



# **Sustainable Fossil Fuels for Future Energy**

*Rome, 6th – 10th July 2009*

## **The Italian policy with reference to the European Community trends**

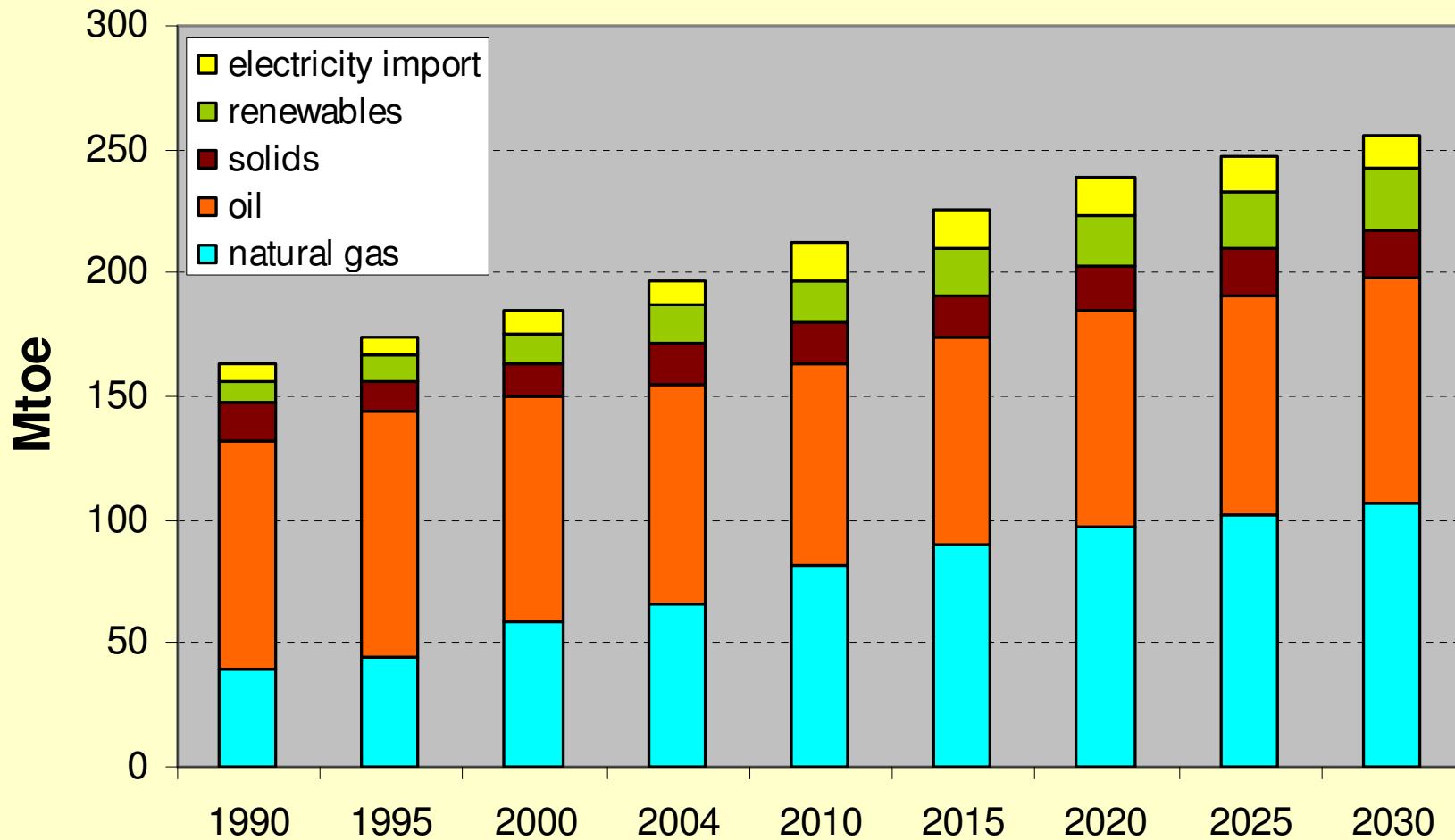
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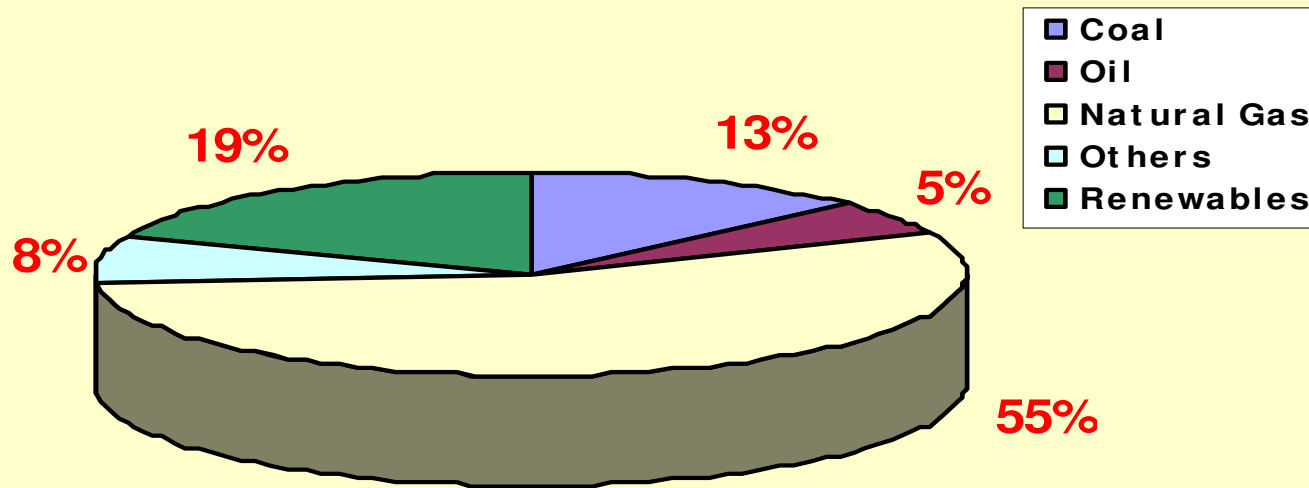
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# The energy demand

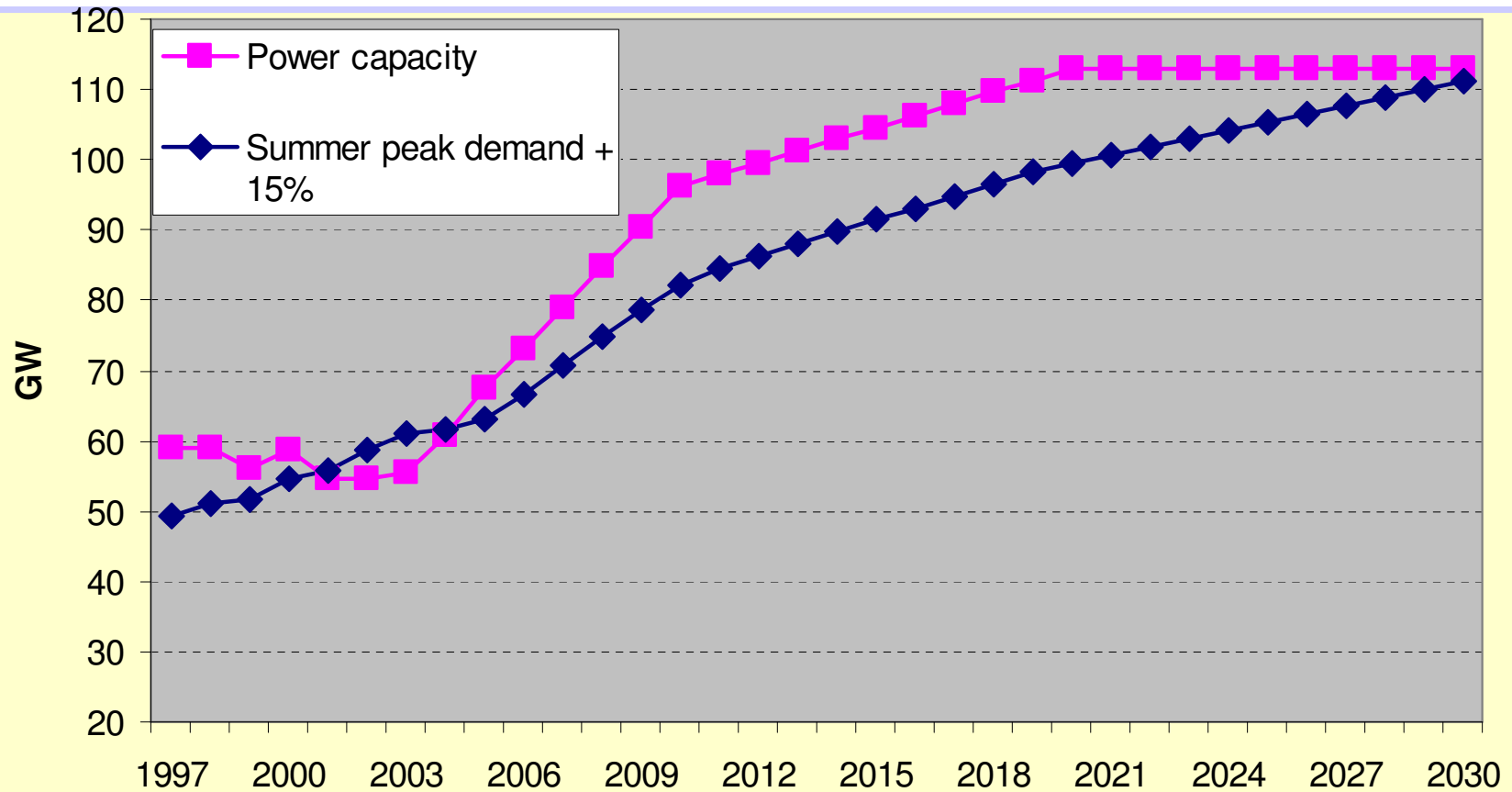


# Electricity Generation



**Primary Energy Sources Contribution (%)  
to 2008 Electricity Generation (305 TWh)**

# Peak demand capacity



**Power capacity (production + import) vs summer peak demand increased by a 15% safety margin**

**In order to overcome these problems,  
the Italian energy policy foresees:**

**In the medium-short term:**

- **Diversify the energy suppliers**
- **Diversify routes and the related infrastructures**
- **Support the international dialogue between producers and consumers**
- **Increase energy efficiency both in electricity generation and in end-uses**
- **Diversify energy sources**

**In order to overcome these problems,  
the Italian energy policy foresees:**

**In the medium-long term:**

- **Emphasise energy diversification while coping with environmental concerns**
- **Continue the process of liberalisation of the electricity market towards retail market**
- **Increase security of energy supply**
- **Reduce energy prices and tariffs**
- **Streamline the authorisation procedures**

## **New issues for coal in Italy**

- **Facing Emission Trading Scheme and National Allocation Plan at EU level (Directive 2003/87/EC)**
- **Development of a long-term vision strategy**
- **Stakeholders involvement**
- **Development of a new technology roadmap for coal combustion and zero emissions**

# The perspective of coal

- **Short-term: keep existing fleet in service:**
  - Switch from oil to coal
  - Reduce carbon intensity and pollutants
- **Long-term: transition to near-zero emissions:**
  - Advanced materials
  - Ultra-high efficiency systems
  - CO<sub>2</sub> capture and storage

# The European “Energy Package”

- **‘Chapeau’ Communication: 20 20 20 by 2020 – Europe’s climate change opportunity**
- **Legislative proposals:**
  - » The Renewable Energy Directive on MS shares
  - » The ETS Directive for the post 2012 period
  - » The CCS Directive on the geological storage of CO<sub>2</sub>
- **Communications to Council and EP:**
  - » The CCS Communication on early demonstration
  - » A Communication assessing MS en. Efficiency plans
- **Guidelines on State Aid to Environment Protection**

# European Energy Program for Recovery

- **European economy is reshaping it to face the demands of energy security and the imperative of cutting GHG**
- **The Commission therefore proposes a set of 3 specific initiatives focused on the EU's key energy goals: interconnection projects, development of offshore wind, CCS demonstration projects**
- **CCS has been identified as one of the key technologies for the future and sustainable power generation from fossil fuels, with an important market opportunity for EU industry**
- **Seven CCS projects will be supported, with a provision of 1,050 M€ (out of 3,980 M€ of the EEPR)**
- **Porto Tolle Project envisaged contribution: 100 M€**

## Emissions Trading Directive (“NER 300”)

- **Max 300 million allowances from New Entrants Reserve available only until 31 Dec 2015 for allocation**
- **Maximum 12 CCS plants plus innovative renewables**
- **Support dependent on verified avoidance of CO2 emissions**
- **Support to be given via Member States**
- **Projects in geographically balanced locations and representing a wide range of technologies**
- **Project selected on the basis of objective and transparent criteria that include requirements for knowledge-sharing**
- **No more than 15% of allowances for any individual project**
- **In principle, no more than 50% of incremental costs of CCS to be financed**

## Strategic Energy Technology (SET) Plan

- **CCS is one of the six Industrial Initiatives to be launched in the next months**
- **The SET Plan should allow knowledge sharing among demo and R&D projects**

## Where in Italy

- **In Italy it is possible to storage CO2 in depleted Oil and Gas reservoirs, in geothermal fields and in deep saline aquifers, either on-shore or offshore**
- **The saline aquifers are particularly well distributed in the Padanian back-arc basin and in the Adriatic Basins**
  - These geological structure are extended from Padania Valley to the Sicily and seems to offer the presence also of different natural analogues, depleted oil and gas reservoirs useful for the project
- **EOR could be studied**
- **ECBM could be studied: proposal regarding coal bed in Sardinia**



# Technological Carbon Management Options

## Reduce Carbon Intensity

- Renewables
- Fuel Switching

## Improve Efficiency

- Demand Side
- Supply Side

## Sequester Carbon

- Capture & Storage
- Enhance Natural Sinks

Ocean

### All options needed to:

- Affordably meet energy demand
- Address environmental objectives

# Energy RTD in Italy

- **International and National Programmes**
- **Different measures for promoting Research and Innovation:**
  - **basic research**
  - **industrial and pre-competitive research**
  - **demonstration and dissemination**
- **National projects and programmes supported by:**
  - **National Government: short to long term**
  - **Ministry of Economic Development: short to medium term**
  - **Ministry of Research: medium to long term**
  - **Regional Governments: short to medium term**

# Industria 2015: Main Goals and Achievements (1)

Three main tools:

- Business networks
- Innovative Finance
- Industrial Innovation Projects on Strategic Technology Areas:
  - ▣ Energy Efficiency
  - ▣ Sustainable Mobility
  - ▣ New technologies for the “Made in Italy”

# Industria 2015: Main Goals and Achievements (2)

- Energy Efficiency
  1. New products and technologies for energy generation
  2. Requalification of industrial sectors
  3. Improvement of Production process
  4. Other technologies

**Total Call EE: 30 projects @ 200 M€ grants**

# Fund for R&D on Electricity System

- Collect of electricity bills (<0.03 c€/kWh)
- Main goal: technology innovation of the electricity system
- New 3-y programme 2009-11, funding: 210 M€
- Power Generation
  - ▣ R&D for efficiency improvement on USC, IGCC
  - ▣ Combined production of hydrogen & power with CCS
- CO<sub>2</sub> Separation & Capture
  - ▣ Quantify existing national potential capacity to storage CO<sub>2</sub> during the time
  - ▣ ECBM Site-Tests in Sardinia (Sulcis Area)

# Main Italian Public R&D on CCS

- **ENEA** - new cycle, high efficiency, no emissions
  - advanced approach for coal combustion and gasification
- **SOTACARBO** - gasification coal platform
  - ECBM for CO<sub>2</sub> storage
- **CESI Ricerche** - R&D on CO<sub>2</sub> capture (high temp. membrane)
  - geological survey
- **Universities** - support to model critical processes
- **OGS** - several studies on CO<sub>2</sub> Storage
- **INGV** - several studies on CO<sub>2</sub> Storage
- **CARBOSULCIS** - ECBM and CO<sub>2</sub> storage in Sulcis (Sardinia) basin

# ENEL's CCS Projects

**Main Initiatives  
towards coal  
fired "ZEP"**

**Oxy-coal firing**

**post-  
combustion**



**2006-2007**

**Experience on  
5MW Isotherm®  
pilot process in  
Gioia del Colle**

**2008-2010**

**48 MWt Pilot  
Isotherm®  
process  
Integrated on BR  
660 Mwe**

**2010-2012**

**Demonstrative  
coal fired  
"ZEP"**

**2006-2008**

**CO<sub>2</sub> capture  
Sorbents studies  
CO<sub>2</sub> Sequestration  
site selection**

**2007-2009**

**CO<sub>2</sub> capture  
pilot plant  
(2 t /h)**

**2010-2012**

**CCS  
Demonstrative  
on 660 Mwe  
plant  
(50% CO<sub>2</sub>)**

**Experiences on coal  
fired "ZEP" key  
processes and  
technologies**

# Zero Emission Committee

- **The Ministry of Economic Development has set up in 2003 a National Committee in order to coordinate the Italian participation to all the international initiatives on Zero Emissions**
- **Main Italian actors actively involved: ENEA, ENEL, ENI, CNR, CESI RICERCA, ANSALDO, SOTACARBO, INGV, OGS, CARBOSULCIS, Universities**

# International Cooperation (1)

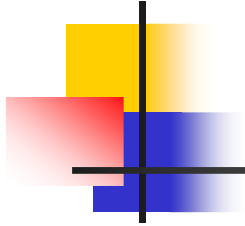
- **Bilateral cooperation**
- **Partnerships and Multilateral Agreements**
- **IEA Implementing Agreements**
- **In the European context:**
  - European Framework Programs
  - European Platforms
  - SET Plan

## International Cooperation (2)

- **Multilateral Partnerships**
  - Carbon Sequestration Leadership Forum
  - International Partnership on Hydrogen Economy
  - Methane-to-Market
  - Global Bioenergy Partnership

## Conclusions

- **Efforts to rationalize R&D investments in the energy sector**
- **New instruments (*Industria 2015*)**
- **Promotion of public-private partnerships**
- **Improvement of the results of the 7<sup>th</sup> European Framework Program in the perspective of the SET Plan**
- **High-level of international cooperation**



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