Concawe
Environmental Science for European Refining

Setting the scene: A Clean Planet for all

… and the role of the refining industry

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01 Setting the Scene: A Clean Planet for all

Introduction and Context

A Clean Planet for all: EU long-term strategic vision

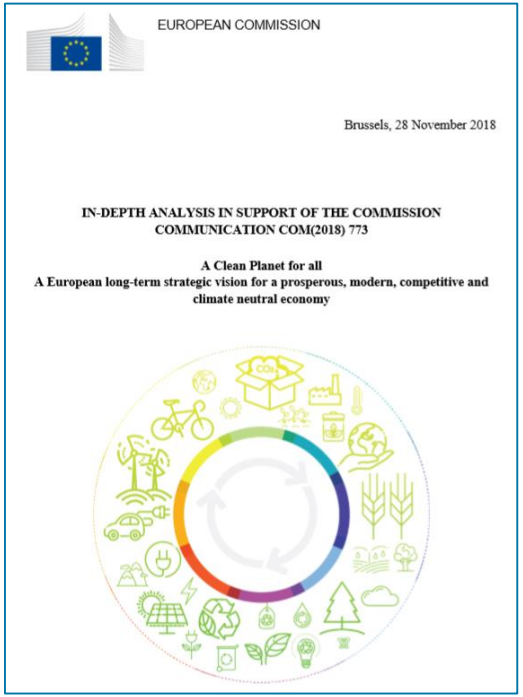
The **EU Commission** has **recently published** (28th Nov 2018) its **long-term strategic vision** for a prosperous, modern, competitive and climate neutral economy in Europe.

Recognising that **climate change** represents an **urgent threat to societies and the planet**, the **2015 Paris Agreement** sets the goal of keeping global warming well below 2°C above pre-industrial levels, and pursuing efforts to limit it to 1.5°C (global warming already reached 1°C).

The EU Commission strategy:

- ✓ confirms Europe's **commitment to lead** in global climate action
- ✓ provides an assessment, in accordance with the Paris Agreement, to reduce EU **greenhouse gas emissions**, starting at **-80% going up to -100% by 2050** compared to 1990.

Link: https://ec.europa.eu/clima/sites/clima/files/docs/pages/com_2018_733_analysis_in_support_en_0.pdf


EUROPEAN COMMISSION

Brussels, 28 November 2018

IN-DEPTH ANALYSIS IN SUPPORT OF THE COMMISSION COMMUNICATION COM(2018) 773

A Clean Planet for all
A European long-term strategic vision for a prosperous, modern, competitive and climate neutral economy

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Scenarios

Eight scenarios to achieve GHG emissions reductions between 80% and 100% by 2050 (compared to 1990)

Long Term Strategy Options

	Electrification (ELEC)	Hydrogen (H2)	Power-to-X (P2X)	Energy Efficiency (EE)	Circular Economy (CIRC)	Combination (COMBO)	1.5°C Technical (1.5TECH)	1.5°C Sustainable Lifestyles (1.5LIFE)
Main Drivers	Electrification in all sectors	Hydrogen in industry, transport and buildings	E-fuels in industry, transport and buildings	Pursuing deep energy efficiency in all sectors	Increased resource and material efficiency	Cost-efficient combination of options from 2°C scenarios	Based on COMBO with more BECCS, CCS	Based on COMBO and CIRC with lifestyle changes
GHG target in 2050	-80% GHG (excluding sinks) ["well below 2°C" ambition]					-90% GHG (incl. sinks)	-100% GHG (incl. sinks) ["1.5°C" ambition]	
Major Common Assumptions	• Higher energy efficiency post 2030 • Deployment of sustainable, advanced biofuels • Moderate circular economy measures • Digitilisation				• Market coordination for infrastructure deployment • BECCS present only post-2050 in 2°C scenarios • Significant learning by doing for low carbon technologies • Significant improvements in the efficiency of the transport system.			
Power sector	Power is nearly decarbonised by 2050. Strong penetration of RES facilitated by system optimization (demand-side response, storage, interconnections, role of prosumers). Nuclear still plays a role in the power sector and CCS deployment faces limitations.							
Industry	Electrification of processes	Use of H2 in targeted applications	Use of e-gas in targeted applications	Reducing energy demand via Energy Efficiency	Higher recycling rates, material substitution, circular measures	Combination of most Cost-efficient options from "well below 2°C" scenarios with targeted application (excluding CIRC)	COMBO but stronger	CIRC+COMBO but stronger
Buildings	Increased deployment of heat pumps	Deployment of H2 for heating	Deployment of e-gas for heating	Increased renovation rates and depth	Sustainable buildings			CIRC+COMBO but stronger
Transport sector	Faster electrification for all transport modes	H2 deployment for HDVs and some for LDVs	E-fuels deployment for all modes	Increased modal shift	Mobility as a service			• CIRC+COMBO but stronger • Alternatives to air travel
Other Drivers		H2 in gas distribution grid	E-gas in gas distribution grid				Limited enhancement natural sink	• Dietary changes • Enhancement natural sink

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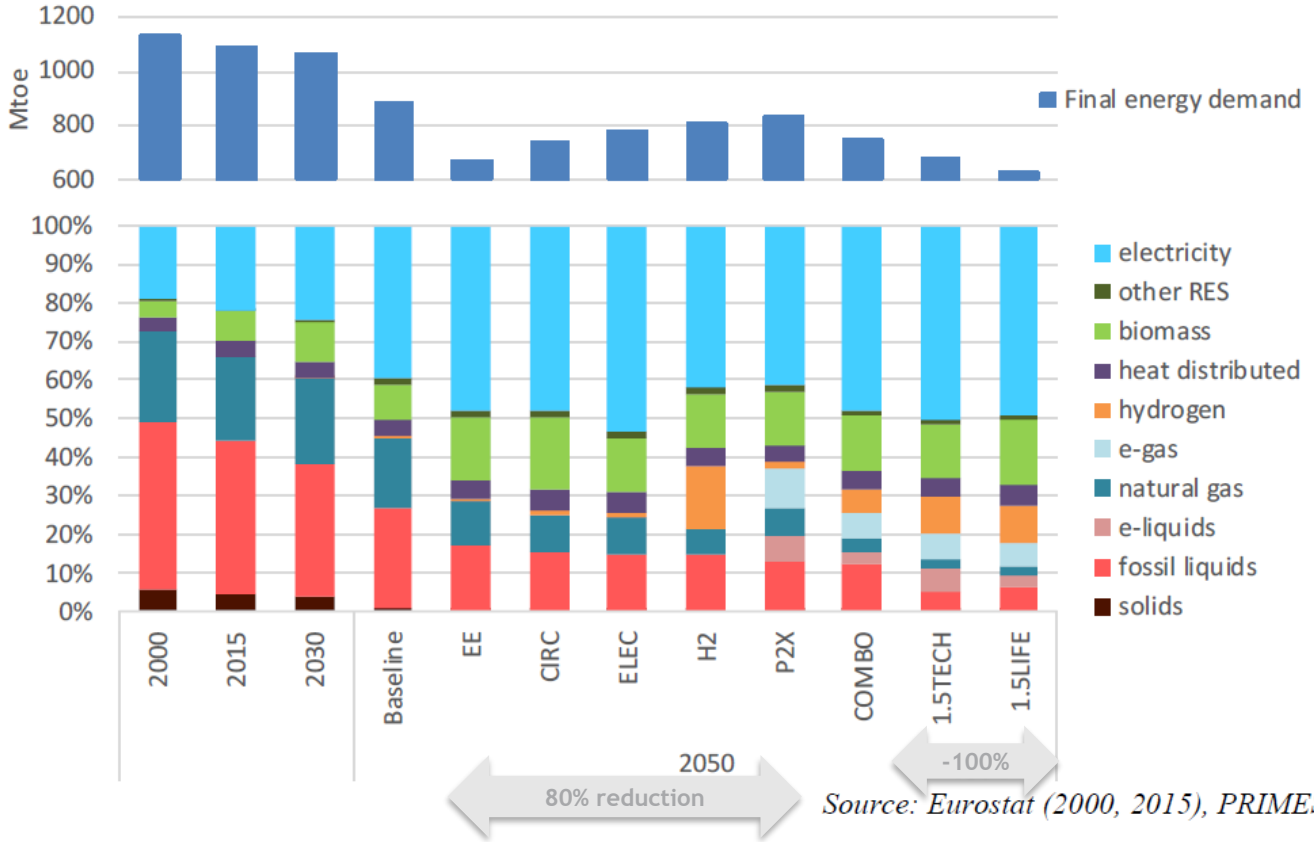
Clean Planet for all (DG CLIMA, 2018)

Share of energy carriers in final energy consumption



Source: Eurostat (2000, 2015), PRIMES.

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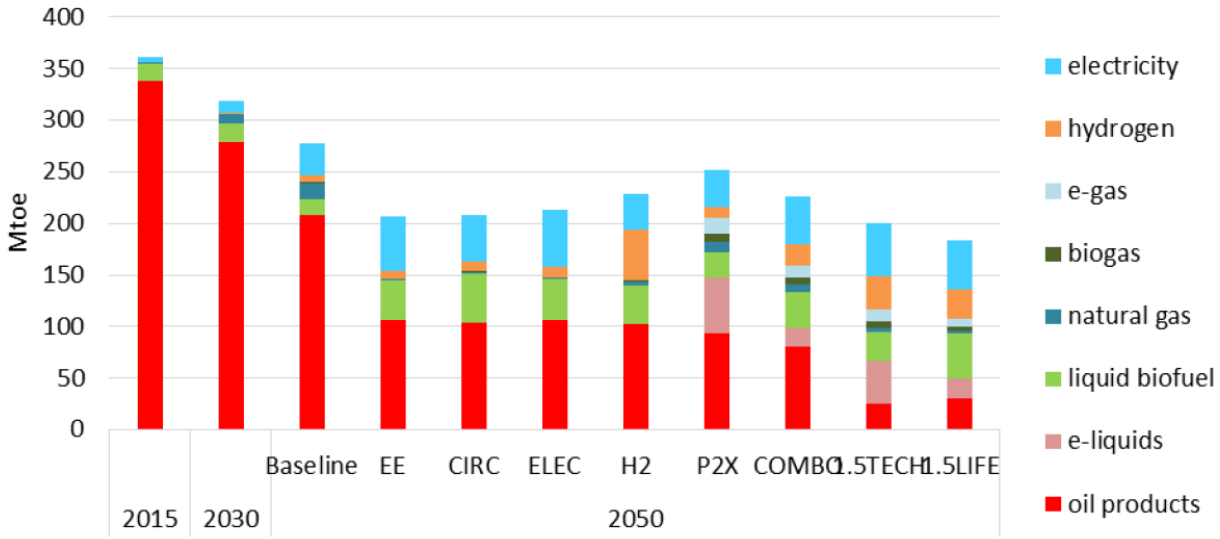
Clean Planet for all (DG CLIMA, 2018)

Fuels Consumed in the transport sector

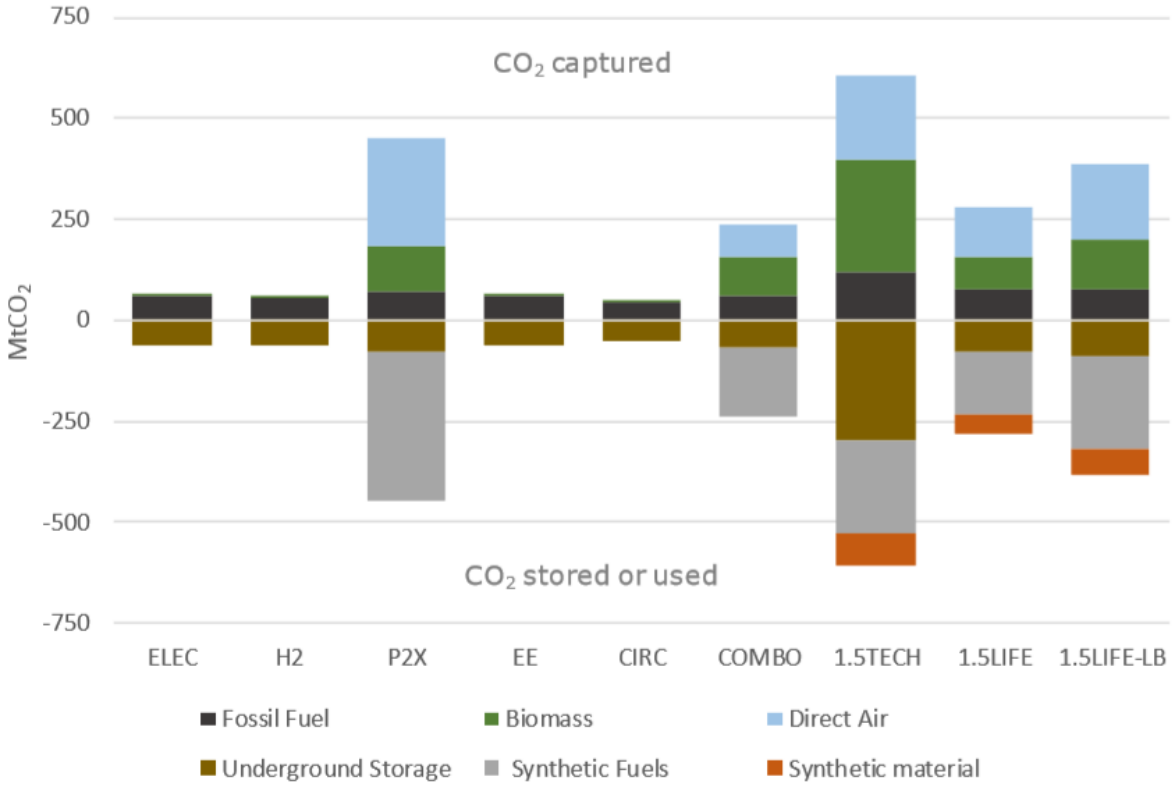


Source: PRIMES.

"[…] For those transport modes where the deployment of zero emission vehicles is unfeasible due to the energy density requirements or technology costs, advanced biofuels and e-fuels can be deployed for use in conventional vehicle engines"

Clean Planet for all (DG CLIMA, 2018)

CO_2 capture and storage or reuse (2050)



CCS and CCU identified as relevant technologies to achieve also **negative emissions**

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Vision 2050 (FuelsEurope)

Low Carbon Pathways (Concawe)

The Team

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The role of the refining system in a low-GHG future (for Europe)

Vision 2050 and Low Carbon Pathways programme

FuelsEurope

Read Vision 2050 >

Vision 2050 - Two Pager >

https://www.youtube.com/watch?v=OtKcTs_A1cw

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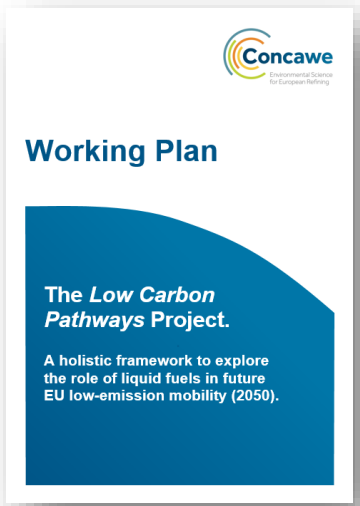

The Low Carbon Pathways Project. A holistic framework to explore the role of liquid fuels in future EU low-emission mobility (2050).

Low Carbon Pathways CO2 efficiency in the EU Refining System. 2030 / 2050 – Executive Summary (Interim report)

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Vision 2050: The refinery as an ENERGY HUB…

… within an INDUSTRIAL CLUSTER