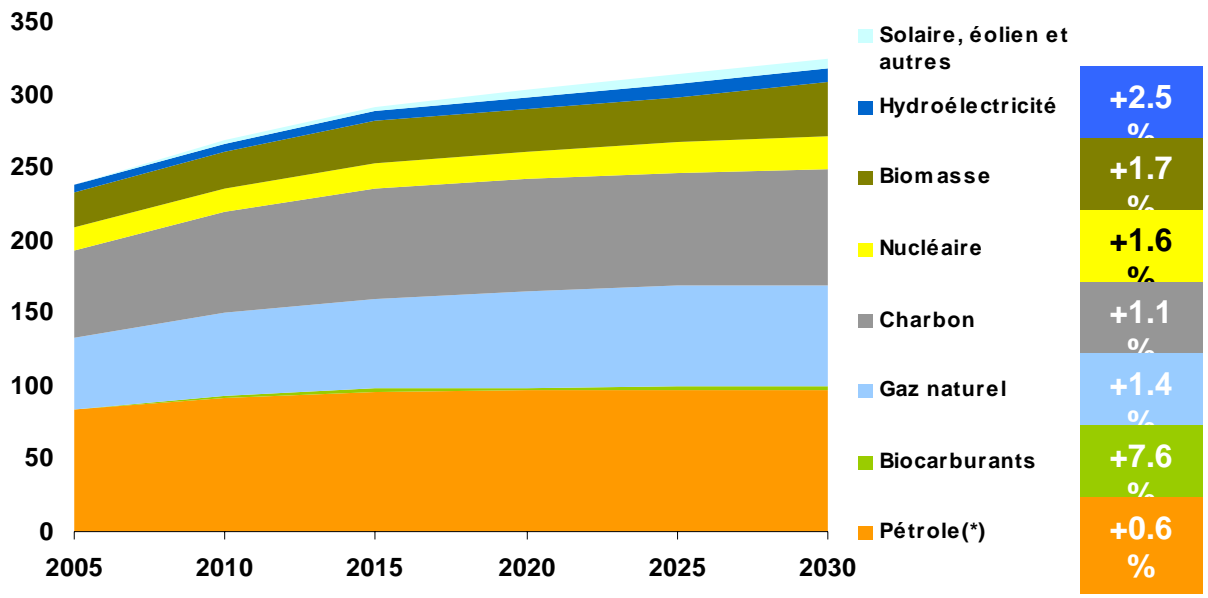
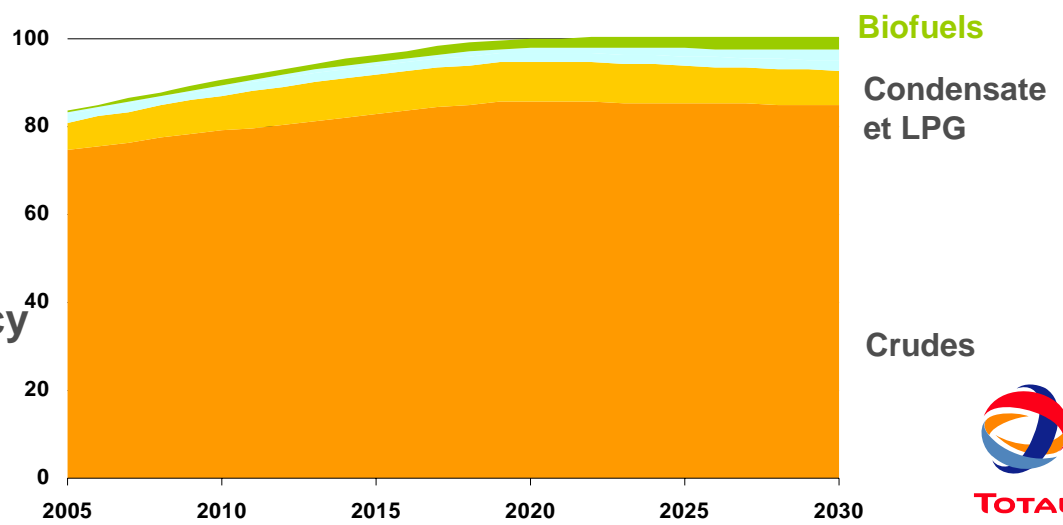


Alternative fuels within TOTAL : Hope and issues

Fossil energies keep predominance on energy mix in 2030



- Supply maintained to +/- 100 Mb/j, thanks to XtL and biofuels
- Important efforts of energy efficiency to contain demand



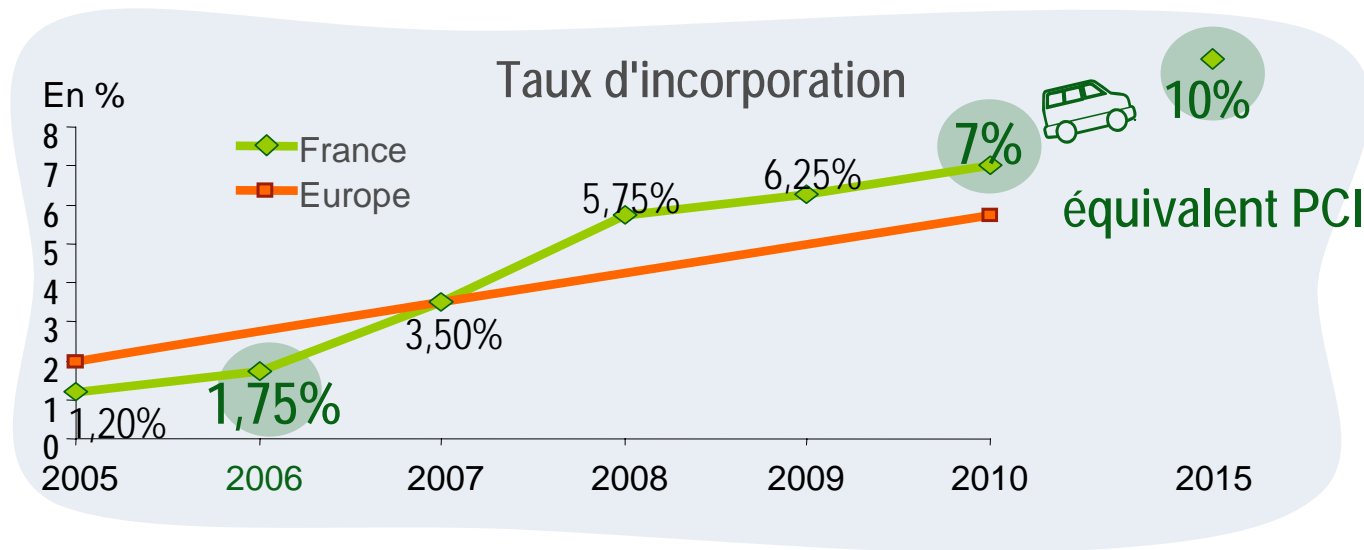
(*) CTL, GTL



European directives will be translated by each EU country

► Each European country has different approaches (for technical or fiscal point of view)

► The French rates of bio-fuels introduction go beyond the EU recommendations :



► **Strong incentives policies : e.g. France is using 2 fiscal ways :**

- Partial exemption from the tax (TIPP) on approval bio-fuels volumes (the volumes are revised every year),
- As Biofuels introduction is mandatory, penalties for fuel supply companies proportional in the sub-introduction
 - **General Tax on the Polluting Activities (TGAP) : several hundreds million € for Total!!**

Biofuels in Europe

▶ Gasoline

- **Bio-components : EtOH or ETBE**
- **E10 will become the standard grade in Europe at the beginning of 2011**
 - For the time being, it is an existing grade in France (since 2009 April the 1st) – 50% of TOTAL Service Station
- **E5 will become the protection grade for one part of the oldest vehicles which are not compatible with E10**
- **E85 only for FFV vehicles**

▶ Diesel Oil

- **Bio-components : esters - most often from vegetable oils (rapeseed, soja, palm, ...) but sometimes from cooking oils or animal fats, HDO, ...**
- **B7 will become the standard grade in Europe at the beginning of 2011**
 - For the time being, it is an existing grade in France (since 2008 January the 1st) – 50% of TOTAL Service Station
- **B10? Discussion started at European level (EU mandates on the subject) but no timing for the time being**
- **B30 only for dedicated fleets in France for 15 years**

Second generation biofuels

Vegetable oils
Animal fats




Oils and fats


Hydro-treatment

Bio-diesel

Wood
Plants





Gazeification and synthesis

Diesel, DME...
(BioTfuel, Bio-DME)

Wood
Straw





Enzymatic hydrolysis
fermentation

Ethanol
(Futurol)

Organic residues
Wood
Straw




Bio-crude


Refining

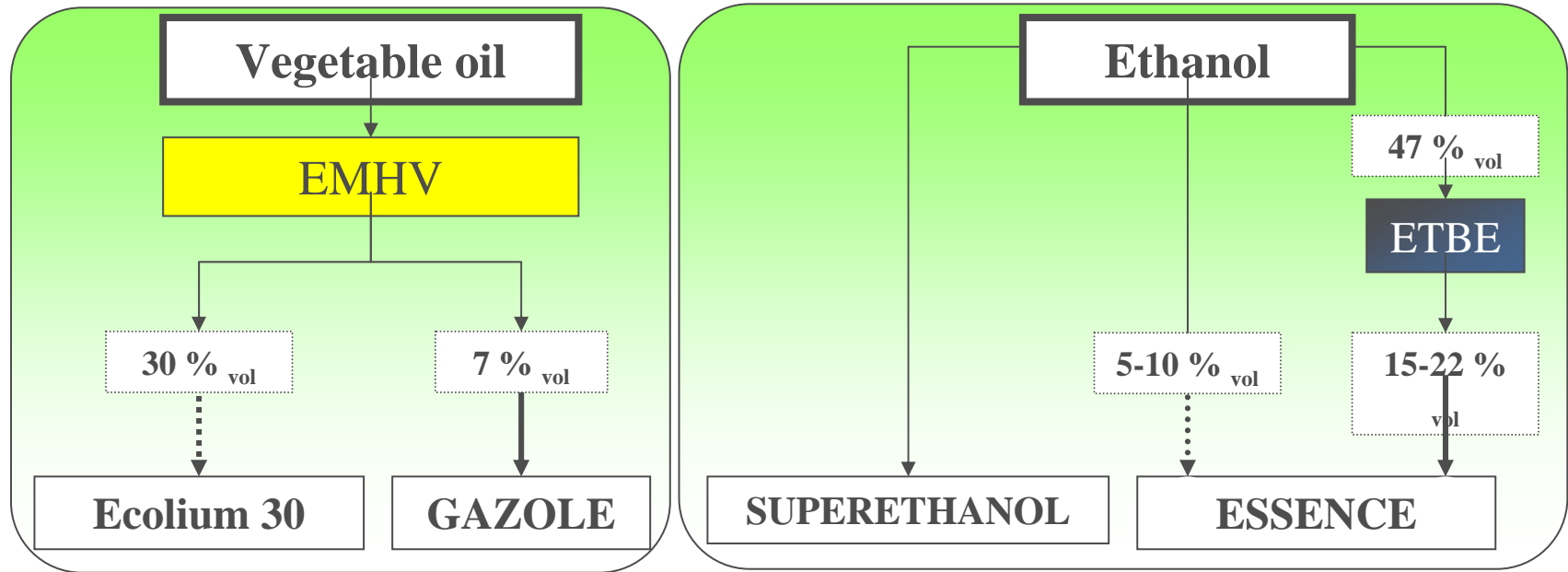
Refined
bio-crude
and fuels
(Hydrothermal
conversion,
pyrolysis)

ACV and energetic yield will be decisive factors



Back up

Bio-fuels – the french example



	2005	2006	2007	2008	2009	2010
Objectifs	1,2 % _{PCI}	1,75 % _{PCI}	3,5 % _{PCI}	5,75 % _{PCI}	6,25 % _{PCI}	7 % _{PCI}
% V/V						
Biodiesel	1,3	1,9	3,8	6,3	6,8	7,6
Ethanol	1,9	2,7	5,3	8,8	9,5	10,7
ETBE	3,1	4,5	9	14,8	16,1	18,0

Oil & Biofuels, a recent revival: ETBE & FAME

The CAP Reform Adopted May 1992

The Common Agricultural Policy (CAP) faced the most fundamental reform since creation in the 60s. European agriculture was confronted with overproduction of many goods and especially sugar and vegetable oils.

The launch of ETBE (Ethyl Tertio Butyl Ether) Since 1993,

ELF, CEPSA and TOTAL invested in ETBE production plants all over Europe. Produced by the reaction of ethanol on isobutene, ETBE offers high octane without any demixion effect nor vapor pressure increase



Meanwhile FAME (Fatty Acid Methyl Ester) is blended into diesel

The Blair House Agreement in November 1992 between the USA and the European Union allows European farmers to grow oilseeds on set aside land if the product is not used for food.

■ Refineries where FAME and ETBE are blended
*Ethanol cannot be transported by pipe-lines
and is blended in depots*