Political Framework and Tail Pipe Emissions for Rapeseed Oil Based Fuels

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Vancouver, 2009

Outline

- Framework and Actual Situation
- Tailpipe Emissions
- Concluding Remarks

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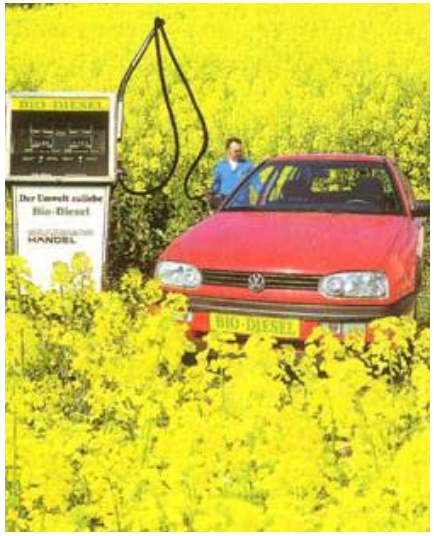
Goals of the European Union

"Indicative goals" for the share of sold biogenic fuels* in the total sold Otto and Diesel fuels (with respect to the energy content) acc. to Information Note 6795/03 of the Council of the EU dated 2003/02/25

year	share [%]
2005	2
2010	5.75

Proposal of the European Commission, Jan 23, 2008:

2020	10.00



Including the sustainability criterion:
Biofuels must exhibit a reduction of at least 35% in the GHG emissions

Recently Decided Goals of the European Union

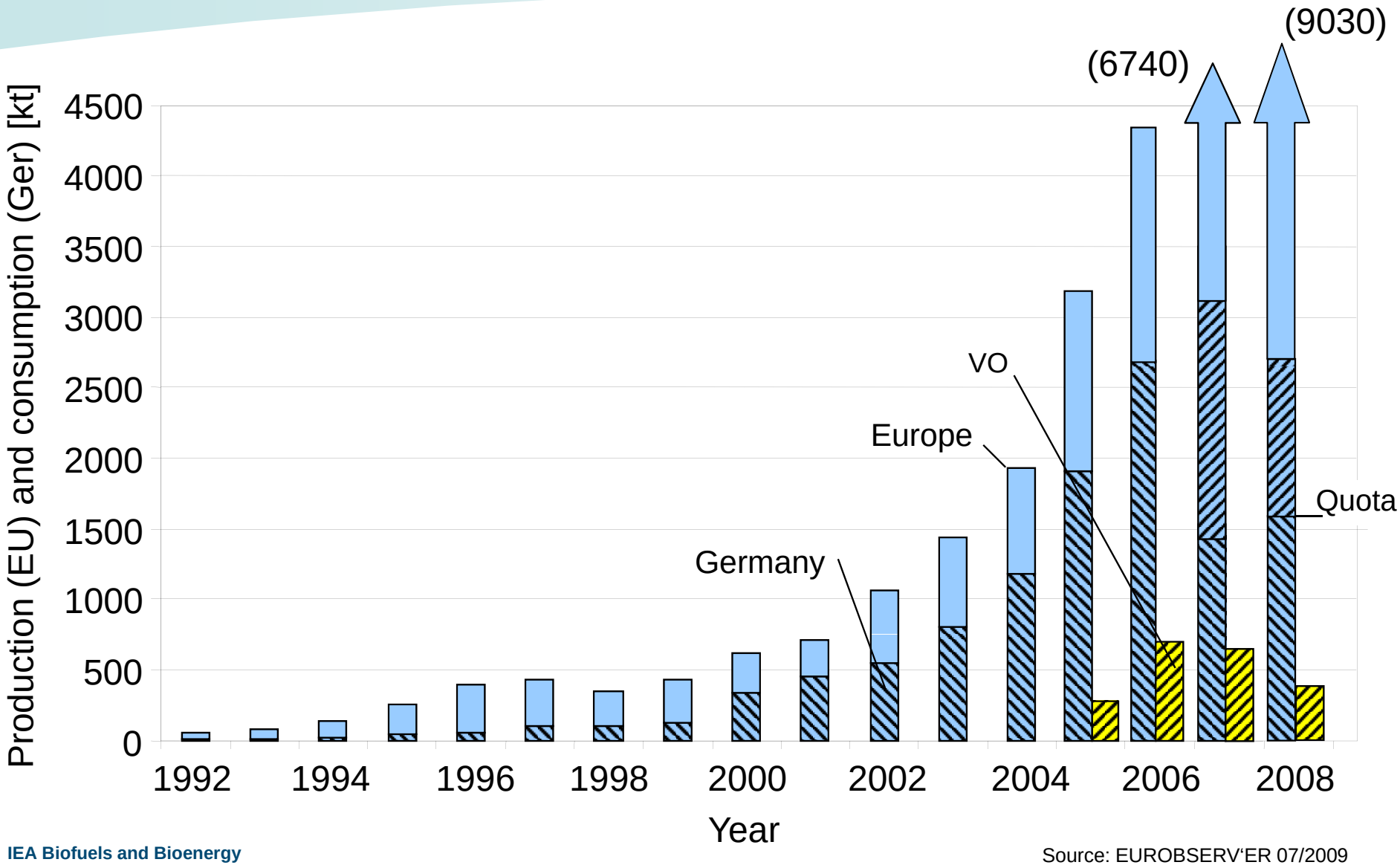
The Renewable Energy Directive (2009/28) of April 23, 2009, demands for sustainability certification and at least 35% GHG savings (50% / 60% from 2017). Default values of GHG savings are introduced for various product pathways.

A 20% share of renewable energies in all energies (gross end energy consumption) is demanded for the year 2020.
In the traffic sector, a share of 10% is demanded for (renewable energies, not necessarily biofuels!)

Biofuels and bioliquids … shall not be made from raw material obtained from land with recognised high biodiversity value … (a) forest undisturbed by significant human activity … (b) areas designated for nature protection purposes … (c) highly biodiverse grassland …

Biofuels and bioliquids … shall not be made from raw material obtained from land with high carbon stock, … (a) wetlands … (b) continuously forested areas …

Production of Biodiesel in Europe and German Consumption of Biodiesel and Vegetable Oil



Source: EUROBSERV'ER 07/2009

Changes in the German Biofuels Policy (2006)

- The former complete tax exemption is ceased; instead, fuel-dependent rising taxes are scheduled (since 8/2006)
- Quotas for admixing biofuels to fossil fuels are introduced; these quota biofuels are fully taxed
- Biofuels for agricultural purposes remain tax exempted
- 2nd generation biofuels and E85 remain tax exempted until 2015

Quotation According to New Legislation 2009; the Admixed Biofuels are Fully Taxed

(Quotas Refer to Energy Content)

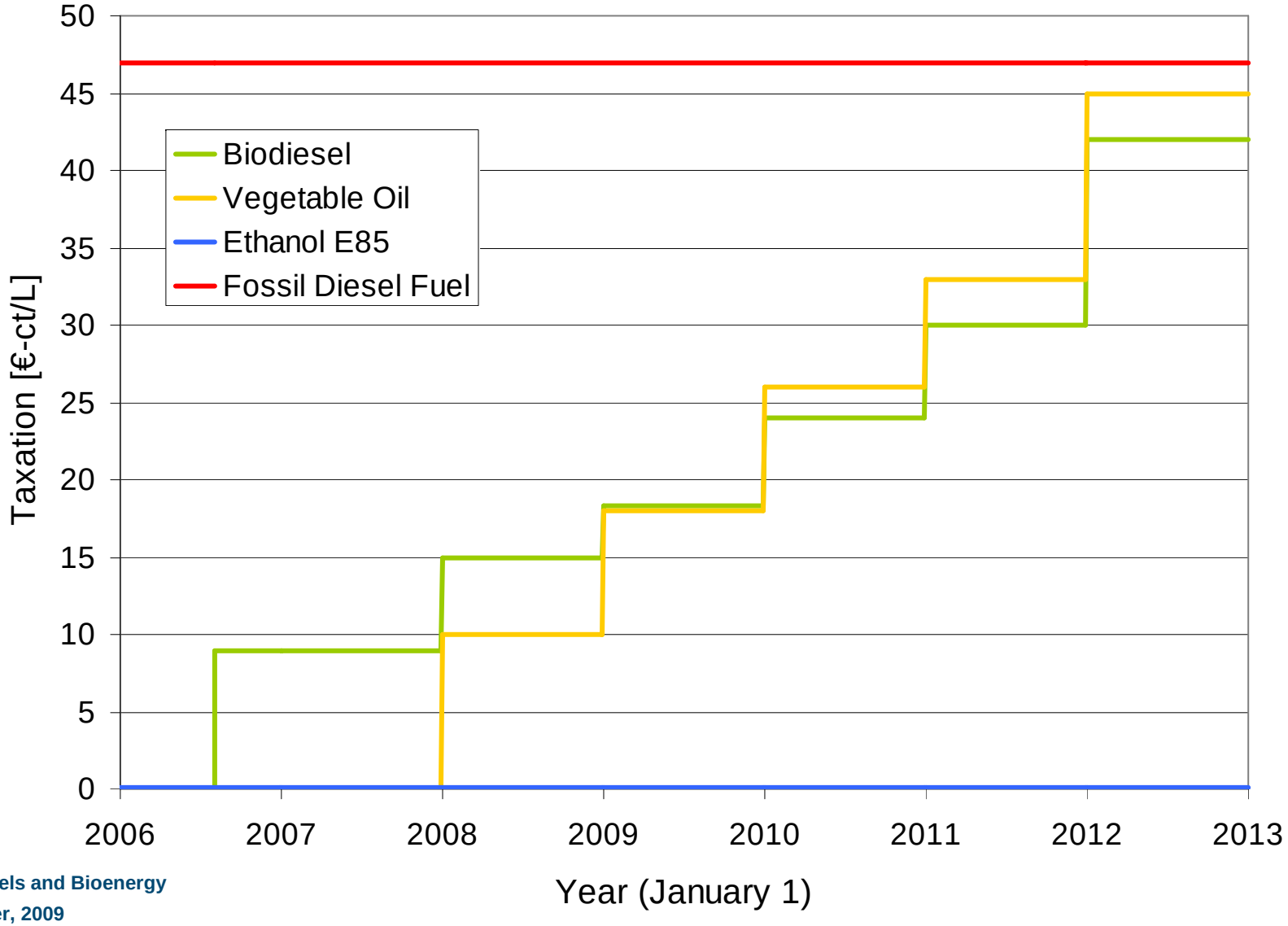
Year	Quota (Total)	Sub-Quota Diesel Fuel	Sub-Quota Gasoline
2007	--	4.4 %	1.2 %
2008	--	4.4 %	2.0 %
2009	5.25 % [was 6.25%]	4.4 % *	2.8 %
2010	6.25 % [was 6.75%]	4.4 % **	2.8 % [was 3.6%]
|			
2014	6.25 % [was 7.75%]	4.4 % **	2.8 % [was 3.6%]
2015	Diminishing of GHG emissions by 3 % required ≈ 5.2 %		
2017	Diminishing of GHG emissions by 4.5 % required		
2020	Diminishing of GHG emissions by 7 % required		

* 6.2 % possible

** 6.2 % + 2.7 % HVO possible

Remark: The tax for diesel fuel is 47 €-ct/L and for gasoline 65 €-ct/L.

Reduced, but Yearly Increasing Taxation for Neat Biofuels, According to New Legislation of 2009



German Consumption of Biofuels per Month in the Years 2007, 2008 and 2009

Fuel	2007 [kt]		2008 [kt]		2009 [kt]
Biodiesel (quota)	119	↗	137	↗	174
Biodiesel (B100)	153	↘	97	↘	24
Biodiesel (sum)	272	↘	234	↘	199
Vegetable oil	64	↘	35	↘	7
Bioethanol (ETBE)	30	→	30	↘	19
Bioethanol (quota)	7.5	↗	21	↗	55
Bioethanol (E85)	0.5	↗	0.7	↘	0.5

Source: UFOP/AMI
2009 numbers are based on Jan-May

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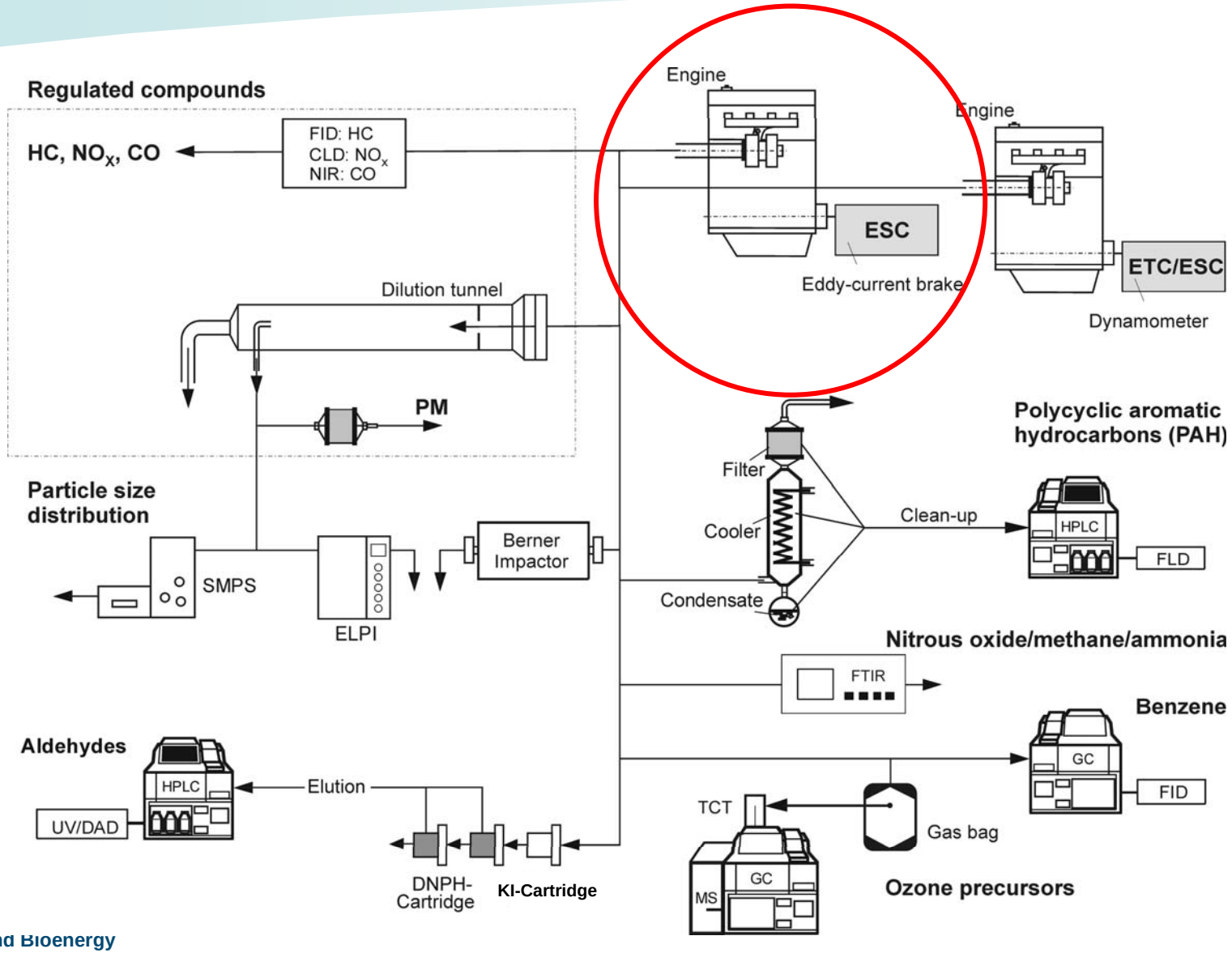
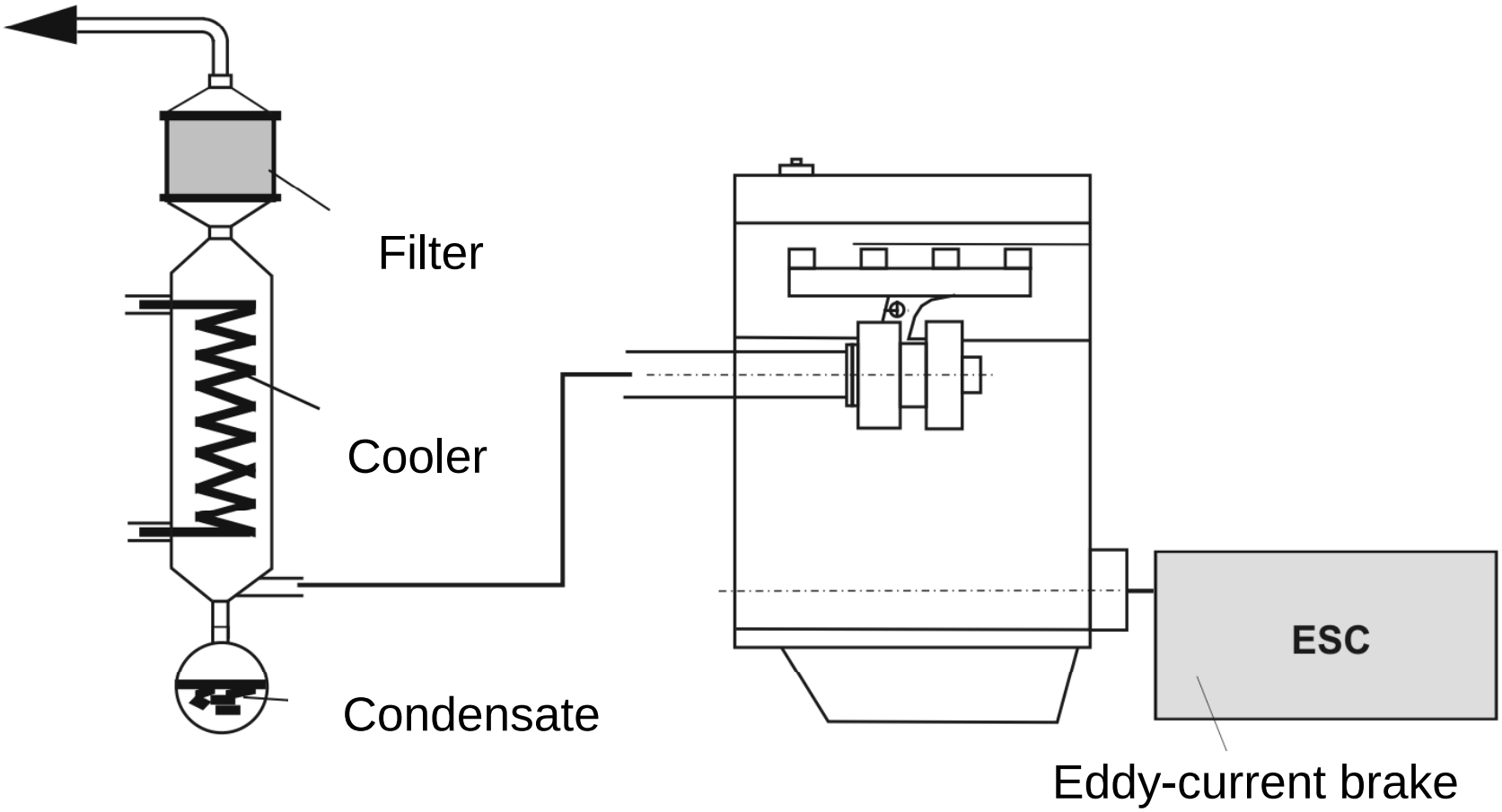
General Scheme of the Emission Test Stand in the vTI



Sampling Procedure According to VDI 3872

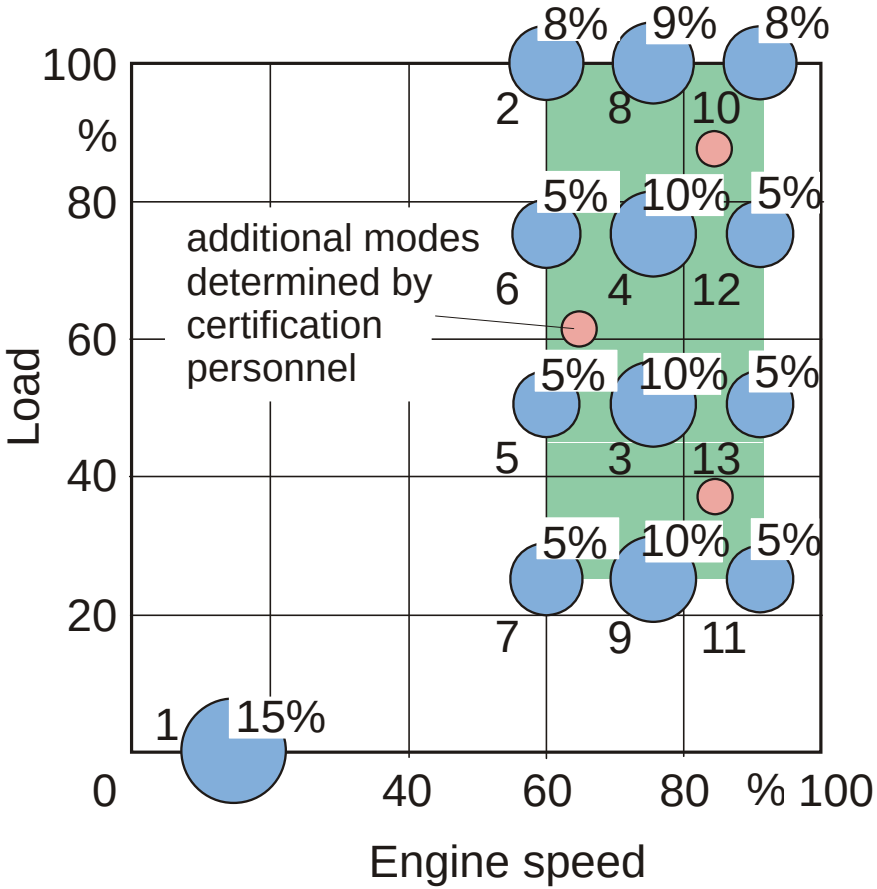


Engine and Test Conditions

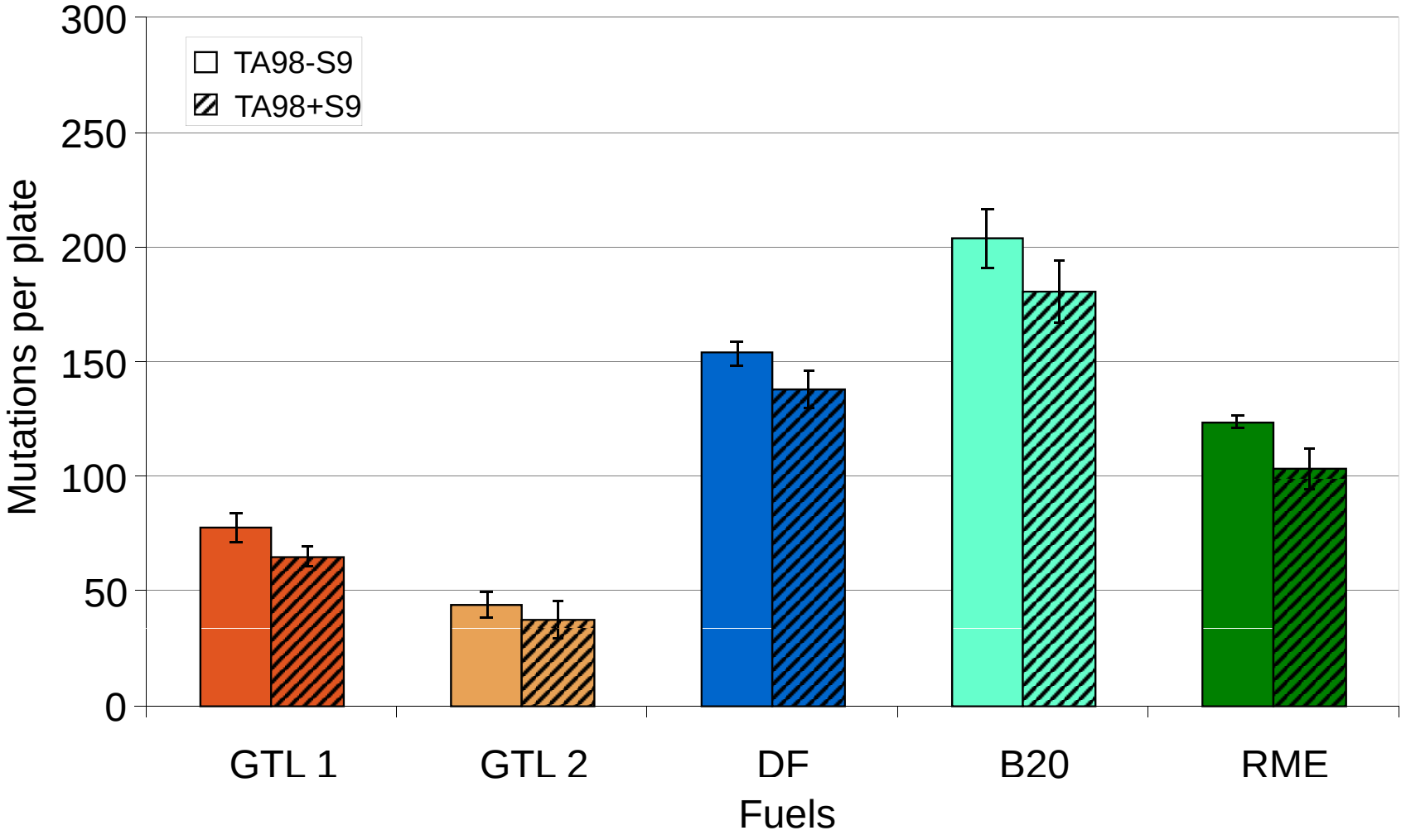
Mercedes Benz OM 906 LA

Stroke of cylinder	130 mm
Bore of cylinder	102 mm
Number of cylinders	6
Stroke volume	6370 cm^3
Normal rate of revolutions	2300 min^{-1}
Rated power	205 kW
Maximum torque	1100 Nm at 1300 min^{-1}
Compression ratio	18
Certification	EURO III

ESC Test



Mutagenicity of PM
Ames Test (OM 906, ESC)



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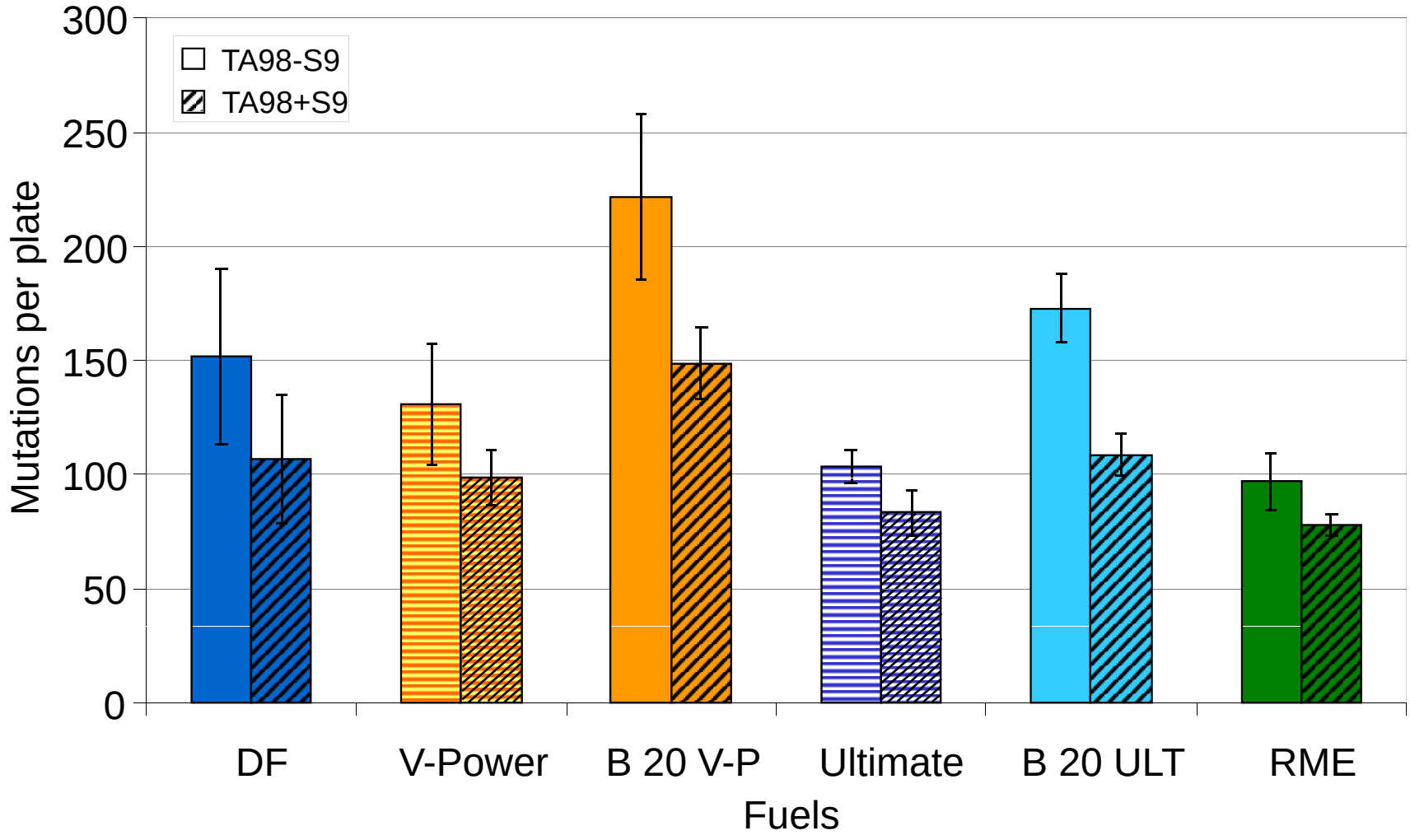
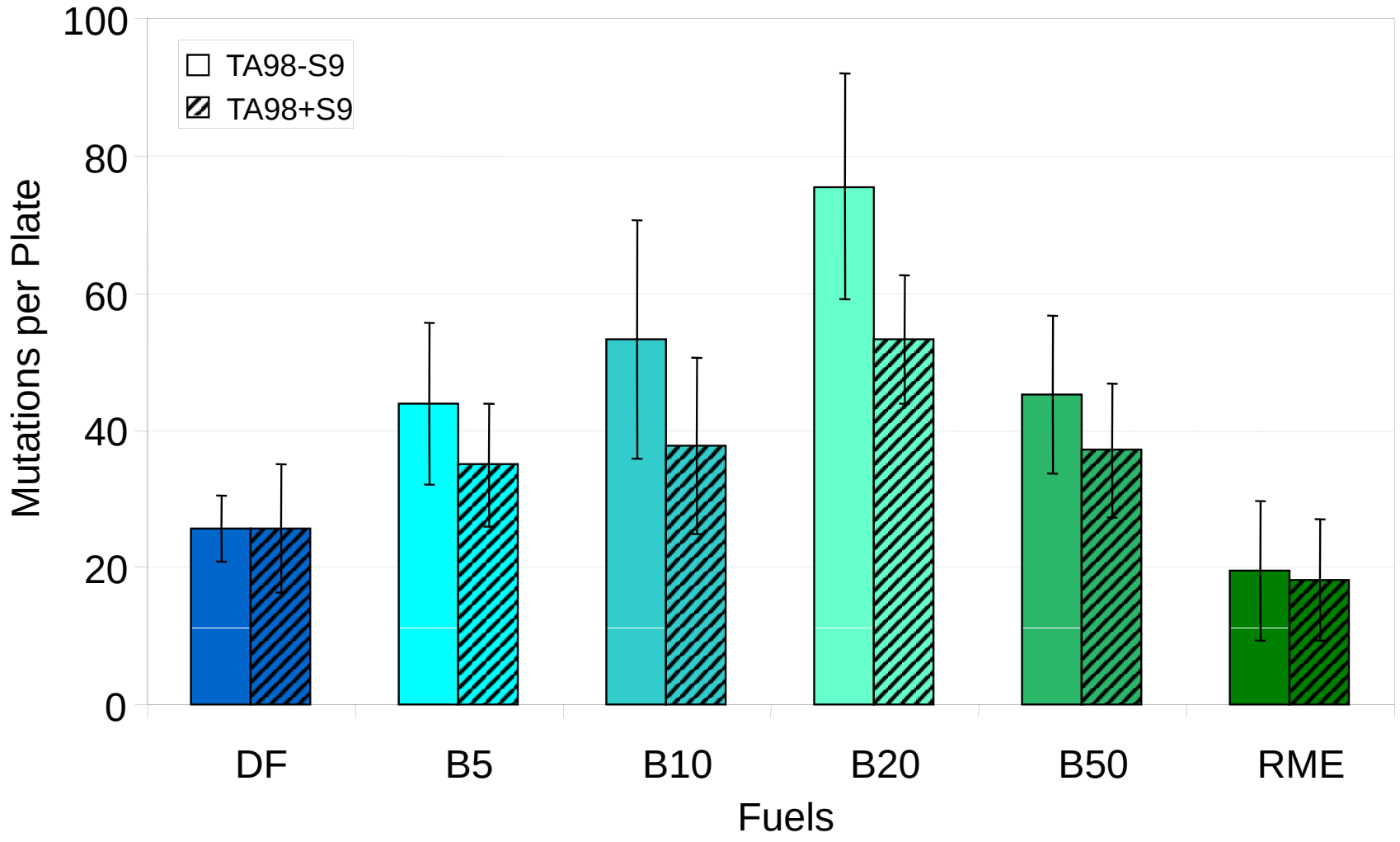
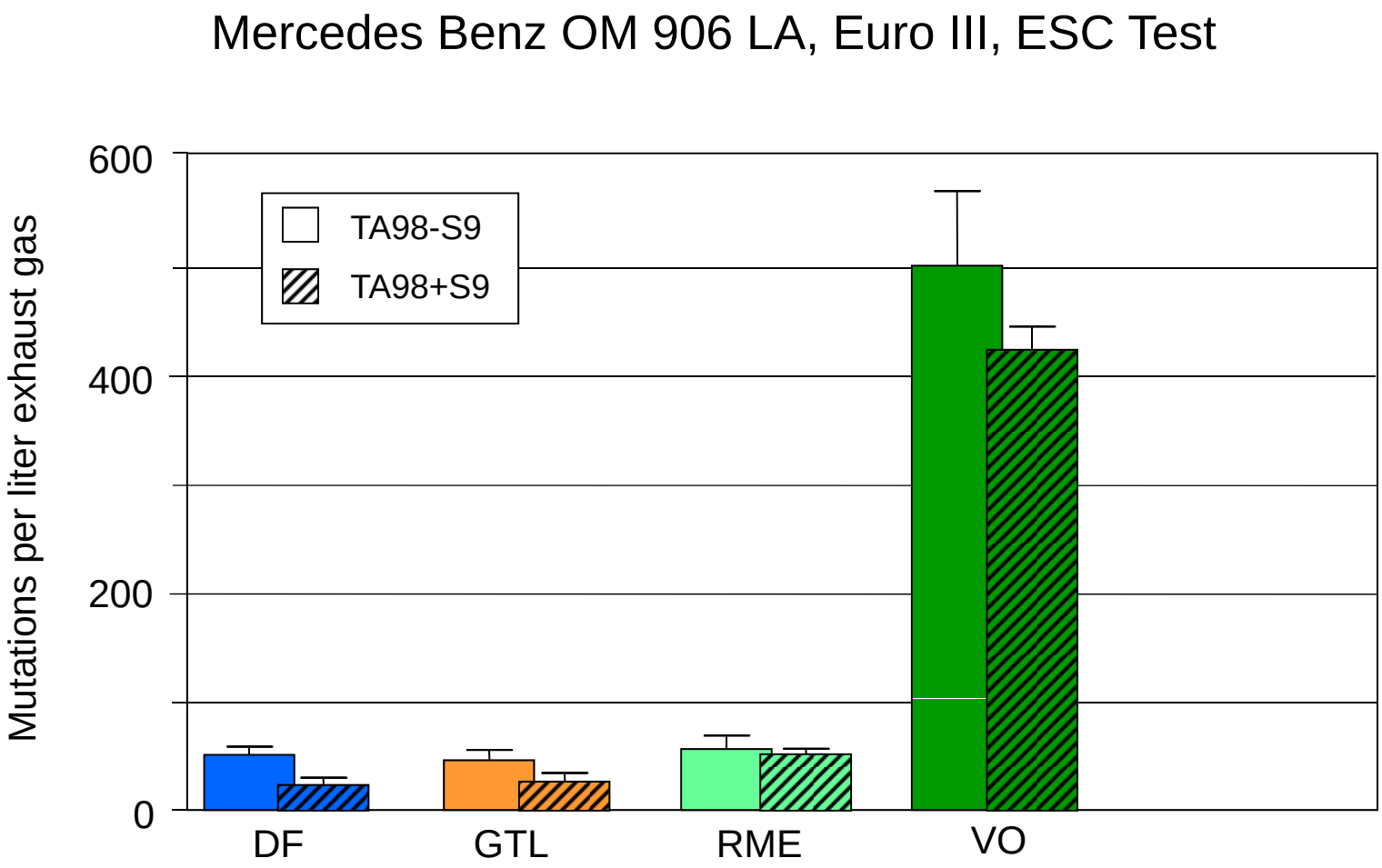


Mutagenicity of PM
Ames Test (AVL 502.019, Rated Power)



Mutagenicity of Particulate Extracts



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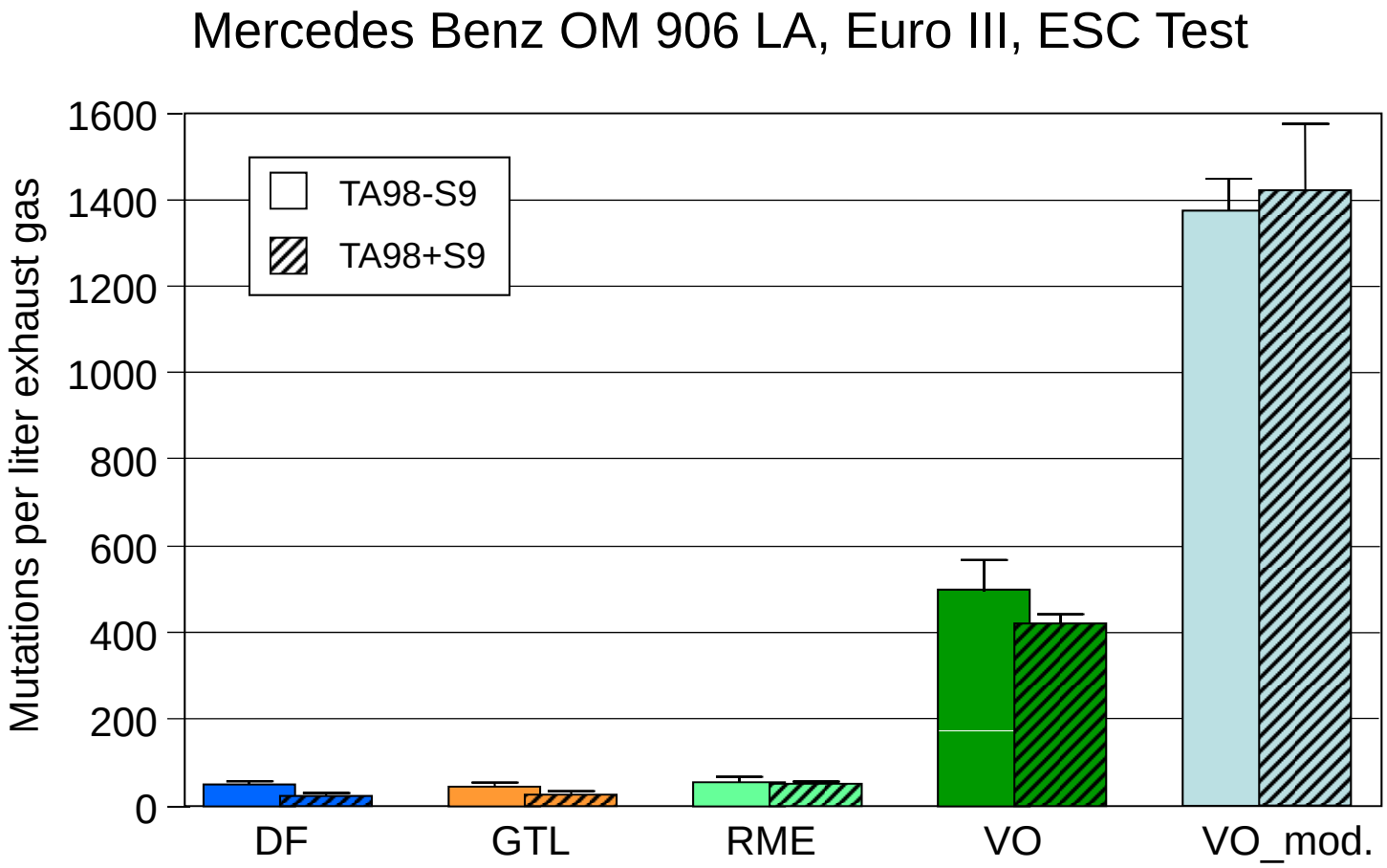

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Concluding Remarks

- Hazardous componds are found in the particulate and in the gas phase of diesel exhaust. A DPF does not necessarily reduce them.
- Modern diesel fuels can contribute to less hazardous exhaust gas emissions.
- Biodiesel blends can lead to an increase of mutagenicity with a maximum in the range of B20.
- Regulated emissions do not enable an estimation of health effects.
- Chemical fuels design must be considered as an important tool to improve the combustion.

Thank you for your

kind attention!