



Horizon 2020 How to get to the EU directives goals

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Table Ronde des biocarburants Mars 2010

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■ Demand

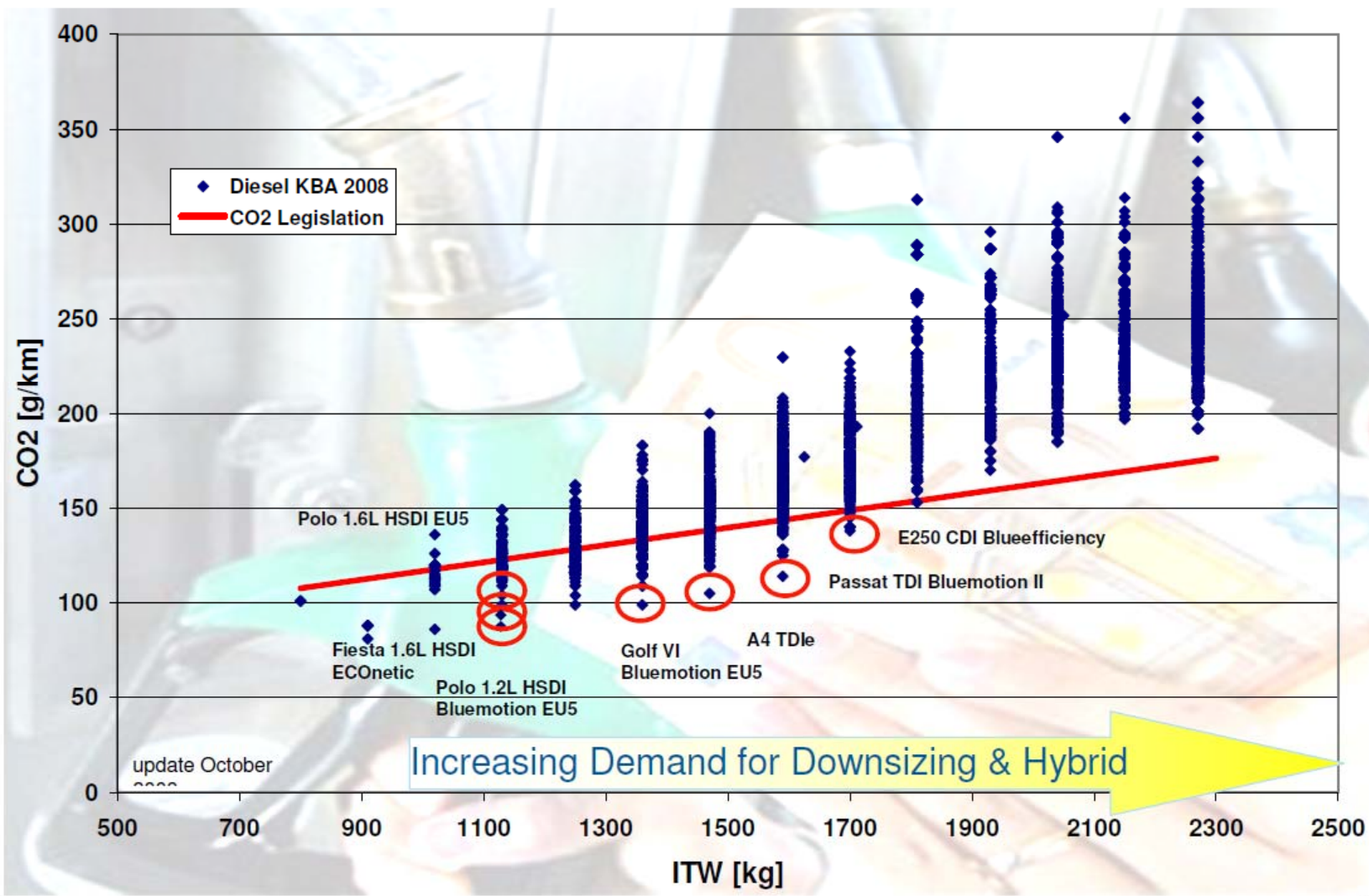
- Fleet evolution
- Fuels demand
- Potential & Feasible scenarii
- Create EU fuels specifications
 - ◆ Gasoline Specification Developments
 - *Revision of EN 228 to meet Fuel Quality Directive requirements*
 - *EN 15376 update for E10 blending*
 - ◆ Diesel Specification Developments
 - *Revision of EN 590 to meet Fuel Quality Directive requirements*
 - *EN 14214 update for B10 blending*

■ Supply

- Supply Chain
- Chain of Custody
- CEN TC383

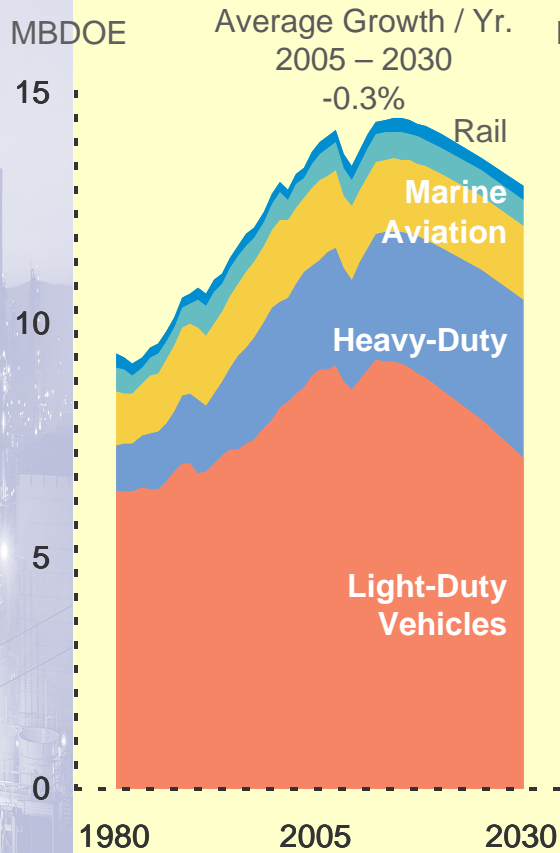


CO₂ Data 2008 (KBA) + Update 2009 (Press) Area for Downsizing & Hybrid

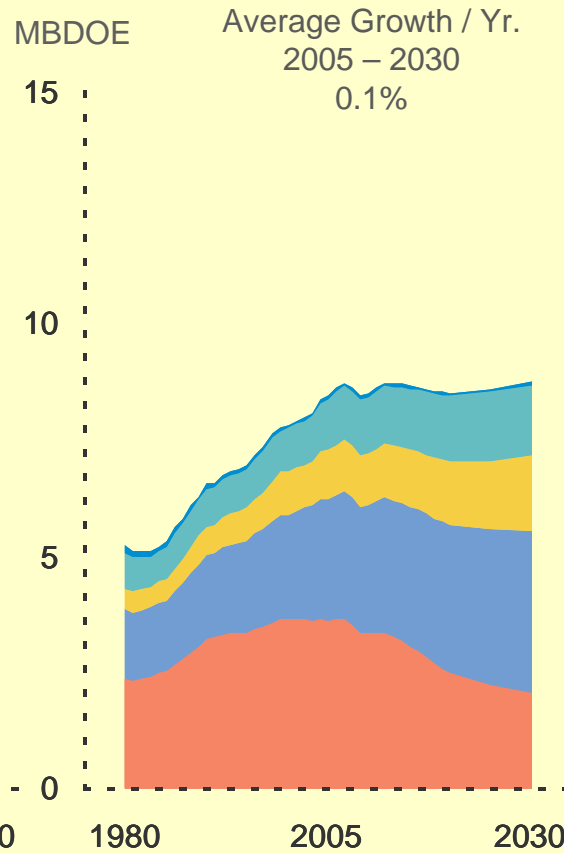


Transportation Fuel by Sector

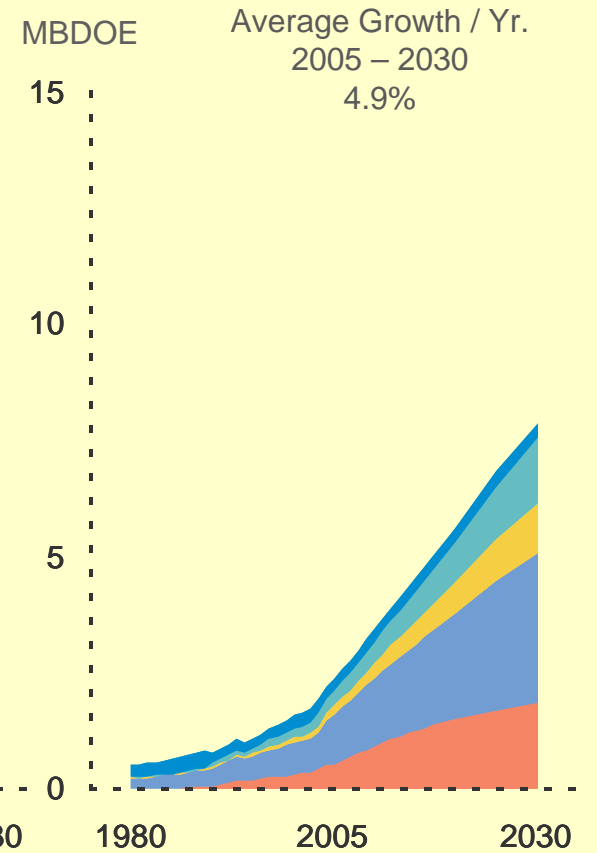
United States



European Union



China



* ExxonMobil estimates

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EUCAR
EUROPEAN COUNCIL FOR AUTOMOTIVE R&D

*A three-way
partnership*

EUROPEAN COMMISSION
DIRECTORATE-GENERAL
Joint Research Centre

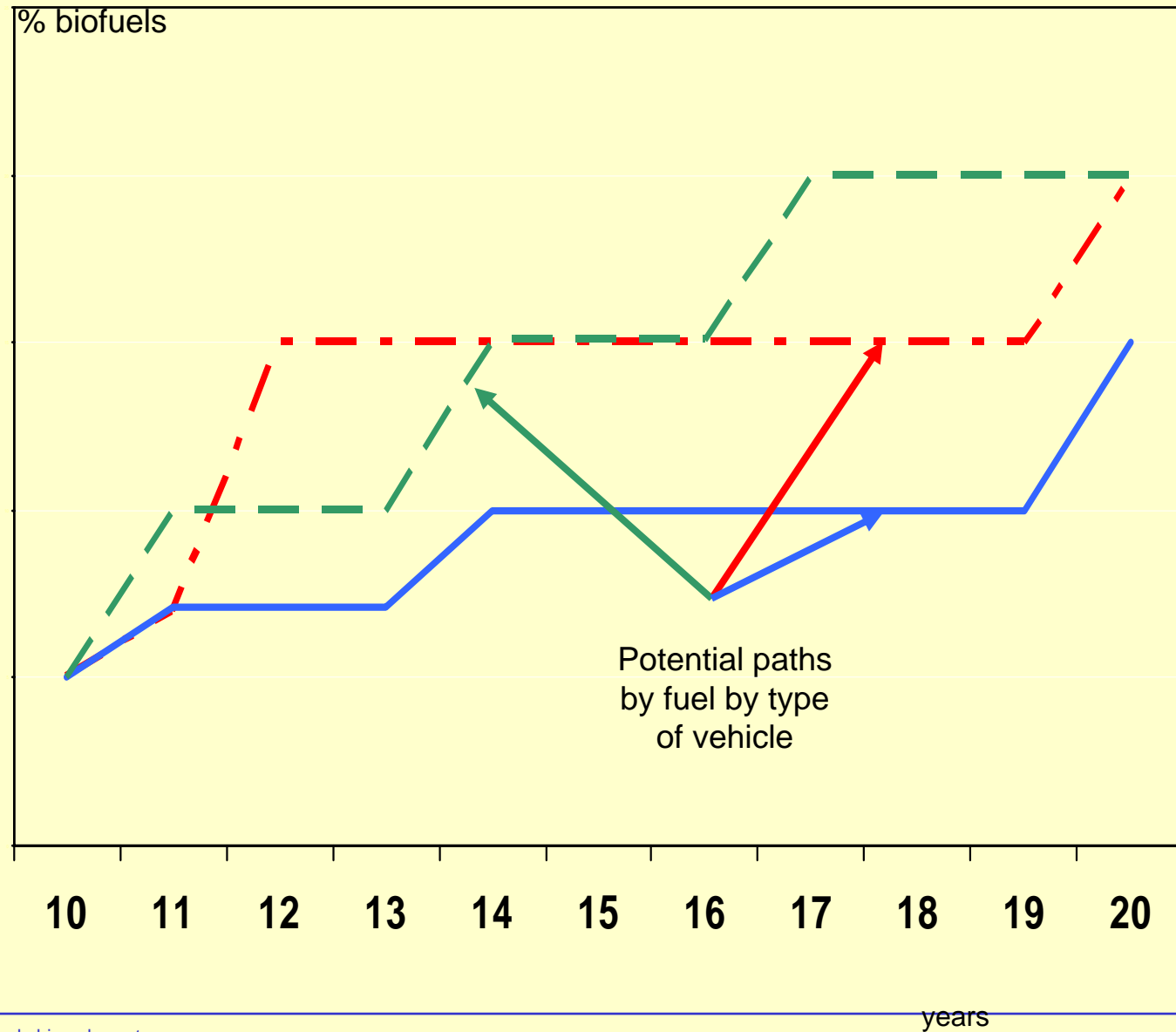
Objectives of the JEC Biofuels Programme:

- Clarify the opportunities and barriers to achieve 10% biofuels (energy basis) in road fuels by 2020
- Ensure that the introduction of biofuel blends to meet the 2020 target is seamless to consumers and results in no detrimental impact on vehicle performance and emissions
- Programme time frame: 3 years (2008-2010)

Programme Plan:

- **First Step:** Develop a consensus demand and supply picture of different biofuel types and availability
- **Second Step:** What are the biofuel performance issues with the existing and near-term fleet?
- **Third Step:** What can the future Light-duty and Heavy-duty fleet handle?
- Support CEN to adapt fuel specifications to higher biofuel levels

JEC extended biofuels program



Targets for All Scenarios:

- 10% biofuels (energy basis) in the road fuel pool by 2020
- 6% reduction in GHG emissions from road fuel manufacturing by 2020

Assumptions for All Scenarios:

- Volume of FAME plus HVO limited by total availability of natural oils
- Volume of HVO and/or BTL in road fuels not be limited by EN specs
- Availability of '2nd Generation' bio-components will be limited primarily by technological developments and not by the inability to obtain investment funding due to the current economic environment

Model used to simulate different combinations of vehicles, fuels, and biofuels

to achieve different targets

- % energy
- % CO₂ saved
- Total fuel demand and diesel/gasoline balance
- Total biofuels demand, including ethanol and biodiesel

Vehicle Fleet Assumptions for Reference Case

❑ Currently factoring in the projected effects of the 2008-9 recession on fuel demand and adding detailed HD classes

Light Duty Fleet			
Sales	Mcars/a	20.2	
Total fleet	Mcars	270	
Total mileage	Tm	3377	
Diesel registration	%	50%	
Vehicle type penetration		% sales in 2020	% in fleet 2020
Gasoline		44.7%	50.7%
Diesel		46.8%	44.5%
CNG		4.0%	2.0%
LPG		1.8%	1.8%
FFV		0.0%	0.0%
PHEV		1.8%	0.3%
BEV		0.9%	0.7%
Total sales CO2 target	g/km	95	
Heavy Duty Fleet (single class)			
t-km year-on-year growth	%	2.0%	
Fuel efficiency in 2020	% 2005	90%	

- Finalize details of the 'fleet and fuels' model
- Evaluate biofuel implementation scenarios that are relevant to oil and auto industries
- Evaluate published literature to assess the availability of different biofuel types between now and 2020
- Assess critical timing, for example for CEN specifications
- Assess implications for vehicle fleet and fuel manufacturing
- Report results to inform all stakeholders (1Q10)



New requirements from the Fuels Quality Directive:

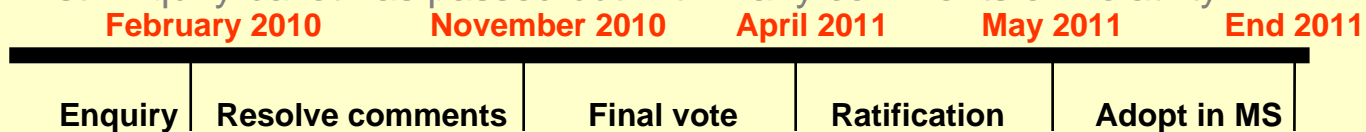
- Standard Grade mogas having a maximum 10% vol. ethanol
- 'Protection Grade' mogas with maximum 5 % vol. ethanol (2.7% vol. Oxygen)
 - *must be available until 2014 to protect older cars (pre-2000)*
- 3.7wt% oxygen and oxygenate content allowed for E10
- Member States can ask for up to 8kPa waiver in vapour pressure depending upon the actual ethanol content
- MMT still allowed as an octane booster but limited to max. Mn content of 6 mg/l until 2013 and 2 mg/l from 2014
 - *Not in use in EC member states*
- Fuels Quality Directive implementation by Member States before end 2010

Implications and timing for EN 228 revision:

- Two spec tables: max. 3.7% and 2.7% Oxygen (10% and 5% vol. ethanol)
- Specific oxygenate blending levels → 3% Methanol, 22% ETBE, 12% Iso-propyl alcohol, 15% Tert-butyl alcohol, 15% Iso-butyl alcohol, Other oxygenates (Other mono-alcohols & ethers with a final boiling point no higher than that stated in EN 228)

Timing for EN228 revision

- Will be later than implementation of the FQD (1 Jan 2011)
- First Enquiry ballot has passed but with many comments on volatility



Main issues for EN 228 revision to allow E10 gasoline

- Volatility (E70/E100): Concaawe has made a proposal based upon output from BEP525 program
 - *Strong opposition from vehicle manufacturers*



- Revised EN 15376 will accommodate blending up to 10% and has successfully completed the enquiry ballot:
 - Currently resolving comments
 - Timing for publication end 2010
- Major updates for this second version concern the inclusion of newly developed methods for determination of:
 - Appearance
 - Oxygenate content
 - Water
 - Total dry residue
 - Sulfate
 - Inorganic chloride
 - Copper and phosphorus
 - Alignment on the units in terms of mass/mass
- Revision includes tighter requirements for contaminants:
 - Inorganic chlorides
 - Phosphorus
- Scope of the Ethanol Task Force (ETF) refers to a single ethanol grade for all blending levels (e.g. E0 up to E85):
 - Further work required to meet scope

EN 590 specification Changes required by Fuel Quality Directive:

- Being handled via amendment process
 - ◆ *Ballot complete 27 November*
- PAH reduced from 11% to 8% max and 50mg/kg sulphur grade removed
- Amendment has been published

Revision of EN590 for 10% FAME/FAEE blending:

- Full enquiry process (3 years)
- Strong opposition from vehicle manufacturers in going above 7% vol
- EC (DG TREN) have confirmed that B10 Mandate is for FAME/FAEE
 - ◆ *FAEE – small demonstration plant in France*
 - *Jet fuel contamination issues*

Main technical issues for B10 diesel specification:

- Diesel fuel stability
- Low temperature performance Longer term cold soak (>5 days)
- Particulate matter, filterability, microbial contamination
- Ash and metal contents (potential impact on after-treatment)
 - ◆ *Na, Cu, Zn, Ca and P (detection range 0,1 - 5,0 mg/kg)*
- Test method precision

Separate table for B10 within EN590 for 10% FAME/FAEE :

- To be discussed at next WG24 meeting (10 March)

- Enquiry ballot for EN 14214 completed January 2010:
 - Ballot successful but many comments to resolve, particularly in the area of cold flow performance and phosphorus, sodium and potassium
- Revisions include:
 - Oxidation stability by Rancimat min 8hrs increased from 6hrs
 - Lowering of the phosphorus limit from 4 mg/kg to 2 mg/kg, and sodium and potassium from 5 mg/kg to 3,5 mg/kg
 - ◆ *Test method precision requires improvement*
 - New cold flow requirements under discussion

Table 3 — Climate-related requirements and test methods for FAME blend component

Table 3a — Cold flow property choices

Property	Units	Limits			Test method ^a
		grade a	grade b	grade c	
Cloud point	°C, max.	+ 5	0	0	EN 23015
CFPP	°C, max.	0	- 5	- 10	EN 116

^a See also 5.5.1.

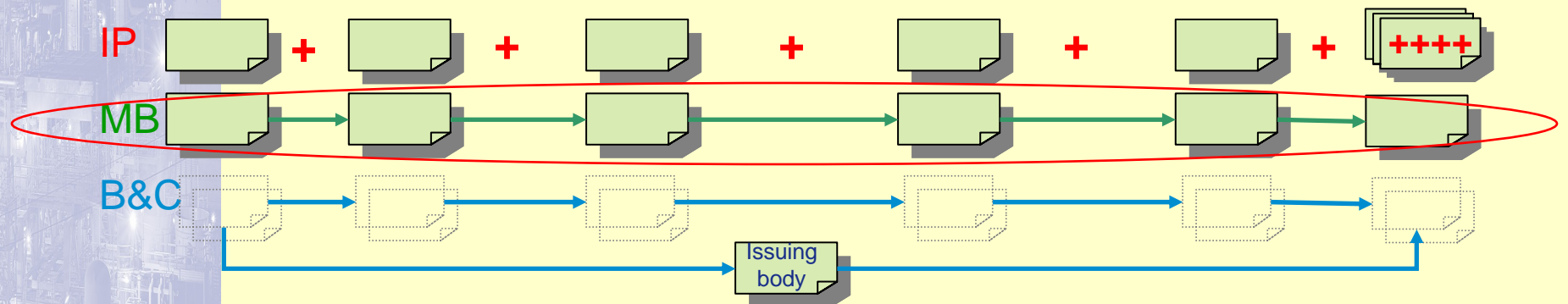
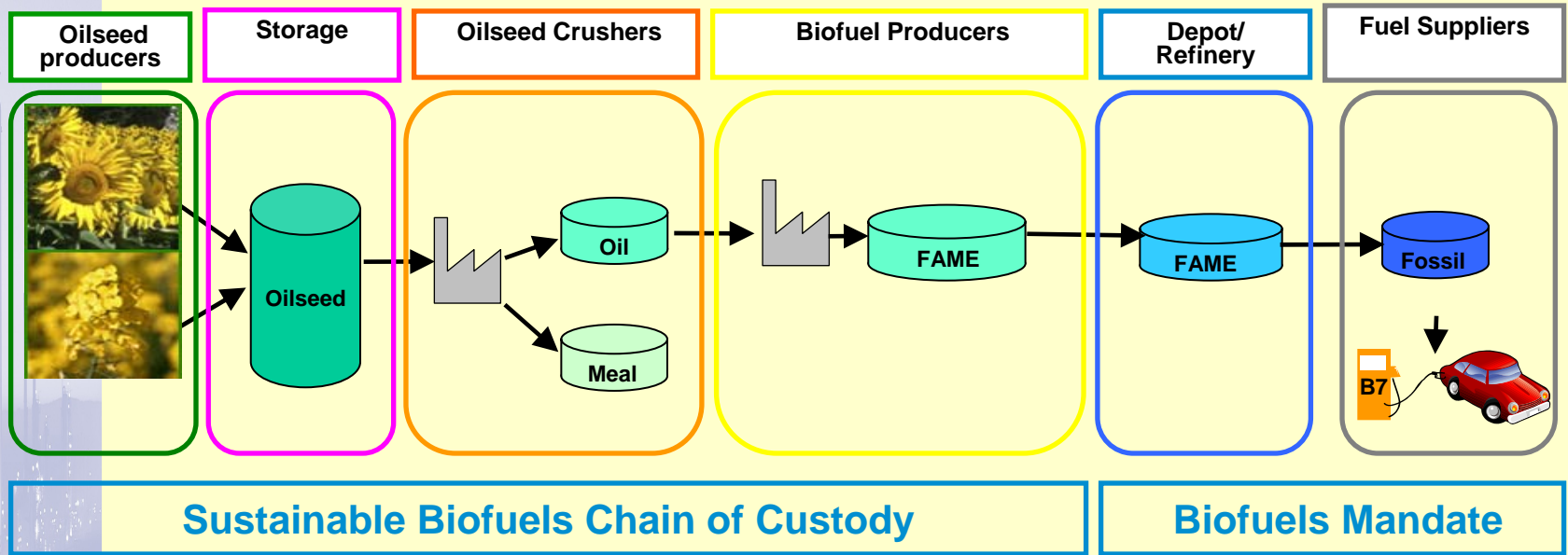
Table 3b — Monoglyceride content choices

Property	Units	Limits			Test method ^a
		grade a	grade b	grade c	
Monoglyceride content	% (m/m)	0,80	0,50	0,30 ^b	EN 14105

^a See also 5.5.1.

^b Limit to be validated by work on the measurement standard precision (see Foreword)

Supply: Chain of Custody Sustainability: FAME example



IP (Identity Preservation), MB (Mass Balance), B&C (Book and Claim)

CEN Status

- TC383 approved the temporary restriction of the scope to the Renewable Directive
 - *WG1 definitions*
 - *WG2 actual values*
 - *WG3 biodiversity protection through land characterization*
 - *WG5 CoC mass balance and Certification and auditing*
- Main concepts
 - *Chain of Custody: every one responsible for certification of its own operations*
 - *Flexibility for the mass balance of the biofuels production*

CEN Timeline

- First draft standards proposed by end September to EU and to TC383
- EU recruited ECOFYS as back up
- EU has stringent interpretation of the CoC & the mass balance system
- TC383 meeting in The Hague 12/13 November confirmed EU support but put TC383 on hold till EU guidelines define further some concepts.
- EU might request WG2 to work on an actuals GHG standard for biofuels
- TC383 will look at scope in February 2010 to stop work or potentially extending to biomass, other criteria or reporting

ISO sustainability for energy first meeting end April 2010 in Rio