Impact of end-use energy efficiency on the distribution network

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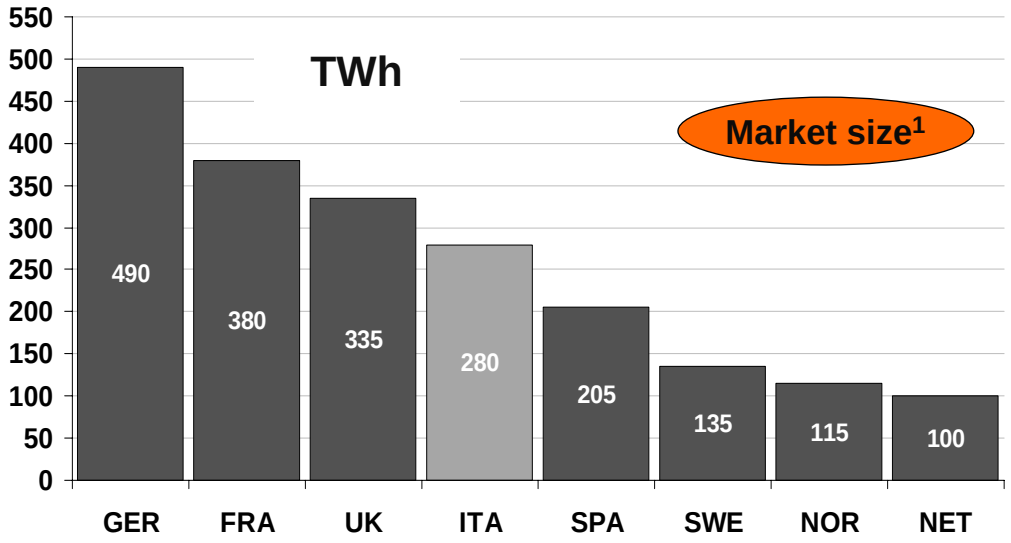
Enel electricity distribution business

Market size and network assets



[1] excluded losses and self-generation

Enel Distribution network assets

over 1,2 million km of electricity lines

400,000 substations

Clients: 30 million

Energy distributed: 81%

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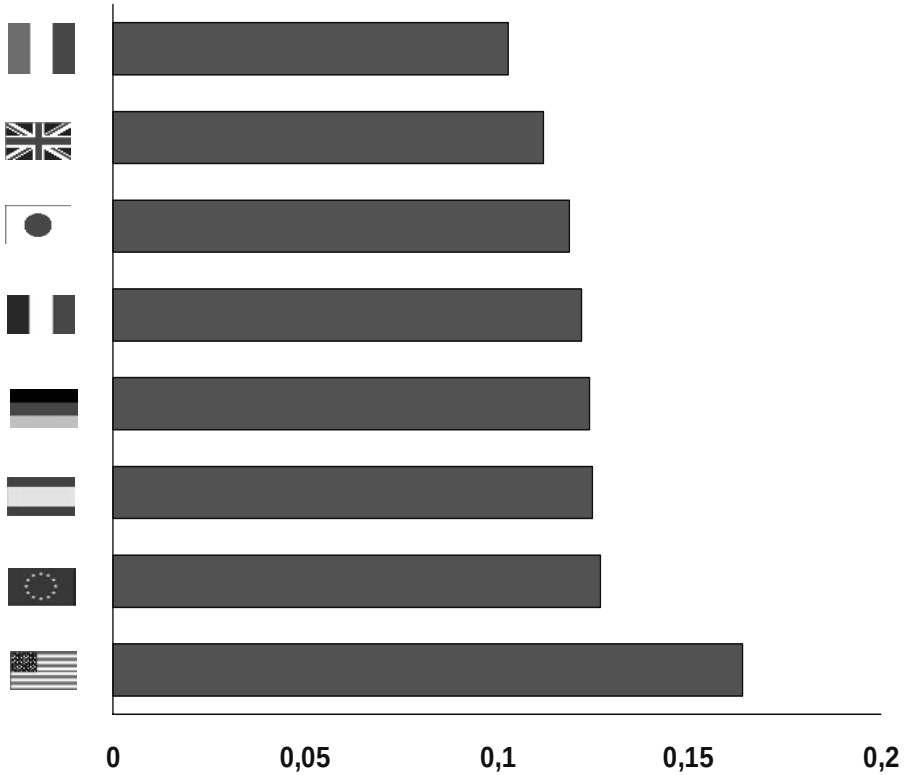
Features of electricity demand

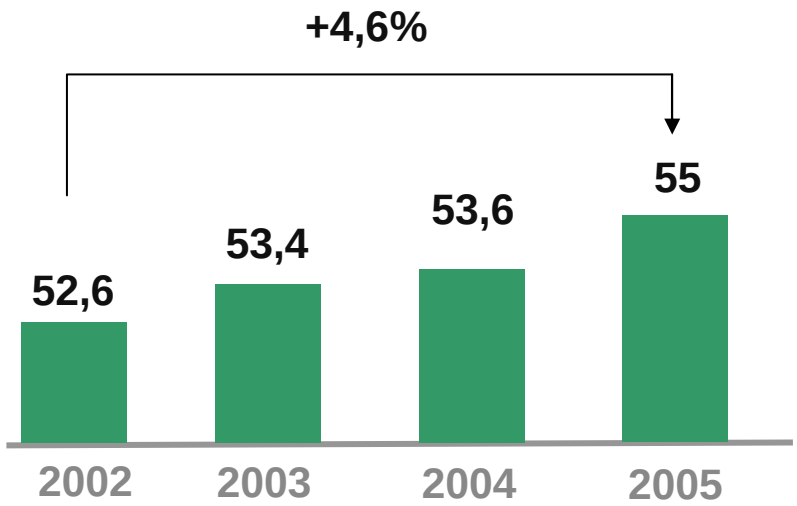
Energy intensity

(kTOE/M$ GDP)



Annual peak of consumption

(GW)



- High increase in peak demand
- Mandatory energy savings targets
- Targets stricter than EU Directives

1 TOE (Tonne of Oil Equivalent) = 41,860 GJ = 4,55*10^3 kWh

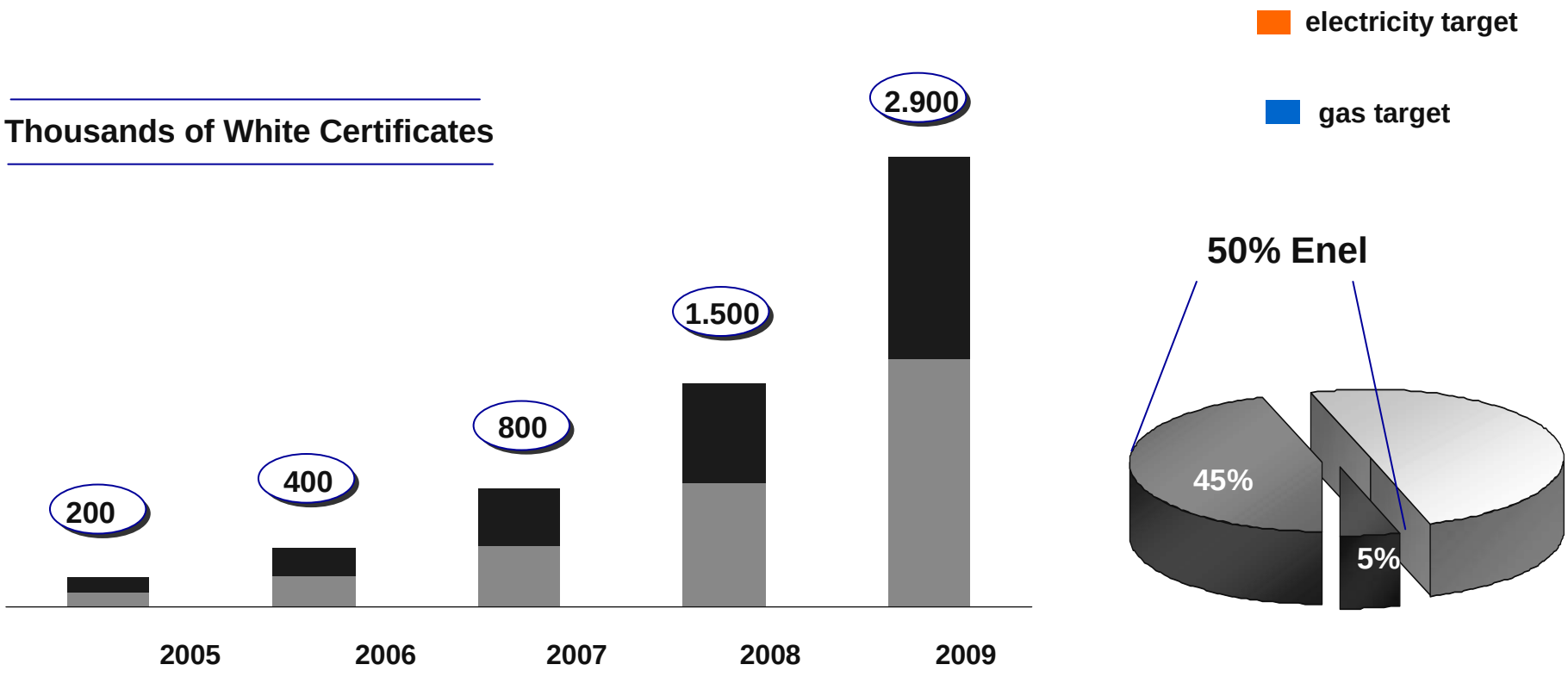
End-use energy efficiency

Italian Regulations

- **Mandatory end-use energy efficiency targets for Power and Gas Distribution Companies**
- **National target: 2.900 kTOE/year within the next 5 years**
- **Energy efficiency projects carried out by:**
  - **Power and Gas Distribution Companies**
  - **Energy Saving Companies (ESCO)**
- **White Certificates awarded for energy savings**
- **1 White Certificate = 1 kTOE saved**
- **A dedicated pool established for white certificates trading**

End-use energy efficiency

National cumulated targets



Enel accounts for 50% of the target achievement

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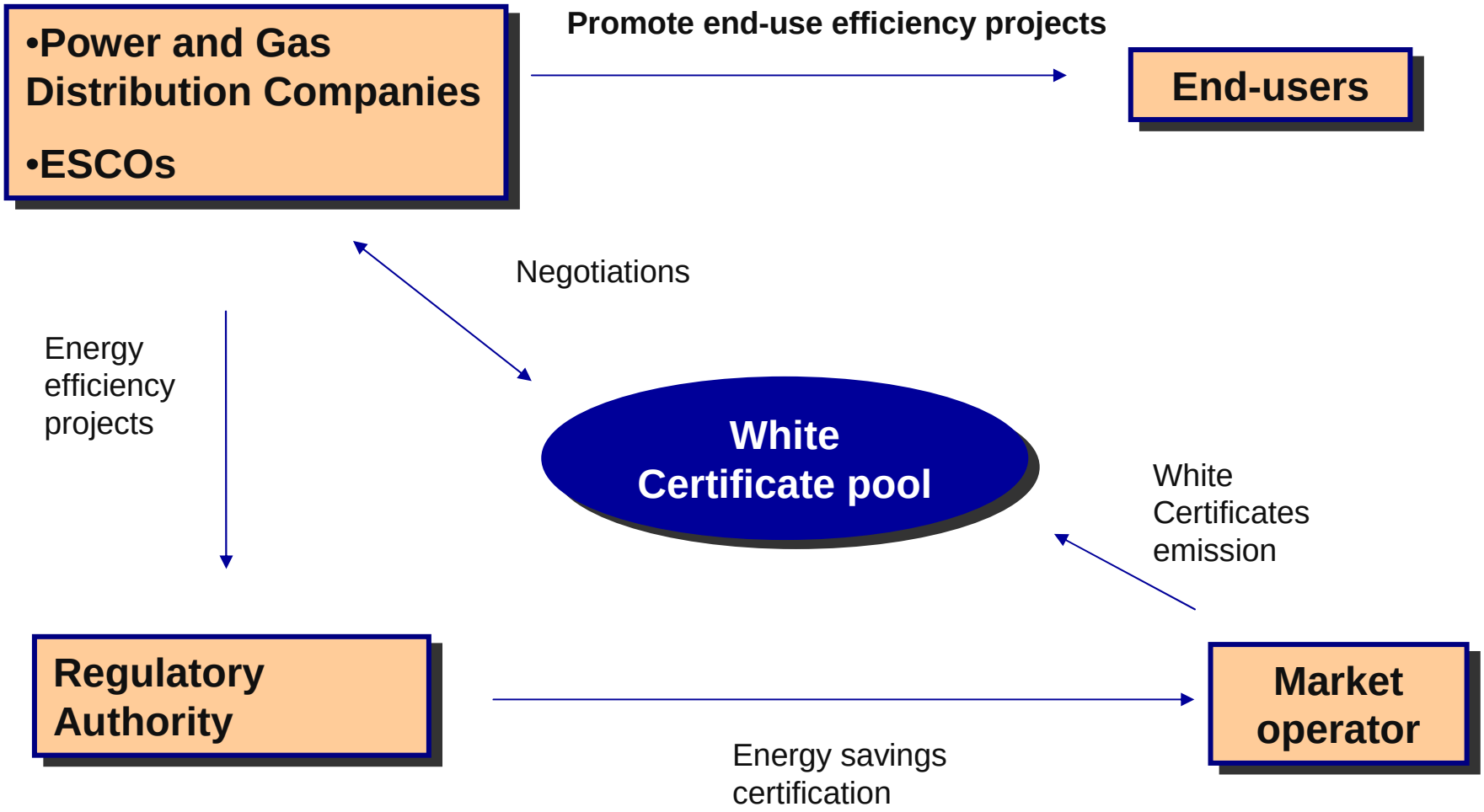
European benchmark: Italy and UK

		ITALY	UK
Certificate duration	•Household appliances	5 years	15 years
	•Thermo insulation	8 years	40 years
Recognized costs		100 /White Certificate	230 /White Certificate
Energy savings evaluation model		Average consumption of market equipment and devices	Real savings measured after the replacement of equipment and devices

White certificates

- National targets to be reached by means of end-use energy efficiency projects
- Power and Gas Distribution Companies have 2 options:
  - Promote and stimulate energy efficiency projects
  - Buy White Certificates from ESCOs and from the pool
- Energy saving projects are certified by the Italian Regulatory Authority
- The Distribution Company earns 100 per year for each certificate

White Certificate pool



High efficiency lamps (FCL) for households

- Fluorescent compact lamps (FCL) have 80% less consumption than traditional ones
- Technical life is up to 8 times higher than traditional ones

Energy efficiency projects:

- **2005: free distribution of 2 million high efficiency lamps**
- **2006: free distribution of 5 million high efficiency lamps**

Energy savings 2005

35.000 White Certificates/year

Energy savings 2006

76.000 White Certificates/year

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Public lighting

Enel operates 1.800.000 spot lights in 4.100 Municipalities

Energy efficiency projects:

- **Replacement of old lamps with high efficiency ones**
- **Installation of flux intensity regulators**

Energy savings 2001-2004

10.000 White Certificates/year

Energy savings 2005

2.500 White Certificates/year

Heating from geothermal sources

Geothermal heat is available in some Italian regions (primarly Tuscany) and is used to produce renewable electric energy

Energy efficiency projects:

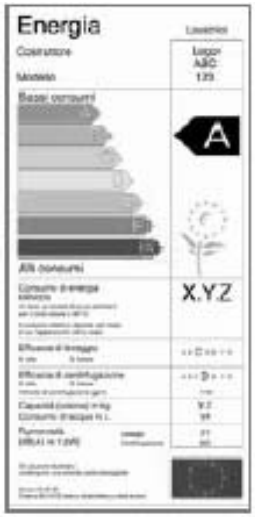
- **Use of low enthalpy geothermal sources (100°C) for civil heating purposes**

Energy savings

1,500 White Certificates/year

Enel Club

Enel Club Cards grant 1 million Enel customers a 10% discount on class A domestic appliance purchase



Energy efficiency projects:

- **Promotion of 37,000 class A discounted domestic appliances**

Energy savings 2004

246 White Certificates/year

Energy savings 2005

284 White Certificates/year

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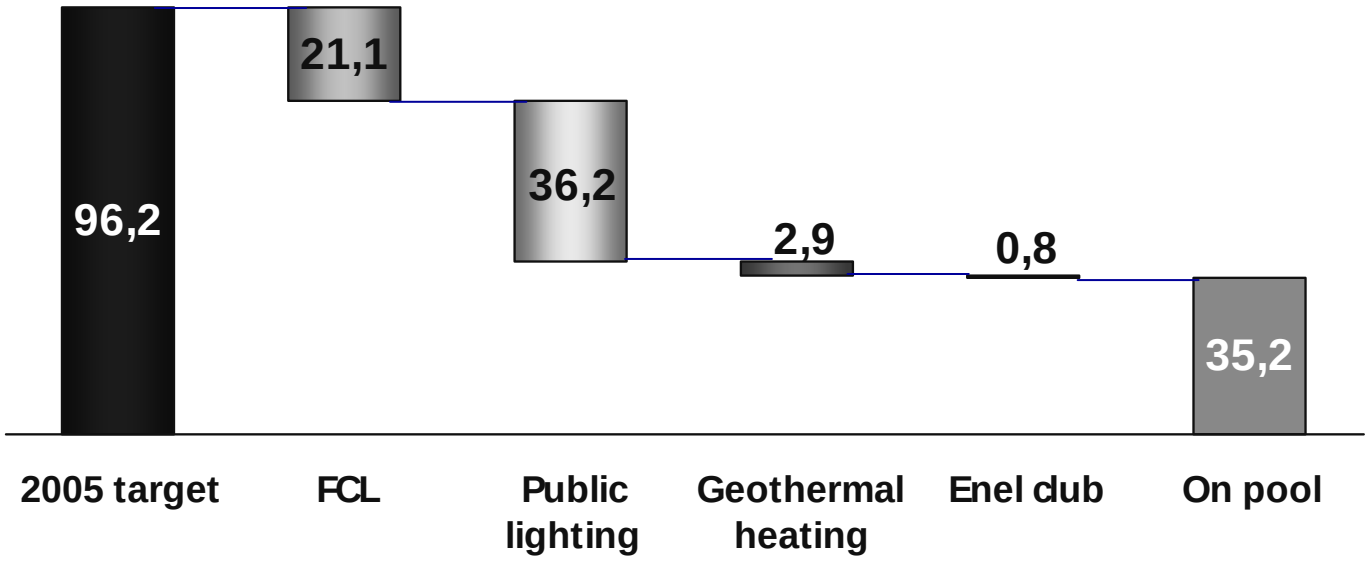
Results delivered: Enel energy savings in 2005

Thousands of White Certificates



Direct actions: 63% of target

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2006 projects: hot water economizers

Energy efficiency projects in 2006:

- **Free distribution of 1 million hot water tap economizers**
- **Free distribution of 240,000 shower economizers**

Energy savings of up to 60% on hot water consumption

The project will be supported by informative campaigns on home energy saving

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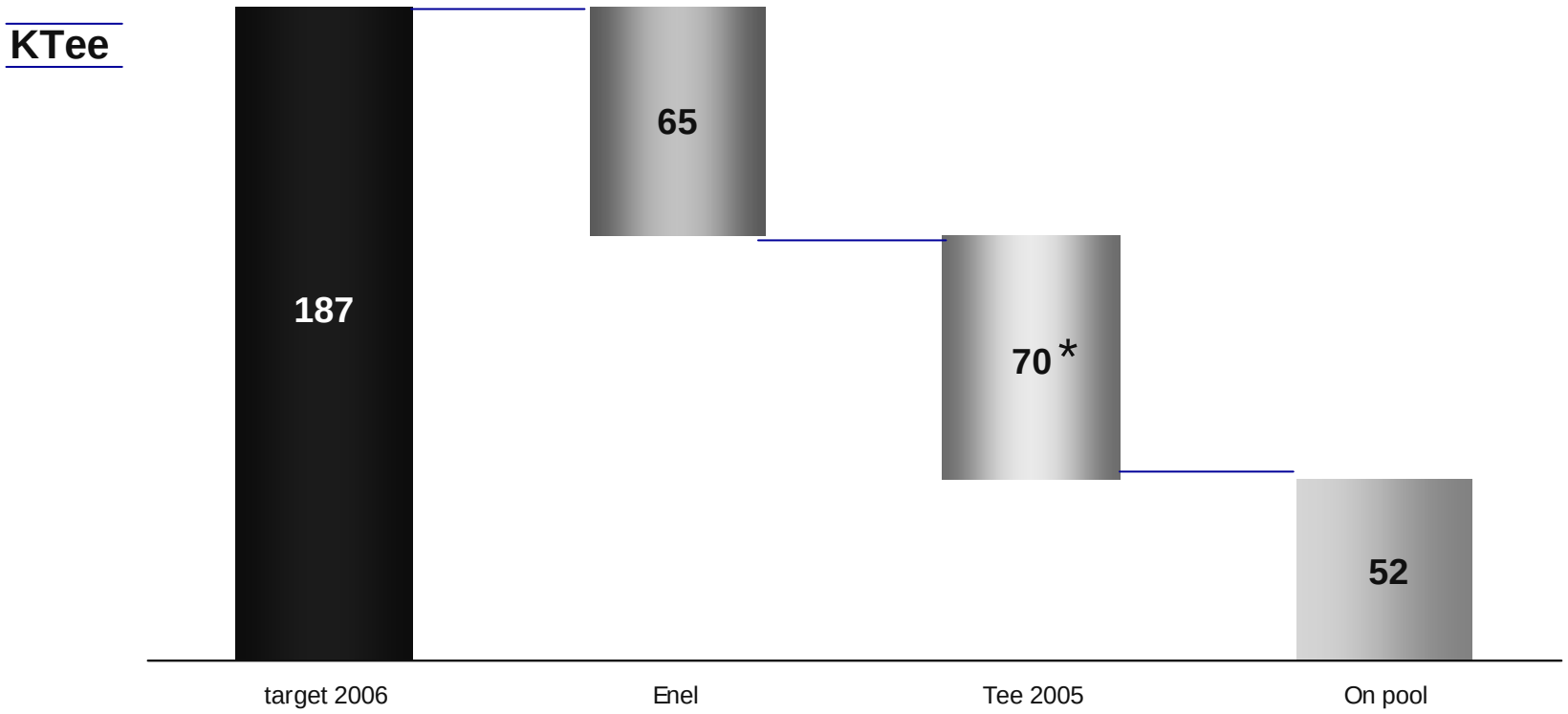
Enel energy savings in 2006



Direct actions: 72% of target

On pool: 28% of target

Demand Side Management: enabling technology

Electronic Metering and the AMM system

Electronic Meter

Integrated equipment for metering and data collection

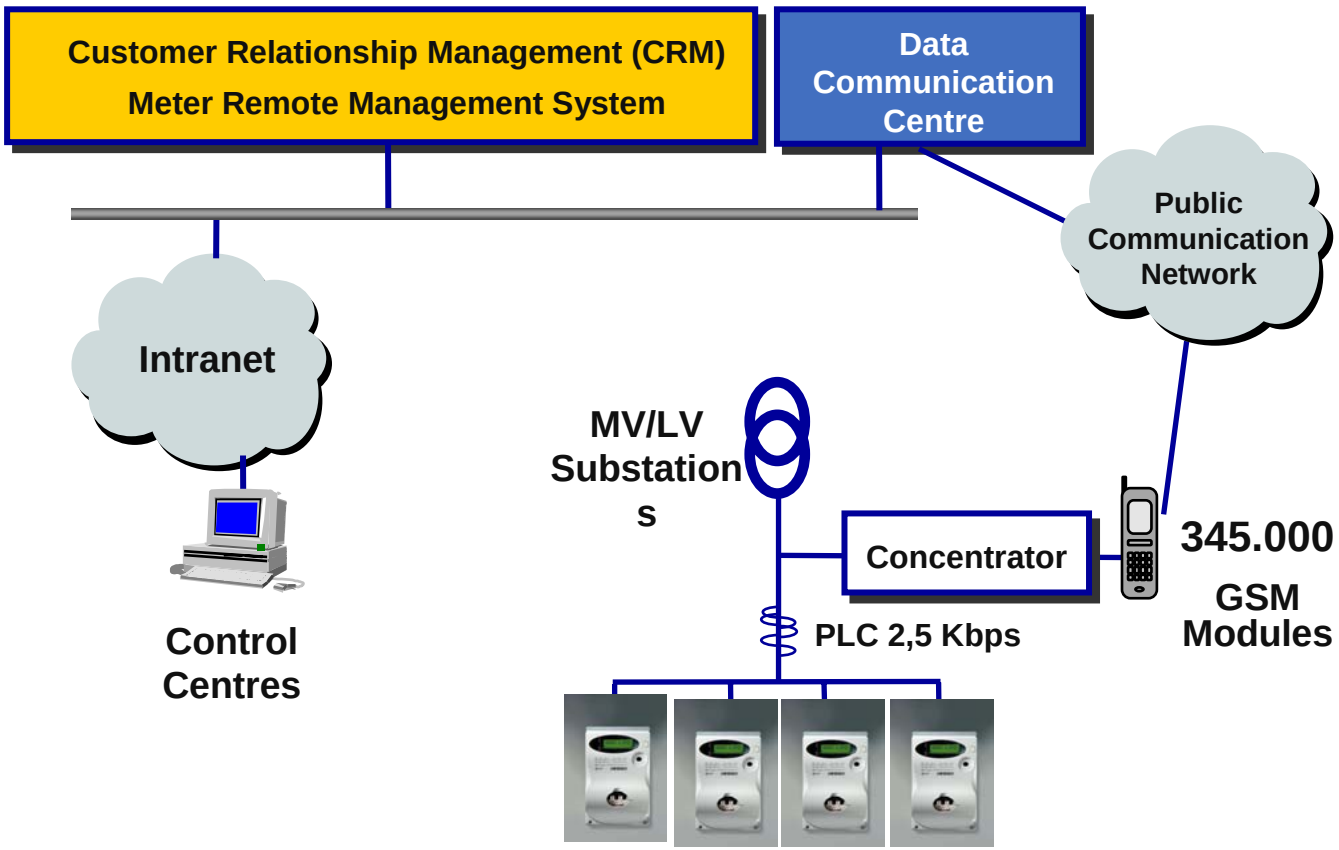
Concentrator

Measured data aggregator. Installed in MV/LV secondary substations

Central system

Data processing, billing and remote control of Electronic Meters

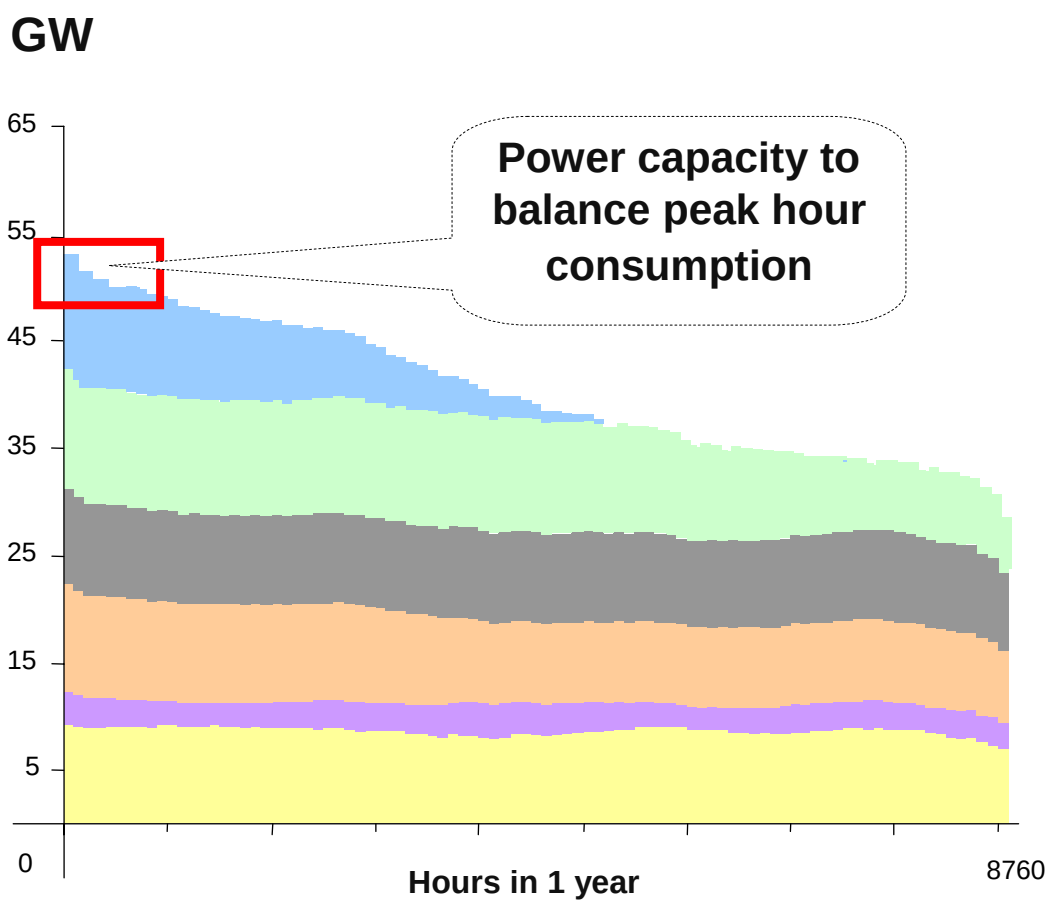
Automatic Meter Management system



30 Million Electronic Meters

New opportunities: Demand Side Management

Shift of electricity demand to off-peak hours



- Increase of system energy efficiency
- No blackouts or programmed interruptions to customers

CO_2 reduction

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Demand Side Management

Results achieved

2001 began to replace old metering devices with new electronic ones

2006 project completed with 30 million meters replaced

Tailored tariffs and load profiles allow for energy savings, reducing CO_2 emissions and energy bills to customers.

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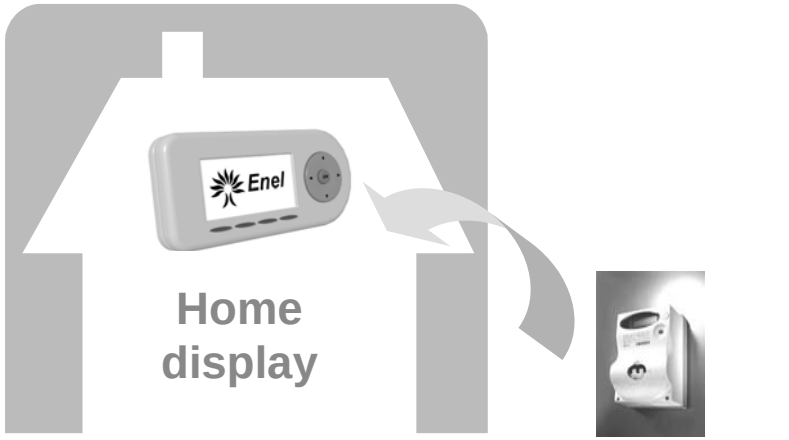
New projects: *home display*



Increased customer awareness of energy consumption

Energy savings evaluated at least 10%

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