

concaawe



Standards for Fuels

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CEPS Workshop

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CONservation of Clean Air and Water in Europe

The Oil Companies' European association for health, safety and environment in refining and distribution

(founded in 1963)



Operating Principles:

- ✓ Sound science
- ✓ Cost-effectiveness of options
- ✓ Transparency of results

- Automotive Emissions & Fuel Quality
- Air Quality
- Water/Soil Quality & Waste
- Oil Pipelines
- Safety
- Refinery Technology Support
- Health Science
- Petroleum Products
- Risk Assessment
- REACH & GHS Implementation

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- ▶ Membership is open to companies owning EU refining capacity
- ▶ 43 Members, representing almost 100% of EU refining capacity

AlmaPetroli

APC

api

BP

CEPSA

ENI

ERG

Essar Oil

ExxonMobil

Galp Energia

Gunvor

Hansen & Rosenthal

Hellenic Petroleum

INA

INEOS

IPLOM

Koch

KPI

LOTOS

LUKOIL

LyondellBasell

MOL

Motor Oil Hellas

Murco

Neste Oil

Nynäs

OMV

Phillips66

PKN Orlen

Preem

Raffinerie Heide

Repsol

Rompetrol

SARA

SARAS

Shell

SRD

Statoil

St1

Tamoil

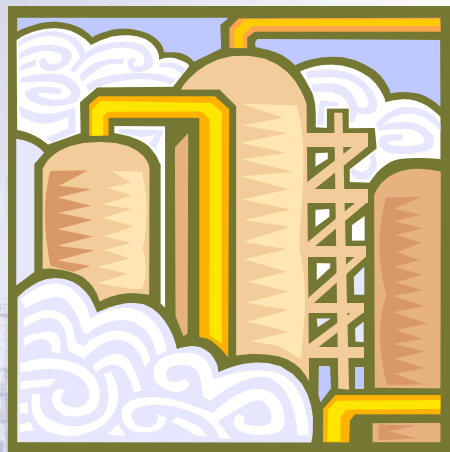
TOTAL

Valero

Varo Energy

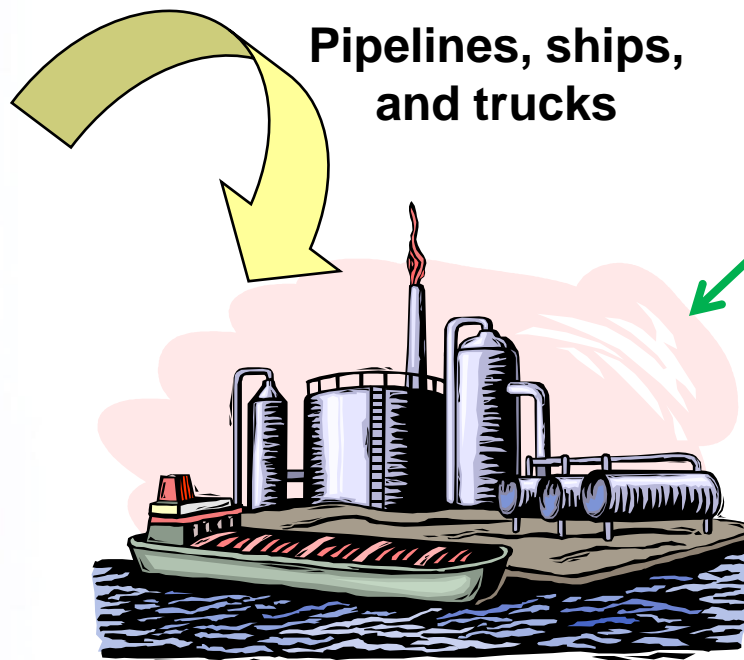
- ▶ Almost all CONCAWE research is funded by Member Companies





Refineries

FAME
Ether

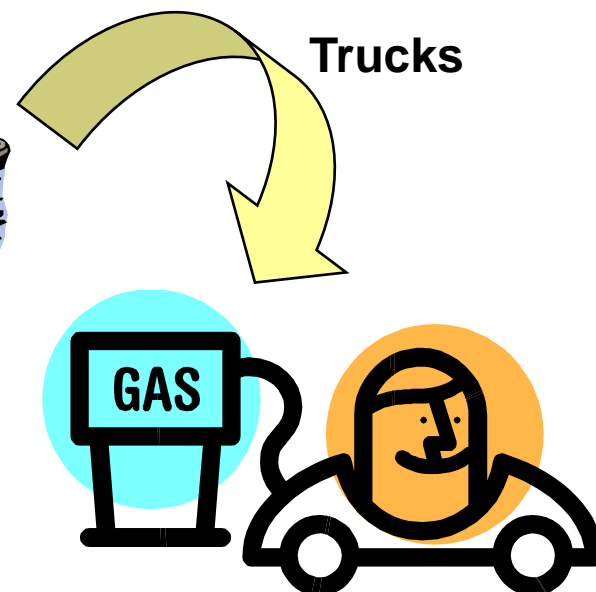


Blending Terminals

Pipelines, ships,
and trucks

Ethanol

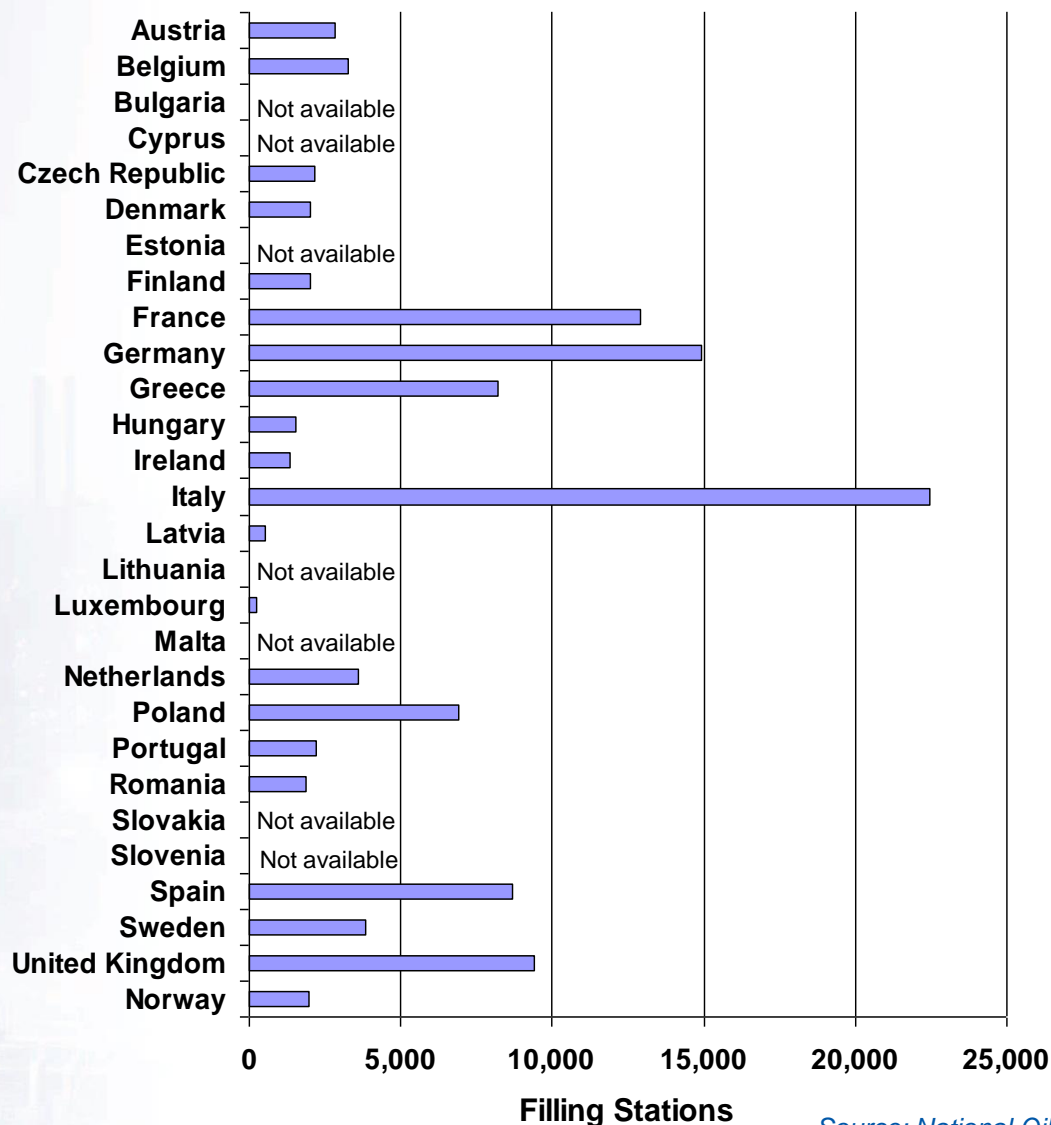
Trucks



Filling Stations

*Guided by standards, test methods, and procedures
.....and informed by experience!*





► About 25 million vehicles refueled each day!

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Source: National Oil Industry Associations (NOIA) (2007)



concauwe How Much Fuel Is 300 Million Tonnes per Year?

- It's about 1 Billion litres per day!
- About 21 times the volume of the Arc de Triomphe!



Eiffel Tower
(300m x 100m x 100m)



Arc de Triomphe
(50m x 45m x 22m)

OR

About the same volume as
the Eiffel Tower!

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- ▶ **Reduce Greenhouse Gas emissions from energy and transport**
 - ▶ Energy Efficient Road Transport Vehicles (2008)
 - ▶ Emissions Trading Scheme (ETS)
 - ▶ Geological Storage of Carbon Dioxide (2008)
 - ▶ **Fuel Quality Directive (2009)**
 - ▶ 6% reduction in GHG emissions by 2020 through refinery efficiency, upstream emissions reductions, and biofuel blending
 - ▶ **Clean Power for Transport (2012): gas & electric refueling infrastructure**
- ▶ **Encourage use of sustainably-produced renewable fuel products**
 - ▶ Fuel Quality Directive (2009)
 - ▶ Allow up to 10% v/v ethanol in gasoline (E10) – DONE!
 - ▶ **Renewable Energy Directive (2009)**
 - ▶ 10% renewables (energy basis) in road fuels by 2020
 - 2012 RED Amendment proposes 5% cap on biofuels that compete with food (ethanol, FAME), encourages advanced biofuels, and includes extra credits for non-food products
 - ▶ Intermediate targets in 2015 and a progress review in 2014
 - ▶ Member State strategies communicated through NREAPs
 - National Renewable Energy Action Plans (2010)



- ▶ Bio-components:
 - ▶ Ethanol, for gasoline blending (EN15376)
 - ▶ Fatty Acid Methyl Esters (FAME, EN14214)
- ▶ Gasoline (EN228)
 - ▶ E5: up to 5% v/v ethanol & up to 2.7wt% oxygen ('protection grade')
 - ▶ E10: up to 10% v/v ethanol & up to 3.7wt% oxygen
 - ▶ Technical Report 16514 approved by CEN/TC19:
Automotive fuels – Unleaded petrol containing more than 3,7% (m/m) oxygen – Roadmap, test methods, and requirements for E10+ petrol
- ▶ Diesel Fuel (EN590)
 - ▶ B7: 7% v/v FAME in diesel fuel
 - ▶ B10: CEN/TC19 considering development based on EC guidance
 - ▶ Generally no limits on advanced diesel blending components
 - ▶ Hydrogenated vegetable oils (HVO) and animal fats

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- ▶ Availability of “1st generation” bio-components:
 - ▶ Ethanol will be more readily available but less utilised in Europe compared to FAME because of the fleet fuel demand
 - ▶ Biodiesel components are needed to counterbalance Europe’s ever-increasing diesel/gasoline ratio
 - ▶ Methodologies have been deployed to define sustainable biofuels and certify them for use in road fuels
 - ▶ Biofuels are not 100% renewable and contribute only partly to GHG emission reductions
 - ▶ Uncertainty about policy directions related to 5% cap on 1st Generation biofuels and indirect land use change (ILUC) effects
- ▶ “1st generation” bio-components will be the mainstay of the road fuel pool for many years while “2nd and 3rd generation” products slowly enter the marketplace

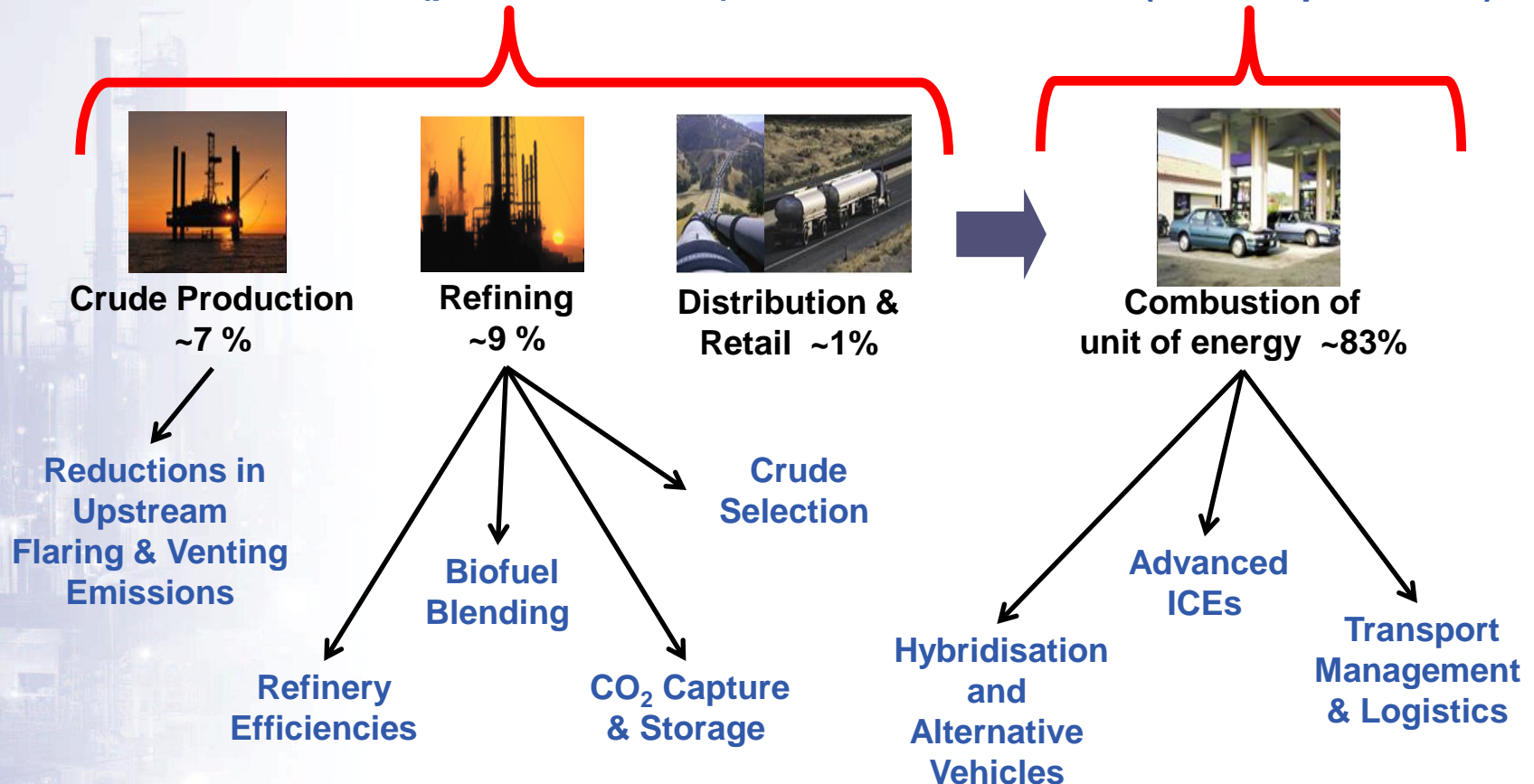


Well-to-Tank (WTT)

~17% (production side)

Tank-to-Wheels (TTW)

~83% (consumption side)





The **JEC** research collaboration was initiated in 2000 by:

- **JRC:** Joint Research Centre of the European Commission
- **EUCAR:** European Council for Automotive R&D
- **CONCAWE:** Research Association of the European Oil Refining Industry

Collaborative Projects

➤ 2000-2012: Projects Completed

- ☐ Well-to-Wheels (WTW) Study Versions 1, 2b, and 2c
- ☐ WTW Study Version 3: enhancing pathways and vehicles
- ☐ Impact of ethanol on vehicle evaporative emissions (SAE 2007-01-1928)
- ☐ Impact of ethanol in petrol on fuel consumption and emissions
- ☐ JEC Biofuels Study for a 2020 time horizon (2011)
- ☐ <http://ies.jrc.ec.europa.eu/about-iec>

➤ 2013: Projects in progress

- ☐ Summer 2013: JEC WTT and TTW Reports (Version 4)
- ☐ Autumn 2013: JEC WTW Report (Version 4)
- ☐ Autumn 2013: Update of the 2011 JEC Biofuels Study



1. Improve efficiency of fossil fuel production

- ▶ Improve energy efficiency (WTT)
- ▶ Decrease GHG/CO₂ emissions
- ▶ *Immediate impact as manufacturing efficiency improves*

2. Replace fossil fuels with renewable fuels

- ▶ Significant questions regarding availability, sustainability
- ▶ *Immediate impact as renewable fuels enter marketplace*

3. Improve efficiency of vehicles & road transport system

- ▶ Improve efficiency of engines and vehicles (TTW)
- ▶ *Longer-term impact as fleet is steadily upgraded*
- ▶ Improve efficiency of road transport through information technology and “non-technology” measures (reduce congestion, eco-driving)
- ▶ *Immediate impact as measures are implemented*



- ▶ How can CO₂/MJ fuel standards be formulated for different energy sources?
 - ▶ JEC Consortium's WTW Studies provide a thorough and reliable source of energy and GHG data on different energy sources in the European context
 - ▶ Evaluating GHG on a WTW basis is preferable to today's regulations based on WTT and TTW for optimizing the entire transport system (vehicles and fuels)
 - ▶ While refiners are responsible for supplying conventional fuels (including biofuel blend) to the marketplace, future fuels and energy sources will be provided by other industries. Future 'fuel' standards must account for this diversity.

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- ▶ Can CO₂/MJ standards for biofuels replace existing regulations for biofuels? How could these be monitored and controlled?
 - ▶ CO₂/MJ is a good metric for valuing different biofuels and should encourage the most efficient production schemes and use of limited renewable resources
 - ▶ A commonly-applied evaluation tool is essential that accounts for details of biofuel processing schemes, including co-product use
 - ▶ Complications from our developing understanding of land use change effects

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- ▶ Can for the CO₂/MJ standards for conventional fuels be gradually tightened to increase the amount of low-carbon fuel in the blend? How could this be monitored and controlled?
 - ▶ Conventional fuels produce relatively little CO₂ during manufacturing and the potential savings from refinery efficiencies are limited
 - ▶ Blending GHG-reducing biofuels is the best option for reducing CO₂ from fuel blends (complicated by our evolving understanding of land use change effects)
 - ▶ Desirable biofuels are limited in availability, limited by vehicle compatibility and fuel blending standards, and depend on a robust means to evaluate the actual GHG reduction from different process schemes

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- ▶ Biofuels can bring environmental benefits but a robust and implementable certification system is needed to:
 - ▶ Encourage biofuel technology improvements that reduce GHG emissions and energy on a Well-to-Wheels basis
 - ▶ Avoid major biodiversity loss and deforestation
 - ▶ Aid public understanding
- ▶ Characteristics of Sustainability Certification Schemes:
 - ▶ Clearly demonstrate the environmental benefits, including favourable reductions in GHG and energy
 - ▶ Common approach across European countries with the potential for global reach
 - ▶ Chain of custody scheme to ensure that relevant information is passed along the chain from production to use
 - ▶ Measurement, auditing, and verification methodologies
- ▶ CEN EN16214 approved 'Sustainably-produced biomass for energy applications' (2012): Part 4. Calculation methods for GHG balance

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- ▶ Refining industry supports European-wide fuel standards because they help to ensure that the same fuel properties and performance levels apply in all European markets
- ▶ Changes in specifications should be fact-based and supported by the best available technical data
- ▶ Proposed changes should be 'fit for purpose' and should not impact the performance of the current fleet
- ▶ All fuel specification values should be reconsidered when anticipating a major change in fuel composition

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Thank you for your attention!

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