



# Impact of the greenhouse gas emissions on our activities

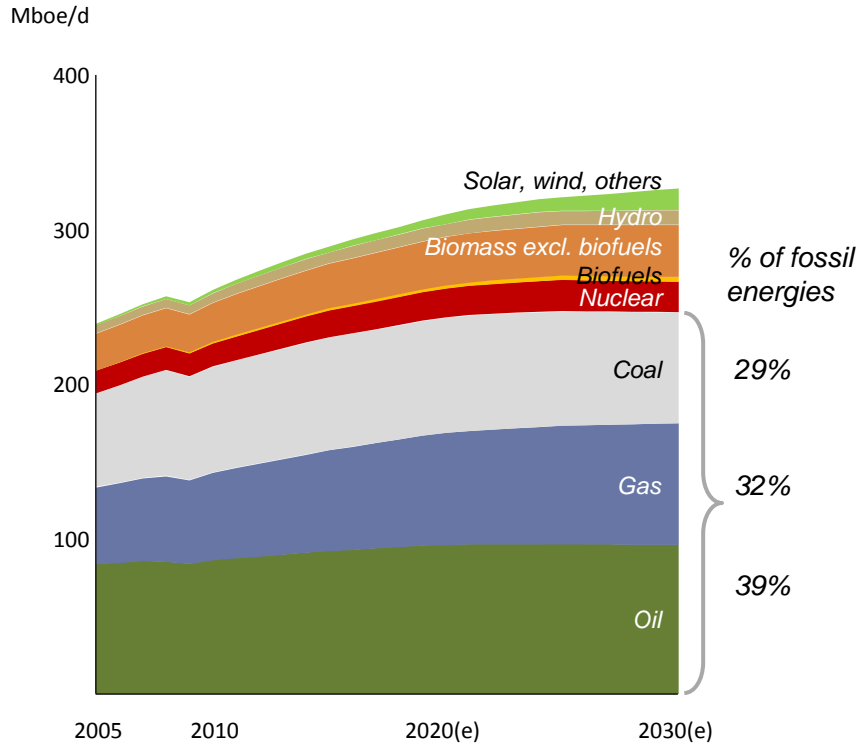


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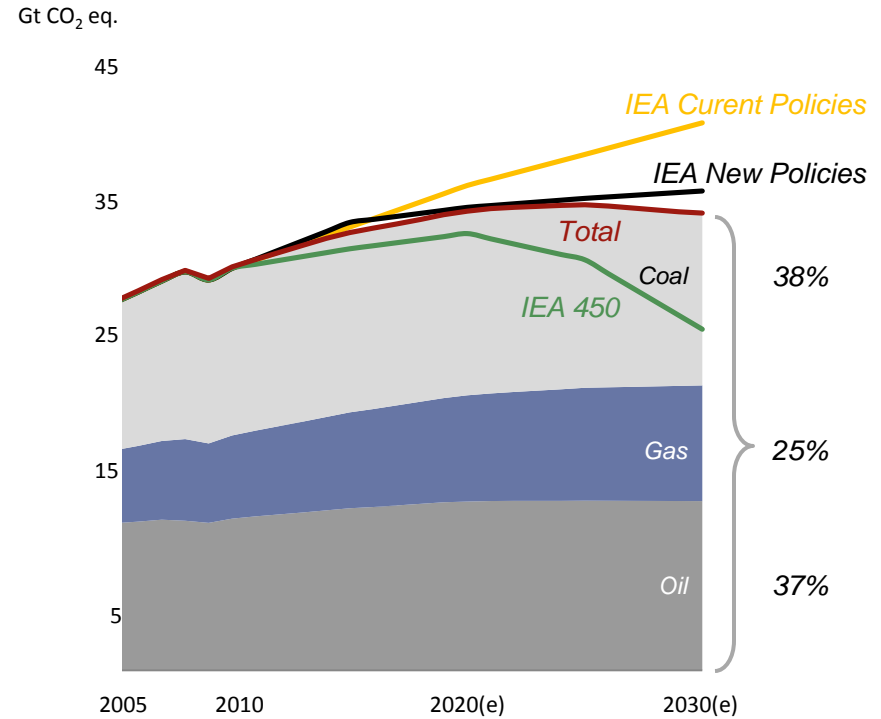


# The challenge of greenhouse gas emissions

Energy mix



GHG emissions from fossil energies

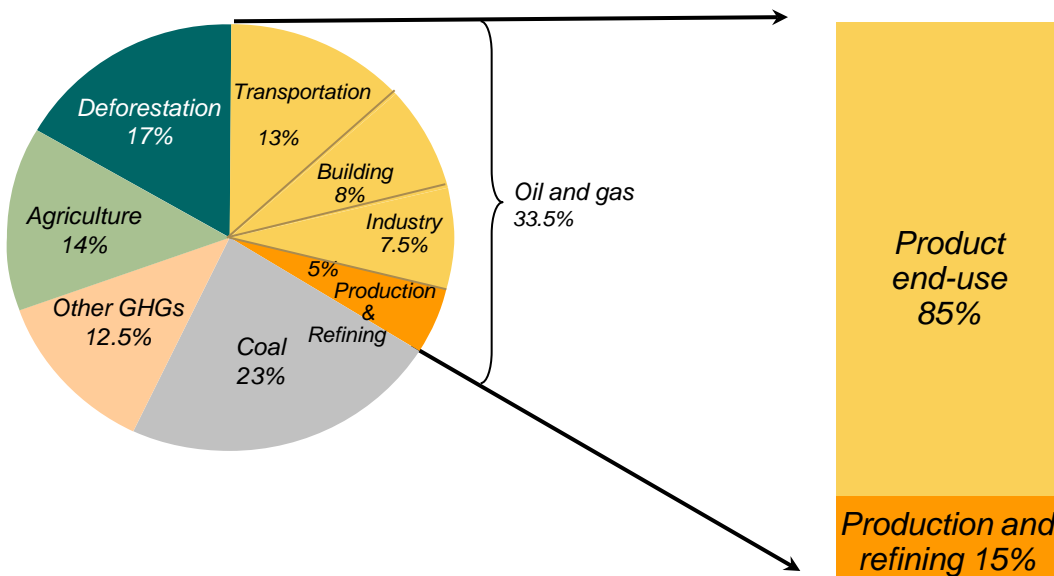


*Fossil energies will remain essential to fulfill energy needs  
Minimizing impacts on climate is a priority*

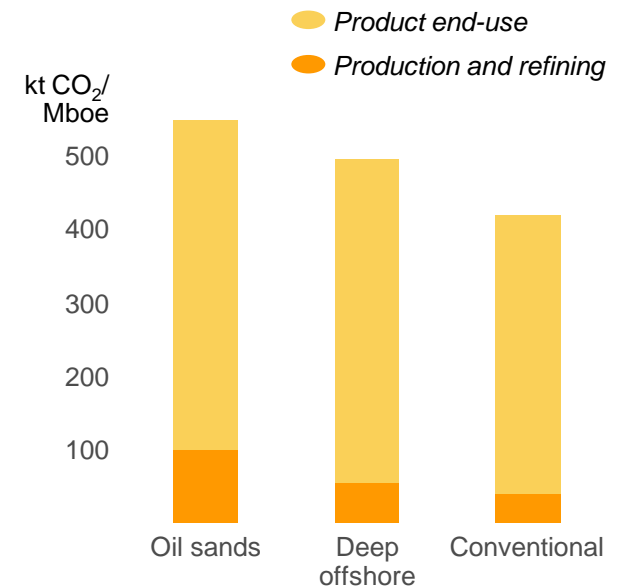
# Fossil fuels will still account for 75% of energy supply in 2030 but...

- On the long term hydrocarbons production will not be able to supply world demand
  - Oil production will soon reach a plateau (before 2020)
  - Access to resources is more and more difficult (technology, policy)
- Fossil fuels have a direct impact on global environment

Global GHG emissions by origin\*



GHG emissions by oil source\*\*



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

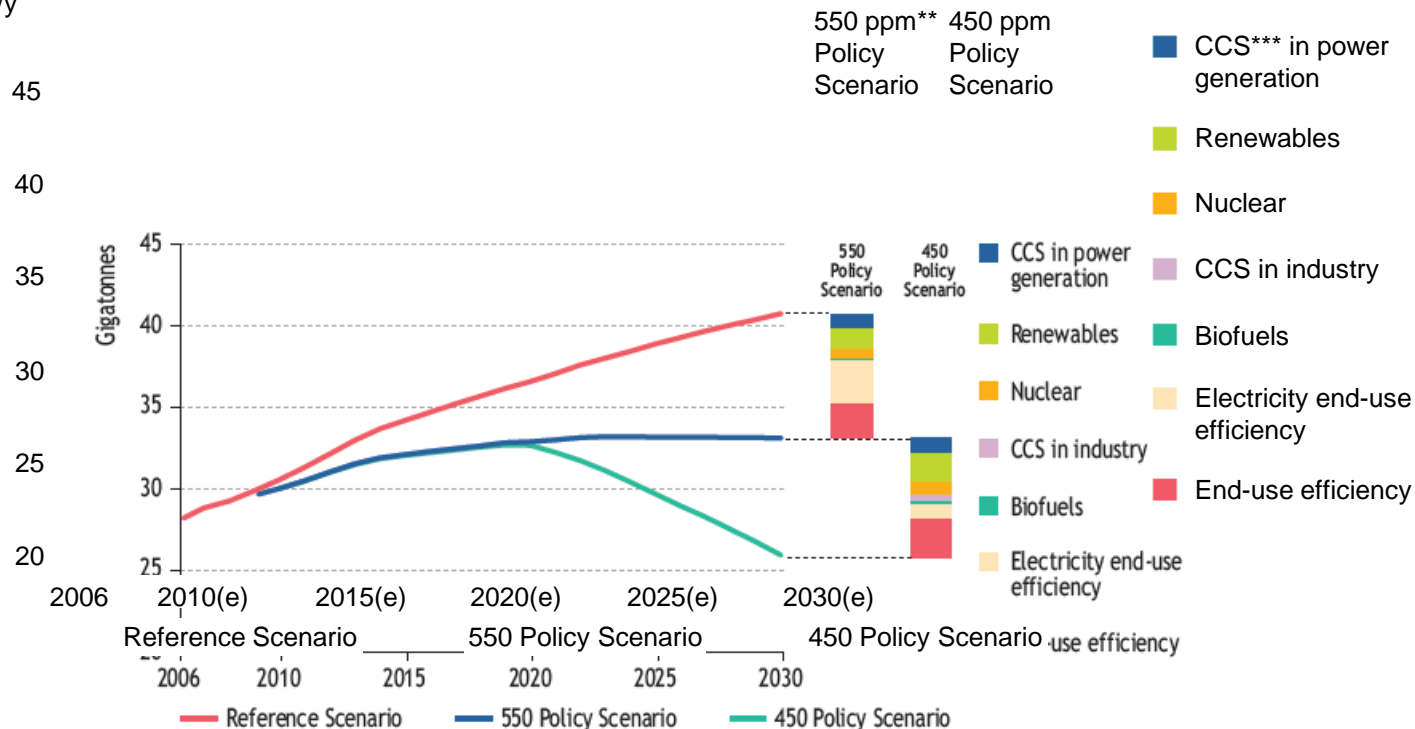
\*\* Total



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

## International Energy Agency climate scenarios

GHG\* emissions  
Bt/y

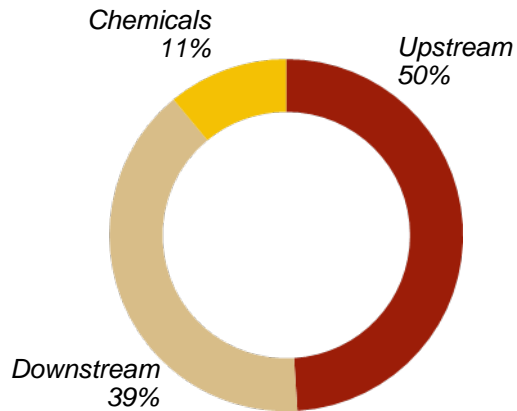


**High costs to implement required GHG reductions**  
**All countries must be involved, including non-OECD countries**

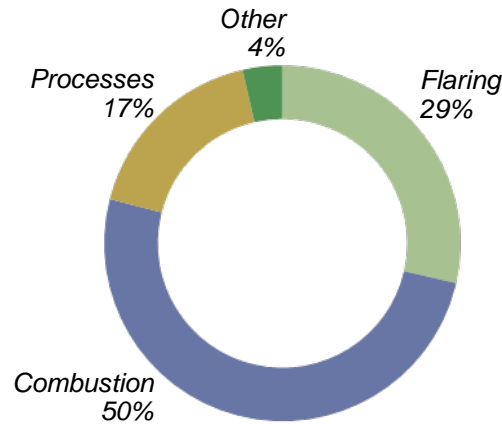
Source: IEA 2008  
 \* GHG: Greenhouse gas expressed as CO<sub>2</sub> equivalent  
 \*\* ppm: parts per million  
 \*\*\* CCS: Carbon Capture and Storage

# GHG emissions from Total-operated sites: 52 Mt CO<sub>2</sub> eq\* worldwide in 2010

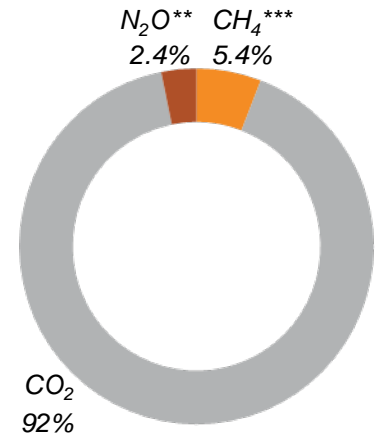
By segment



By source



By type of gas



## Leverage to cut GHG emissions today at our facilities:

- ✓ Reduce flaring
- ✓ Improve energy efficiency
- ✓ Develop carbon capture and storage

Source: Total, 2010

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

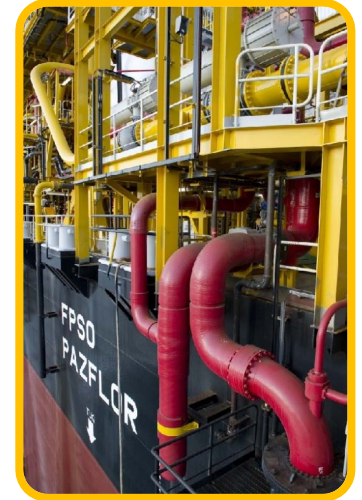
\*\* N<sub>2</sub>O: nitrous oxide

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



# Total's responses

- Reducing our own emissions
- Investing in energy efficiency
- Increasing gas share in Total's productions
- Promoting low CO<sub>2</sub> energies
- Investing in carbone capture and storage applications



*Fully using our innovation capabilities in our operations and our products*

# Decrease GHG emissions by 15% in 2015 compared to 2008

## Fast decrease over 2008-2010

- Action plans
- Activity level
- Rationalization of portfolio

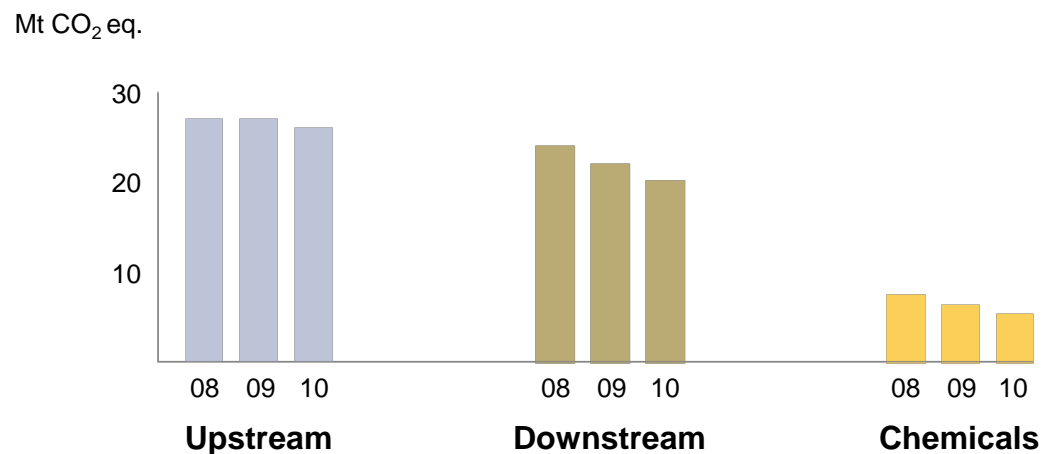
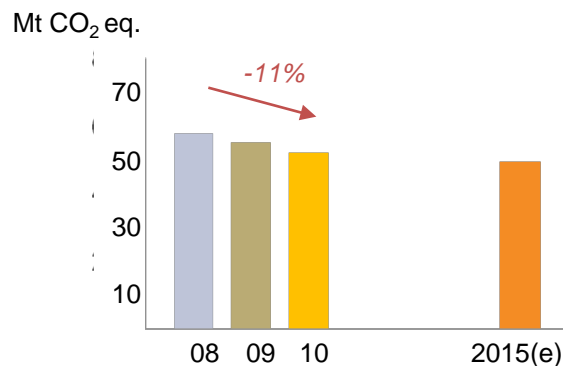
## Further improvements

- Innovation and projects to reduce flaring and enhance energy efficiency
- CO<sub>2</sub> emissions taken into account in investment decisions and portfolio management

*On track to achieve our objective*

\* current perimeter, operated sites

Total GHG emissions\*



TOTAL

# Exploration & Production: focus on two examples in Africa

## Anguille flaring reduction project (Gabon)



**Redevelopment of Anguille field: new gas fired power plant onshore, low pressure gas recompression for closed loop gas-lift**

**Flaring will decrease from around 400 km<sup>3</sup>/d to 100 km<sup>3</sup>/d in 2014 (50 km<sup>3</sup>/d in 2015)**

## Ofon 2 flaring reduction project (Nigeria)



- **Phase 2: additional development of 200 Mboe, monetize associated gas to NLNG**
- **Flaring will decrease from 1300 km<sup>3</sup>/d to around 150 km<sup>3</sup>/d end-2014 (startup mid-2014)**

# Total's energy efficiency strategy

## Operational optimization including monitoring, reliability and maintenance

Example: furnaces and boilers

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

## More energy-efficient new projects

Example: planned heat recovery and Packinox exchanger

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

## Sharing best practices and technologies

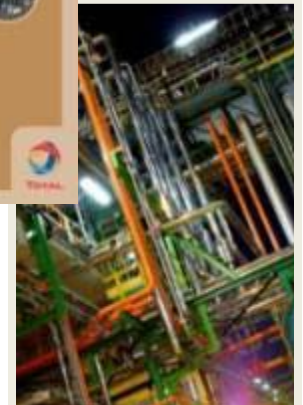
Energy Performance Management Guide published in November 2008

## R&D partnerships:

Capital investment

€100 million for a 5-year program to promote efficient technologies for small and medium-sized businesses

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



**TOTAL**

# End users

- Close to 29% of GES are due to the use of oil and gas Consumers are changing
- Innovation include eco performance
- For business and private clients  
In all sectors: transports, buildings, industry



## Total Ecosolutions program launched in 2009

More energy-efficient and environmentally-friendly products and services

Labeling process

- ISO 14021 principles
- External audits

➤ 25 products so far



Lubricants



Packaging



Heating solutions

**Total Ecosolutions products avoid CO2 emissions of up to 700,000 tons per year**

# Our strategy is also to develop low CO<sub>2</sub> energies and CCS for future energy mix

## Solar



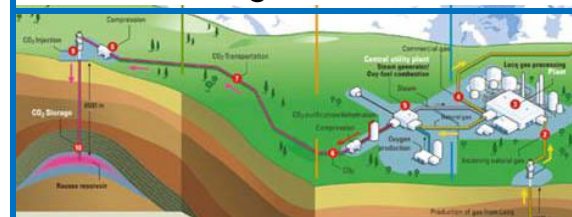
- › Unlimited resource adapted for access to power in remote areas
- › Necessary improvement of efficiency and costs
- › Issue of power storage

## Biomass



- › Complementary source for liquid fuels
- › Competition with food for first generation
- › Second and third generation still in R&D stage
- › Logistics

## Carbon capture and storage



- › Pilot stage, further R&D needed
- › Acquiring expertise and reducing costs
- › Dependent on governmental policies
- › Clean coal

***Helping oil and gas-producing countries to diversify their energy mix***

# ...and diversify our offer to new and future markets

## Develop new markets for the Bottom of the Pyramid

### 4 axis understudy, in line with our core areas:

- Photovoltaic Solar
- Biofuels (produced and locally consumed)
- Gas valorization
- Energy poverty

***A triple challenge :***  
***- Take position on potential market***  
***- Reinforce our local integration***  
***- Develop new low cost solutions with low environmental impact***

