

European objectives for biofuels, and biodiesel

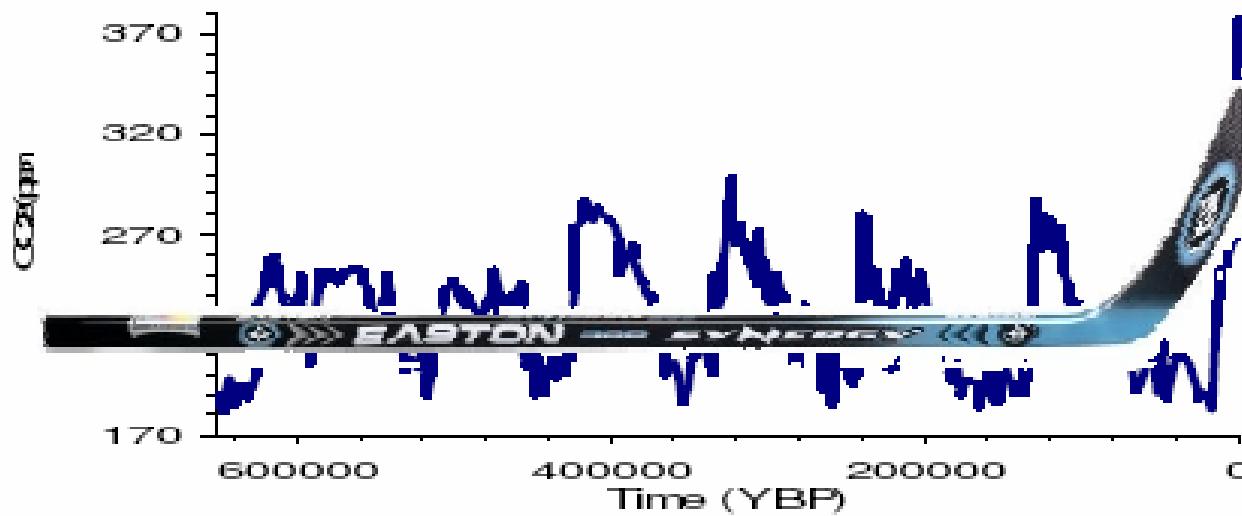
- Burgos
 - June 19, 2008
 - Hans Gulliksson
- Supported by ManagEnergy



- A general view of the European Directives related to biofuels and the current European objectives for biofuels in general and for biodiesel in particular
- General data about biodiesel production and consumption in European countries and future



Much talk and less hockey ?



 Trivector



Current European policy

- Energy Policy
 - 20% renewables by 2020
 - 10% biofuels by 2020
 - Vision for 20%+ biofuels by 2030?
- Biofuels directive
 - 5.75% in 2010 moving to 10% by 2020
- Car CO₂ targets
 - 140g/km 2008/2009
 - 120g/km 2012
 - 100g/km 2020?



An Energy Policy for Europe - the need for action

Proposed EU Energy Policy Targets and Objectives (2007):

- With the central objectives for energy:
supply security, environmental sustainability, competitiveness
 - Reducing greenhouse gas emissions by 20% by 2020, scale up to 30% if other developed countries make comparable efforts (below 1990 levels)
 - Improving energy efficiency by 20% by 2020
 - Raising the share of renewable energy to 20% by 2020
 - Increasing the level of biofuels in transport fuel to 10% by 2020
- Climate action and renewable energy package, a legislative proposal from the European Commission 23 Jan 2008



20 20 by 2020

- National renewable energy targets are proposed for each Member State
- National action plans reflecting national differences in available renewable energy sources; including a minimum 10% share for biofuels in petrol and diesel by 2020
- Sustainability criteria for biofuels



Transport and renewable energy

Transports:

- fastest growth in energy consumption
- the largest consumer of final energy in the EU (30.4% in 2003).

97.3% of the energy in the transport sector from oil-derived products 2005

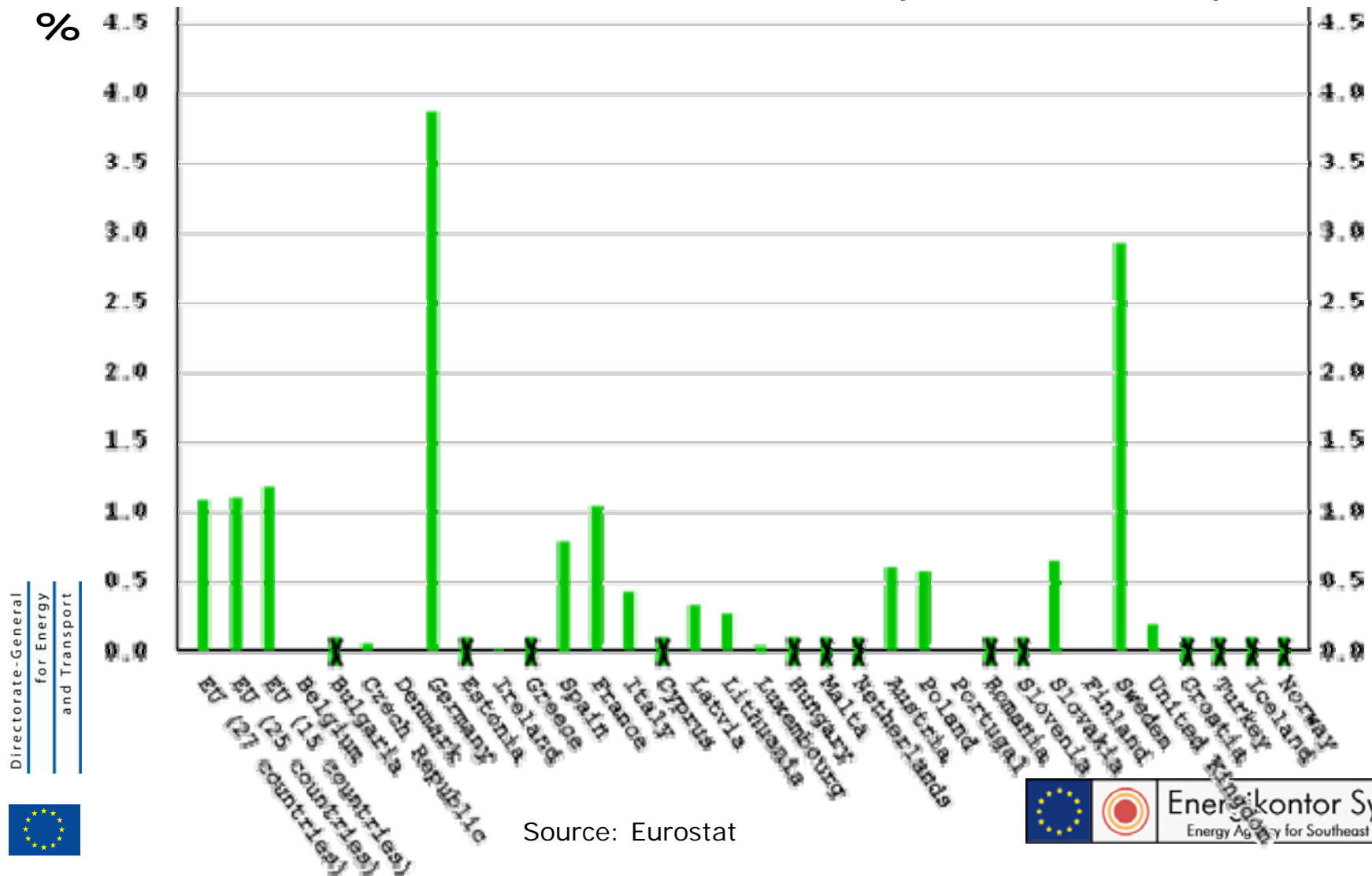


Biofuels for transport in the EU Member States 2005

<u>Country</u>	<u>National target 2010</u>	<u>National target 2005</u>	<u>Share of biofuel 2005</u>
Germany	5.75%	2.0%	3.75%
Sweden	5.75%	3.0%	2.2%
France	7.0%	2.0%	1.0% (2004)
Austria	5.75% (2008)	2.5%	0.93%
Lithuania	5.75%		0.72%
Malta		0.3%	0.52%
Italy	5.0%	1.0%	0.51%
Poland	5.75%	0.5%	0.48%
Spain		2.0%	0.44%
Slovenia	5.0%	1.2% (2006)	0.35%
Latvia	5.75%		0.33%
United Kingdom	5.0%	0.3%	0.18%
EU25			1.0%



Share of biofuels in total fuel consumption of transport 2005



Source: Eurostat





Central objectives of EU energy policy:

- environmental sustainability
- competitiveness
- energy supply security

European Council's proposal for an Energy Police for Europe, March 2006



More ways to meet the targets

7th Research Framework Programme FP7, 2007—2013

R&D for a renewable energy for fuel production, e.g. demonstration projects for alternative fuels, biofuels, the clean secure car

Intelligent Energy-Europe programme, IEE, 2007—2013

Broad support to promoting the use of renewable energy with:

- information activities
- help remove barriers that block the penetration of renewable energy, particularly administrative ones



Energy in the Treaty

- With the Treaty of Lisbon, for the first time, the Treaties will contain a section on energy (which assigns to Union policy in this sector the objectives of ensuring the proper functioning of the energy market, in particular energy supply and the promotion of energy efficiency and energy saving, and the development of new and renewable forms of energy).
- The Treaty of Lisbon – signed by 27 Member States in Lisbon on 13 December 2007. It gives an opportunity to address climate and energy issues.
- The Treaty will not apply until and unless it is ratified by each of the EU's 27 members. Ireland?



The EU Objective 120 g CO₂/km

- Average CO₂ emissions from new passenger cars should not exceed 120g CO₂ per km by 2012
- The objective is defined as the average of the new cars sold in a given year
- A proposed revision of the Fuel Quality Directive will introduce a new greenhouse gas reduction target for all transport fuels, whether fossil fuels or biofuels



About biodiesel



- A well-established technology
- Generally methyl esters made by transesterification. A feedstock oil or fat reacts with methanol and a catalyst, usually potassium hydroxide or sodium hydroxide.
- FAME (Fatty Acid Methyl Ester) or FAEE (Fatty Acid Ethyl Ester)
- A common FAME is RME, made from oil-seed rape
- Renewable raw material: vegetable oils (rapeseed oil, sunflower oil, soy oil, palm oil), animal fat or used cooking/frying oil
- Co-products: glycerine and animal feed
- Used in compression ignition diesel systems
- Mixable with fossil diesel (pure, B100, or blended, B10, B20 ...)



Biodiesel production levels

2006: 4.9 million tonnes biodiesel were produced in Europe of the total world production of biodiesel , 5–6 million tonnes (most of the rest in the USA)

2005: 3.2 million tonnes of biodiesel were produced in the EU, an 65% increase from 2004

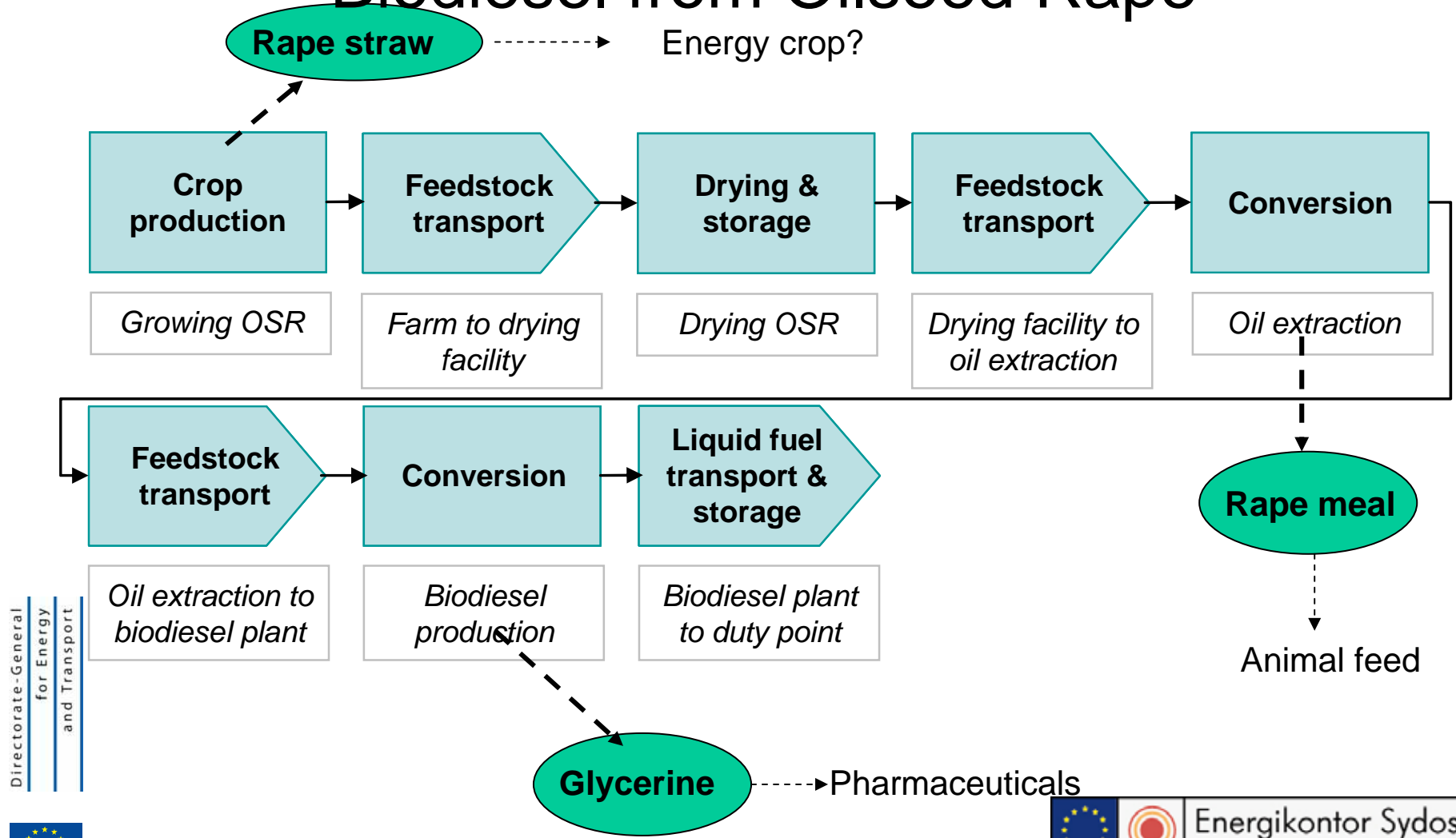
2004: 1.9 million tonnes of biodiesel were produced in the EU

Germany was the largest producer in Europe (and in the world) with more than 50% of the total production. Other producers of 1 million tonnes of biodiesel and more were France, Italy, UK, Austria, Poland, the Czech Republic and Spain (2006).

The biodiesel production capacity of the EU-27 was 10.3 million tonnes on 1 July 2007.



Biodiesel from Oilseed Rape



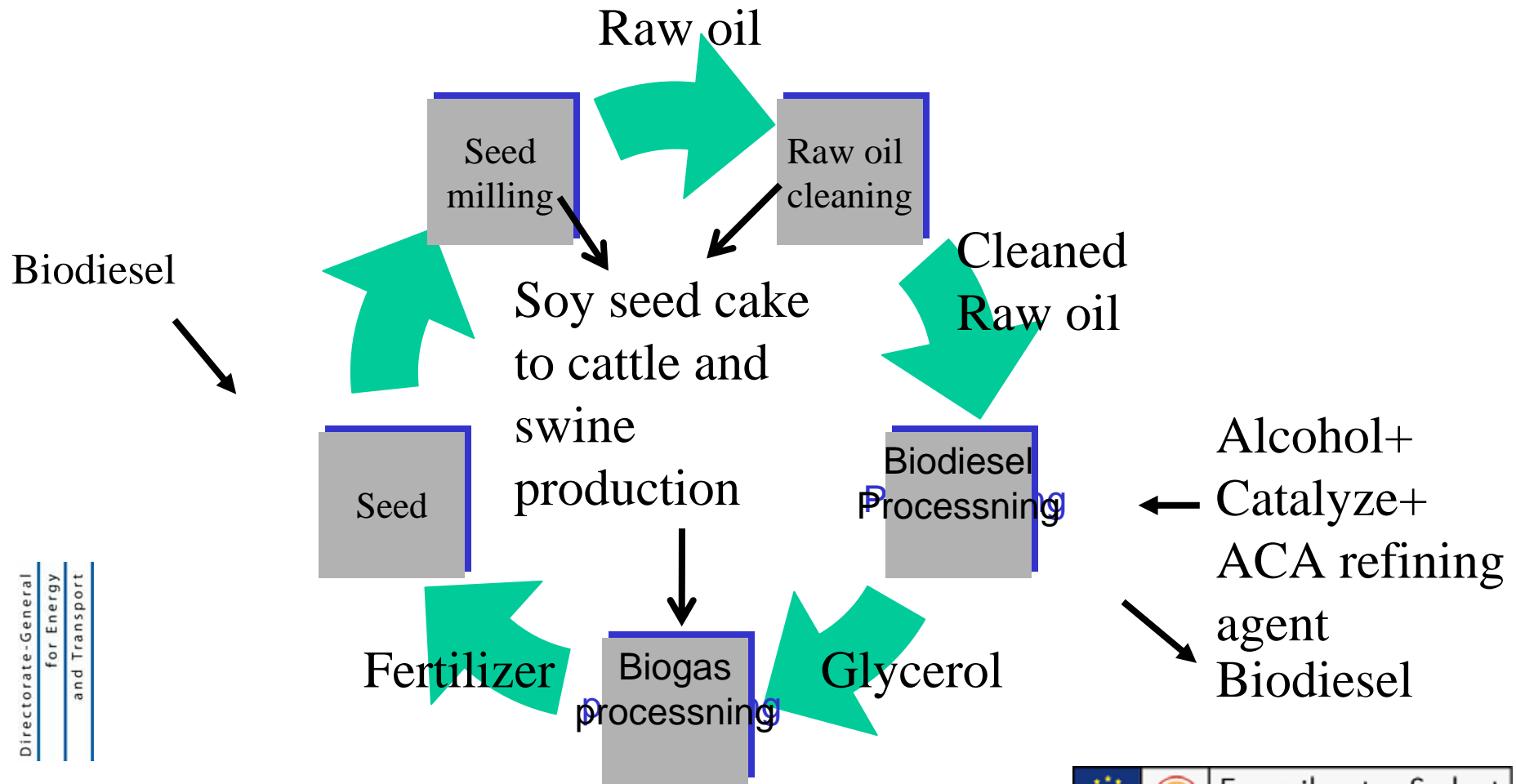
Directorate-General
for Energy
and Transport



Energikontor Sydost
Energy Agency for Southeast Sweden



Integrated biodiesel system with biogas production from glycerol





Cultivation and harvesting

- N₂O emissions from nitrogen fertilizer application
- Fossil fuel content of all fertiliser and pesticides
- Diesel in farm machinery
- Changes in carbon storage due to
 - Alternative land use
 - Previous land use



Biodiesel quality standard EN 14214

The EU has also published strict guidelines in compliance with CEN Standardisation (EN14214) in order to insure quality and performance.

EN 14214:2003/AC:2007 Automotive fuels - Fatty acid methyl esters (FAME) for diesel engines - Requirements and test methods

Accordingly, the CEN should establish appropriate standards for other transport biofuel products in the European Union

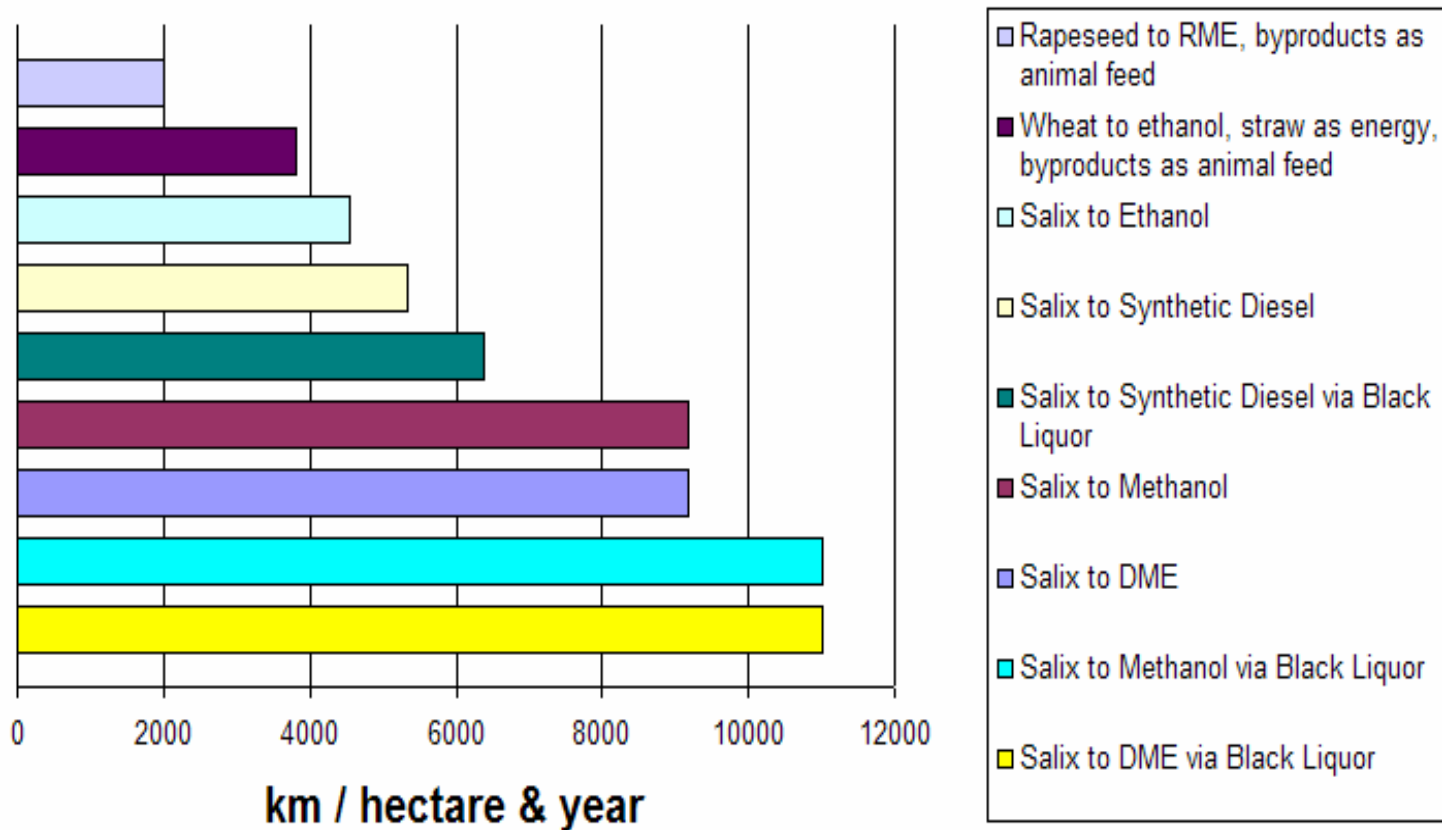


The European production of biodiesel in 2004 was only 1.2% of the total diesel consumption.



Distance per hectare and year

(Heavy duty vehicle)

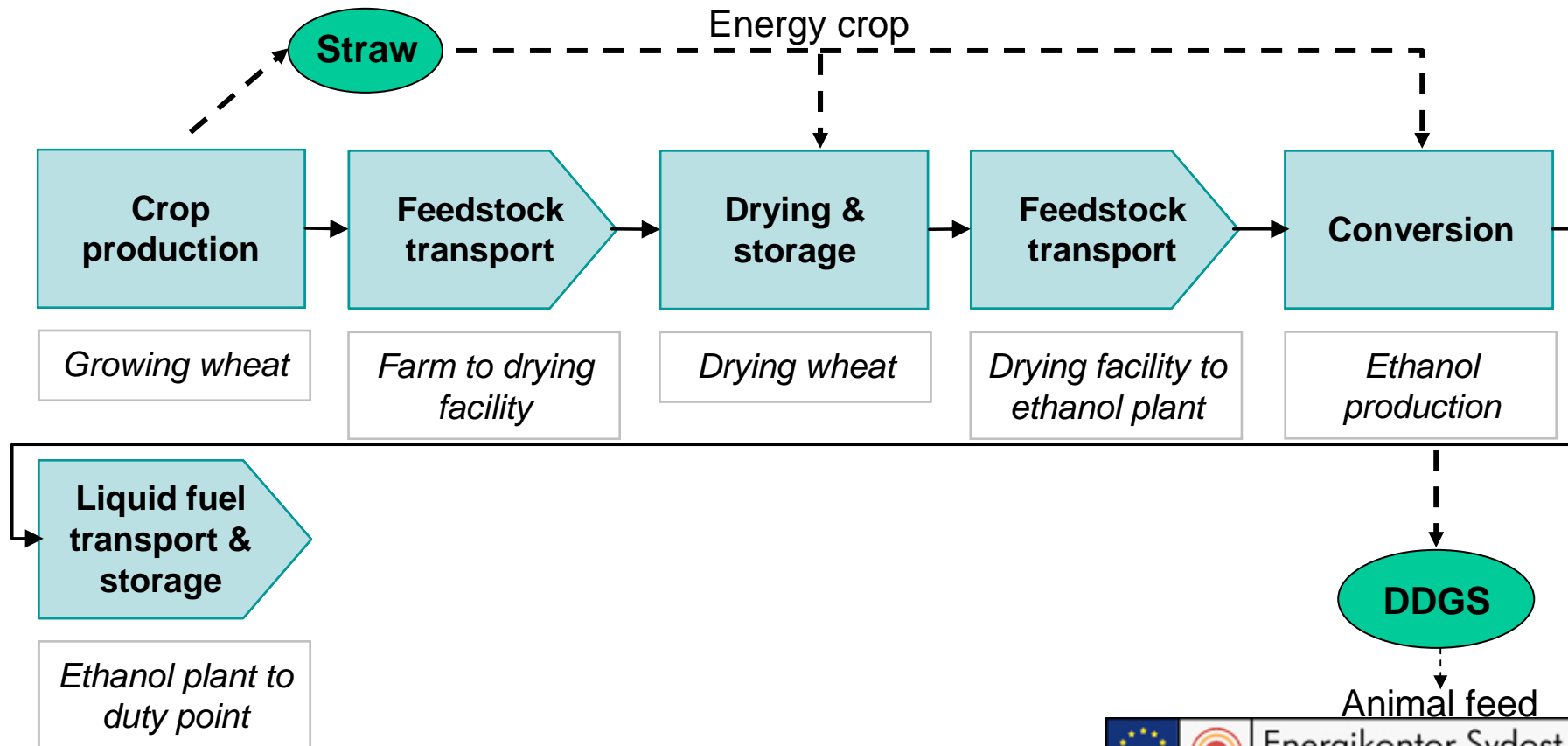


Diesel engine efficiency assumed also for methanol and ethanol

Source: Volvo AB

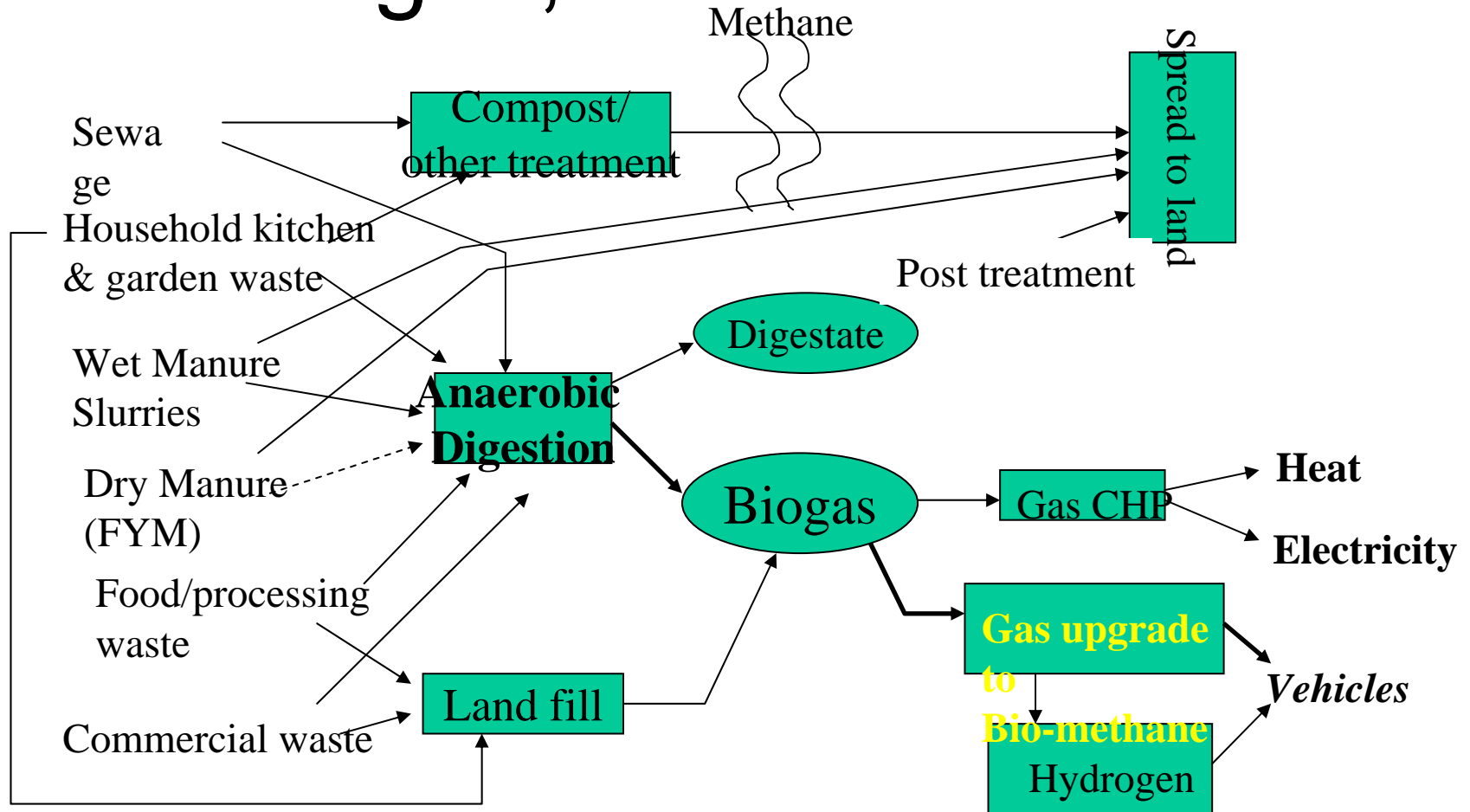


Wheat to Ethanol



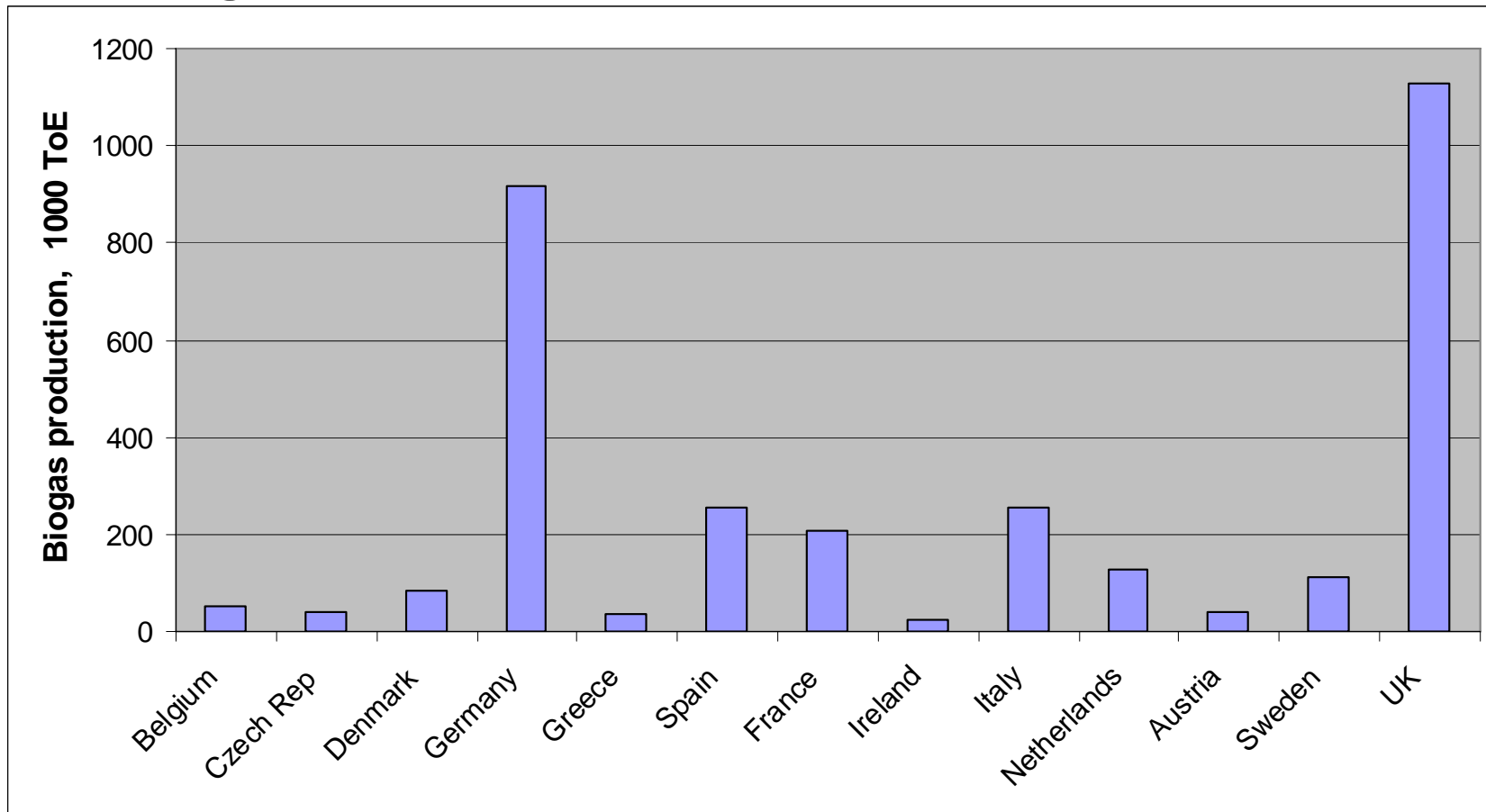


Biogas, bio-methane





Biogas production in Europe 2003



EuroStat 2003 data



Gas fleets in Europe

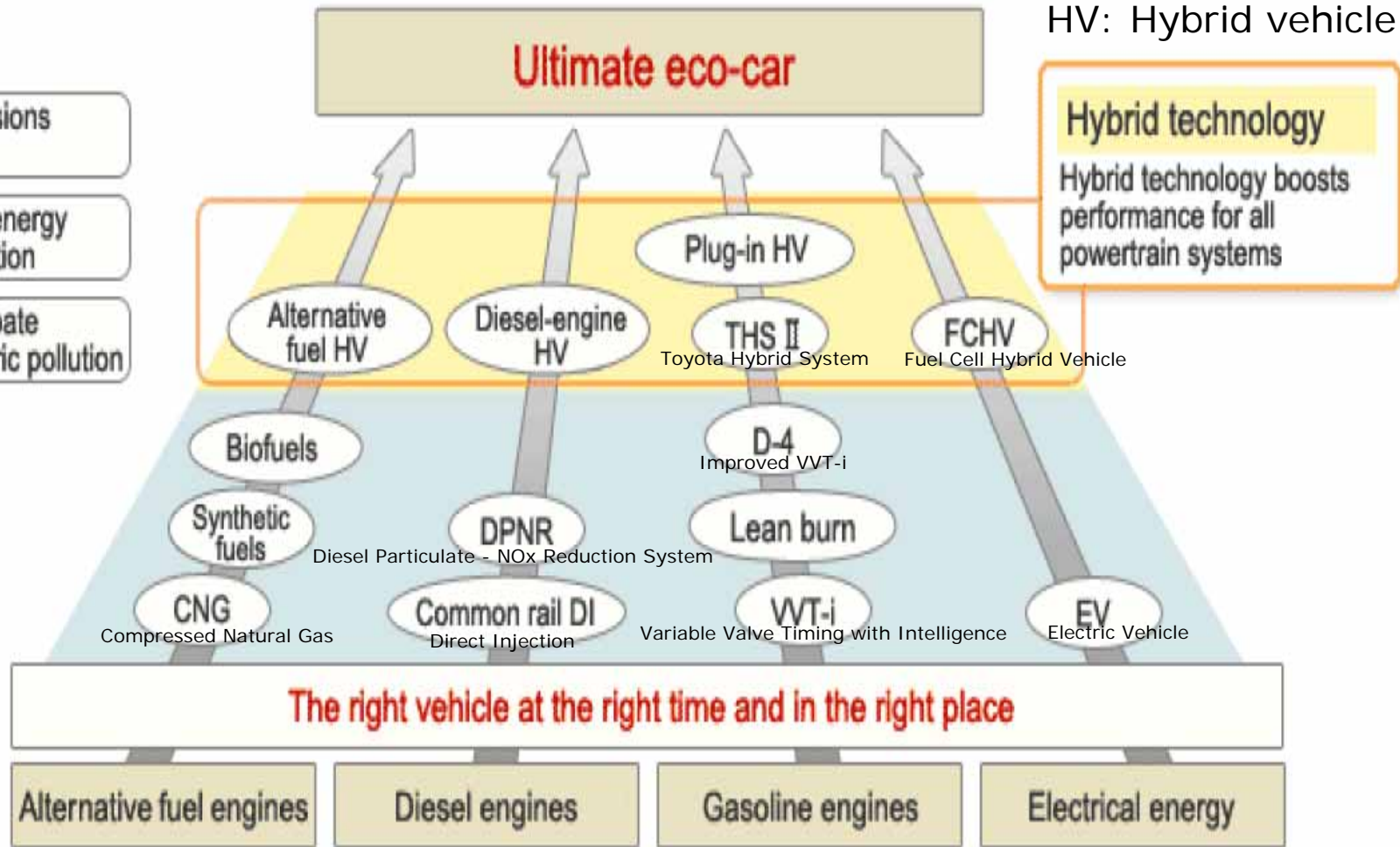
Country	Total	LD vehicles	Buses	Trucks	Other
Italy	382000	380000	1600	400	
Germany	38933	30557	1277	6688	411
France	8400	6000	2000	400	
Sweden	7880	6948	656	276	
Switzerland	1965	1870	70	25	
Spain	912	47	356	509	
Poland	771	360	41	370	
Austria	584	580	2	2	
Netherlands	550	165		385	
United Kingdom	543	82	35	426	
Argentina	1457118	1457118			
Brazil	1052295	1052295			
Pakistan	1000000	1000000			



Issue

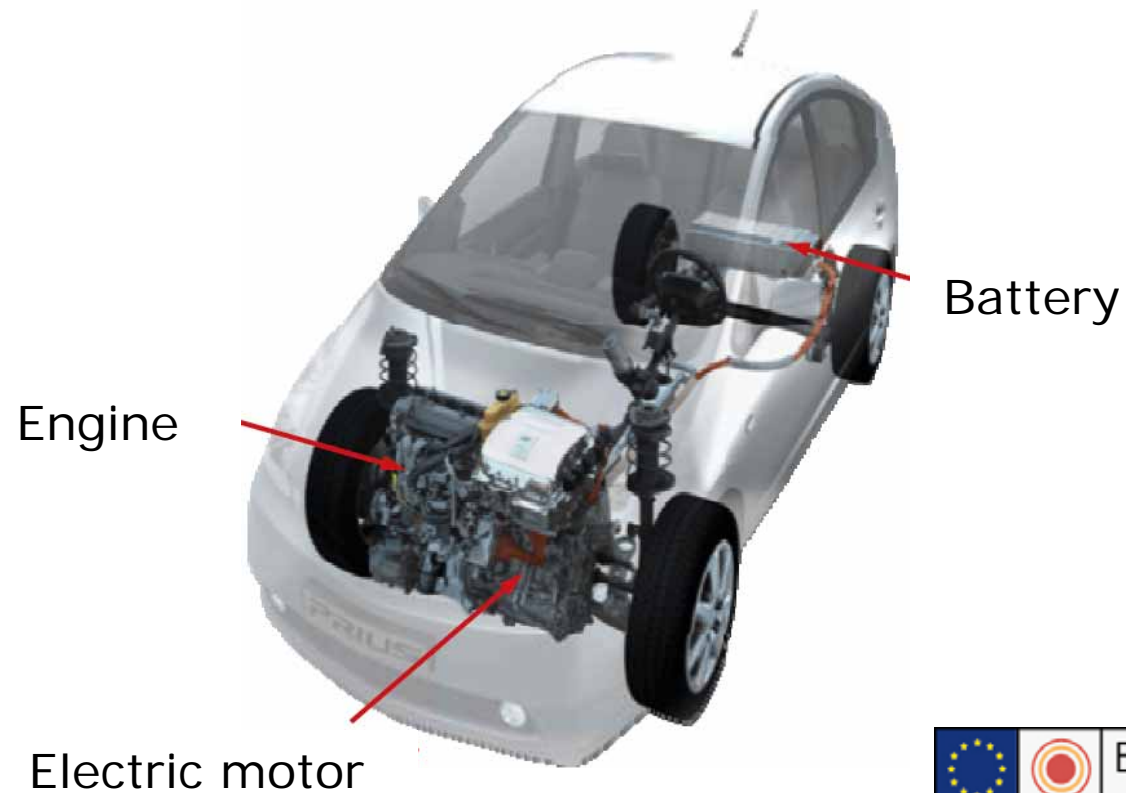
- CO₂ emissions reduction
- Pursuing energy diversification
- Helping abate atmospheric pollution

HV: Hybrid vehicle



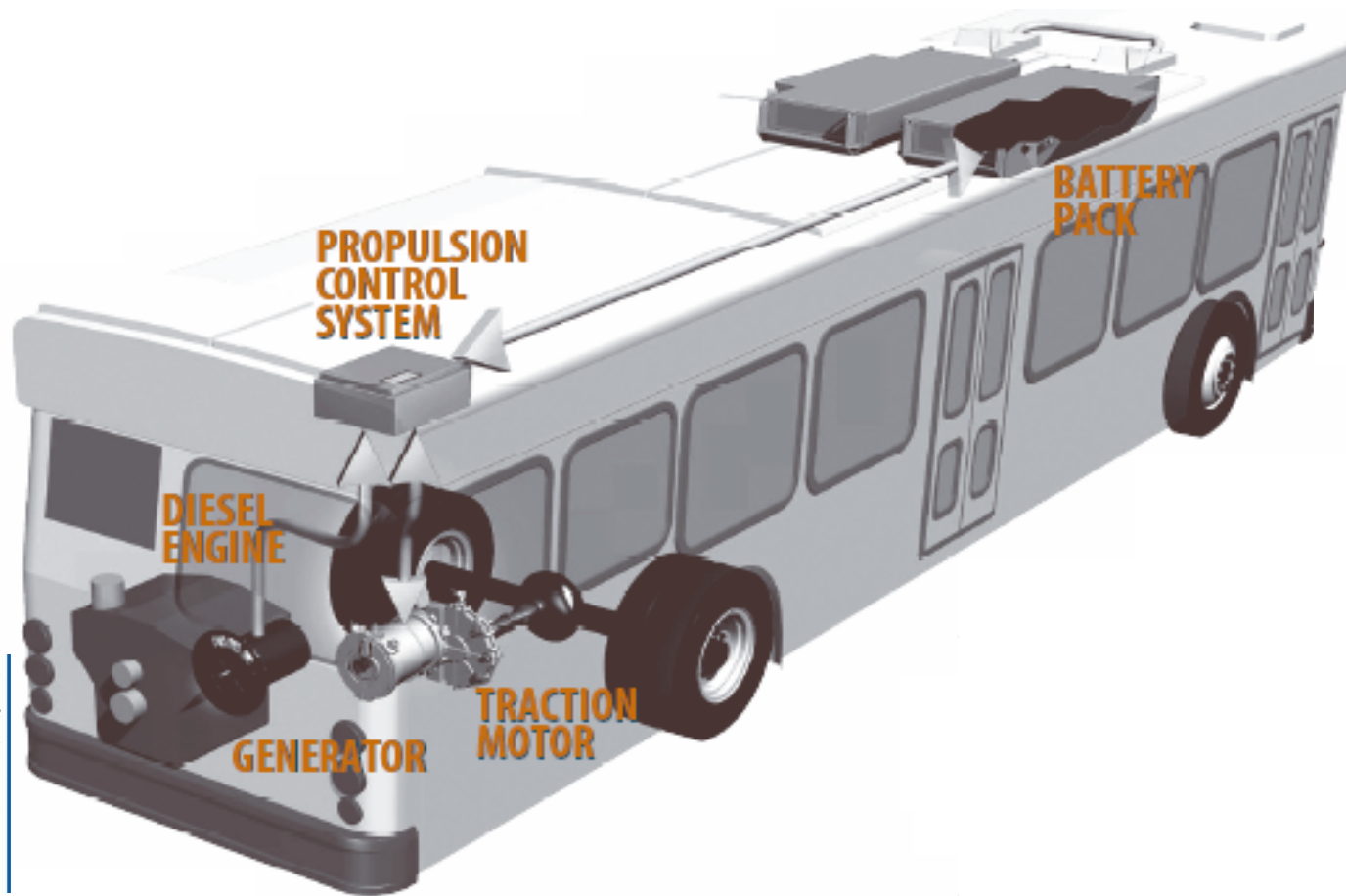


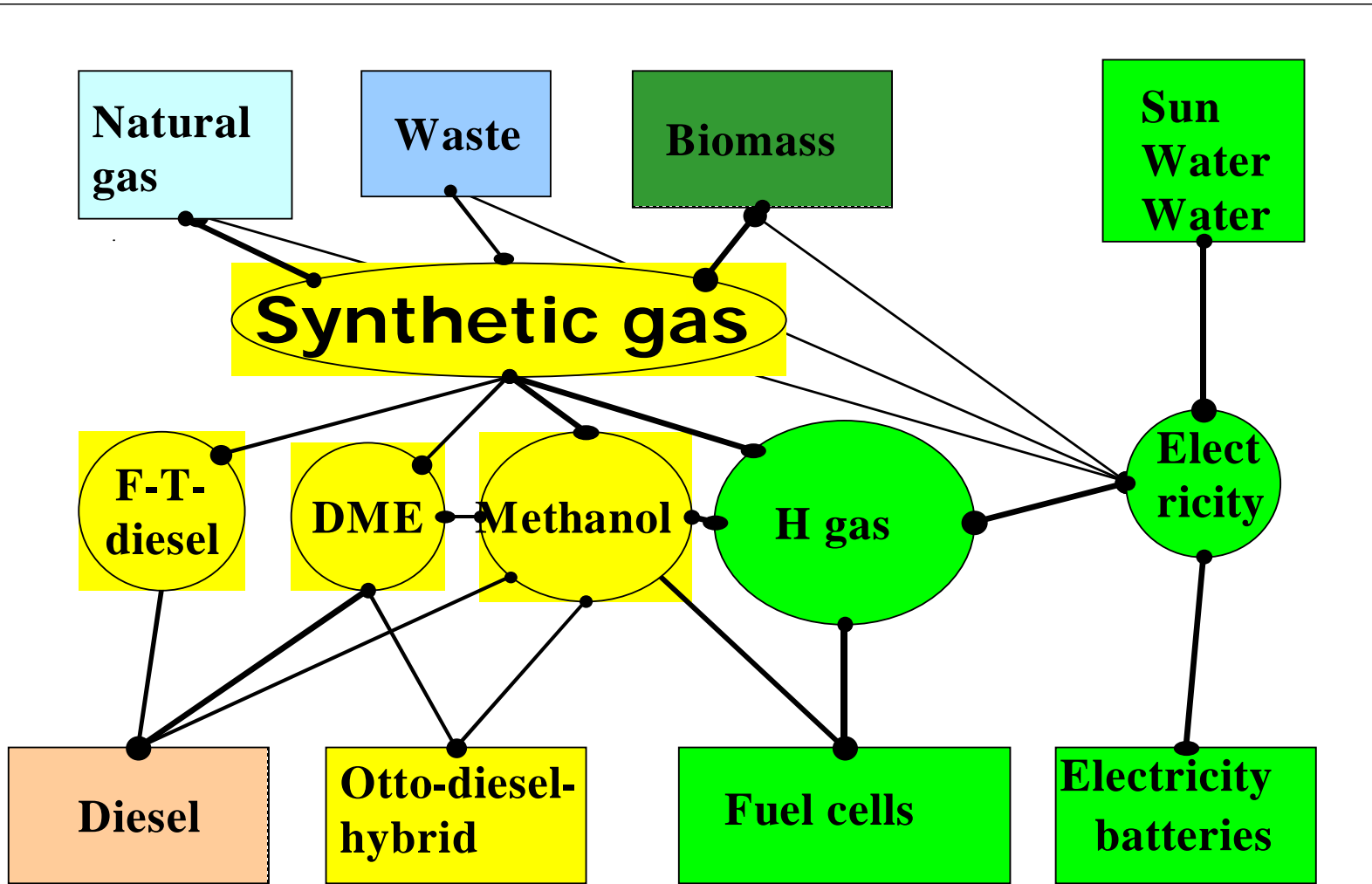
Hybrid vehicles





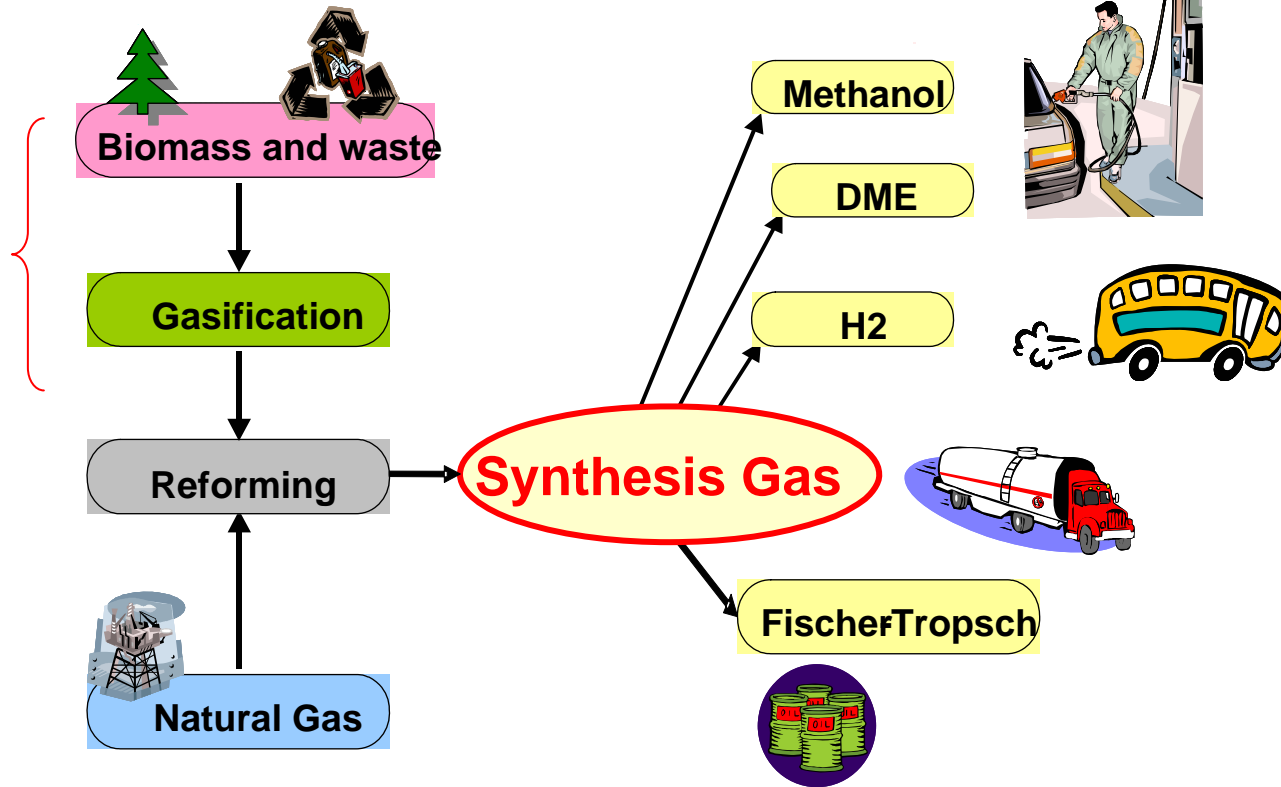
Diesel-electric hybrid







CHRISGAS: Clean Hydrogen-rich Synthesis Gas





Växjö Värnamo Biomass Gasification Centre (VVBGC)



Non-profit
making
project-
based
company

Large-scale
test
platform

European
biomass
gasification
centre



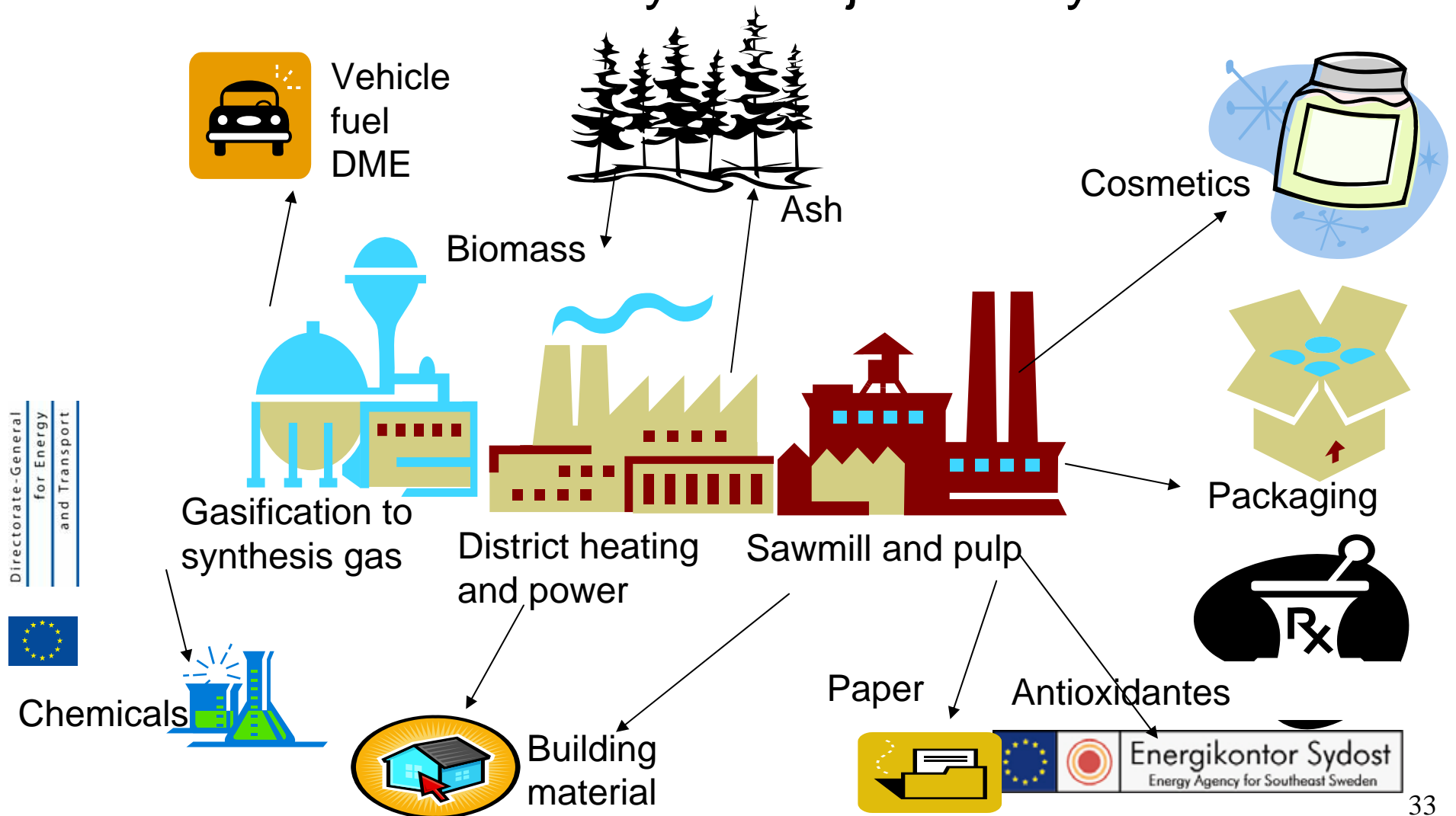
Bioenergy creates sustainable jobs



- 1 TWh biofuel => 300 new jobs
- An increase with 80 TWh biofuel → + 24,000 new jobs in Sweden
- Manufacturing of equipment → another 8000 jobs
- Large export potential → further more jobs
- The society benefits: gets income taxes and no need for support to unemployed people



The biobased economy in Växjö – today and future





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