



Green and White certificates market construction and implementation

The Italian experience

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The liberalization of the energy market

A green certificate system

Main assumptions behind a green certificate market

Pros et cons of a green certificate market

An energy efficiency certificate system

Conclusions



This Directive **2003/54/** establishes common rules for the generation, transmission and distribution of electricity.

It lays down the rules relating to the organisation and functioning of the electricity sector, access to the market, the criteria and procedures applicable to calls for tenders and the granting of authorizations and the operation of systems.

Electricity enterprises must be operated in accordance with commercial principles, with no discrimination between them as regards either rights or obligations.

The objective is to achieve a competitive, secure and environmentally sustainable market in electricity.

Member States must:

- impose on enterprises operating in the electricity sector public service obligations which may relate to security, including security of supply, regularity, quality and price of supplies and environmental protection, including energy efficiency and climate protection;
- ensure that all household customers and small enterprises, at least, enjoy the right to be supplied with electricity of a specified quality within their territory at reasonable, easily and clearly comparable and transparent prices;
- take appropriate measures to protect end-users and vulnerable customers, including measures to help them avoid disconnection;
- ensure the implementation of a system of third party access to the transmission and distribution systems for all eligible customers;
- inform the Commission upon implementation of this Directive.

The tasks of the distribution system operator are:

- to maintain a secure, reliable and efficient electricity distribution system in its area with due regard for the environment;
- to ensure non-discrimination between system users;
- to provide system users with the information they need for efficient access to the system;
- to give priority to generating installations using renewable energy sources or waste or producing combined heat and power;
- to procure the energy they use to cover energy losses and reserve capacity in their system according to transparent, non-discriminatory and market-based procedures;
- to take energy efficiency/demand-side management and/or distributed generation measures that supplant the need to upgrade or replace capacity.

The minimum criteria which must be applied to safeguard the independence of transmission or distribution system operators are that:

- they may not participate in the integrated electricity undertaking responsible, directly or indirectly, for the day-to-day operation of the generation, transmission or supply of electricity;
- appropriate measures must be taken to ensure that the professional interests of the persons responsible for the management of the distribution system operator are taken into account so that they are capable of acting independently;
- they must have effective decision-making rights, independent from the integrated electricity undertaking, with respect to assets necessary to operate the network;
- they must establish a compliance programme, which sets out the measures taken to exclude discriminatory conduct, and make sure that it is adequately monitored.

Market opening and reciprocity

Member States must ensure that the following are regarded as "eligible customers":

- until 1 July 2004, the eligible customers specified in Directive 96/92/EC. Member States must publish by 31 January each year the criteria for the definition of these eligible customers;
- from 1 July 2004 at the latest, all non-household customers;
- from 1 July 2007, **all customers**.

After the liberalization process, many different financial and market mechanisms to support Renewable Energies and Energy Efficiency have been set out among European Countries;

They can be divided in two categories:

- Market mechanisms
- Administrative mechanisms

The electricity produced by renewable sources can be sold through different ways:

- Electric exchange
 - Wholesaling to traders
- } Direct access
- Dedicated collect system
 - Net metering
- } Indirect access

The Italian market has almost all the incentive schemes:

- CIP 6 (premium price for RES and “assimilated to”);
- Green certificates for RES;
- Feed in tariff/premium price for RES power plants up to 1 MW (200 kW for wind);
- Feed in tariff/net metering for PV plants (up to 200 kW)
- Investment subsidies at local level

Green energy has the priority in the dispatching system up to cover the National electricity demand.

TERNA, that is the primary owner of the National high-voltage Electricity Transmission Grid (RTN), with 98.3% of the country's electricity infrastructure is also responsible for the transmission and dispatching of energy throughout the entire territory, and therefore for the safe management of the balance between electricity supply and demand, included renewable sources.

In addition, from 1° January 2008 all the green energy produced in Italy is collected by GSE, so we can consider it as the main player in the RES market.

GSE is responsible for all the payments and reimbursements deriving from all the incentive schemes in Italy



- The first step towards the liberalization of the Italian market was the administrative measure, deriving from the law 9/91, called CIP 6;
- The main goal of this measure was to break the monopoly of ENEL in the production of electricity even if only for RES.



ENEL had to collect the electricity produced by RES power plants at a fixed price composed by:

- costs avoided for the construction of new power plants
- costs avoided for the conduction of the plants
- Costs avoided for fuel

The main effects were:

- Increase in investment volume, thanks to the predetermination of the economic and financial returns;
- Free access to the market;
- The raising of the market share for RES

The other side of the coin:

- The extension of the subsidies to many others sources not really renewable, non useful to reach the European mandatory targets (e.g. EU/77/01)
- Too much expensive for the energy market in terms of cost/benefits analysis
- Unclear in terms of administrative and legal framework

Costs and results:

- None new authorization after 1997 but the economic effects are still present on the market;
- In 2007 we had 5.22 billion of Euro absorbed by this mechanism with a net cost for the system equal to 2.4 billion of Euro (GSE)
- Only 18% of the energy supported was generated by RES as stated by the European Directive 77/01



**Compulsory withdrawals
by GSE**

GWh

	2003	2004	2005	2006	2007
CIP6	50,361	52,398	50,296	48,340	46,462
of which assimilated	40,723	42,268	40,463	39,068	38,268
of which renewable	9,638	10,131	9,833	9,272	8,194
Resolution no. 108/97	1,140	1,218	966	689	115
Resolution no. 62/02	2,411	3,064	-	-	-
Total	53,912	56,680	51,262	49,029	46,577

Source: AEEG calculations on GSE data.

**Energy withdrawn by
assimilated sources
during the period
between 2003 and 2007**

GWh

	2003	2004	2005	2006	2007
New plants	33,963	34,182	25,097	20,465	16,935
of which plants that use process fuels, residuals or energy recoveries	16,530	17,773	12,891	13,290	12,929
of which plants that use fossil fuels with hydrocarbons	17,433	16,409	12,206	7,175	4,006
Existing plants	6,760	8,086	15,366	18,603	21,333
Total	40,723	42,268	40,463	39,068	38,268

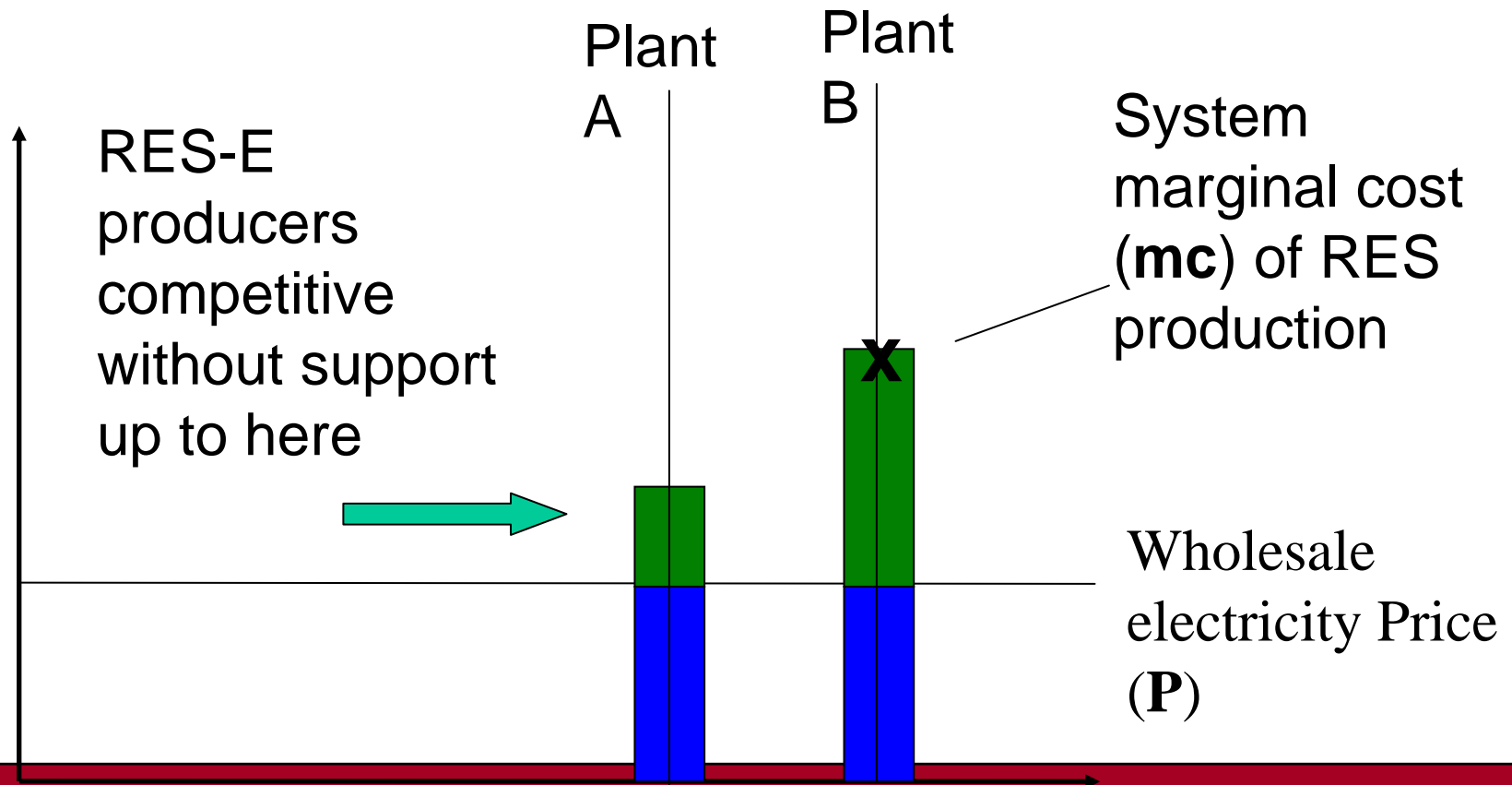
Source: AEEG calculations on GSE data.



- A Green Certificate also known as Renewable Energy Certificate (REC) is a tradable commodity proving that certain electricity is generated using RES.
- Typically one certificate represents generation of 1 Megawatt hour of electricity.

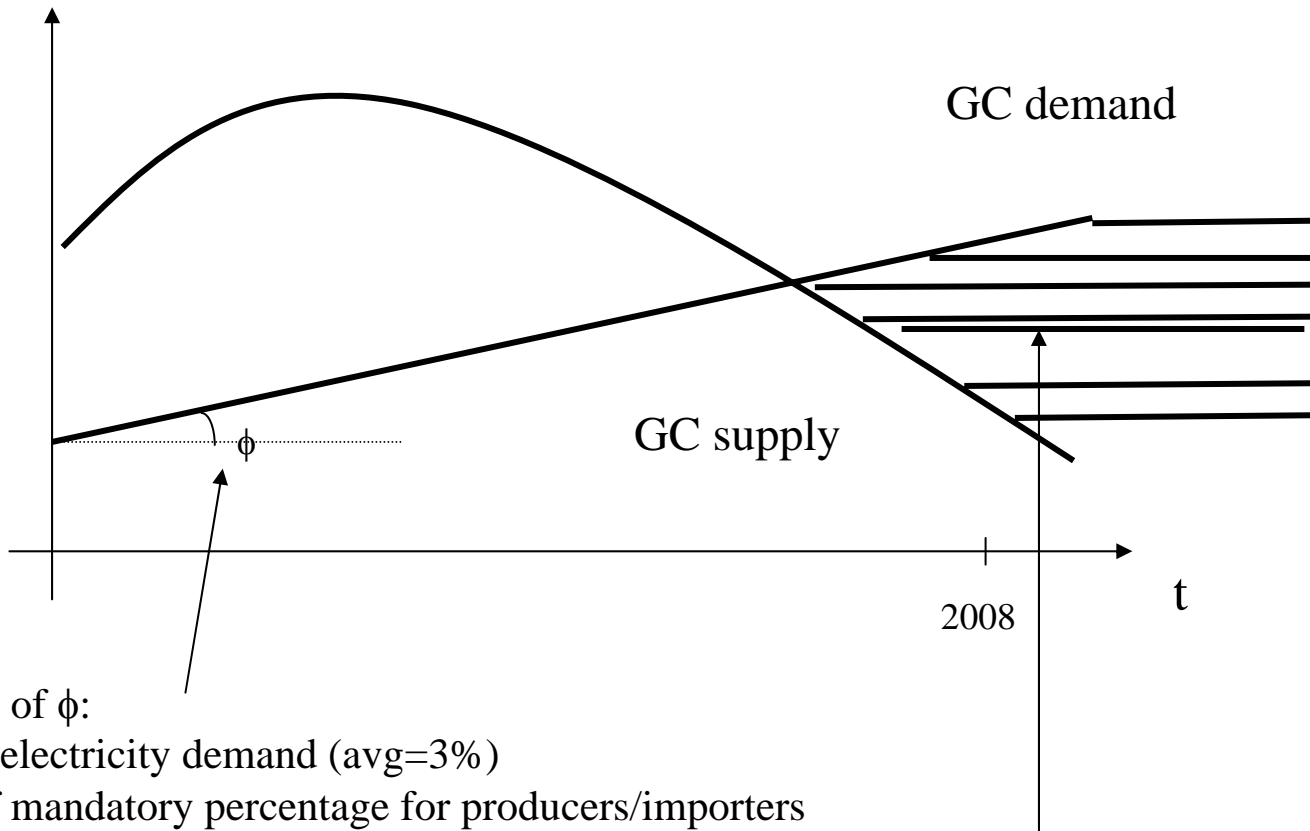


A GC scheme creates a market value for certificates to cover additional cost of RES production





- Introduced in Italy in 1999;
- It imposes to any producer or importer of electricity to inject into the grid a percentage of electricity produced from renewable energy sources;
- For the producers qualified as RES, the GSE recognized GCs for 8 years
- 1 GC equal to 100 MWh (commercial rounding)



Determinant of ϕ :

- Increase of electricity demand (avg=3%)
- Increase of mandatory percentage for producers/importers

GC demand to be covered by new plants



Year	Target (%)
2007	3,80
2008	4,55
2009	5,30
2010	6,05
2011	6,80
2012	7,55



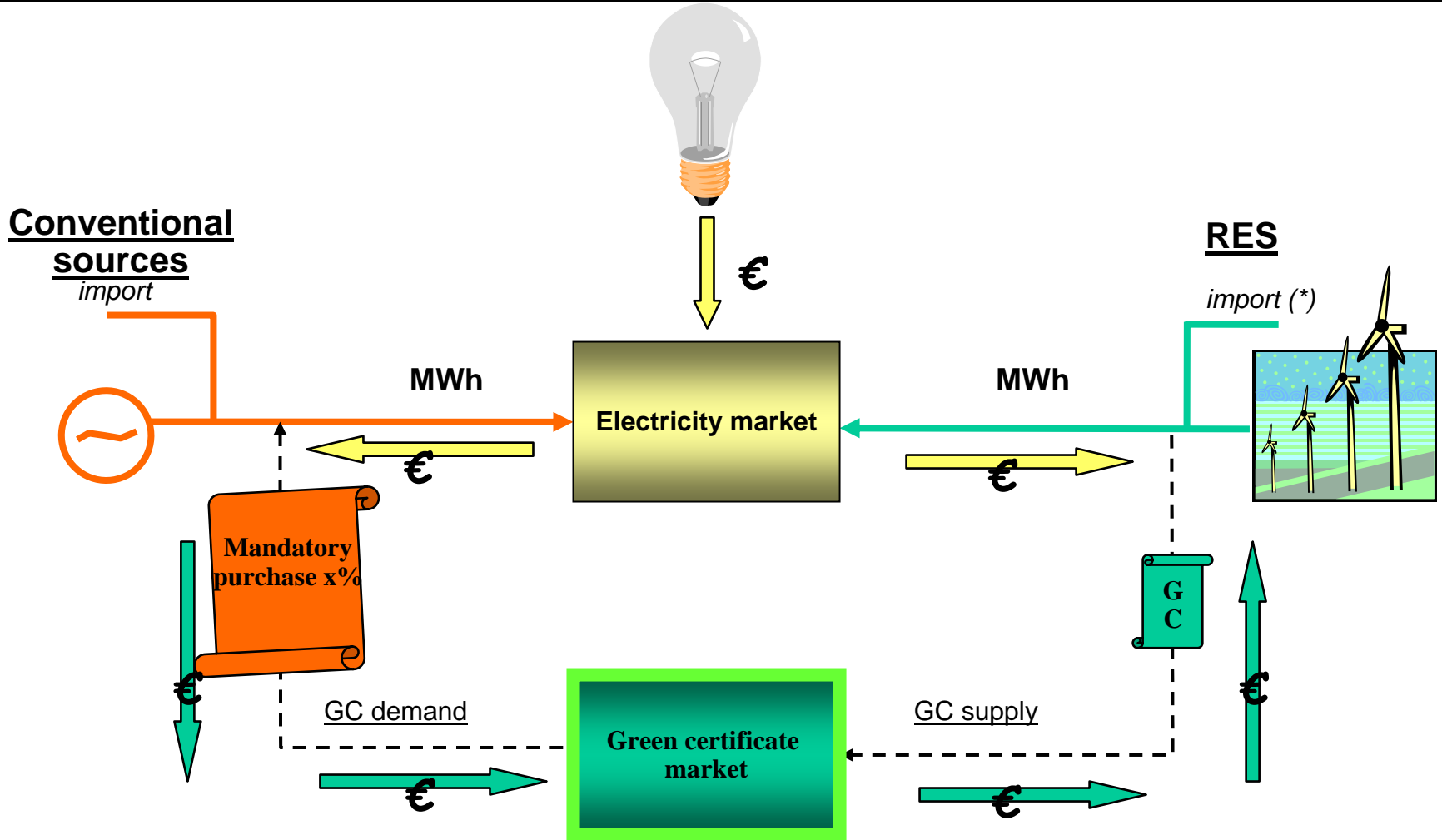
- According to the Financial Law of 2007, the production of electricity from RES in plants which started operations or plants repowered as from 1 April 1999 to 31 December 2007, is entitled to certification of production from RES (green certificate) for the first 12 years of operation;
- 1 GC equal to 50 MWh (commercial rounding)



- The production of electricity from renewable energy sources in plants which started operations or plants repowered as from 1 January 2008 is entitled to certification of production from renewable energy sources for the first 15 years of operation;
- 1 GC equal to 1 MWh (commercial rounding);
- New mechanism for calculating the price (cap between 120-130 €/MWh)



Green certificates – market interactions







Year	GC value (MWh)	Avg price (€/MWh) VAT included	Avg price (€/MWh) VAT excluded	Total volume (n. GC)	Total value (€)
2003	100	98,88	82,4	20.775	205.431.760
2004	50	116,84	97,37	22.901	133.787.642
2005	50	130,85	109,04	8.065	52.765.263
2006	50	144,23	120,19	9.813	70.766.450
2007	50	115,78	96,48	1.255	7.265.195



- Energy efficiency certificates (TEE), which are also known as white certificates, were established by the decrees of the Ministry of Productive Activities on 20 July 2004 and set national quantitative objectives for additional energy efficiency for the electricity and natural gas sectors;
- Are subject to obligations the distributors that, as at 31 December of the two years prior to each obligation, have no more than 50,000 consumers.

Resources of the proponents

Distributors

Escos

Other resources

State, regional, local communities
contributions

Customer contributions

AND

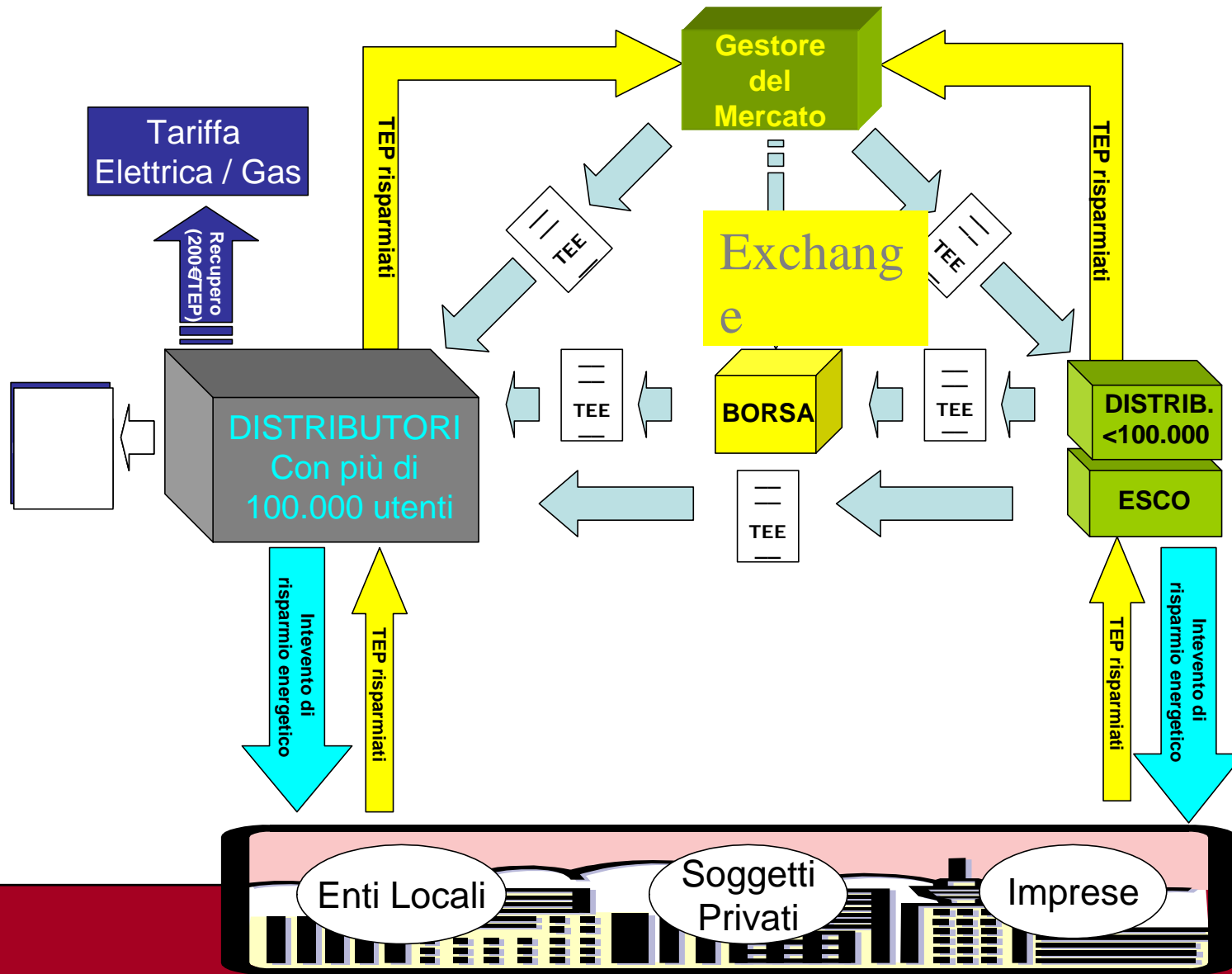
White Certificates



Source of funding

The energy efficiency certificates have a value of 1 toe and are available in 3 forms:

- type I, certifying the achievement of savings in primary energy through actions aimed at reducing the final consumption of electricity;
- type II, certifying the achievement of savings in primary energy through actions aimed at reducing the consumption of natural gas;
- type III, certifying the achievement of savings in primary energy through actions other than those specified under Type I and Type II.





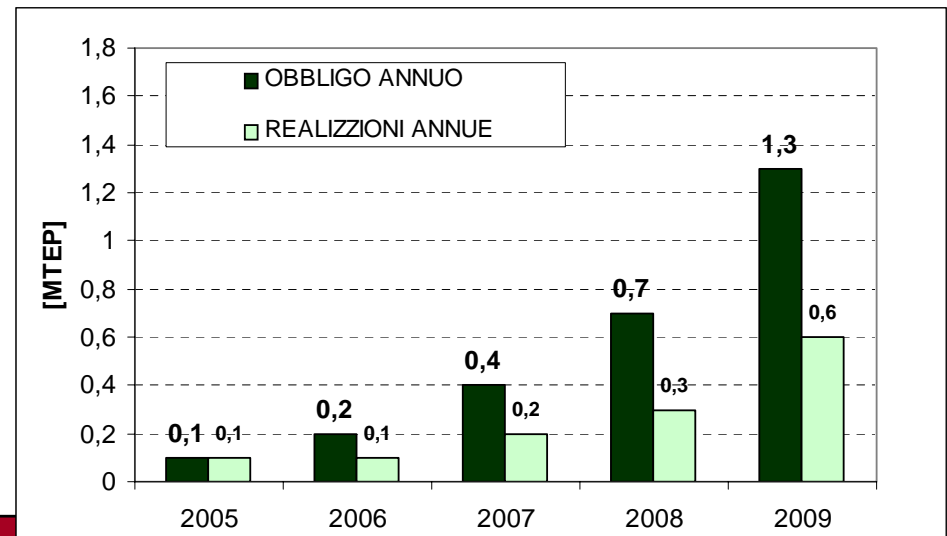
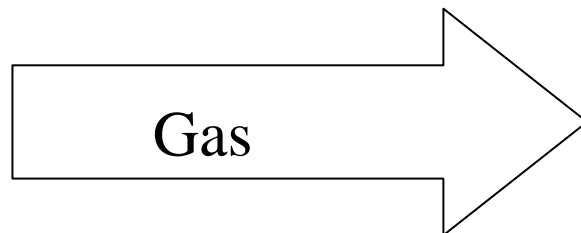
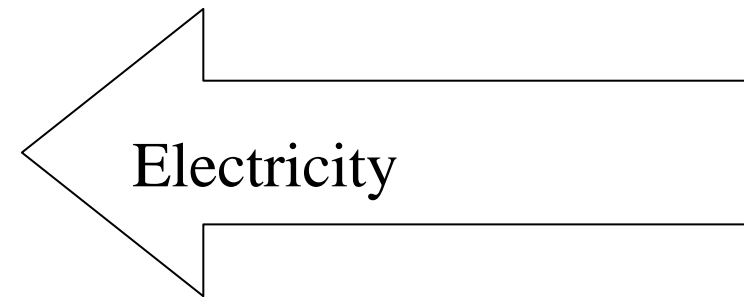
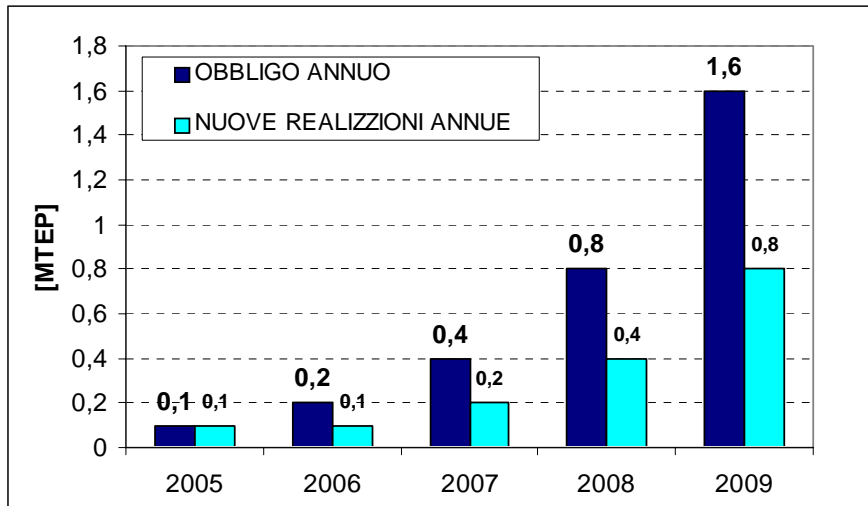
- **Distributors** whose projects achieved energy savings below their yearly target have to purchase White Certificates to comply with their obligation;
- To carry out this task, GME has organized and manages the energy efficiency register



- Distributors whose projects achieved energy savings above their yearly target may sell their Energy Efficiency Certificates in excess, thereby getting an economic benefit;
- ESCOs may sell the Energy Efficiency Certificates obtained through their independent projects, thereby making profits into the market.

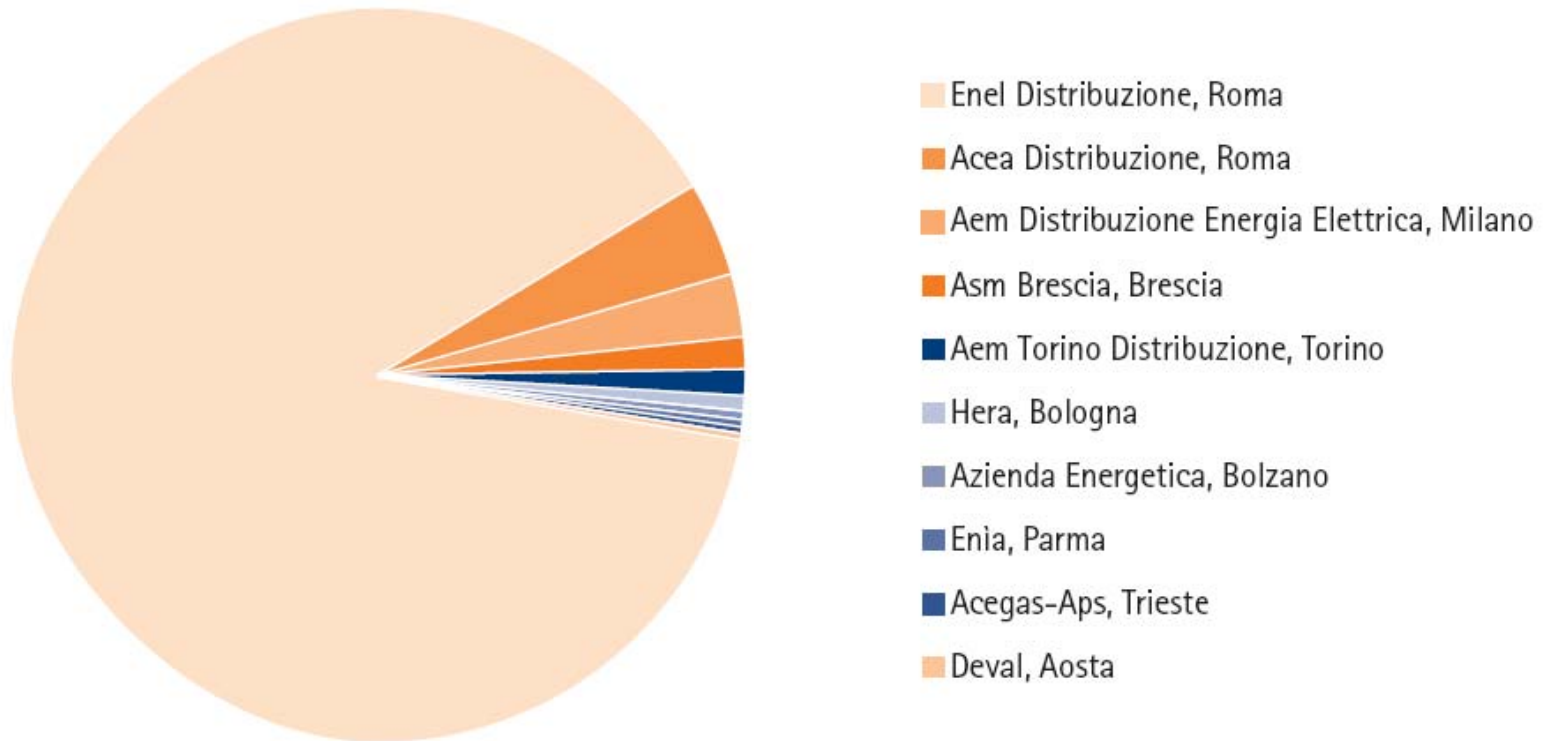


White certificates – Italian targets



The energy distributors targets for Electricity in 2007

Percentage values



The project step by step

Preparation

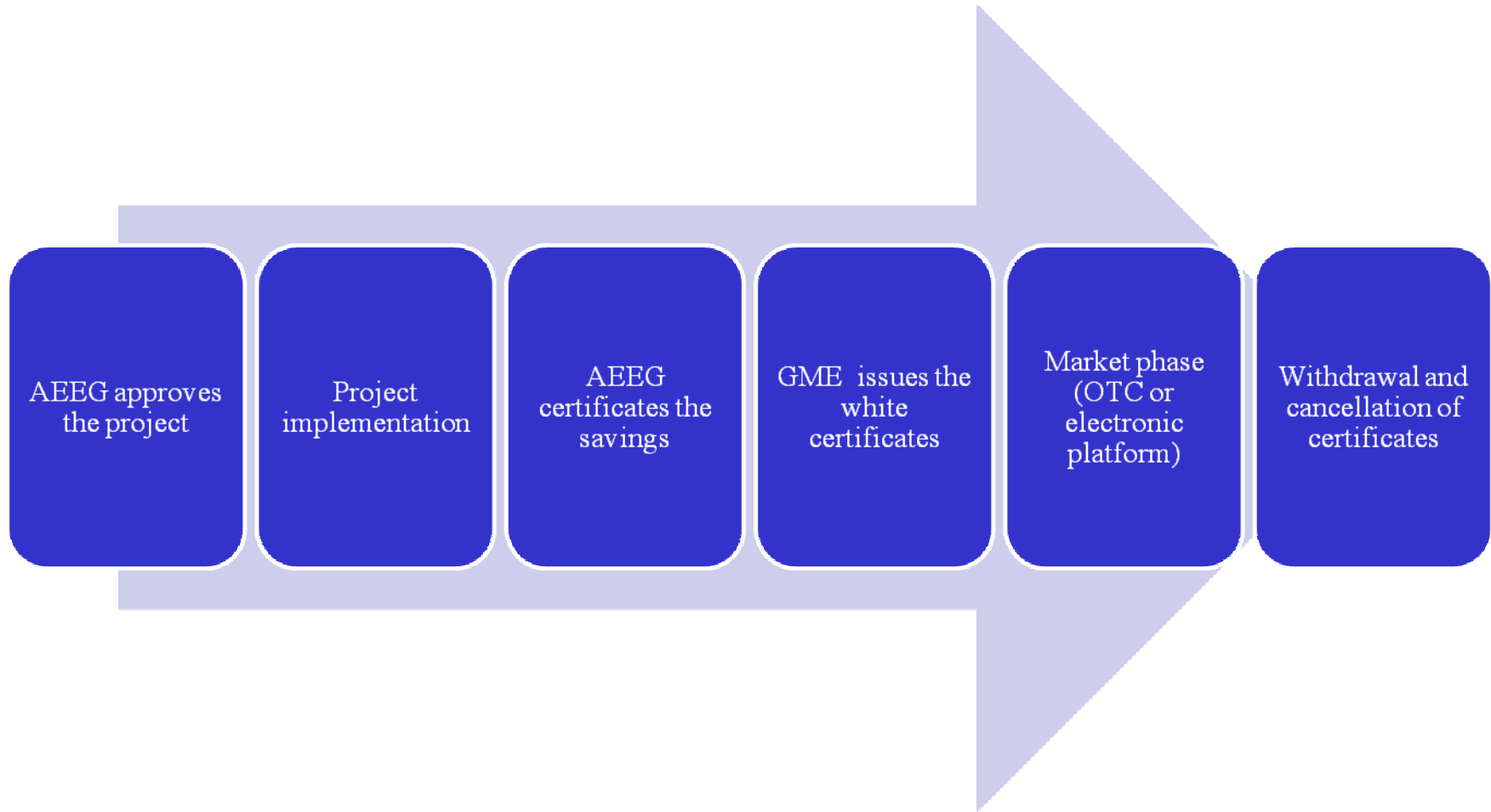
Implementation

Evaluation of the results:

- A) standardized assessment methods
- B) evaluation methods
- C) Post data Assessment.



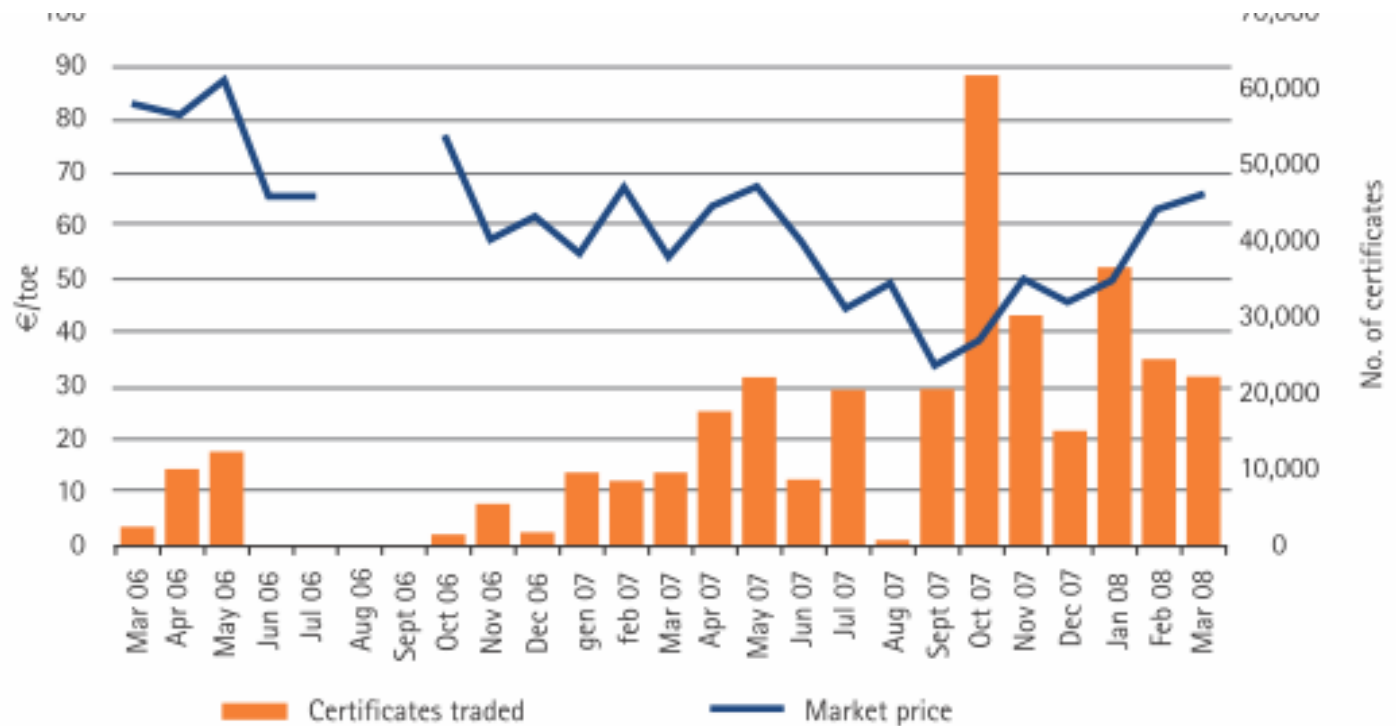
The certificate step by step





Trend of prices and quantities on the energy efficiency certificate market

€/toe; number of certificates



Source: AEEG calculations on GME data.

Three years of mechanism in Italy

- Objectives assigned were largely exceeded;
- development of the energy services market.
- New collaboration tools
- Involvement of financial institutions
- Growth of informative initiatives;
- Environmental and economic results
- No decrease for customer satisfaction

	2000	2001	2002	2003	2004	2005	2006	2007
Thermoelectric power	218,549	216,792	227,646	238,291	240,488	246,918	255,420	258,356
Solids	26,272	31,730	35,447	38,813	45,518	43,606	44,207	45,000
Natural gas	97,608	95,906	99,414	117,301	129,772	149,259	158,079	168,200
Oil products	85,878	75,009	76,997	65,771	47,253	35,846	33,830	25,860
Others	8,791	14,147	15,788	16,406	17,945	18,207	19,304	19,296
Production from renewable energy sources	51,386	55,087	49,013	47,971	55,669	49,893	52,239	50,423
Biomass and waste	1,906	2,587	3,423	4,493	5,637	6,155	6,745	7,200
Wind power	563	1,179	1,404	1,458	1,847	2,343	2,971	4,144
Photovoltaic	6	5	4	5	4	4	2	40
Geothermal	4,705	4,507	4,662	5,341	5,437	5,325	5,527	5,570
Hydroelectric from natural sources	44,205	46,810	39,519	36,674	42,744	36,067	36,994	33,469
Production of hydroelectric power from pumping	6,695	7,115	7,743	7,603	7,164	6,860	6,431	5,574
Total production	276,629	278,995	284,401	293,865	303,321	303,672	314,090	314,353
<i>For memory:</i>								
Total production of hydroelectric power	50,900	53,926	47,262	44,277	49,908	42,927	43,425	39,043

Source: AEEG calculations on Terna data. The data for 2007 is provisional.



Some data about the costs of different incentive schemes

- CIP6/92 electricity production (50 TWh from RES and CHP) amounted to 3.500 M€/year, or 11 €/MWh on the end-users bill;
- green certificates 4,3 TWh had a cost of 310 M€/year, or 1 €/MWh;



- 2 TWh from photovoltaic plants will cost around 1.000 M€/year, or 3 €/MWh;
- 0,3 Mtoe of white certificates costed 12,5 M€, or 0,05 €/MWh.



THANKS FOR YOUR ATTENTION

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