

Climate Protection Through Energy Efficiency in the EU and Germany

Federal Ministry for the Environment, Nature Conservation and Nuclear Safety and the Wuppertal Institute

Berlin, 10 December 2009

White Certificates in Italy

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A market-based instrument

- ◆ **Command and Control component**: End-use Energy Efficiency Obligation placed on electricity and natural gas DSOs

- ◆ **Four options to comply with the EEO**:
 1. develop own energy saving projects on final consumers
 2. develop energy saving projects on final consumers jointly with third parties
 3. **buy white certificates** (or **energy efficiency certificates – EECs**) attesting that a certain amount of energy has been saved by a third party via energy saving actions on final consumers → **Market-Based component**
 4. do nothing and pay the sanction for non compliance

- ◆ **Rationale** for trading (market-based component): the possibility to trade certificates will guarantee, at least in principle, that **savings will occur where it is more economic**:
 - parties with relatively high marginal costs of saving energy will be able to buy certificates from parties capable to realize savings at relatively lower marginal costs;
 - the overall cost of meeting a certain target should thus be minimized

Major steps of the scheme

- ◆ **Legislative framework** introduced in **2001** (EEO on distributors in 1999 and 2000)
- ◆ **Regulatory framework** developed throughout **2002-2004** via consultation of all interested parties
- ◆ **Limited revision** of the legislative framework in **2004**
- ◆ **Fully operational** since **January 2005**
- ◆ **Extended and revised** in **late 2007**

“Model of Governance”

◆ Government:

- **targets**
- **obliged parties** (including apportionment rules)
- **eligible parties**
- **eligible measures**
- **some M&V rules**, i.e.: *ex-post* accreditation for a conventional lifetime
- **trading ‘routes’**
- **enforcement mechanism**: general criteria for setting the penalty, grace period
- **cost-recovery**: general principle(s)
- **responsibilities** regarding the definition of the implementing regulation, the administration of the system, the monitoring of results

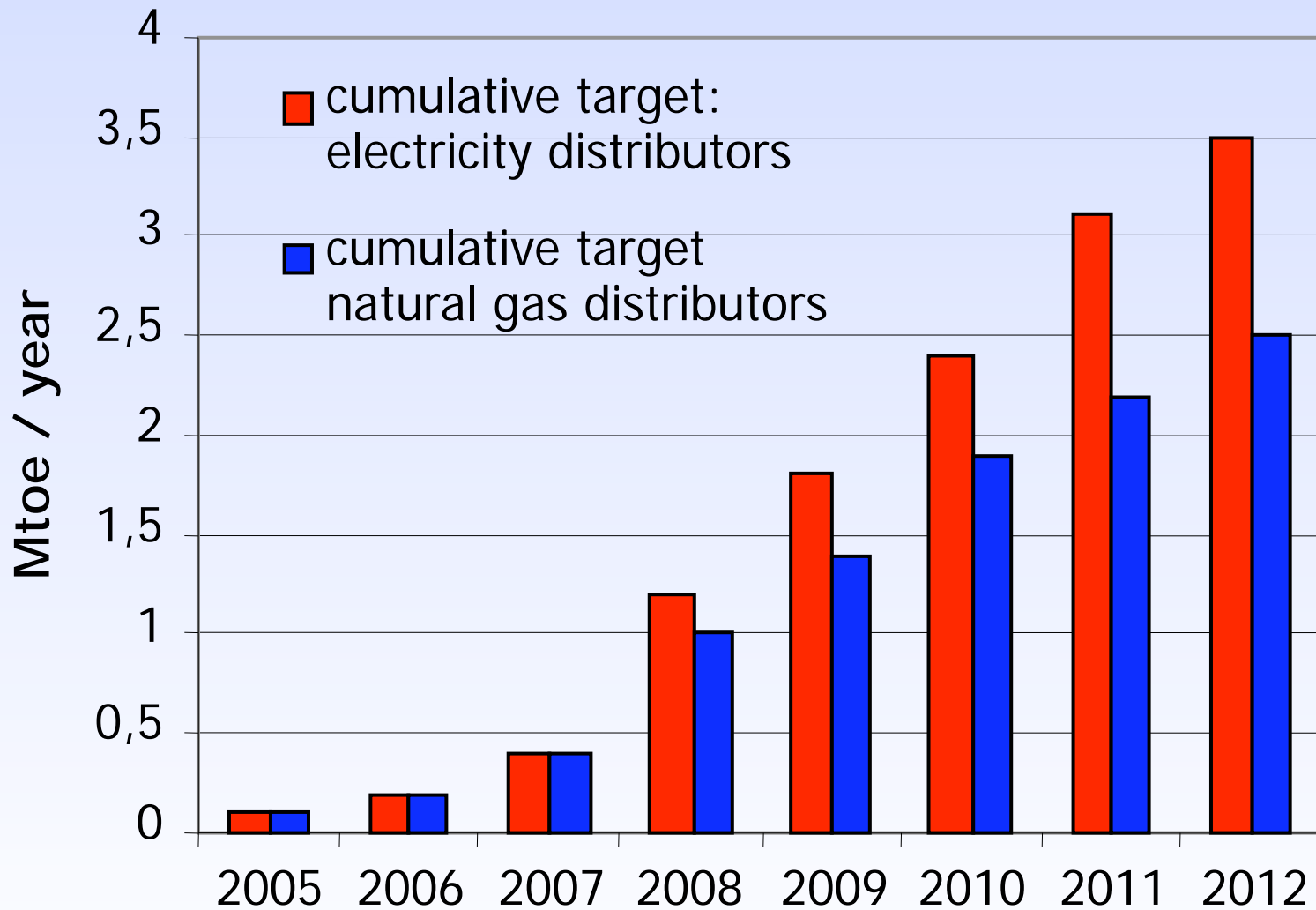
“Model of Governance”/2

◆ Regulator (AEEG):

- technical rules for **projects design, development and evaluation**
- technical rules for the **issuing of EECs** (e.g. how many types, unit, lifetime)
- technical rules for the **functioning of the EECs market** (jointly with the Electricity Market Operator)
- definition of **sanctions** for non compliance
- criteria and rules for **cost-recovery**
- day to day **administration, e.g. project evaluation and certification of energy savings; annual compliance check with the targets and EECs redemption**
- **monitoring of results and proposals to the Government:** publishes an **Annual Report** and two **Interim Reports** on the results delivered by the mechanism with proposals to improve its effectiveness

The Demand Side

The targets (primary energy)



Source: AEEG

The Obligated Actors

◆ Obligated actors (in year t)

- electricity and natural gas distributors (> 50.000 customers as of 31 December of the year t-2)

(> 100.000 customers as of 31 December 2001 for the first three years of implementation)

◆ Apportionment rule:

- relative market share
(total market in the first three years of implementation)
- automatic adjustment mechanism in case of supply surplus > 5%



The Supply Side

Eligible Projects and Eligible Actors

◆ Eligible projects

- all end-use sectors (plus PV > 20 kW)
- only “hard” measures
- early actions (2001-2004)

◆ Banded obligation (50% constraint) (in the first three years of implementation)

◆ Projects can be implemented by

- electricity and natural gas **distributors**
- **companies controlled by** electricity and natural gas distributors
- **energy service providers** (including ESCOs)
- **big energy end-users** (“with energy manager”)

Measurement and Verification (M&V)

- ◆ What is “special” about M&V of energy savings?
 - **you can not measure** energy savings **at the meter**
 - you have to measure the energy savings via a **comparison of the energy consumption before and after the project**
 - **in some cases** the “before the project” scenario is not known (data, new installations) and **you need to make assumptions** (“**project baseline**”; cf. following slide)
 - in other cases the “before the project” scenario is known, but **you need to net out** the impact on consumption trends of variables other than those on which the energy saving project have an influence
 - in other cases **measuring everything is not cost-effective**

AEEG approach to M&V

◆ 3 types of M&V methods:

- 1) **deemed** savings (no on-field measurement)
- 2) engineering **estimates** (partial on-field measurement)
- 3) energy **monitoring** plans (subject to pre-approval)



project/M&V complexity

◆ **Market Transformation measures** (e.g. information campaigns, training programs) are eligible **only if they are associated to “hard” measures**

- provided they meet specific qualification requirements they entitle the hard measure to a **“premium”** on the amount of certified energy savings

◆ **Only additional savings are considered, i.e. over and above spontaneous market trends and/or legislative requirements**

◆ Deemed savings and engineering methods developed also with the technical support of external consultants

◆ **Ex-post accreditation of annual savings** + conventional year lifetime of 5/8 years (→ relative stringency of the EEO when comparing with other countries experiences)

The trading mechanism

- ◆ Trading is a central element
- ◆ No authorisation needed
- ◆ Spot market trading plus OTC
- ◆ Electronic EECs Registry directly linked with the AEEG information system for administering projects evaluation
- ◆ Electronic trading platform (one session per week)
- ◆ Specific market rules and procedures to guarantee access, transparency, security of market deals both for sellers and for buyers, market liquidity

The enforcement mechanism

- ◆ Penalties for non-compliance defined by AEEG
- ◆ No pre-defined unit penalty; case-by-case assessment on the basis of general criteria
- ◆ Minimum overall penalty: 25.000 euro
- ◆ Maximum overall penalty: 155 Meuro
- ◆ Grace period: one year if non-compliance < 40%

The cost-recovery mechanism

- ◆ **Costs born by distributors may be recovered via electricity and gas tariffs according to criteria and mechanisms defined by AEEG:**
 - **obliged distributors, up to the target**
 - **including purchasing of EECs from third parties**
 - **no pass-through but standard allowed cost (efficiency goal)**
 - **€/unit of primary energy saved → flat and technology-neutral (efficiency goal)**
 - **except transport uses**
 - **updated on an annual basis according to a pre-defined formula (inversely linked to past trends in energy prices=avoided energy costs)**

A user friendly system



Autorità per l'energia elettrica e il gas

Sistema Efficienza Energetica

A) Request submissions

Benvenuto **Cariati Roberto** (Utenza di test Autorita per l'energia)

B) Check requests status

C) Questions

Dati anagrafici

- Visualizza e modifica i dati archiviati

Inoltro di nuove richieste

- Richiesta di verifica preliminare di conformità alle Linee guida
- Proposta di progetto e di programma di misura
- Richiesta di verifica e certificazione risparmi

Richieste Presentate

- Visualizza e stampa il contenuto delle richieste già presentate e verificane lo stato di avanzamento

Altro

- Invia segnalazione all'Autorità
- Cambia password

A user friendly system/2

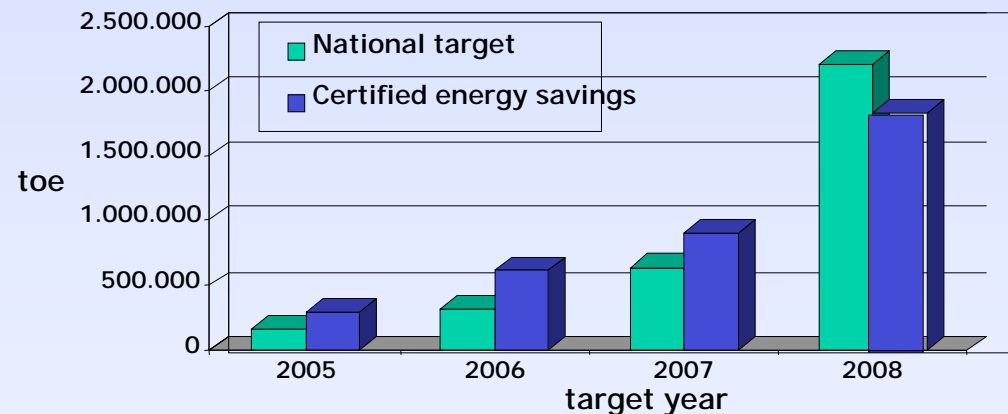
Figura 3: Informazioni generali sull'intervento

Informazioni quantitative sull'intervento					
		Zona climatica - Destinazione d'uso dell'edificio	Impianto di riscaldamento alimentato a		
Seleziona il valore dei parametri da utilizzare per il calcolo e premi il tasto "Aggiungi" per inserire una nuova combinazione		A, B Abitazioni	gas		AGGIUNGI
Si ricorda che per la richiesta in oggetto il periodo di riferimento su cui vengono calcolati i risparmi indicati nel seguito è pari ad un semestre.					
3.1	3.2	3.3	3.4	3.5	3.6
Superficie di vetro sostituita [m ²]	Zona climatica - Destinazione d'uso dell'edificio	Impianto di riscaldamento alimentato a	Risparmio Specifico lordo annuo [tep/anno/m ²]	Coefficiente	Risparmio netto conseguito [tep]
s			RSL	a	
30000	A, B Abitazioni	gas	.002	100%	30
Calcola Tutti					
3.7 Risparmio totale netto conseguito [tep]					30
3.8 Eventuale risparmio aggiuntivo riconosciuto per campagna di supporto [tep]					1.5
3.9 Risparmio totale netto di cui si richiede la verifica e certificazione [tep]					32

Results achieved

Period 2005-2008

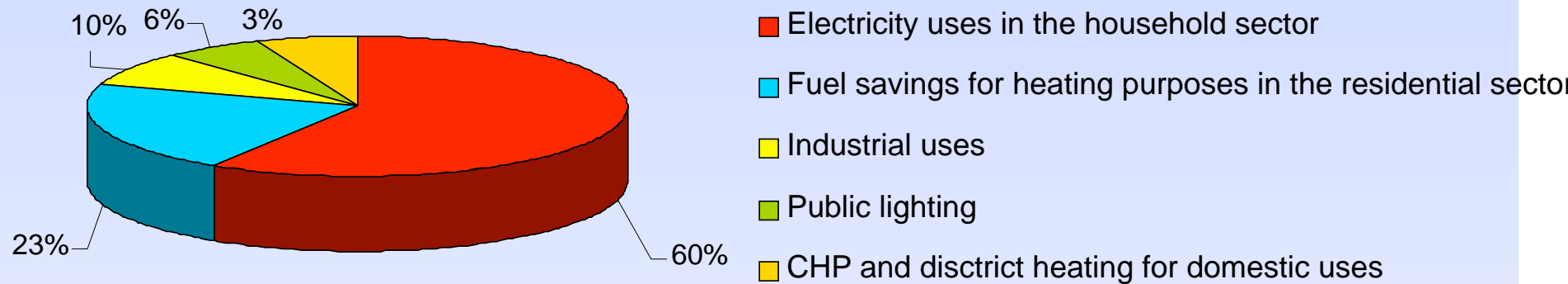
- ◆ **3,7 million toe saved against a target of 3,3 million toe:**



Source: AEEG

- **77% electricity savings; 19% natural gas savings; 4% other fuels savings** (cf. following slide)
- **90% of savings delivered via projects for which simplified M&V methodologies exists** (mostly deemed savings)
- **80% of savings delivered by energy service providers** (including ESCOs)
- **significant trading**, with an increasing share on the spot market (transparency)

- **Breakdown of certified energy savings:**

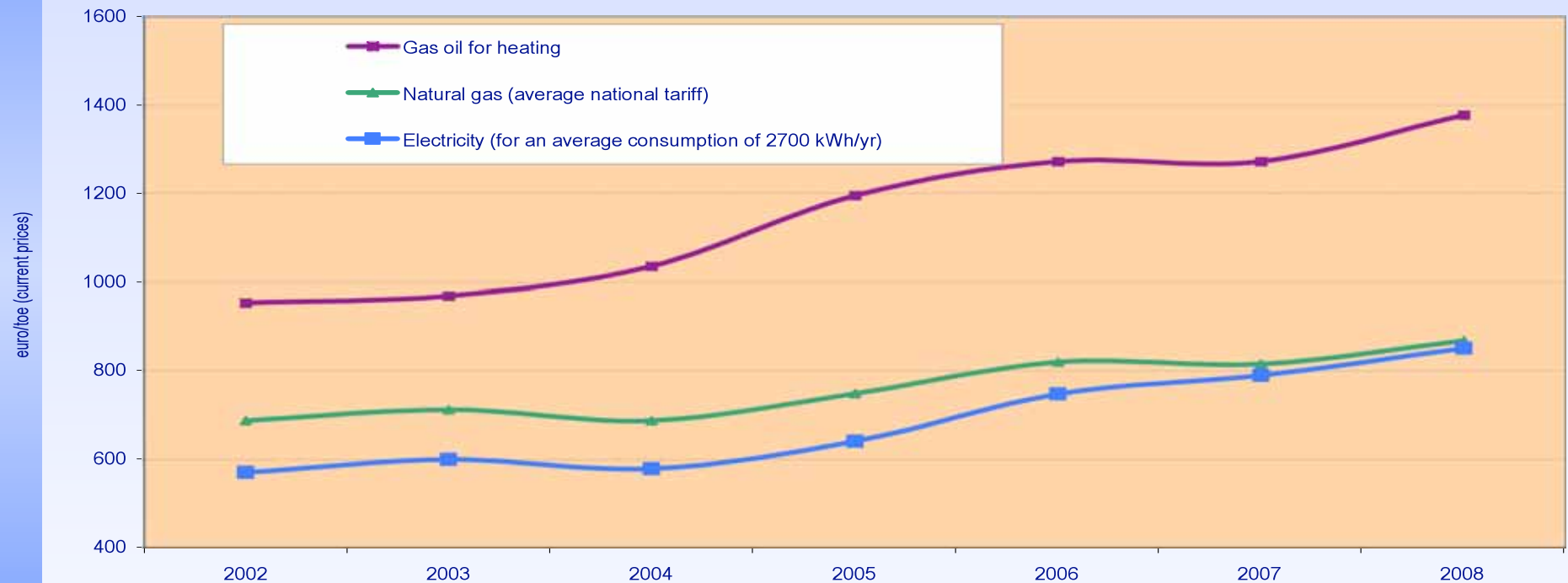


Source: AEEG

- It has gradually promoted the **entrance into the energy services market of new actors**
- It has gradually promoted the **development of new forms of collaboration between different market actors**
- It has promoted a **growing number of information campaigns and training programs**

Avoided energy costs for participating customers

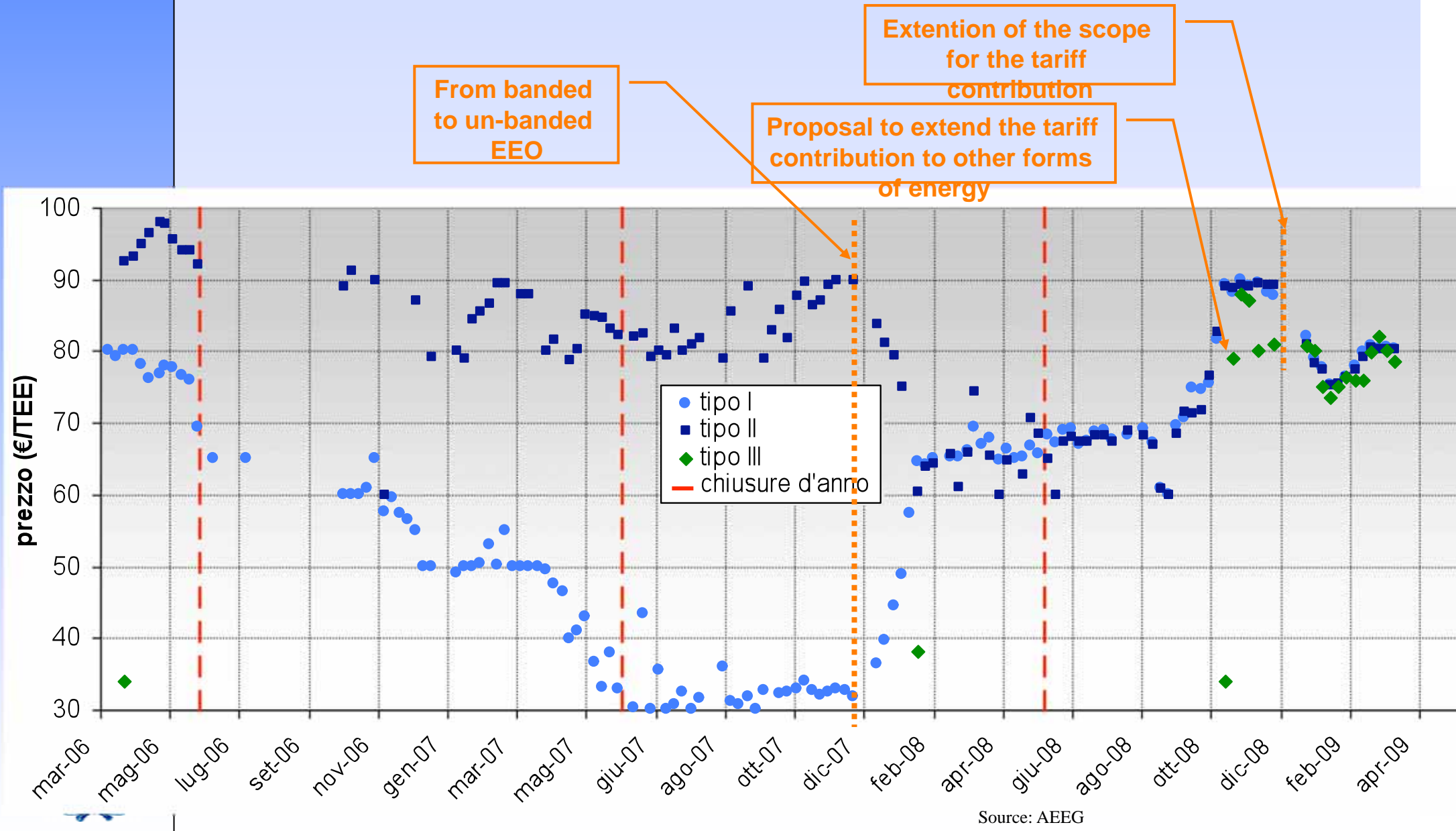
Value of saved energy for domestic users (taxes included)



cf. tariff contribution = 100 euro/toe
and market prices always below this value
→ large “private” economic gains

Source: AEEG

Market prices



Conclusions and lessons learned/1

- ◆ **It is working** in delivering energy savings, in a cost effective way, mainly via “mass market” measures and technologies that are already cost-effective, and via energy service providers (including but not limited to ESCOs)
- ◆ **Major regulatory challenges:**
 - criteria and rules for **M&V of energy savings**
 - criteria and rules for **cost-recovery** (flat and technology neutral versus differentiated)
 - definition of **sanctions** for non compliance (pre-defined *versus* determined *ex-post* on a case by case-basis)
- ◆ **If you go for a market-based instrument, then leave the market work**
- ◆ **Regulation needs to look for a balance** between apparently conflicting goals e.g.:
 - exploiting the **ECONOMIC EFFICIENCY** potential of a MBI calls for
 - **DIVERSITY** of technological and cost options via a **BROAD SCOPE** (eligible measures and parties) but a broad scope inevitably entails **HIGHER ADMINISTRATION COSTS** (e.g. limits the scope for robust simplified M&V approaches)
 - **NO REGULATORY ACTION LIKELY TO INTERFERE WITH THE MARKET** e.g. technology neutral tariff contribution + no predefined penalty, but this could lead to **RISK OF WINDFALL PROFITS (AVERAGE COST), SPECULATIVE BEHAVIOUR AN MARKET TURBULENCE**
 - **ROBUST M&V RULES** inevitably means **HIGHER ADMINISTRATION COSTS** → trade-off between economic efficiency and accuracy?

Conclusions and lessons learned/2

- ◆ **Importance of the market component: price signals key to highlight market disequilibrium** and the need for corrective legislative and regulatory measures → need to increase market transparency
- ◆ **Model of governance:** split the day-to-day administration and the updating of the technical regulation (deemed savings) with a technical agency in charge of the former and the Regulator/Government focusing on general technical rules, economic regulation and monitoring
- ◆ **Not a panacea → need for:**
 - complementary, structural initiatives to facilitate consumers access to information as well as to credit
 - complementary policy tools such as energy labels and minimum energy efficiency requirements
 - market studies and statistics to help identify and monitor the technological baseline and to give incentives where they are more needed
- ◆ **Do not work in a vacuum → need for policy coordination in order to avoid over-incentives and alteration of market forces**

References

In Italian:

- ◆ www.autorita.energia.it/ee/index.htm (including the first three *Annual Report on the White Certificates Mechanism*)

In English:

- ◆ Pavan M. (2008) – *Tradable energy efficiency certificates: the Italian experience*, in *Energy Efficiency (2008) I: 257-266*, Springer Ed.
- ◆ Pavan M. (2007) – *Not just energy savings: emerging regulatory challenges from the implementation of tradable white certificates*, in *Proceedings of the 2007 ACEEE Summer Study on Energy Efficiency in Buildings*
- ◆ Pavan M. (2006) – *New trends in energy regulation: the integration of command and control approaches, tariff regulation and artificial markets for demand-side resources* in *Proceedings of the 2007 Conference of the International Association of Energy Economists (IEAEE), Postdam, Germany*

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