



**CSR**  
in Total's business model

# Total and the climate change challenge

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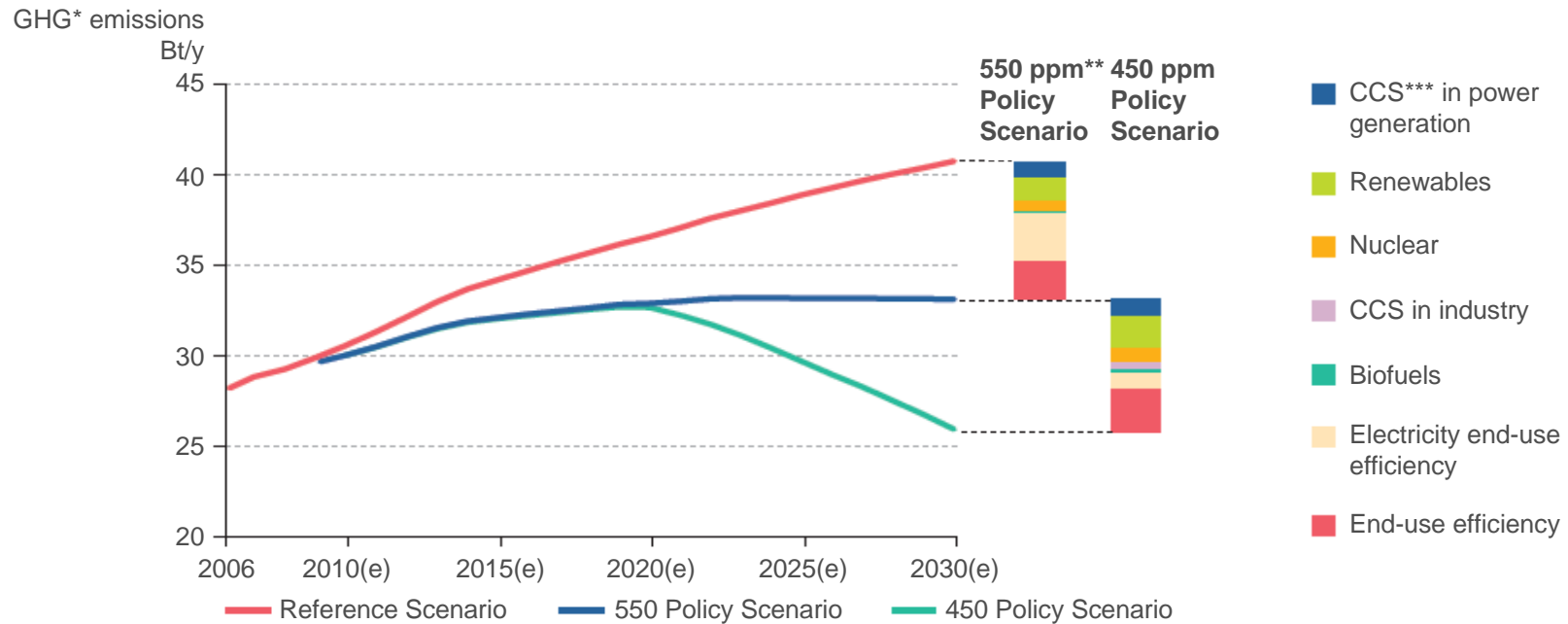


# Drivers of the climate change challenge



# All technologies needed to reach CO<sub>2</sub> concentration targets

International Energy Agency climate scenarios



***High costs to implement required GHG reductions***  
***All countries must be involved, including non-OECD countries***

source : IEA 2008

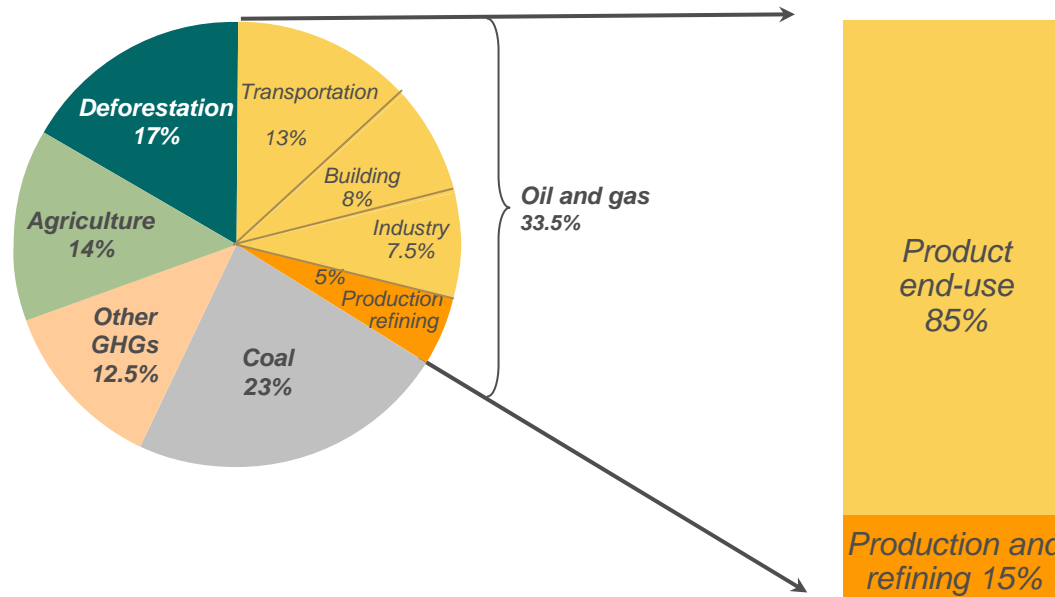
\* GHG : Greenhouse Gas expressed as CO<sub>2</sub> equivalent

\*\* ppm : parts per million

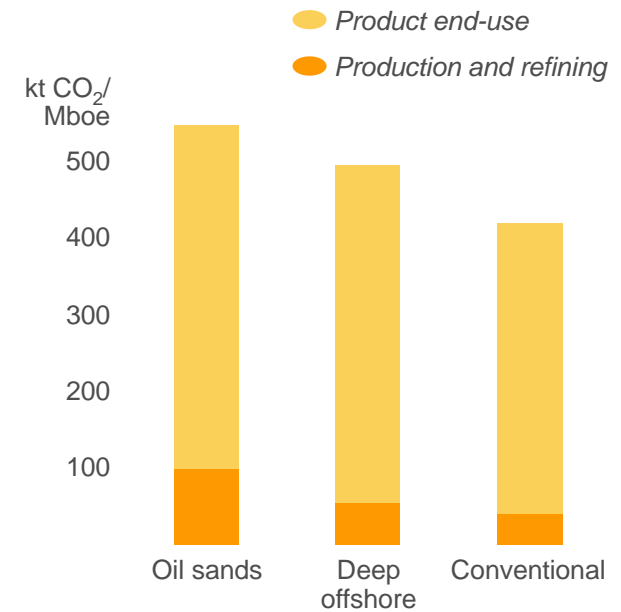
\*\*\* CCS : CO<sub>2</sub> Capture and Storage

# Oil and gas GHG emissions

Global GHG emissions by origin\*



GHG emissions by oil source\*\*

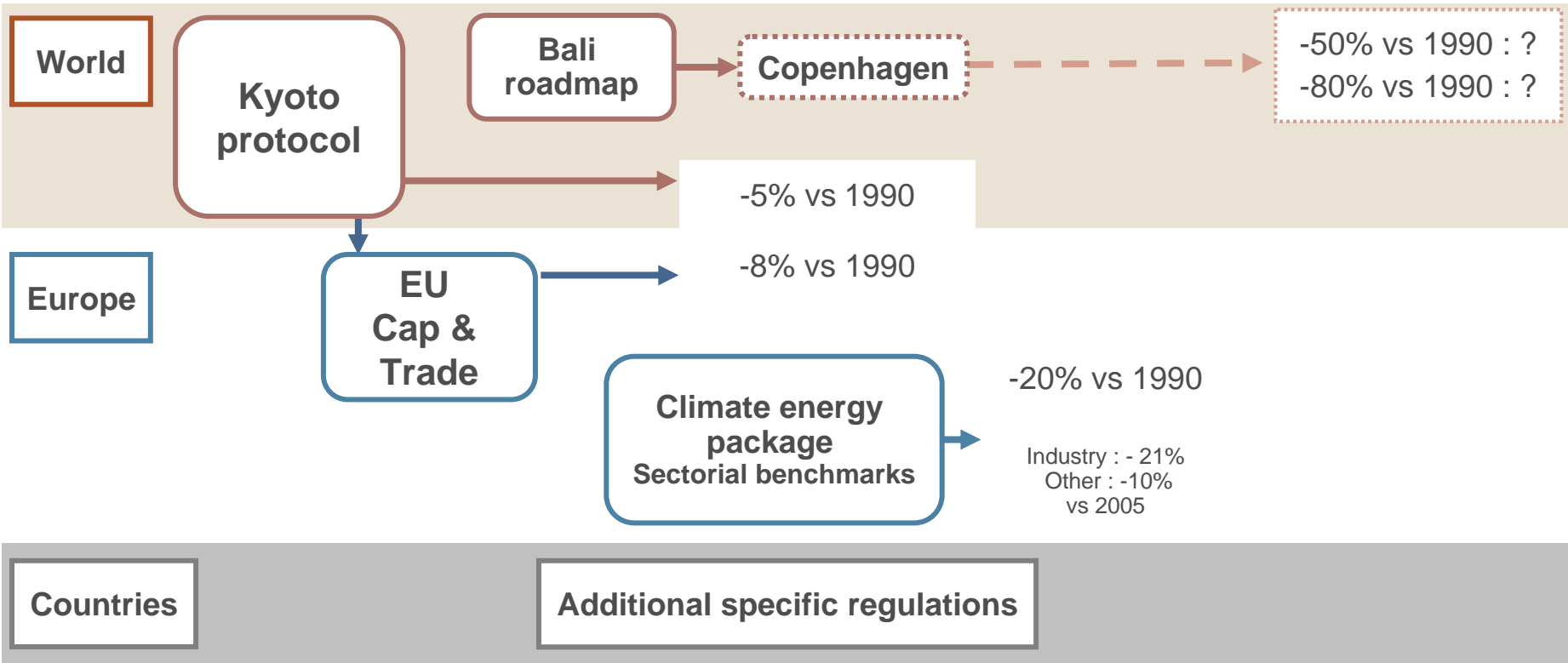
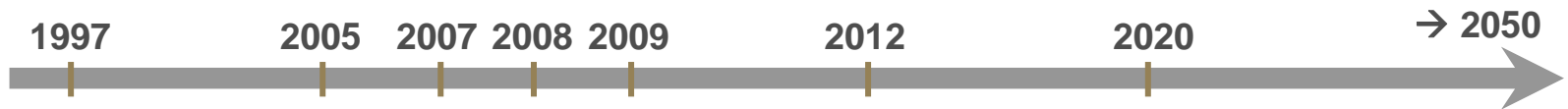


**Working on solutions for production and refining**  
**Need to work with industry and consumers**  
**on greater efficiency in end-use phase**

\* International Panel on Climate Change (IPCC) 2007 and IEA 2007

\*\* Total

# Complex and evolving climate regulatory framework



***International negotiations need to define global framework that is fair and avoids distortion of competition***

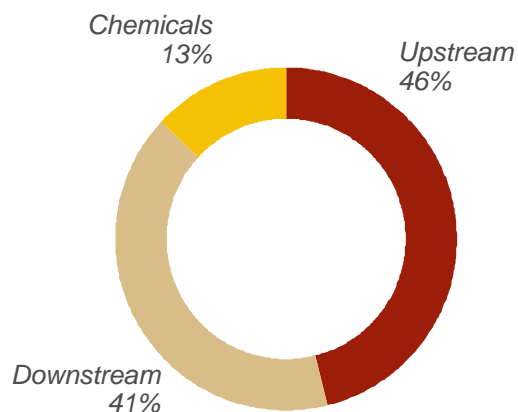


# Total's response

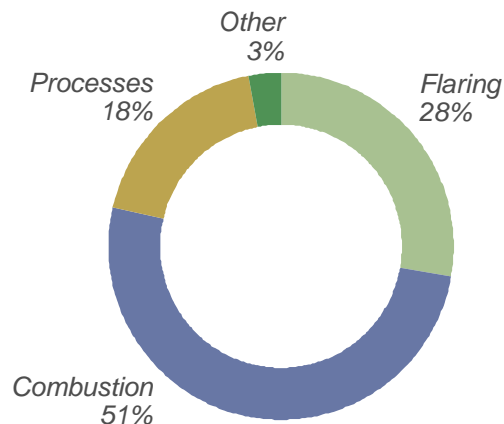


# GHG emissions from Total-operated sites : 58 Mt/y CO<sub>2</sub> eq\*

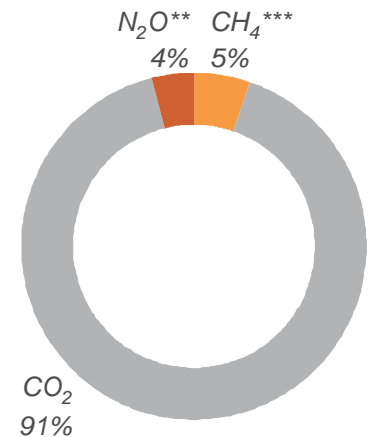
By segment



By source



By type of gas



**Leverage to reduce GHG emissions today within our installations :**

- **Reduce flaring**
- **Improve energy efficiency**
- **Develop CO<sub>2</sub> capture and storage**

source : Total, 2008

\* CO<sub>2</sub> eq. : CO<sub>2</sub> equivalent

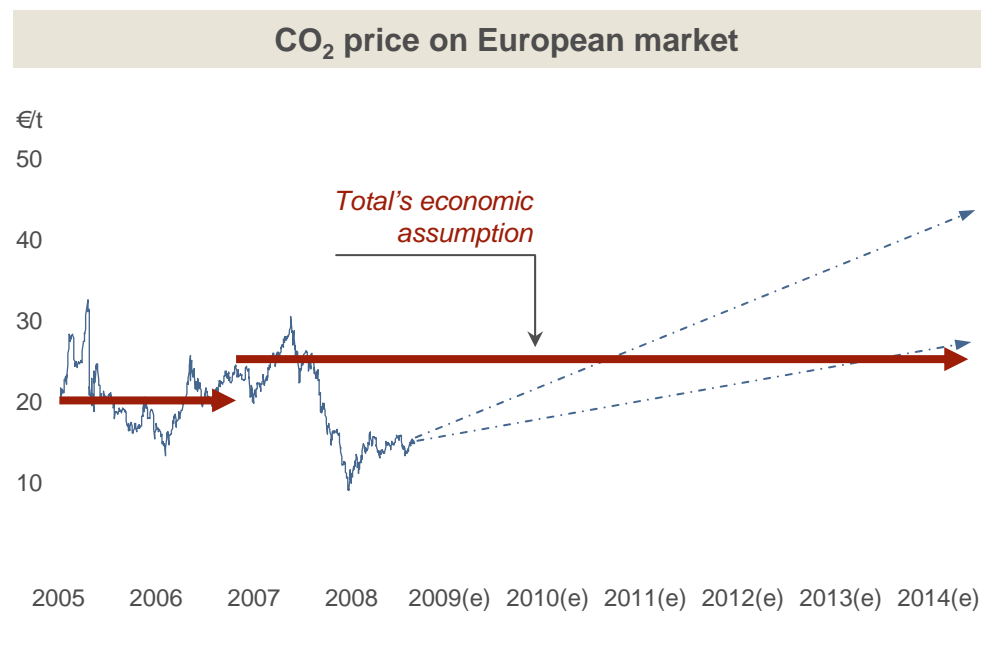
\*\* N<sub>2</sub>O : nitrous oxide

\*\*\* CH<sub>4</sub> : methane



# Cost of CO<sub>2</sub> integrated in our strategy

- > Consider CO<sub>2</sub> emissions of each project
- > Economic assumption of 25 €/t CO<sub>2</sub> in our new projects since 2008
- > Price signal linked to regulatory framework and technology development



- > EU market price estimations for 2020 between 20-50 €/t

***Long-term visibility required  
to define sustainable investment and R&D strategy***

source : Total

# Exploration & Production : no flaring on new projects and flaring reduction on existing fields

## > Flaring reduction technologies :

- Valorization of associated gas through LNG
- Increase reinjection

## > Some delays in projects on existing fields (Nigeria, Libya, Russia)

- Local context
- Partnership decision
- Economic conditions

## > Success in associated gas treatment without flaring :

### → on new projects

- Currently producing : Girassol, Dalia and Akpo
- Ongoing projects : Pazflor, Usan, Egina

### → on existing fields

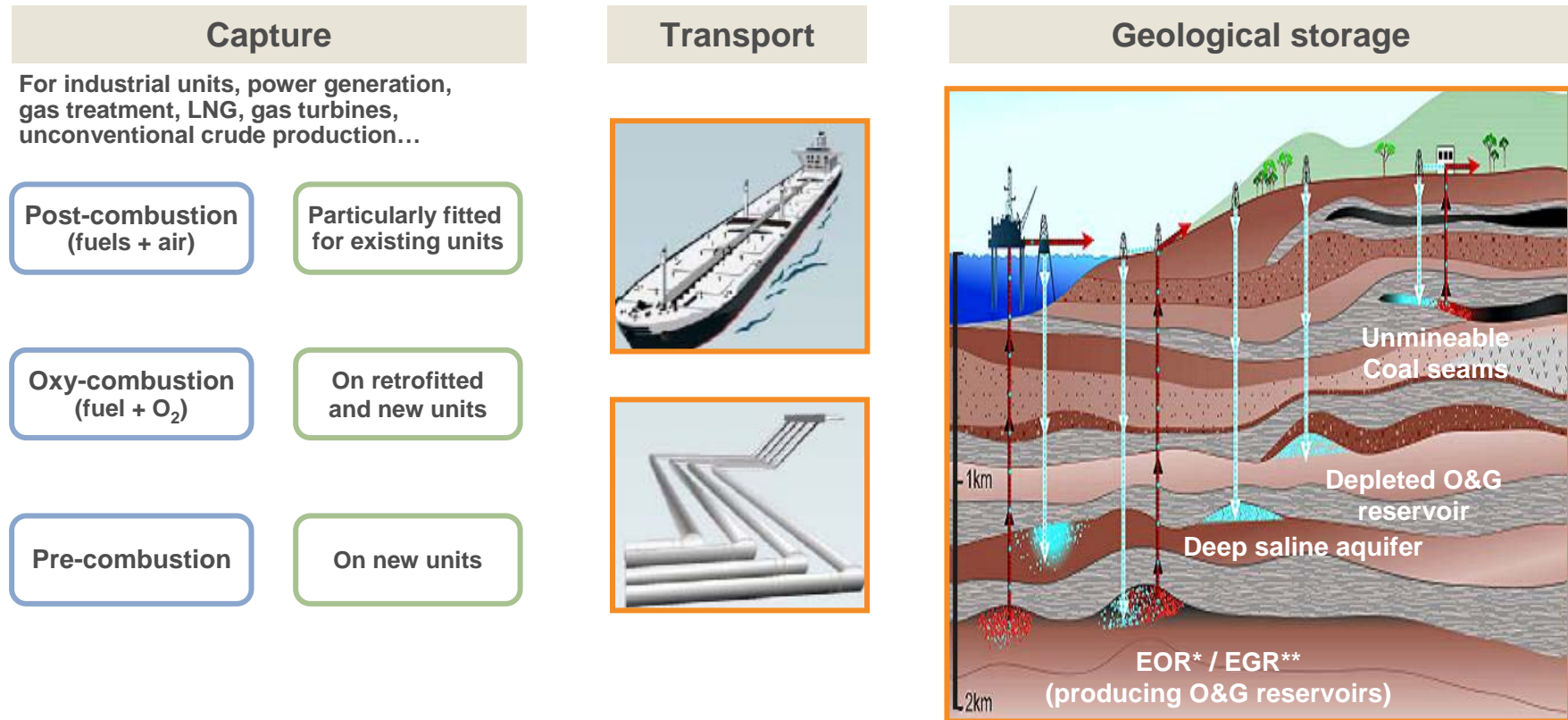
- ABK (OKDG project) : new compression unit to recover low pressure associated gas (-0.2 Mm<sup>3</sup>/d)
- Nkossa : improvement of compression capacity and reliability (-0.4 Mm<sup>3</sup>/d)
- Amenam : gas valuation by export to Bonny LNG

Akpo compressor



***Flaring reduction target : -50% in 2014 vs 2005  
subject to partners' support***

# CO<sub>2</sub> capture and storage : a chain of potential technologies



***Committed to making CCS sustainable***  
***Cooperation strongly needed with private and public stakeholders***

Geological storage image source : IPCC  
 \* EOR : Enhanced oil recovery  
 \*\* EGR : Enhanced gas recovery



# Total CCS pilot in France : the first fully integrated project

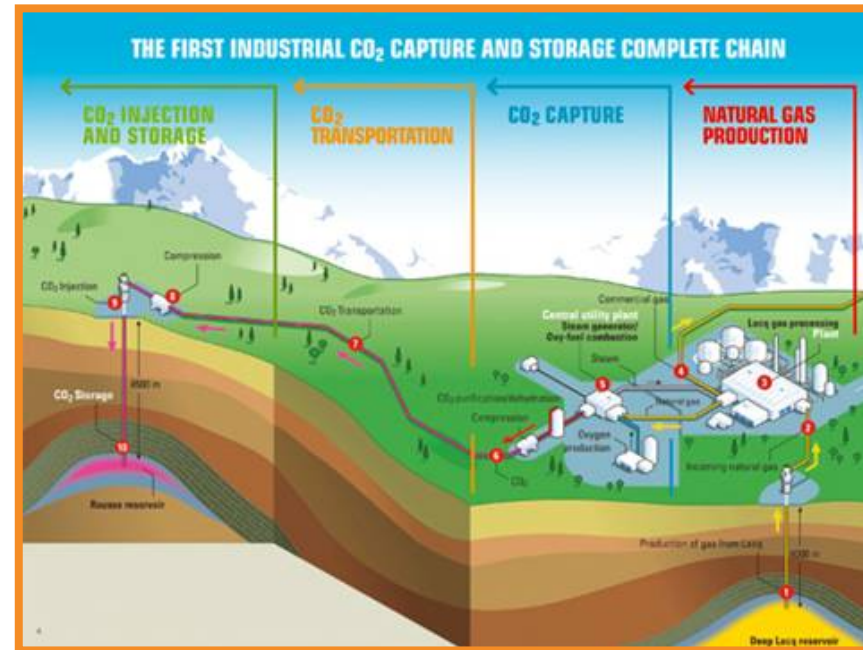
## > Innovative approach

- Technology (oxy-combustion, monitoring...)
- License to operate on existing gas field
- Public dialogue

## > Project budget : 60 M€ Capex

## > Objectives following the start-up of oxy-combustion and capture (June 2009)

- Start up injection end-2009
- 120 kt CO<sub>2</sub> injected during 2 years equivalent to emissions of 40,000 vehicles
- Oxy-combustion from laboratory (30 MW) to industrial scale (300-500 MW) in 2015+



***Acquire expertise and reduce costs  
for future industrial deployment***

# Total strategy on energy efficiency

## › Operational optimization including monitoring, reliability and maintenance

Ex : furnaces and boilers

→ from 0.5% to 4% of site Energy Efficiency Index gain

## › More energy efficient new projects

Ex : planned heat recovery and Packinox exchanger

→ from 0.8% to 3% of site Energy Efficiency Index gain

## › Sharing best practices and technologies

## › R&D partnerships :

- Capital investment
- 100 M€ for a 5-year program to promote efficient technologies for small and medium enterprises



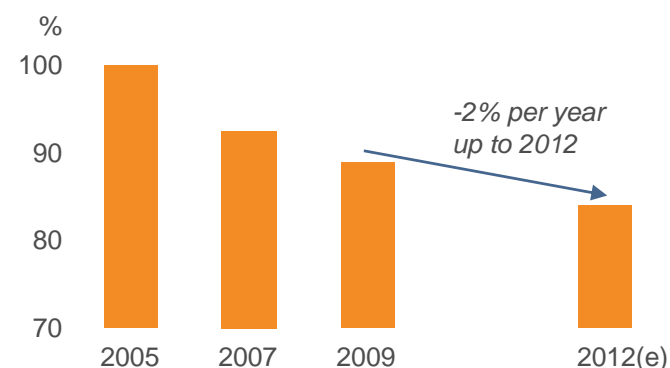
**Targets for optimization :**  
**-1% per year for Refining and**  
**-2% per year for E&P and Petrochemicals**

# Reducing energy intensity of Petrochemicals

- Important energy reduction in 2009 due to successful styrene modernization project in France and closure of inefficient energy units
  - 30% improvement in energy consumption resulting in equivalent GHG emission reduction
- Continuing energy reduction projects on :
  - Cracker furnaces
  - Cogeneration unit
  - Turbine replacement
  - Further styrene optimization in the US
- Energy savings over 10 years estimated at 170 M€ at 80 \$/b



Energy intensity activity (GJ/ t)\*



***On track with 2012 optimization target and continuing program thereafter***

\* GJ/t : Gigajoule per ton

# Energy Efficiency : innovative solutions for end-users

- › Excellium premium engine fuels launched in 2005



- › New “Total Ecosolutions” program launched in 2009

- More energy efficient and environment-friendly products and services
- Labeling process
  - ISO 14021 principles
  - External audits
- 12 products already labeled



Lubricants



Packaging



Heating systems

***Total Ecosolutions products avoid up to 500 kt/y CO<sub>2</sub>***

# Ongoing Total performance

- **Recognition of our approach by third parties**
  - Annual environmental reports subject to external audits
  - Sustainability index rating including Carbon Disclosure Project in 2006, 2007 and 2009
  
- **Results achieved between 1990 and 2008 :**
  - From -17% in Refining activities up to -40% in Upstream for emissions intensity
  
- **With the current scope of activities, global emissions to be reduced by about 15% in 2015 vs 2008**

***Sustainable energy : climate change is one of the global natural resource challenges Total is addressing***

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