack of ex-ante evaluations analysing potential effects of TWC schemes is identified in most of these countries.

	UK (CERT and CESP)	Italy	France	Denmark	Flanders (Belgium)
<i>Obligation period</i>	2002-2005 (EEC-1)* 2005-2008 (EEC-2) 2008-2012 (CERT) 2009-2012 (CESP)	2005-2012	2006-2009 (first period)  2011-2013 (second period)	2006-2009 (first period)  2010-2012 (second period)	2003 –
<i>Target size (ongoing phase)</i>	293 MtCO <sub>2</sub> lifetime savings in 2012 (CERT) 19.25 MtCO <sub>2</sub> lifetime savings in 2012 (CESP)	Cumulative savings of at least 22.4 Mtoe in 2012	345 TWh lifetime discounted (over the period January 2011- Dec. 2013)	2.95 PJ annual (first year savings) until 2009 As of 2010: 6.1 PJ/y (first year savings weighted with prioritisation factors reflecting action lifespan)	Approx. 580 GWh (2009 target) 3.5% of the amount of electricity supplied the year before to household and non-residential clients (2.5% in case of less than 2500 clients).

\* Obligations on energy suppliers since 1994

In the pipeline: **Poland and Ireland**. The Netherlands, Portugal, Romania and Bulgaria are interested in this policy instrument.

- Analysis of major design choices
- Dominant measures implemented
- Measurement & verification approaches adopted
- Trading
- Transaction and system costs
- Some key issues related to energy efficiency obligation schemes and energy saving targets set in the new proposal for a EU Directive on Energy Efficiency
- Evidences of results achieved by energy saving obligations

## Unit for the measurement of the energy saving target

Primary energy (IT, Flanders)

Final energy (DK, FR)

CO<sub>2</sub> content of energy saved (UK)

**The choice of the obligation unit ultimately depends on the main policy goal to be achieved...**

## Annual vs. multiannual & cumulated vs. annual targets

Multi-annual targets (UK, FR)

Annual targets in the framework of multiannual obligation periods (DK, IT, Flanders)

Cumulated savings (UK, FR, IT)

First year savings (DK, Flanders)

**A relatively short obligation period combined with long-term policy commitment allows adjustments of operational modalities, while ensuring investment stability.**

**Allowing first year savings alone or allowing only short lifetimes of savings may penalise comprehensive solutions that are likely to have longer payback times**

## Grid-bound energies vs. wider scope

Providers of grid-bound energies are put under obligation in UK (el. & gas), IT (el. & gas), Flanders (el. only) whereas DK and FR oblige also other energy providers (e.g. heating oil, LPG, DH) to save energy.

The 2011-2013 France obligation has included also transport fuel suppliers who are obligated to realise about 26% of the total target for this period (345 TWh cumac)

**Market distortions** may in principle arise when both actors regulated (e.g. suppliers of residential el. and gas in FR) and actors not subjected to price regulations (e.g. suppliers of transport fuel in FR) are put under obligation.

## Actor types obligated to save energy

**Retail energy sales companies** (UK, FR)

**Distribution system operators** (IT, DK, FL)

**Retail energy sales companies have strong links to the final consumer** and may have the motivation to offer value-added services.

**On the other hand distributors are more stable regulated organisations and**, with proper tariff regulation, **may not have the strong push to sell 'more kWh'**, as is in the case of energy retailers.

Energy saving obligations and white certificates are considered **best suited for measures in end-use sectors, excluding generation projects and network**

	<b>UK (CERT and CESP)</b>	<b>Italy</b>	<b>France</b>	<b>Denmark</b>	<b>Flanders (Belgium)</b>
<b>Energy end-use sectors covered</b>	Residential	All	All excl. ETS	All except transport	Residential and non energy intensive industry and service
<b>Restrictions in achieving the target</b>	40% priority group and 15% super priority group. 25% insulation measures (CERT) Low income areas; max 4% by loft insulations; max 4% by cavity wall insulations; max 1% by energy advice.	Until 2008 50% on own energy source	25 TWh cumac max. achievable by information, formation and innovation programmes	None specific	The actions must always consist of financial contribution and an awareness-raising element

Measures related to energy grid loss reduction are eligible in DK (as of 2010) and IT (as of 2011).

Measures “in-between” supply and end-use options are allowed in some schemes (e.g. micro CHP, PV panels, solar water heaters; etc.). Installation of highly efficient CHP of any size is allowed in IT.

The inclusion of the transport sector may be in principle troublesome for various reasons...

Theory suggests that the wider the scope (in terms of sectors covered and eligible measures), the greater the benefits (especially in terms of trading). On the other hand, extensive scope may result in difficult and expensive administration of the scheme.

In most supplier obligation schemes obligated parties are allowed or may decide to choose one of the following actions to comply with the target or otherwise pay non-compliance or under compliance penalty:

- Implement energy efficiency projects directly (IT, UK, FR, Flanders);
- Implement energy efficiency projects via daughter companies (DK, IT);
- Purchase certificates from third parties by bilateral trades or spot market (IT, FR)
- Establish partnerships with contracted installers, retailers, etc. (FR, UK, DK)
- Tender out the implementation of projects (attempted in DK);

In DK distributors are not allowed to directly implement projects other than information and informative bills, unless these projects relate to realisation of savings in own grid

Until 2009 in all schemes the targets have been met or exceeded (in the sense that the total amount of savings generated or certificates available has achieved or exceeded the overall targets set, but not in sense that every obligated actor has always achieved its own target).

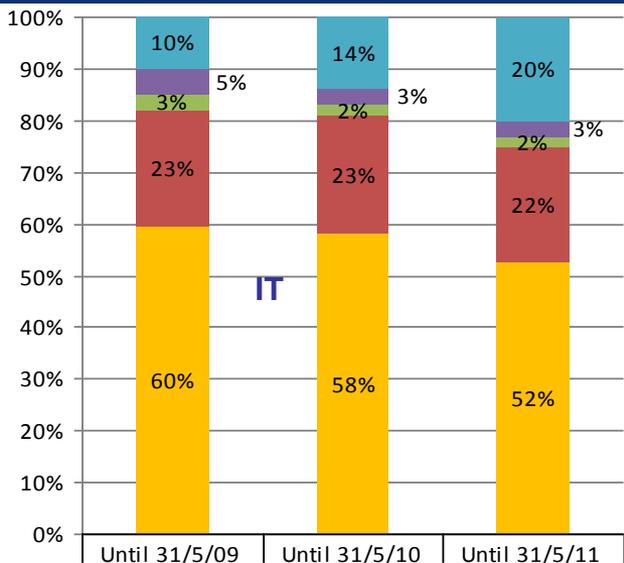
In **IT** the number of certificates available for target achievement in **2005, 2006, 2007, 2008, 2009, 2010** corresponded respectively to **184%, 240%, 210%, 122%, 102%, 94%** of the targets apportioned among obligated actors during these years

In the **UK suppliers achieved savings equal to 140% of the target under the EEC-1** and banked their surplus savings into EEC-2. Suppliers also **over-achieved the target in EEC-2 by 44%**, which translated into a carry over of an amount of savings equal to approximately 13% of the original CERT target from EEC-2

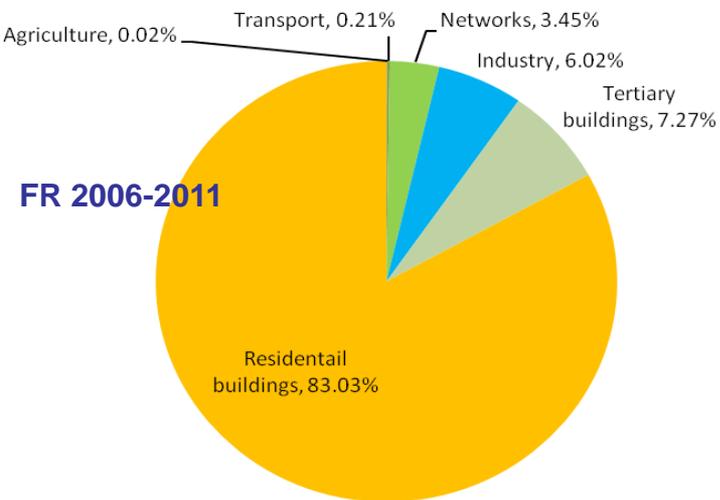
In **FR 121%** of the target established for the period 2006-2009 and 44% of the target established for the period 2011-2013 was already achieved on June 2011

In **DK savings delivered** during the first obligation period (2006-2009) **amounted to 114%** of the target and the sub-targets established for the companies of all the energy sectors considered (electricity, gas, district heating, oil) were all overachieved.

In Flanders the **2009 target** was **exceeded by at least a factor of 4**



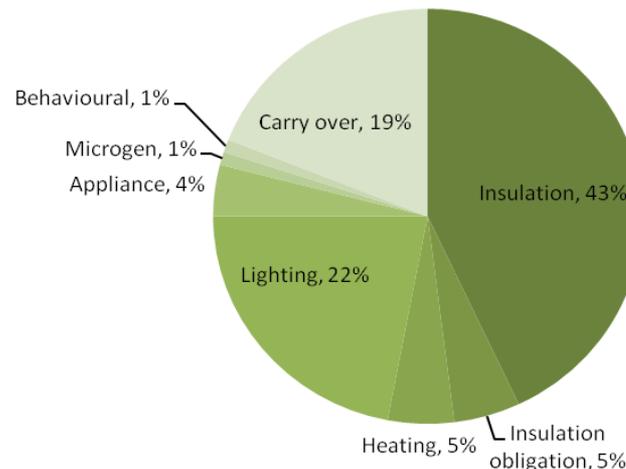
Source: AEEG six annual evaluation report for 2010 obligation



FR 2006-2011

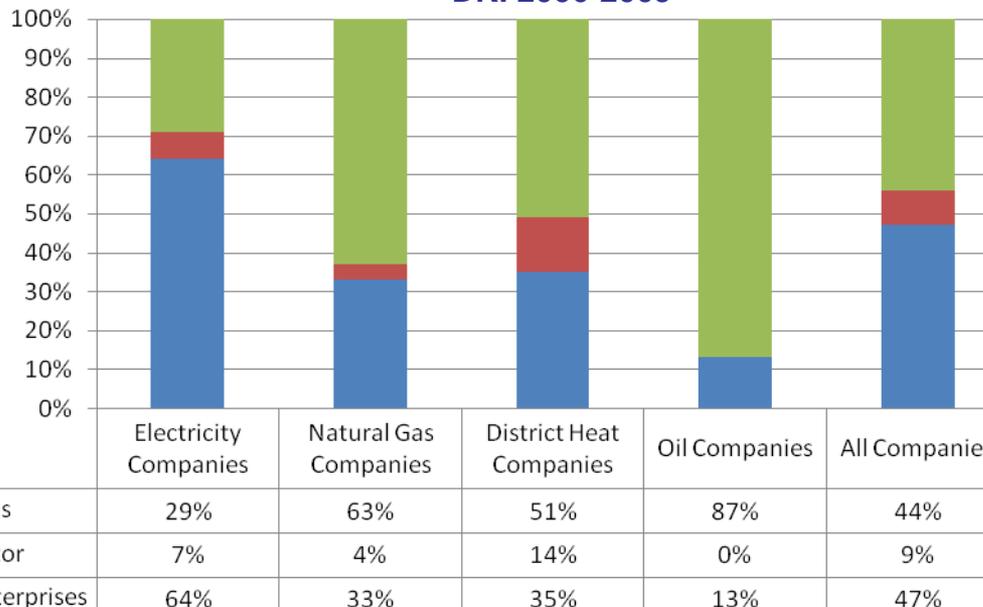
Source: MEEDM and MINEFI. Lettre d'information « Certificats d'économies d'énergie »; August 2011

UK CERT: 04/2008- 03/2011



Source: 2011 Ofgem review of the third year of CERT

DK: 2006-2009



Source: JRC Workshop on Experiences and Policies on Energy Saving Obligations and White Certificates, 27-28 January 2011, Varese-Italy

	UK (CERT and CESP)	Italy	France	Denmark	Flanders region (Belgium)
<b>Measurement and verification options</b>	Standard values	Standard values (19 measures) Engineering approach (5 measures) Metered baseline method	Standard values (about 240 measures) Case-by-case approval for other measures	Standard values for approx. 200 measures Specific engineering calculation	Case-by-case approval by VEA
<b>Dominant measurement and verification choice</b>	Deemed savings only	Deemed savings	Deemed savings	Specific engineering calculations	NA
<b>Accreditation of savings</b>	Ex-ante	Ex-ante (majority)	Ex-ante	Ex-ante (adjusted first year savings only)	Ex-ante approval

Most of the schemes are dominated by measures with **standardized saving factors**, especially in the residential sector (UK scheme only in the residential sector). Transaction costs for real measurement could be very high.

Ex post certification approach may result too costly for small projects (up to 20%), but guarantees “real” savings.

The potential domain of excellence of « ex post » approach is large savings and large investments, as the rate of transaction costs due to measurement and verification of savings tends to become lower.

To lower “transaction costs” due to Measurement and verification (M&V) of energy savings, TWC should be mostly awarded ex-ante and in only one package

Nevertheless there can be dangers associated with purely ex-ante schemes (like partial realisation of savings, poor additionality, etc.) if EE measure impact is not well understood.

	UK (CERT)	Italy	France	Denmark	Flanders region (Belgium)
Size of certificate	NA	1 toe	1 kWh cumac	NA	NA
Validity of certificate	NA (compliance in 2012)	The entire phase of the scheme (2005-2012)	3 compliance periods (compliance in 2009 and 2013)	NA (only adjusted first year savings count)	NA
Certification threshold size	NA	20 toe/year, 40 toe/year and 60 toe/year for savings evaluated respectively by deemed, engineering and metered baseline methods	1 GWh cumac (projects can be pooled to reach the threshold)	NA	NA
Accreditation of savings	Ex-ante mainly	Ex-ante mainly (with the exception of engineering and metered baseline methods)	Ex-ante mainly	Ex-ante (adjusted first year savings only)	Ex-ante + approval (first year savings only)
Trading* mechanisms	Trading among suppliers	Spot market OTC (dominant)	OTC only	No trading	No trading
Banking, borrowing	Banking of excess savings between phases (EEC-1 to EEC-2, EEC-2 to CERT)	Banking till 2012 Borrowing for 1 year if under compliance below 40%	Banking three compliance periods	Banking till 2012 As of 2010 borrowing if under compliance below 35% (45% in 2010)	Banking of excess savings

In **IT** 2010 trades amounted to 92% of the 2010 target.

In **FR** trades amounted to 1% of certificates issued as of 2011

In the **UK** EEC-2 horizontal trades accounted for approximately 0.25% of the target.

In **FR** and **UK** suppliers prefer to position themselves vis-a-vis their clients as suppliers of energy services.

\*In Italy highly efficient CHP plants owners can obtain certificates and ask the GSE (Gestore Servizi Energetici) to buy them at a price equal to the cost recovery rate

- Questionable whether **trading** is a key element in national systems;
- EU-wide certificate market would be very complex (e.g. need to harmonise measurement methods);
- Buoyant certificate trading is taking place only in **Italy**, where projects are implemented by **ESCOs**
  
- France - **limited trading**
- Suppliers prefer to implement the projects themselves through agreement with equipment suppliers and installers, positioning themselves as suppliers of energy services (utilities do not offer incentives, act as “*project organizers*”).
  
- UK - certificate **trading is not a feature of the scheme** and no formal certification of attained savings takes place.
  - Most suppliers use the same contractors to undertake the work;
  - Suppliers can only trade once they meet their own energy saving targets;
  - **Agreements with equipment suppliers** and installer to offer “standards” solutions to residential clients (not necessarily their customer base).
  - Banking of savings

Two research initiatives investigated TCs affecting the development of EE projects (i.e. planning + implementation + M&V).

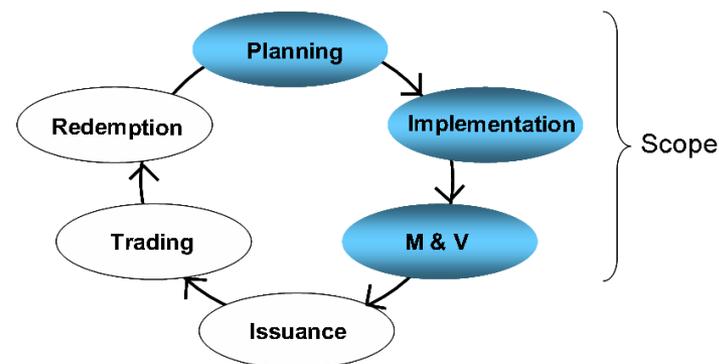
## Main outcomes

Scale of such TCs may range from approximately 10 up to 40% of total direct investment costs and can affect TWC scheme performance.

There is a negative direct correlation between the burden of TCs and the size and performance of projects.

TCs arising during EE project planning phase may range from 5 to 20% of total direct investment costs (in particular finding information on customers willing to implement EE measures seems critical).

## Life cycle of TWCs



Source: Mundaca, 2005

## Cost to households:

- Italy: 3.7 Euro/household in 2009 (AEEG estimates go up to 6.4 Euro/hh in 2012).
- UK EEC-2: 6.9 GBP/year per customer per fuel bill (23% below ex-ante estimates).
- UK CERT: 45 Euro/year/household on bills.
  
- UK EEC-2 cost of conserved energy: 0.6 pence/kWh gas and 2 pence/kWh electricity.
- Italy: 1.7 Eurocents/kWh annual.
- Flemish region: 2.3 Eurocent/kWh primary (first year savings only).
- Denmark 2010-2012: approx. 6 Eurocents/kWh (4.5 Eurocents/kWh in 2006-2009, first year savings only or 0.45 Eurocents/kWh for average lifetime of 10 years).

### Administrative cost estimates (implementing authority):

- UK EEC-1: 1 million GBP over 3 years.
- France: 700,000 euro/year.
- Italy: 1 million euro/year.

# Proposal for a Directive of the European Parliament and of the Council on energy efficiency (EED)

## Article 6, paragraph 1

Each Member State shall set up an energy efficiency obligation scheme. **This scheme shall ensure that obligated energy distributors and/or retail energy sales companies operating in each Member State's territory achieve a cumulative end-use energy savings target by 31 December 2020. This target shall be equivalent to achieving new savings each year from 1 January [year after implementation] to 31 December 2020 of 1.5% of the annual energy sales to final customers of all energy distributors or all retail energy sales companies by volume, averaged over the most recent three-year period prior to [implementation date]\***.

\*Text of the proposal with new Presidency suggestions of 2 February 2012

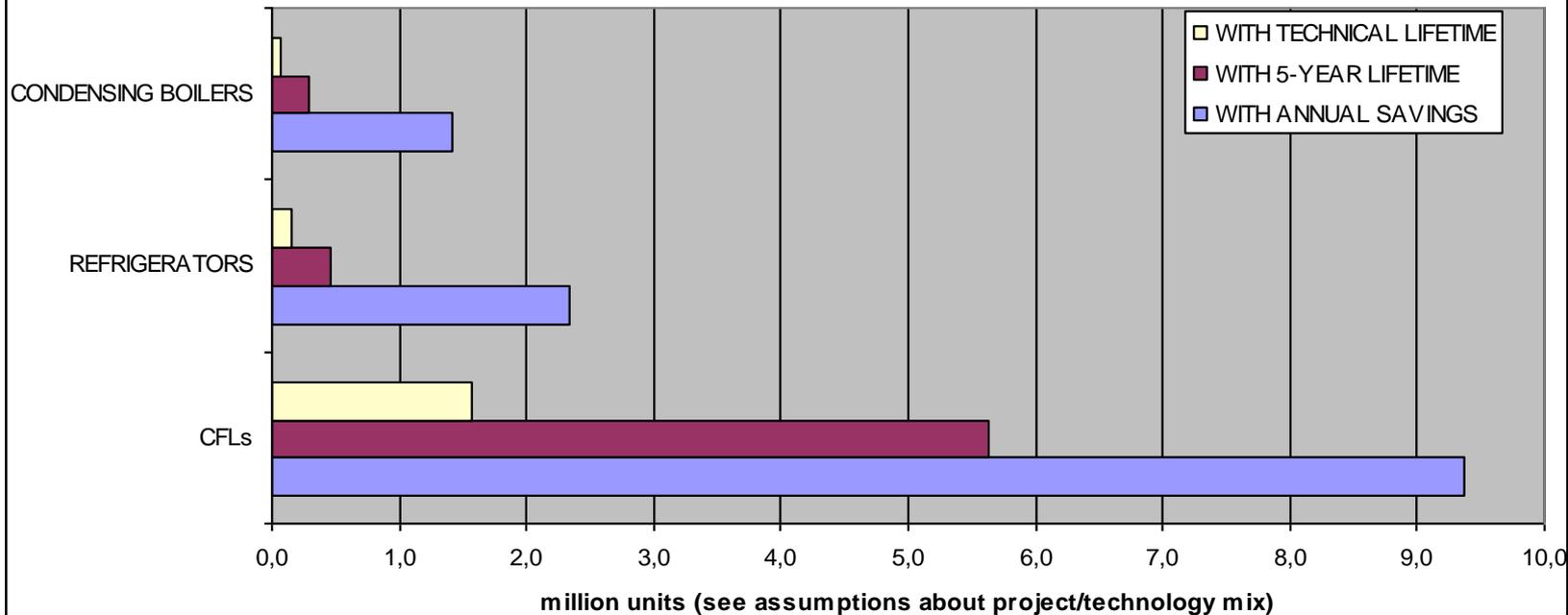
# Some key issues related to energy efficiency obligation schemes and energy saving targets set in the article 6 of the EED proposal

- TWC unit of measure should be commercial (final) energy savings (preferably not discounted over saving measure lifetime).
- Recognition of independence of certifiers
- Common understanding of additionality
- Common calculations, instead of the completely diverging methods of today

## Annual vs lifetime savings

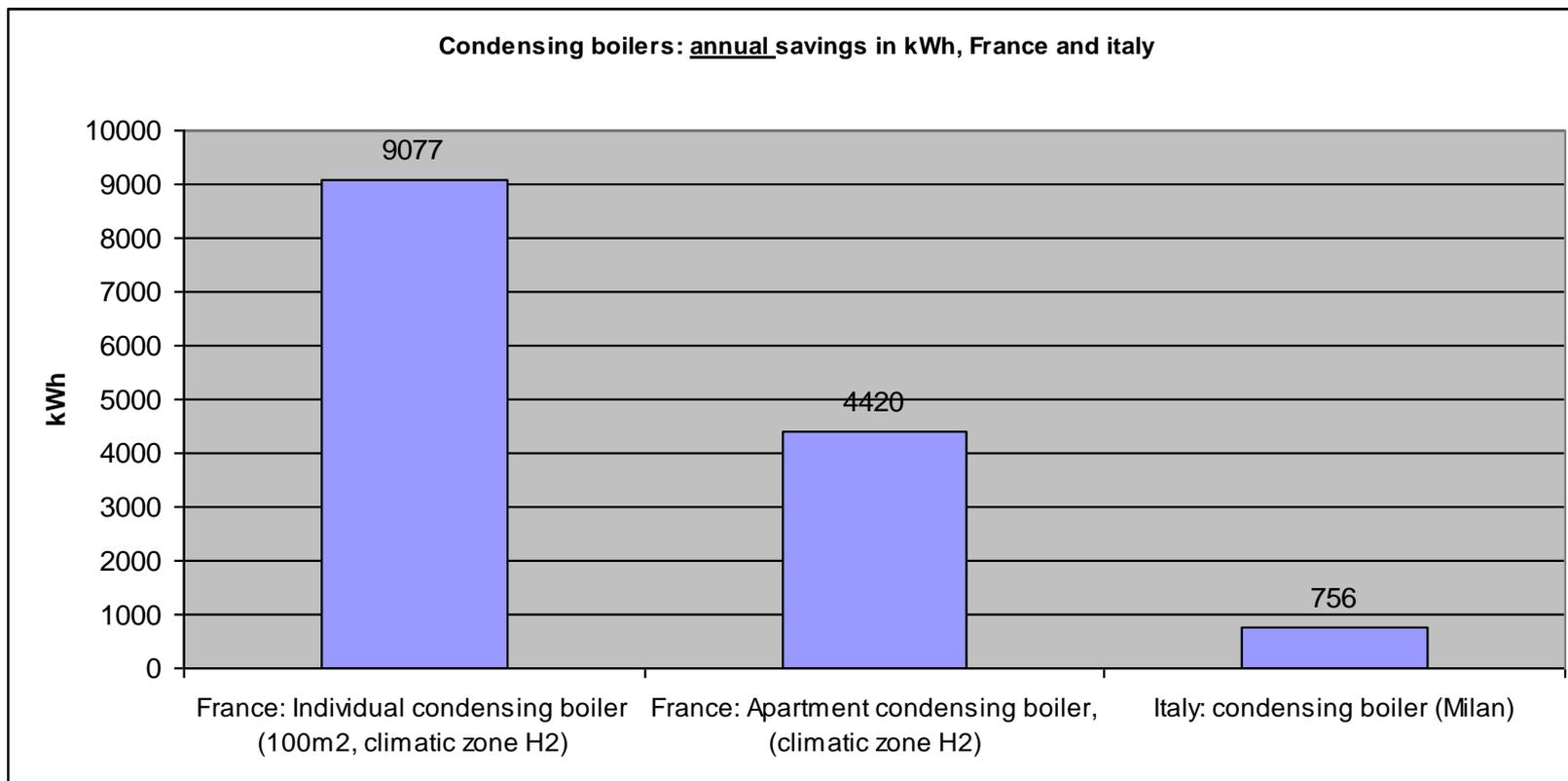
- Very large difference in the efforts needed by the utilities between annual vs lifetime savings

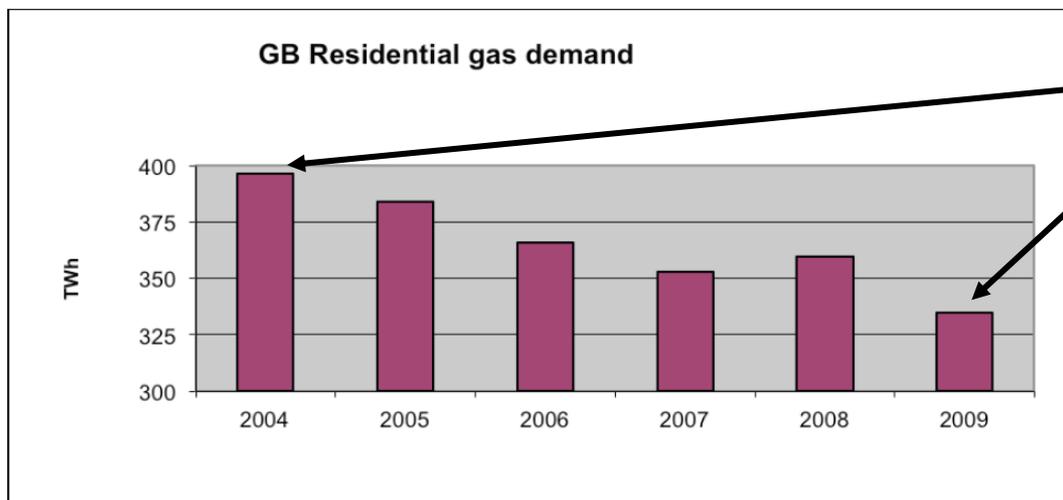
Number of units deployed to meet an annual target of 1.5 TWh in year 1 (million units)



## Deemed Savings

- Choice of baseline (old replaced equipment efficiency and insulation of building stock)
- Very large difference between France and Italy for annual energy savings!





**15% reduction** in total residential gas demand **despite a 7% increase** in the number of households using gas!

Reduction in GB Residential Gas Demand in the period 2004-2009 (Source: Digest of UK Energy Statistics 2010). No correction made for colder winters of 2008 and 2009

## Outcomes of a study performed by British Gas:

- 22% reduction in the gas consumption per household during the period 2006 to 2009 observed over ~4 million of British gas customers...
- Annual reduction in gas customer demand of 3.3% as a direct result of energy efficiency measures (mainly insulation and heating)

Sources:

- Energy Efficiency Obligations – The EU experience; Eoin Lees, Eoin Lees Energy, UK, 2 March 2012
- British Gas Home Energy Report 2011 – An Assessment of the drivers of Domestic Natural Gas Consumption, February 2011, Centre for Economics and Business Research Ltd

In general several ***flexibilities*** (besides trading) are given to obligated parties to meet a mandatory energy saving target cost-effectively, i.e. :

- a) eligible measures that parties can use;**
- b) the number of eligible end-use sectors that can yield energy savings;**
- c) banking provision for surplus of TWCs;**
- d) market engagement of non-obligated parties (e.g. ESCOs)**

Ambitious but reachable targets can trigger a more dynamic usage of all flexibilities by eligible parties and thus active behaviour in TWC markets.

We should not forget that what really matters in target-and-trade schemes is the “target” as such.

Analysis and performance of TWC schemes is quite country- or context-specific.

For well functioning TWC schemes, it is an absolutely prerequisite that **all** market actors are well informed about their operation and development.

Measures to reduce the administrative burden for both the authorities and eligible actors (e.g., clear and simple institutional framework, ex-ante M&V approach) without hampering the integrity of TWC schemes are needed.

Trading is certainly an inherent and relevant component that adds efficiency, but it is not an objective *per se* in TWC schemes.

Comparative assessments and possible integration/interaction with other energy policy instruments need further investigation.

Ambitious, gradual and realistic energy saving targets are fundamental for TWC schemes to outperform other energy policy instruments.

**Thank you!**

**We welcome comments**

**For more information!**

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