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TAIEX Workshop on
Demand Side Management in Energy Efficiency

Market Mechanisms for Energy Efficiency: White Certificates in Italy

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- Energy Efficiency Obligations in Italy
- Implementation Results 2005-2006
- The White Certificates Market
- Directive 2006/32/EC

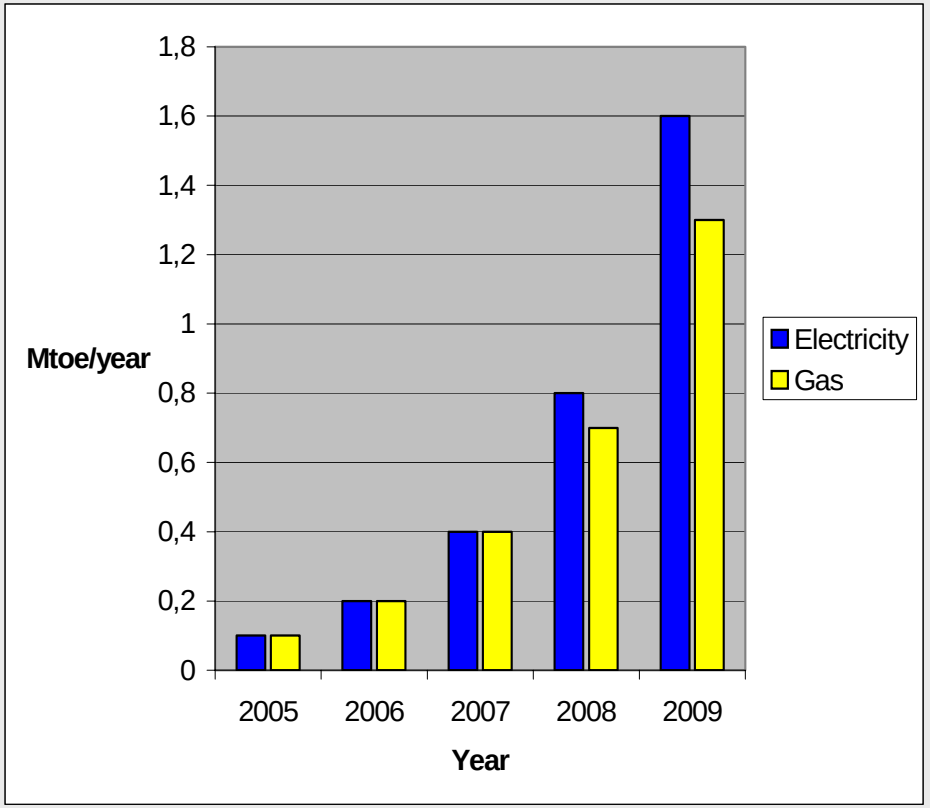
Legislation

- Two Decrees (20 July 2004) establish mandatory **End-Use Primary Energy** savings from 2005 to 2009 with annual schedule:
  - One regulates the electricity sector, the other the natural gas sector
  - Jointly issued by the Ministry of the Productive Activities[1] and the Ministry of the Environment
  - Enforce dispositions on end-use energy efficiency mandated by the liberalization laws of the electricity and natural gas sectors (D.Lgs. n. 79/1999; D.Lgs. n.164/2000)
  - Italian Regulatory Authority for Electricity and Gas (AEEG) entrusted with implementation and monitoring

[1]Holds energy responsibilities (today named "Ministry of Economic Development")

National Target Savings

Year	Annual Energy Savings (Mtoe/year)	
	Electricity Sector	Natural Gas Sector
2005	0.1	0.1
2006	0.2	0.2
2007	0.4	0.4
2008	0.8	0.7
2009	1.6	1.3



1 Mtoe = 1 million ton of oil equivalent ➡ energy (heat) content of one million tons of fuel oil

Obliged parties

- Are the Distributors of electricity and gas with more than 100,000 customers (on 31 Dec 2001):
  - 10 Electricity Distributors (96% market share)
  - 20 Natural Gas Distributors (60% market share)

- Proportional allocation of national targets: single Distributor's obligation depends on the ratio between own electricity/gas volumes and the total electricity/gas distributed countrywide

- At least 50% of savings are to be obtained with electricity and gas consumption reductions for electricity distributors and gas distributors respectively (*the 50% rule*)

Distributor= natural or legal person responsible for operating, ensuring the maintenance of and, if necessary, developing the distribution system

Distribution= regulated Monopoly

Savings Evaluation

- Energy savings are the result of the implementation of one or more end-use energy efficiency measures

- Savings are referred to Primary Energy:

  1 toe = 41.86 GJ ==> 1,212 Sm^3 NG , 980 kg diesel oil, …

  ↳ (η_{ES} = 39.1%) ==> 4,545 kWh_e

- Three types of pre-approved evaluation procedures are foreseen:

  1. Default methods (no on-field measurement)
  2. Analytic methods (some on-field measurement)
  3. Metered baseline methods

Default method

- Gives ex-ante energy savings per “physical unit of equipment” installed

- Typically available for “mass” projects where reliable averages can be determined

Analytic method

- An “open” default method, where the calculation model needs some specific (not average) parameters
- Savings are assessed after on-site metering of relevant parameters. Savings may be normalized to other process variables
- Justified for peculiar projects having relatively large unit size (cogeneration, VSD pumping systems, etc.)

Metered baseline method

- Used when energy savings are the results of measures involving complex interactions among several equipments

- Savings are based on the difference of metered energy consumption ‘before’ and ‘after’ the implementation. Normalization needed

- Recommended for very large projects

Typical projects (1)

PROJECT TYPE:

1 *Power Factor compensation in users' networks*

2 *Electric motors and their applications*

3 *Lighting Systems*

4 *Electricity leaking (stand-by losses reduction)*

5 *Substitution of electricity with other more efficient energy sources*

6 *Reduction of electricity consumption in thermal uses*

7 *Reduction of electricity consumption for air conditioning*

8 *Promotion of high efficiency electric appliances in offices and homes*

Typical projects (2)

PROJECT TYPE:

9	*Devices for combustion of non renewable fuels*
10	*Substitution of electricity to other energy sources (with reduction of primary energy consumption)*
11	*Heating/cooling and heat recovery in buildings supplied with non renewable fuels*
12	*Development of renewable energy sources at users' premises*
13	*Promotion of electric and natural gas vehicles*
14	*Campaigns for education, information and promotion of energy efficiency*

Approved Evaluation Procedures (1)

1. *Substitution of incandescent lamps with CFLs*
2. *Substitution of electric water heaters with electronic ignition gas heaters*
3. *Installation of efficient gas fired boilers*
4. *Substitution of pilot-flame gas water heaters with electronic ignition gas heaters*
5. *Substitution of single-pane with dual-pane windows*
6. *Wall and roofing insulation (heating savings)*
7. *Use of photovoltaic generators up to 20 kW*
8. *Use of solar water heaters*

Approved Evaluation Procedures (2)

9 *Installation of variable speed drives for pumping systems up to 22 kW (default procedure)*

10 *Energy recovery from natural gas expansion*

11 *Installation of high efficiency electric motors*

12 *Installation of high efficiency refrigerators, deep freezers, washing machines, dish washers*

13 *Installation of low flow showerheads in homes, hotels and recreational facilities*

14 *Installation of faucet aerators in homes*

15 *Installation of air source heat pumps in new or renovated residential buildings*

16 *Installation of variable speed drives for pumping systems above 22 kW (analytic procedure)*

Approved Evaluation Procedures (3)

17 *Installation of power regulators in public lighting systems*

18 *Replacement of mercury vapor lamps with high pressure sodium lamps*

19 *Installation of air conditioners with cooling capacity up to 12 kW*

20 *Wall and roofing insulation (cooling savings)*

21 *Small co-generation for heating, cooling, and hot water in buildings*

22 *District heating systems for heating, cooling, and hot water in buildings*

Compliance

- Obliged parties comply with their energy savings obligation by returning a correspondent amount of White Certificates

- Compliance with one year's targets by May 31st of the following year, starting with 2006

- Distributors can obtain White Certificates in three ways:
  - directly implement energy efficiency projects
  - jointly implement energy efficiency projects with third parties (customers, manufactures, ...)
  - buy the Certificates

White Certificates (1)

- Are "*Certificates issued by independent certifying bodies confirming the energy savings claims of market actors as a consequence of energy efficiency improvement measures*"

- Are awarded after completion of an energy efficiency project designed, implemented, and evaluated according to the Guidelines issued by the Authority for Electric Energy and Gas (AEEG)

- As a general rule eligible projects "produce" White Certificates for a period of 5 years (8 years for specific projects: buildings thermal envelope, bioclimatic design, reduction of cooling needs, etc.)

- Once issued a White Certificate "lives" for 5 years

White Certificates (2)

- 1 White Certificate = 1 toe of primary energy saved
- Issued by the Electricity Market Operator (GME) upon request of AEEG
- Credited to accounts opened for registered Market participants (electronic recordings, no paper)
- Can be awarded to:
  - Obliged Distributors
  - Non-obliged Distributors
  - Companies controlled by Distributors
  - ESCOs

} Eligible parties

White Certificates (3)

- Can be bought and sold by any operators:
  - Obliged/eligible parties
  - Brokers
  - Green consumers

- Tradable through:
  - bilateral contracts
  - on the Organized Public market according to rules jointly established by AEEG and GME

- Three types of Certificates:
  - I ➡ electricity savings
  - II ➡ gas savings
  - III ➡ other fuels savings

- Banking allowed

Non Compliance

- "Missing" savings in one year to be recovered in the following 2 years
- Money penalties to be defined
- Penalty payment doesn't extinguish the obligation

Cost Recovery

- Complying Distributors are entitled to a regulated reimbursement for the quota of the obligation obtained with Type I and Type II Certificates
- Present cost recovery: 100 Euro/toe
- Funds raised through electricity and gas tariffs

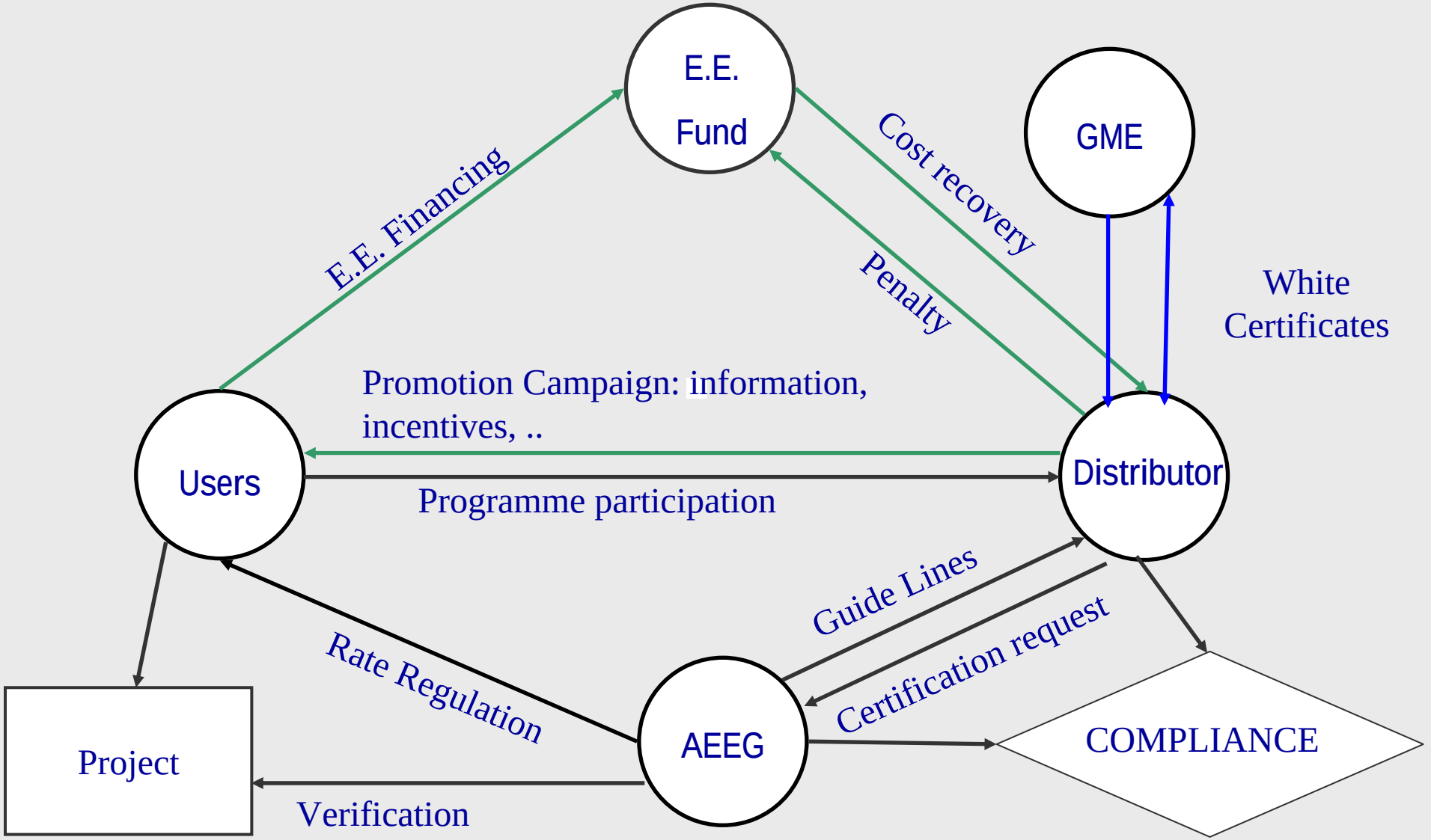
Cost impact of Energy Efficiency

Electricity Rate adders for the Energy Efficiency Fund (AEEG Decision n. 135/04):

Customer Class	c€/kWh
Residential	0.0213
Public Lighting L.V.	0.0168
Other L.V.	0.0188
Public Lighting M.V.	0.0149
Other M.V.	0.0188
H.V. and V.H.V.	0.0078

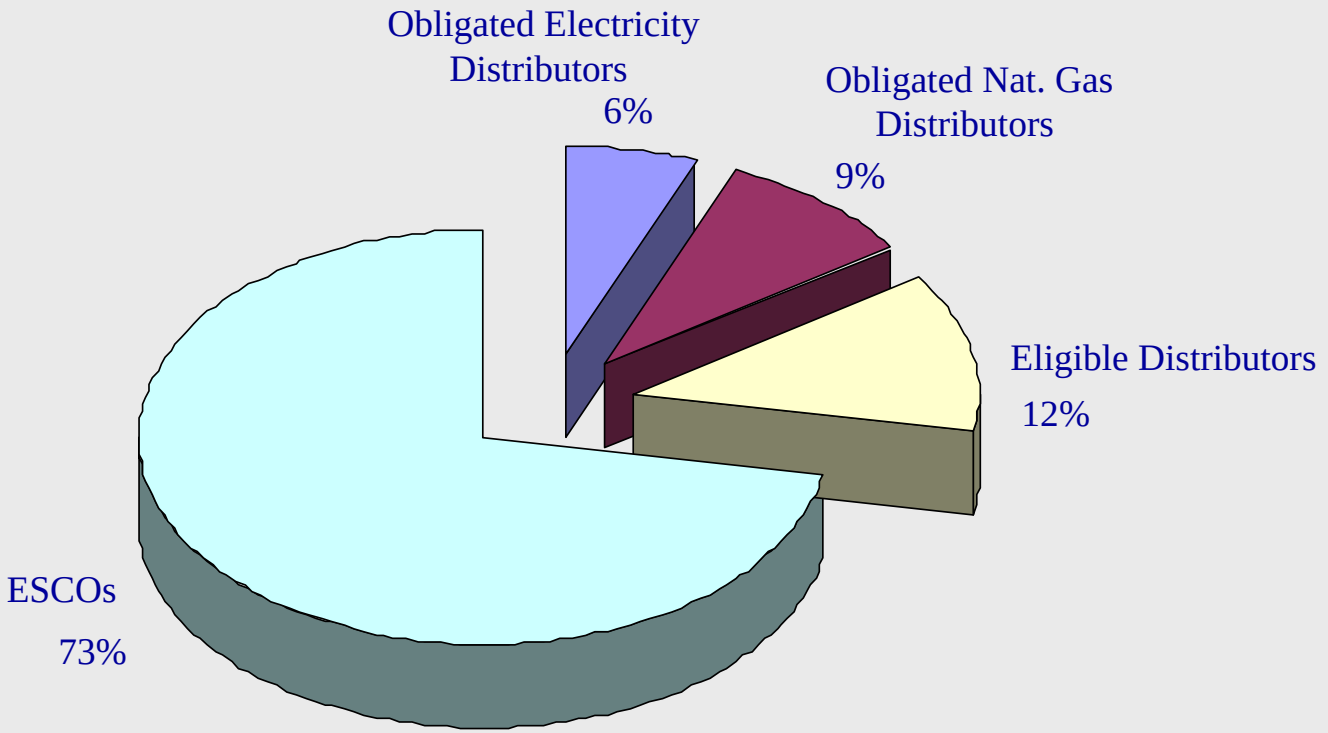
Average family: ~ 0.6 €/year

Players' Interaction

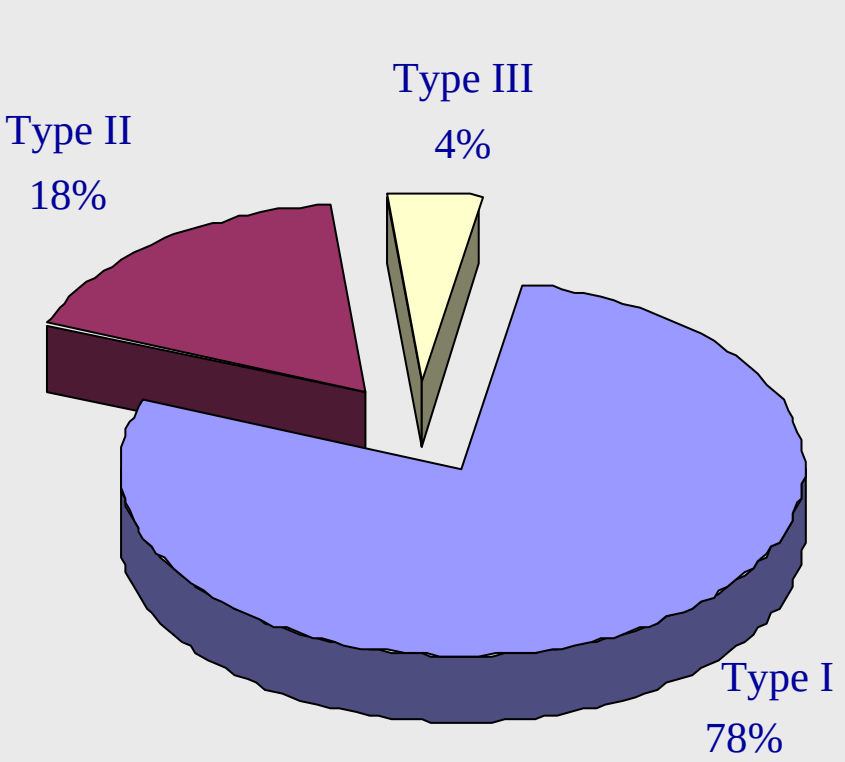


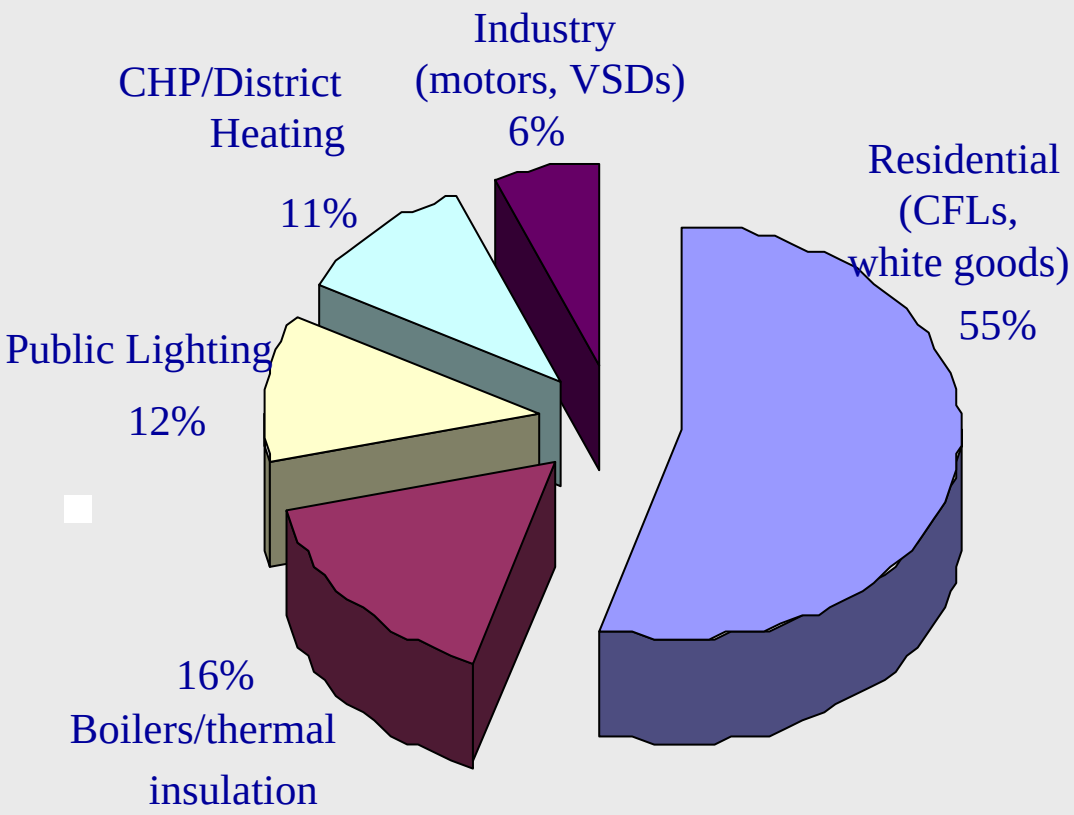
Implementation 2005-2006

- Target assigned = 468,000 toe (78% of nominal objective)
- 898,000 White Certificates awarded (192% of target)



Distribution of Savings 2005-2006





- 90 % of savings certified by means of default/analytic method

Savings Impact 2005-2006

- Certified savings correspond either to avoided yearly consumption of a city with 1,150,000 inhabitants or to production of a 490 MW power plant

- Avoided CO_2 emissions: more than 2,000,000 tons

General Remarks (pros)

- Positive judgment on the operation of the mechanism
- Less-than-expected “youth problems”, despite the complexity of the scheme that asks for new skills, business models, technical rules applied to a very wide selection of projects and operators
- Economic efficiency: least cost measures selected
- Important role to educate and inform consumers on efficient technologies
- Birth of new ESCOs encouraged

General Remarks (areas of improvement)

- Predominance of short range measures, need for more structural interventions (building insulation)
- Limited participation of Industry
- Excess liquidity (certificates prices decreasing)
- Difference between “nominal” and actual targets (review allocation mechanism, regulate smaller Distributors’ obligations)
- Define soon new targets for the next five-year period beyond 2009
- Simplify the penalty mechanism

The Market of Efficiency (1)

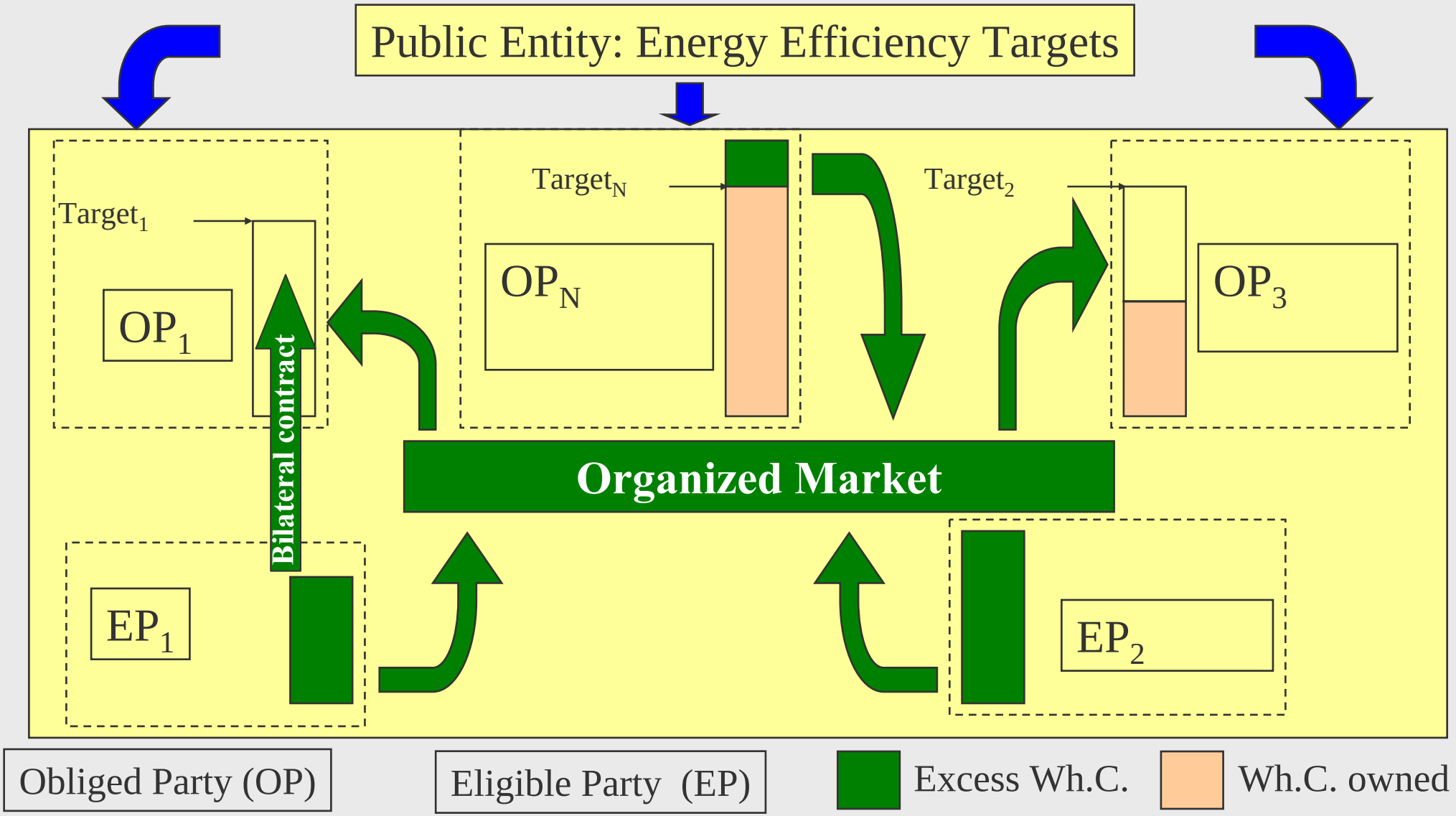
Commodities: Energy Efficiency Certificates, represent measured and verified quantities of saved energy

Buyers: Obligation-bound parties, voluntary (green, ethical) buyers

Sellers: Eligible Parties, who are entitled to undertake energy efficiency projects that create certificates

Others : Financial Brokers

The Market of Efficiency (2)



The Italian White Certificates Market

- Market start: 7 March 2006
- Weekly Sessions
- 138 Market operators (on 31 May 2007):
  - 31 Distributors
  - 100 ESCOs
  - 7 Traders
- Trading:
  - 24 % Public market (+7% in 12 months)
  - 76% bilateral contracts
- Bilateral agreements preferred for their flexibility, natural choice when buyer (obliged) and seller (ESCO) belong to the same industrial group

Market Sessions – Oct. 2007

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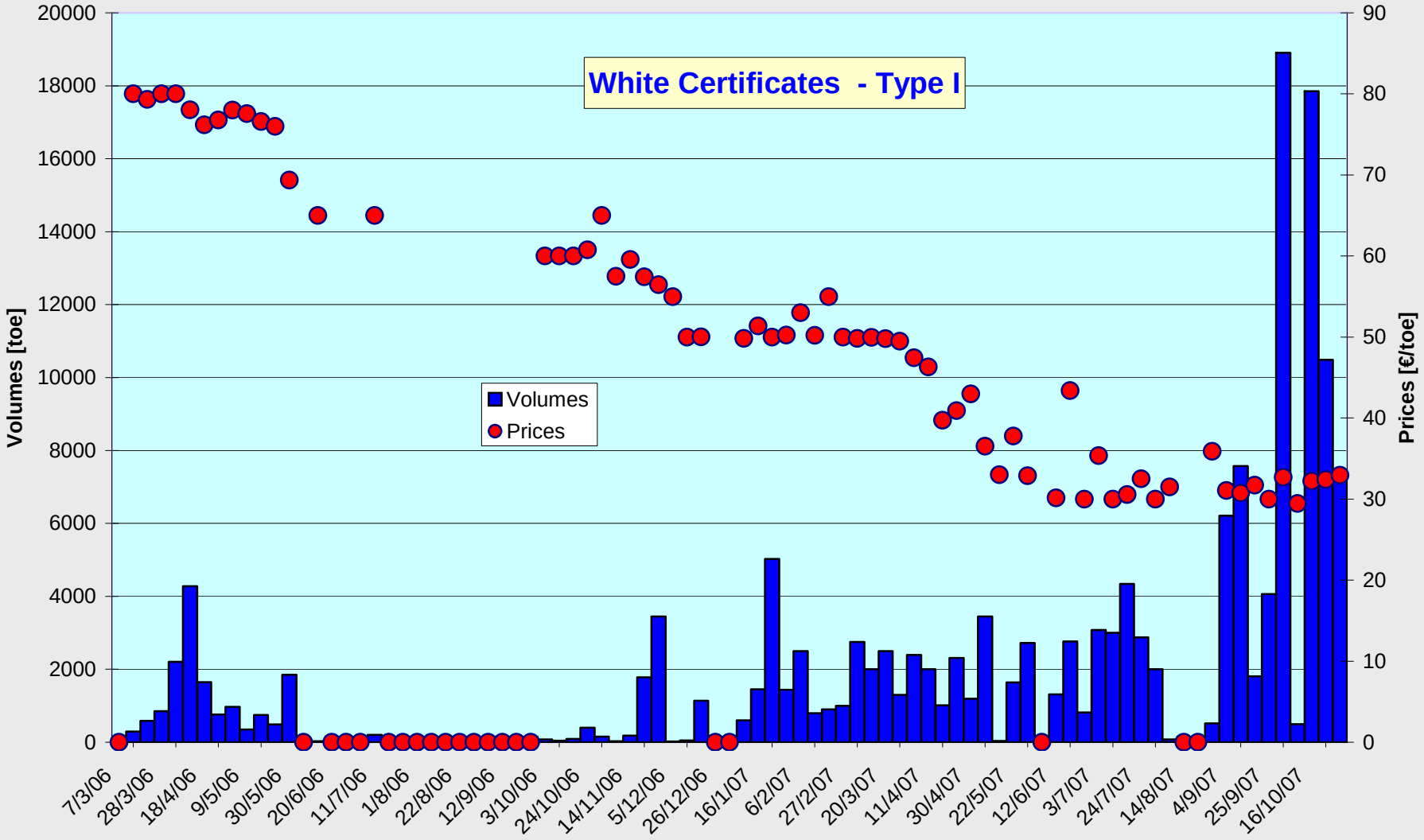
energy efficiency certificates results

date	type	minimum price (€/toe)	maximum price (€/toe)	reference price (€/toe)	TEE traded
02 October 2007	I	30	38	32,6976990214229	18905
02 October 2007	II	79	79	79	6
02 October 2007	III				0
09 October 2007	I	27	30	29,4397590361446	498
09 October 2007	II	75	85	82,9920469361147	1534
09 October 2007	III				0
16 October 2007	I	30	33	32,2267914168861	17849
16 October 2007	II	80	88	85,8882235528942	1002
16 October 2007	III	5	5	5	10
23 October 2007	I	27	34	32,3982073042815	10487
23 October 2007	II	78	88	81,8045191942227	2631
23 October 2007	III				0
30 October 2007	I	30	33,47	32,9413384742495	7262
30 October 2007	II	84	90	87,6658179503501	1571
30 October 2007	III				0

Market Sessions 2006-2007



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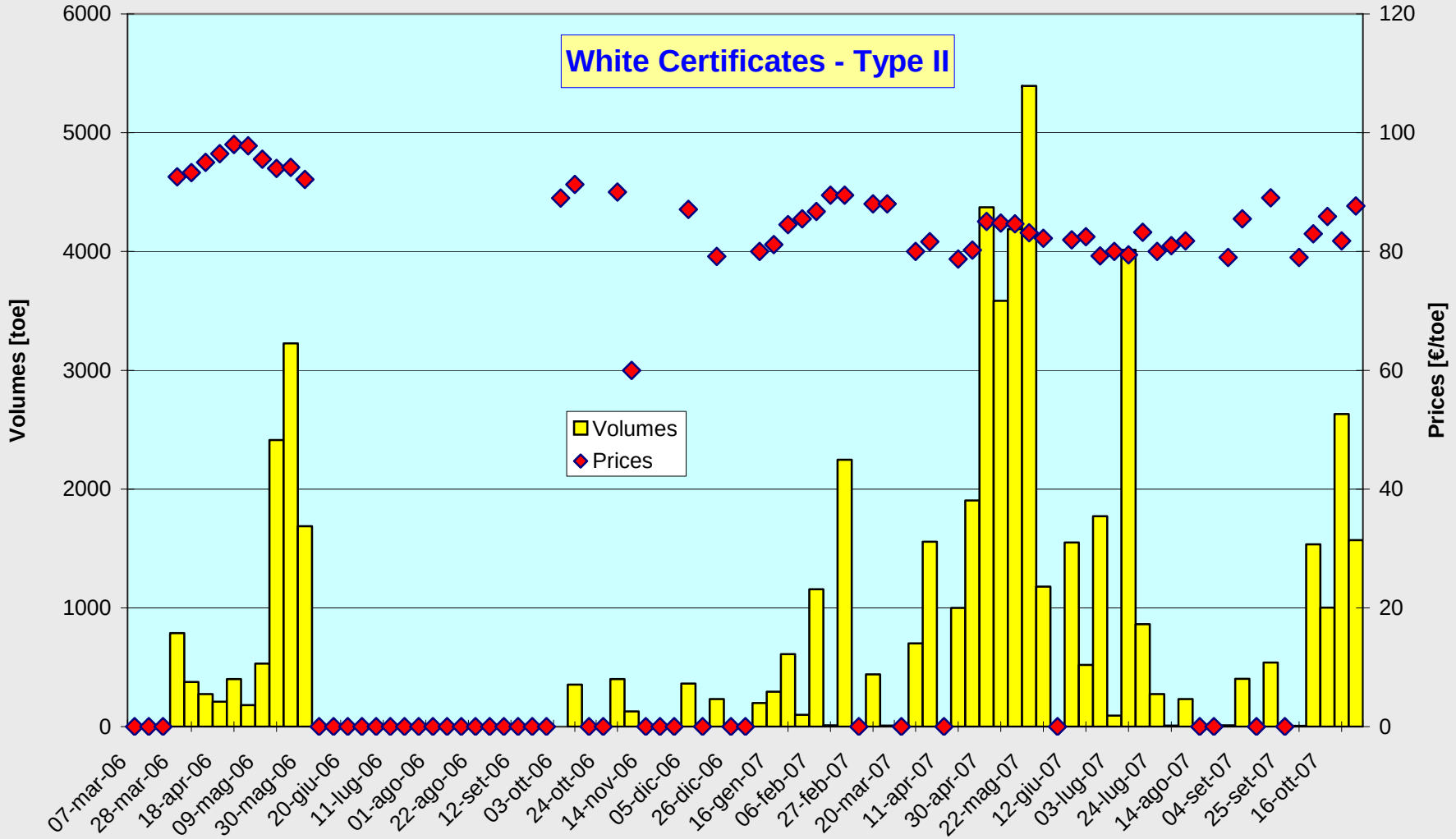

Cost recovery revision

Current trend on the market of energy efficiency titles makes AEEG to consider a reduction of the regulated cost reimbursement from the present level of 100 €/toe.

Differentiated cost recovery levels have been proposed:

- 46 €/toe Type I
- 80 €/toe Type II

The final decision is expected by the end of the year with effect starting in 2008

Directive 2006/32/CE

- Defines indicative energy savings to be achieved by the Member States: target of 9 % for the ninth year of application (2016).
- Mentions the White Certificates mechanism as a tool to achieve the target savings. Based on the results of the first three years, the Commission shall examine whether it is appropriate to introduce a market approach based on Certificates trading
- Stresses the need for the development of harmonized methods for energy efficiency and savings calculation (CEN/CLC Task Force)
- Most requirements indicated for *bottom-up* calculation methods (*Annex IV*) are already incorporated into the three type of procedures adopted in the Italian scheme

Grazie

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