









VOLVO

Biofuels in the Transport Sector – the Forest as Energy Resource

**Anders Röj
Fuels and Lubricants
Volvo Technology Corporation
anders.roj@volvo.com
+46 31 666918**

***The Future of Forest Bioenergy
Stockholm, 6-7 February 2007***

Business Areas

Mack Trucks	Renault Trucks	Volvo Trucks	Buses
			
Construction Equipment	Volvo Penta	Volvo Aero	Financial Services
			

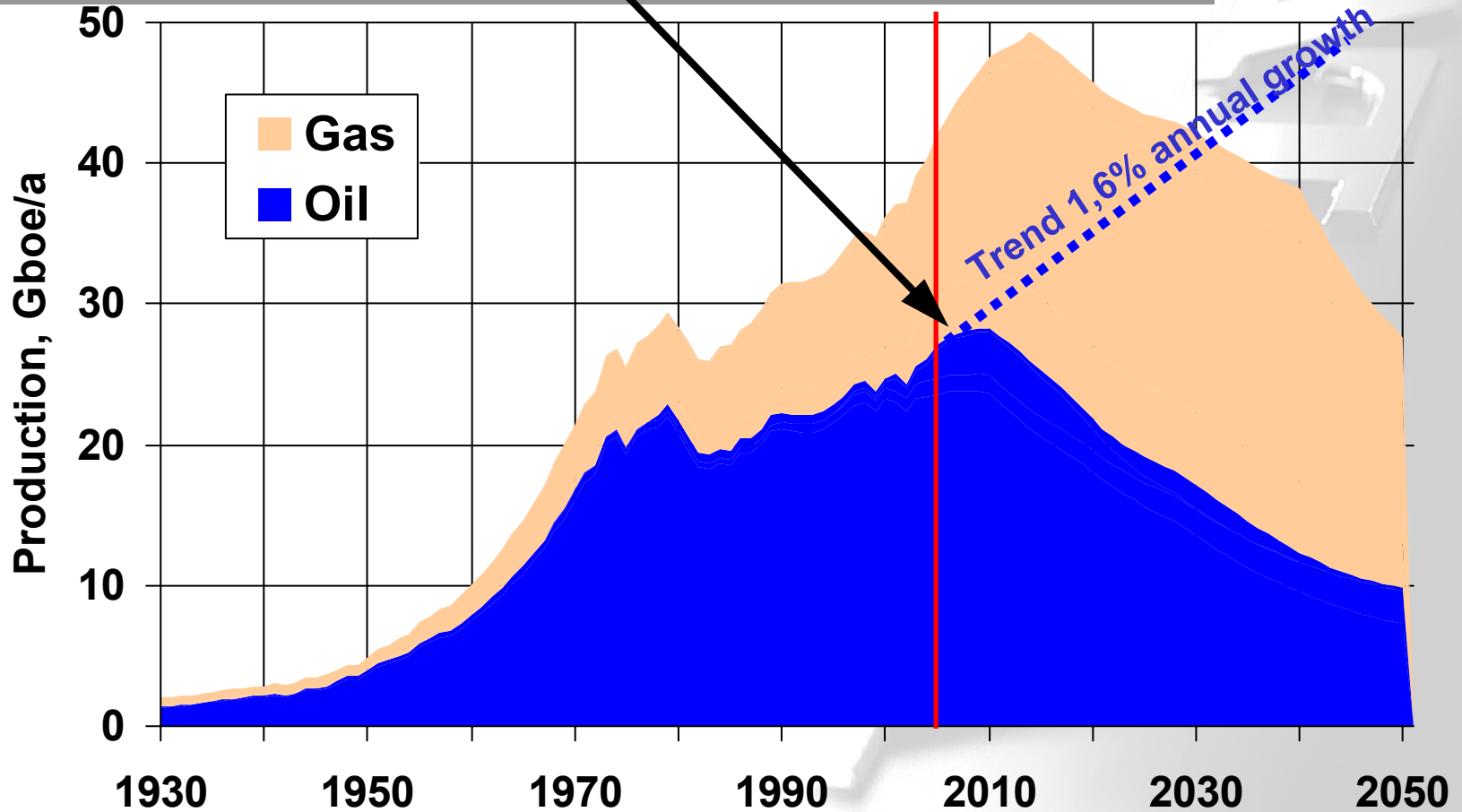
Fuels for the Future

Drivers for change

- ***Climate change*** - greenhouse gas emissions
- ***Availability of energy resources*** and projected increasing demand
- ***Security of supply***
- Emissions, regulated and unregulated
- Urbanisation, congestion and noise

Production of all conventional Oil and Gas

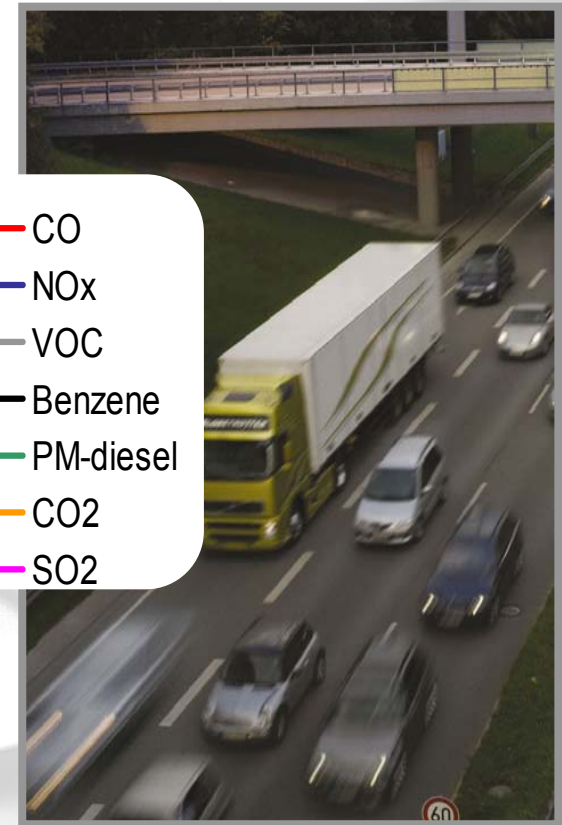
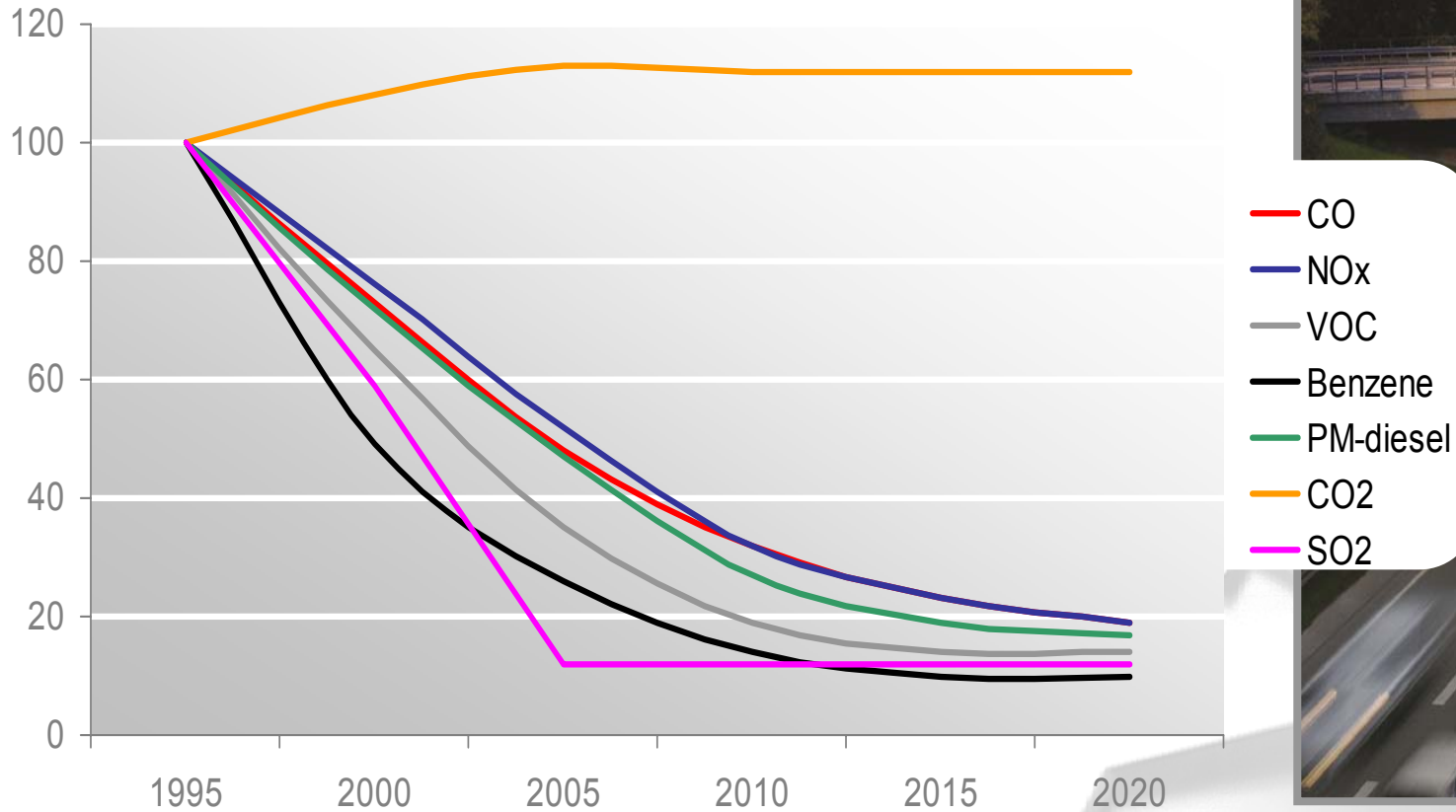
“Oil peak. The time of cheap and abundant crude oil will be over!”



Source: CJ Campbell, 2004

Air Quality Modeling for Europe (Auto-Oil II)

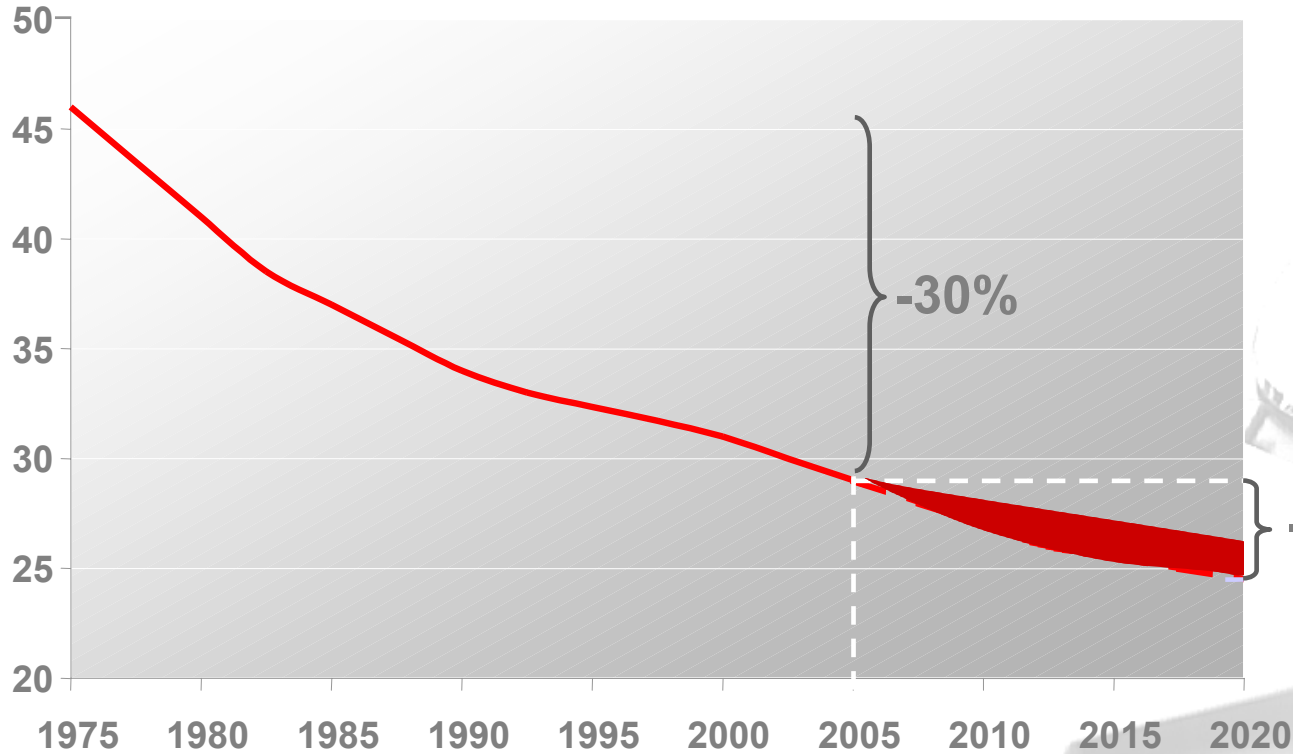
All gaseous emission components & PM will soon reach “sustainable” levels except **CO₂** ... *our future challenge!*



Fuel Consumption Reduction

Heavy duty vehicles liter/100 km

litre / 100 km



Fuels for the future

How should the alternatives be evaluated?

- Sustainable *availability*
- Well-to-wheel *energy efficiency* and *CO2 emissions*
- Well-to-wheel *regulated and unregulated emissions*
- *Economy* & infrastructure
- Other considerations
 - ✓ energy density
 - ✓ safety and health (fuel handling)
 - ✓ specific issues/concerns related to the different driveline applications (trucks, buses, marine, stationary)
 - ✓ political environment
 - ✓ customer perceptions

Well-to-Wheels analysis of future automotive fuels and powertrains in the European context

concaawe



WTW

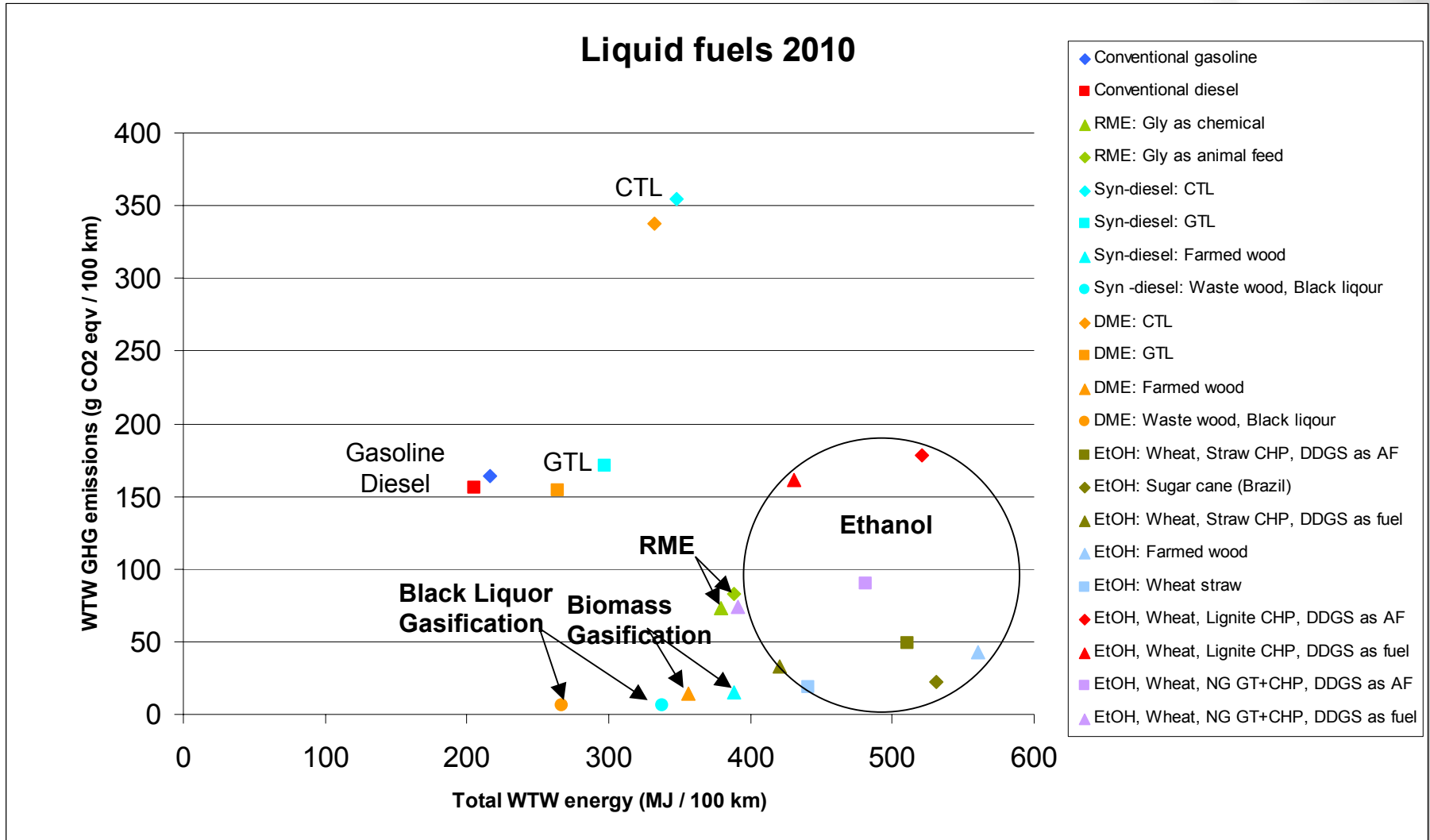


A joint study by

EUCAR / JRC / CONCAWE

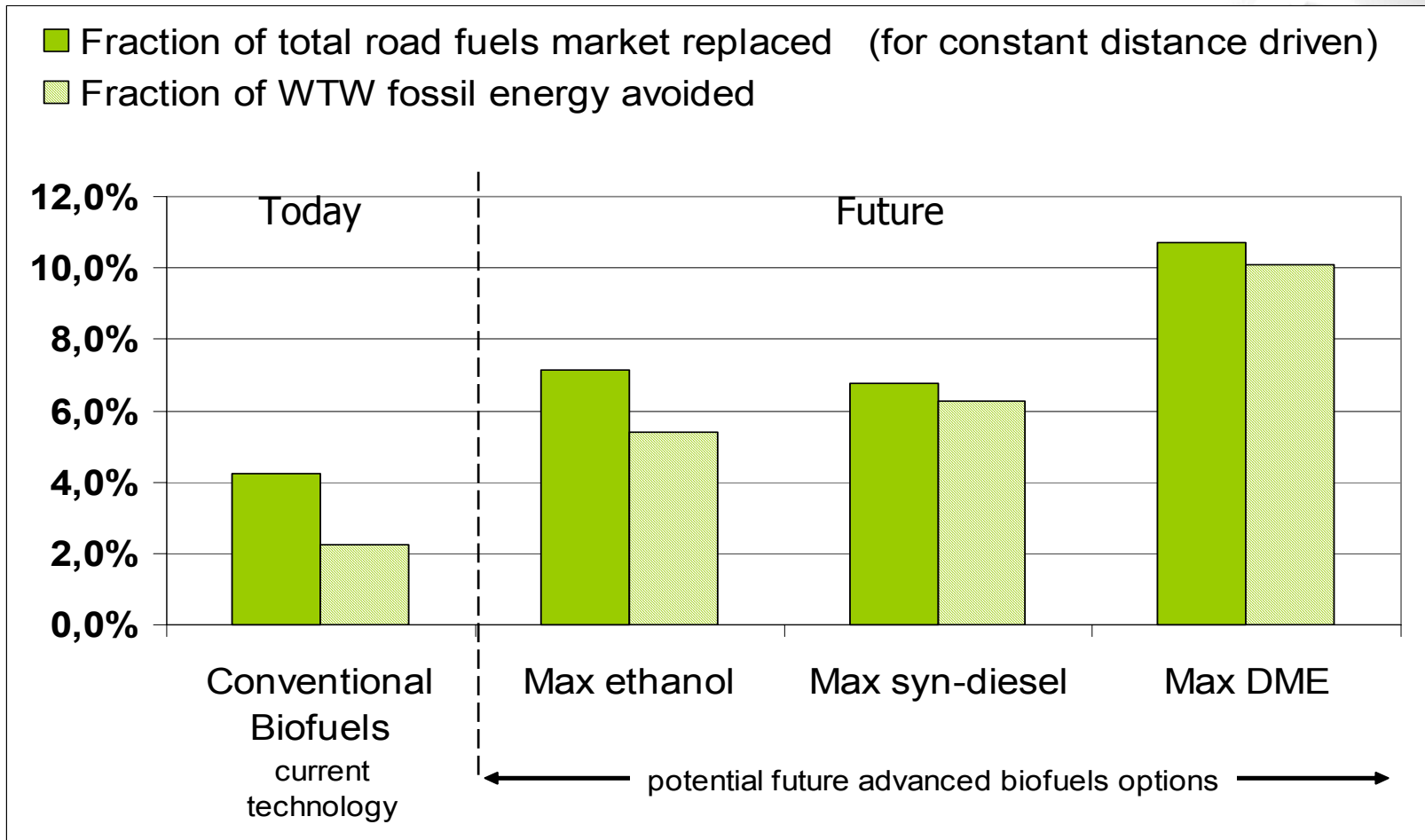
WtW GHG versus total energy use

(from Eucar/Concawe/JRC 2006)



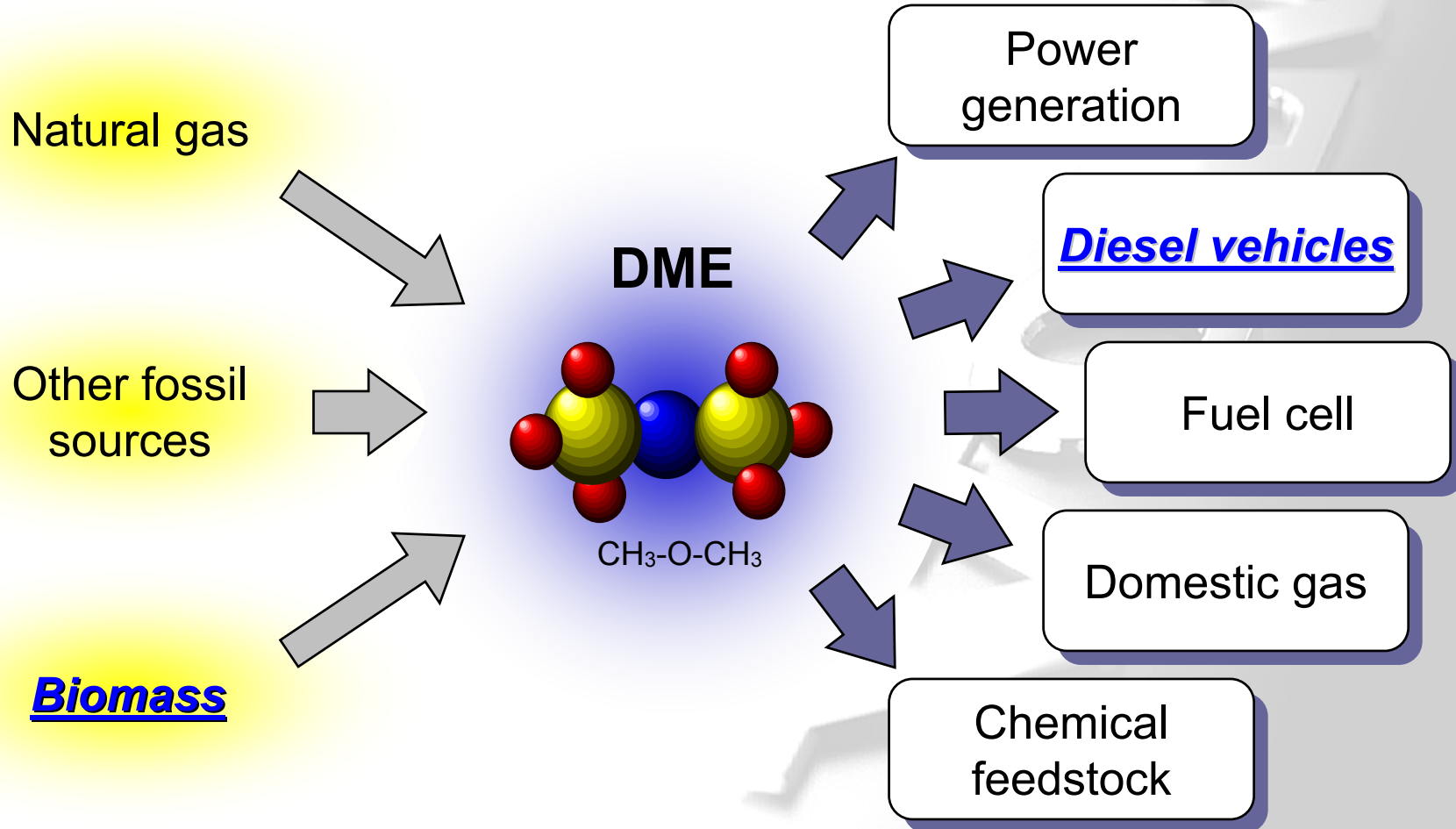
Possibility to Replace Gasoline & Diesel Fuel by 2012

(source: WtW study, Concawe)



DME – Dimethyl ether

A "multi source and multi purpose fuel"



Volvo DME-bus 1999

(1st generation technology)



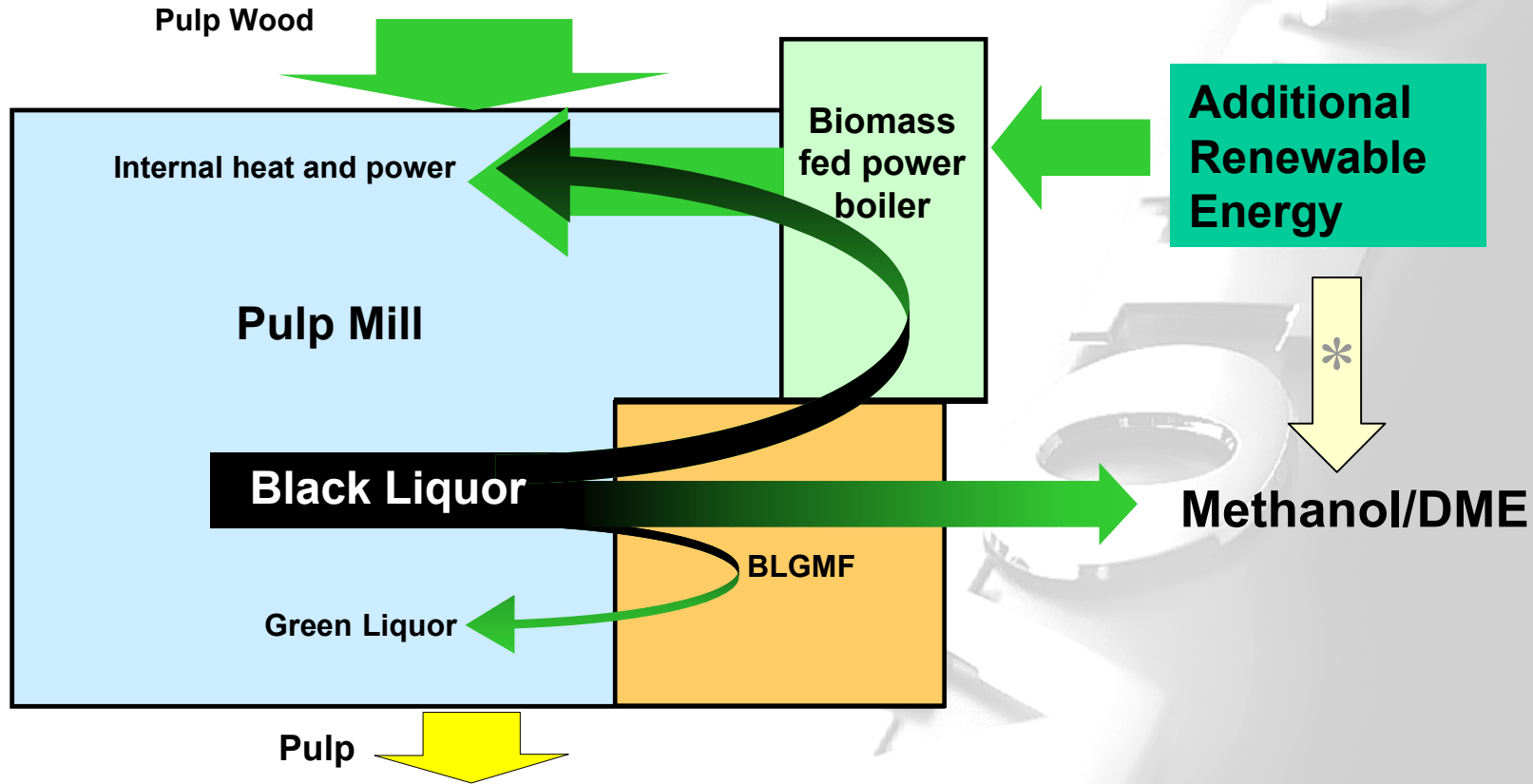
Volvo DME-truck 2005

(2nd generation technology)



Black liquor to engine fuels

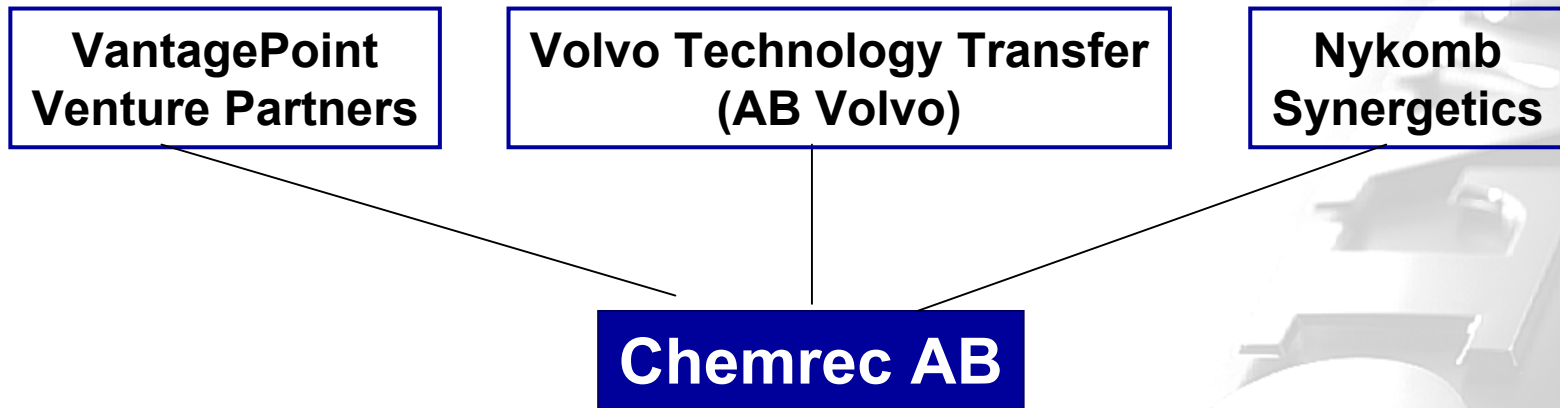
- making good use of low grade biomass



(Source: Chemrec)

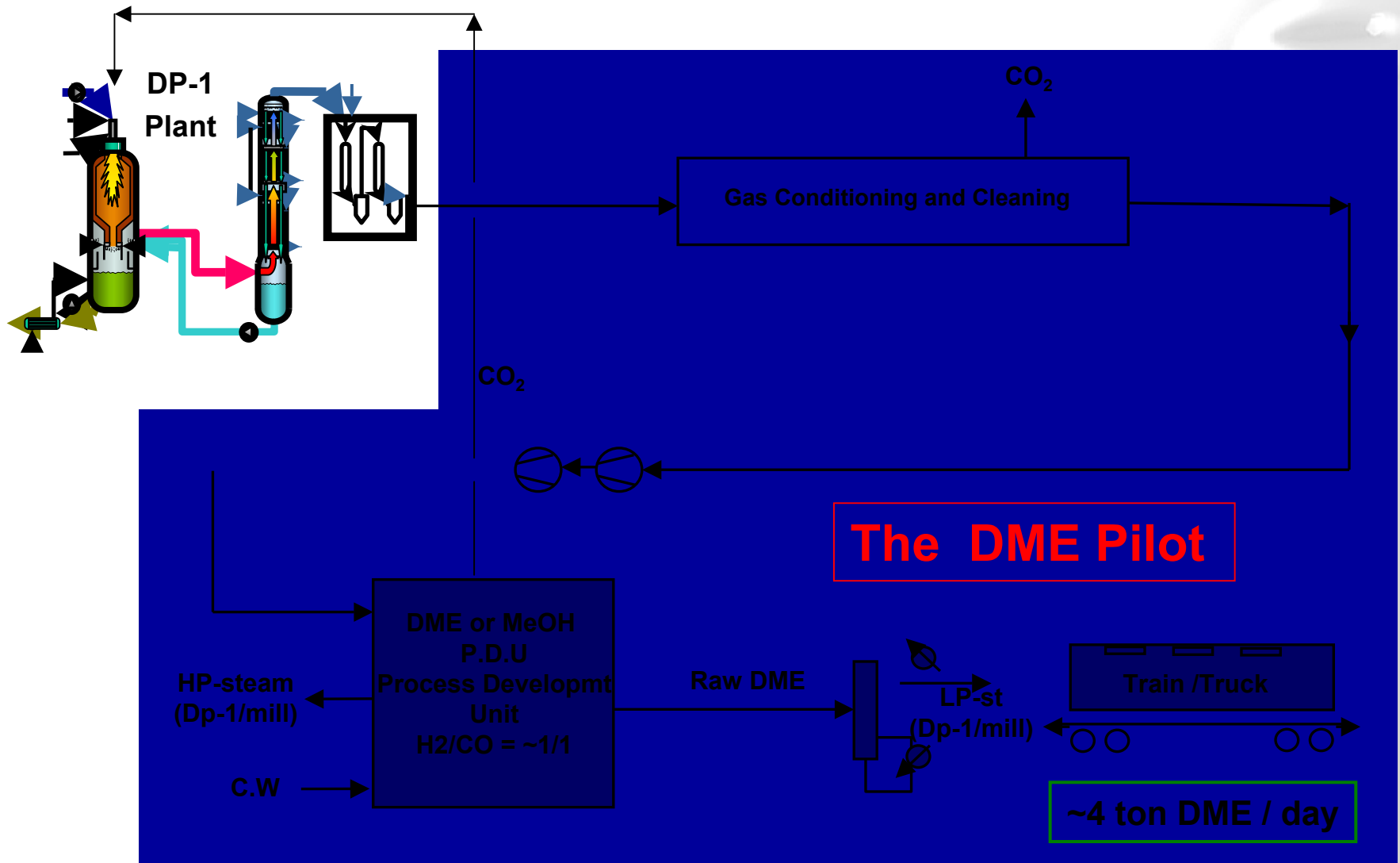
$$\text{Production Efficiency} = \frac{\text{Methanol/ DME}}{\text{Additional Renewable Energy}} > 65\%$$

Chemrec Ownership and Main Business



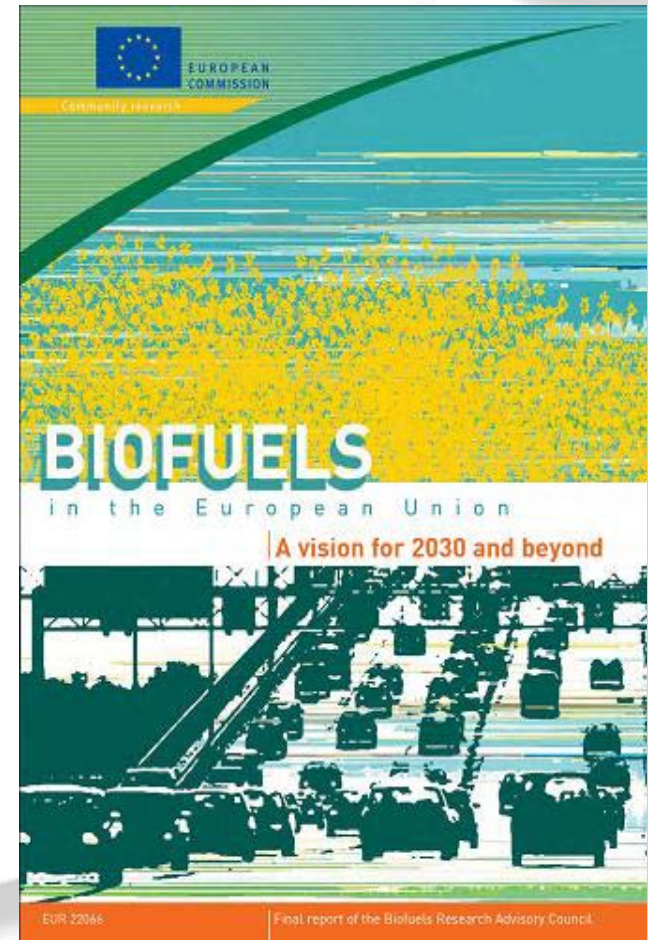
- Chemrec develops and Commercializes **Black Liquor Gasification Technology** which will convert Pulp Mills to Biorefineries
- The technology has the **potential to generate near 30 % of Sweden's current consumption of automotive fuels through black liquor gasification** at the Swedish pulp mills. The potential in Finland is ~50%, in Canada ~7% and in the US ~3%.
- Fuel generation at pulp mills becomes a second main product generating a cash flow on the level of 1/3 of the cash flow of the pulp at prices close to energy price of diesel and gasoline at crude prices of 30 USD/bbl
- Alternatively the technology has the **potential to generate approx. 10 TWh added green power production** or ~7 % of current Swedish power consumption.

In the plan: A DME Pilot at the Chemrec DP-1 Plant in Piteå, Sweden

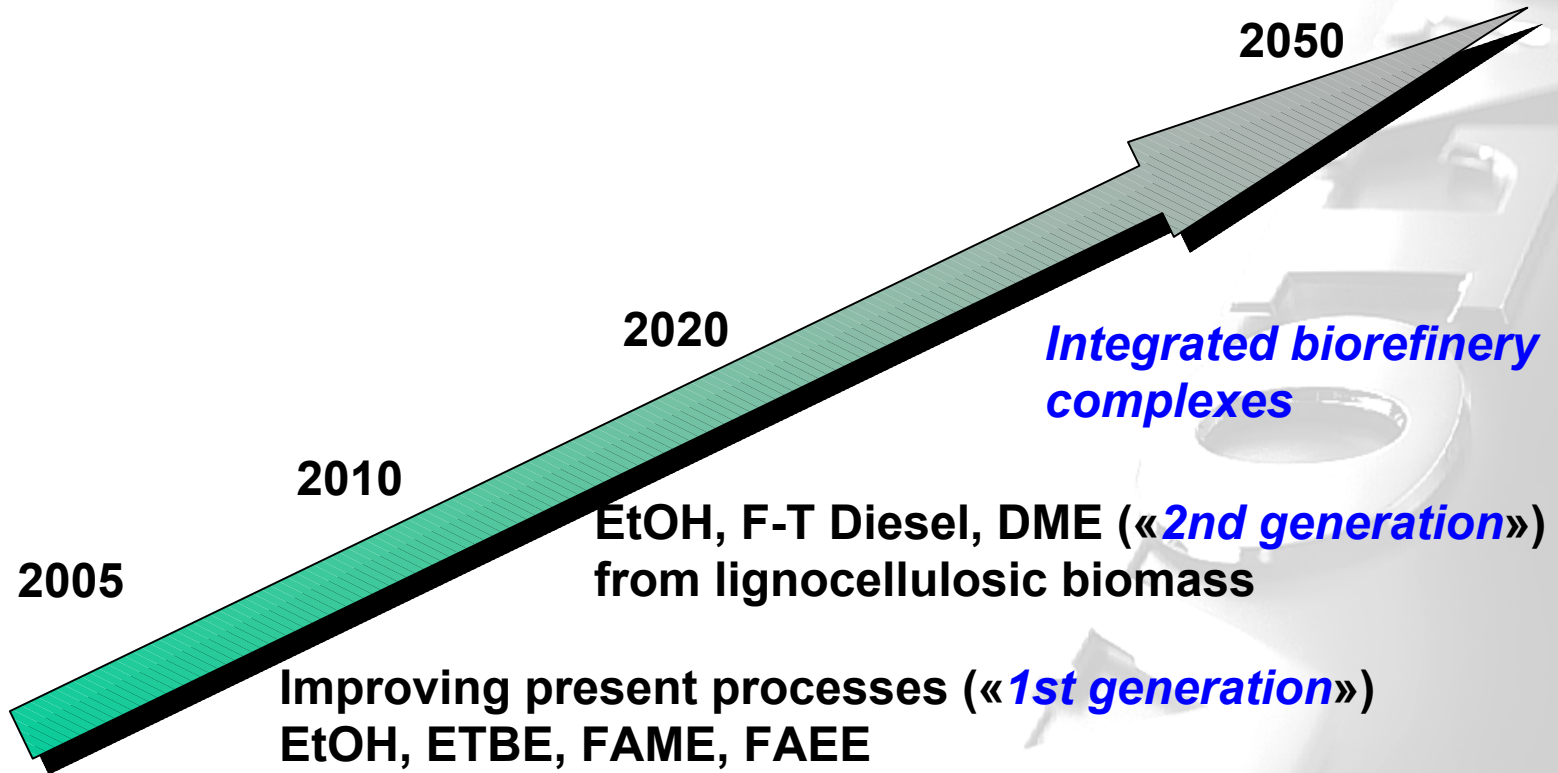


Biofuels Advisory Council (BIOFRAC) Biofuels in the EU – A Vision for 2030 and Beyond

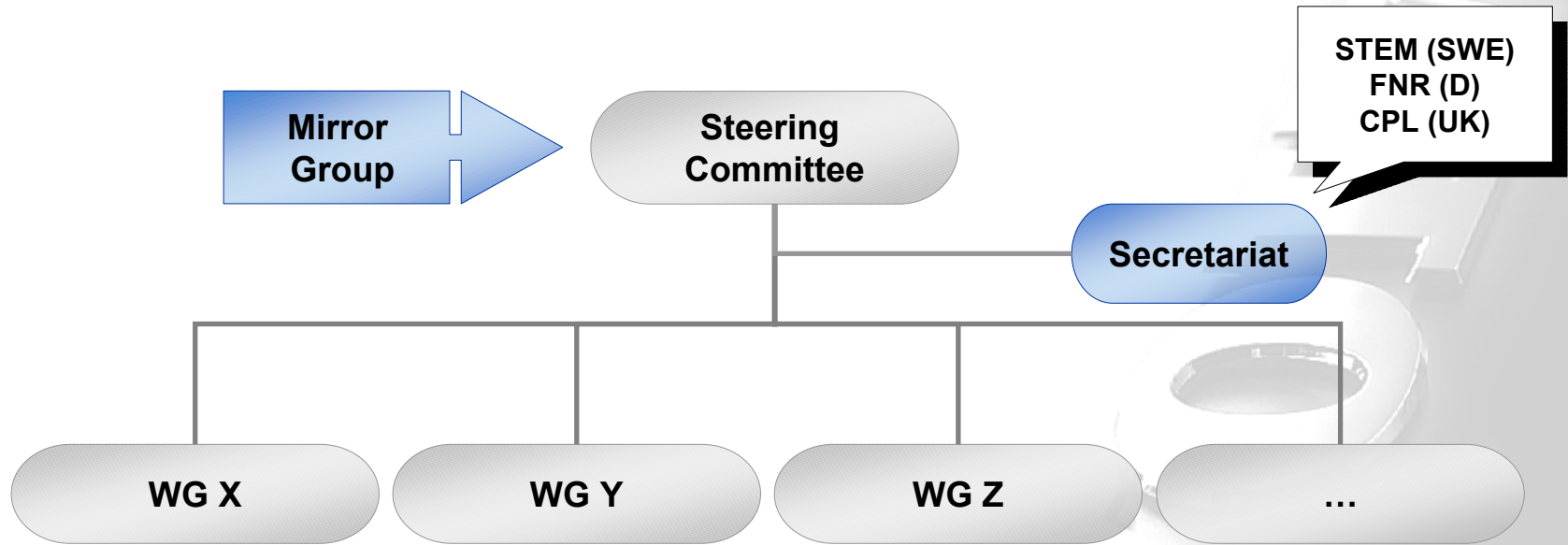
- By 2030, the European Union covers **up to one fourth** of its road transport fuel needs by clean and CO₂-efficient biofuels.
- A **substantial part is provided by a competitive European industry**. This significantly decreases the EU fossil fuel import dependence.
- Biofuels are produced using **sustainable and innovative technologies**, creating opportunities for biomass providers, biofuel producers and the automotive industry



Biofuels Advisory Council (BIOFRAC) Anticipated future roadmap



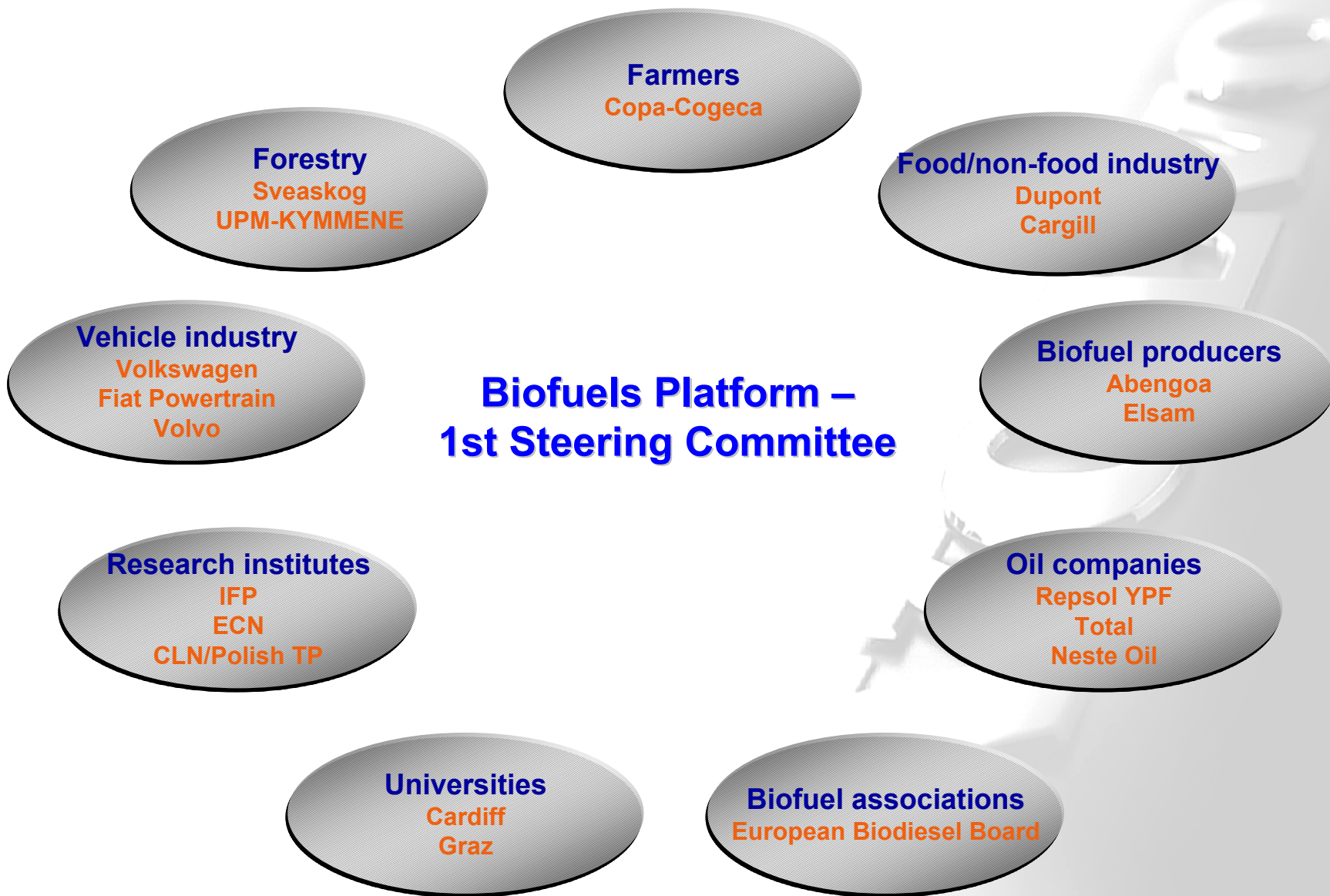
Biofuels Technology Platform: Structure



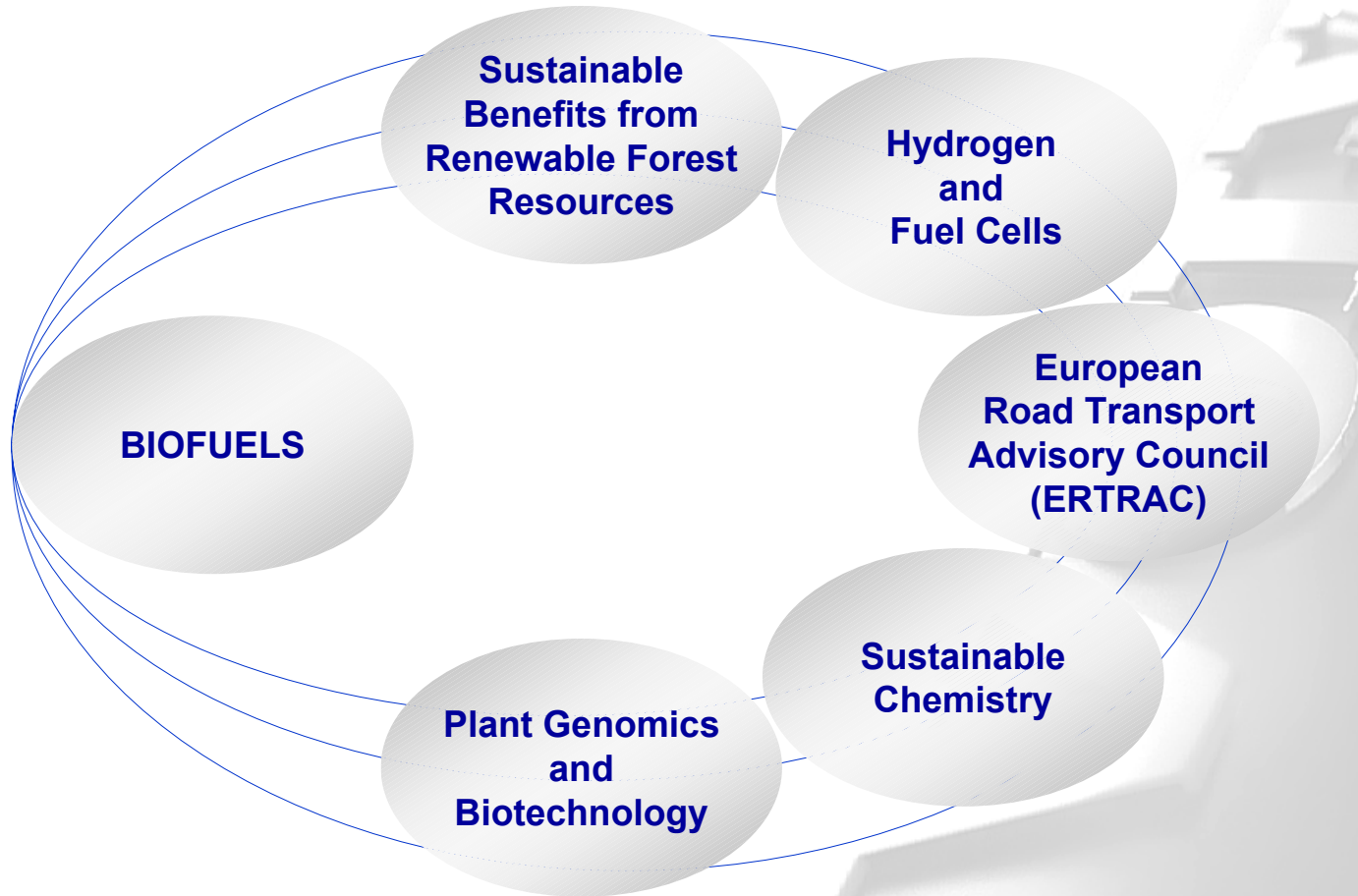
Biofuels Technology Platform

Working Groups

- Working group structure, organization (officers, memberships) and tasks worked out by the Steering Committee
- Following WGs have been decided:
 - WG1: ***Biomass availability and supply***
 - WG2: ***Conversion processes***
 - WG3: ***Product distribution and use***
 - WG4: ***Sustainability assessment***
 - WG5: ***Markets and regulations***
- The Working Groups are up working, first meetings held during the last couple of weeks.
- Target for the first year of work: finalization of a comprehensive ***Strategic Research Agenda (SRA) for Biofuels***



Interaction with other Technology Platforms



Thank You for Your Attention !





VOLVO