The BioDME project

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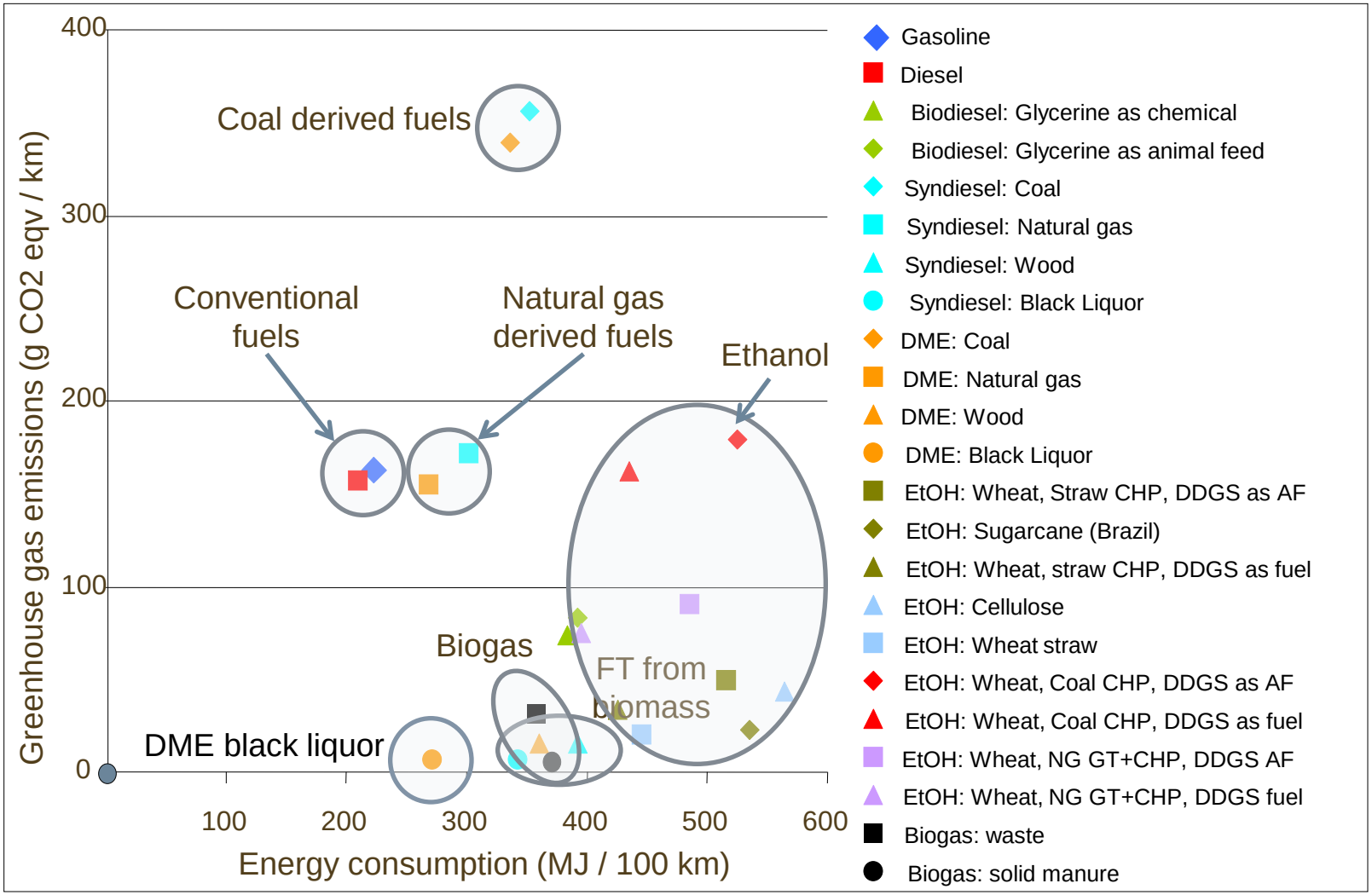
Fuels for the future

How should the alternatives be evaluated and judged?

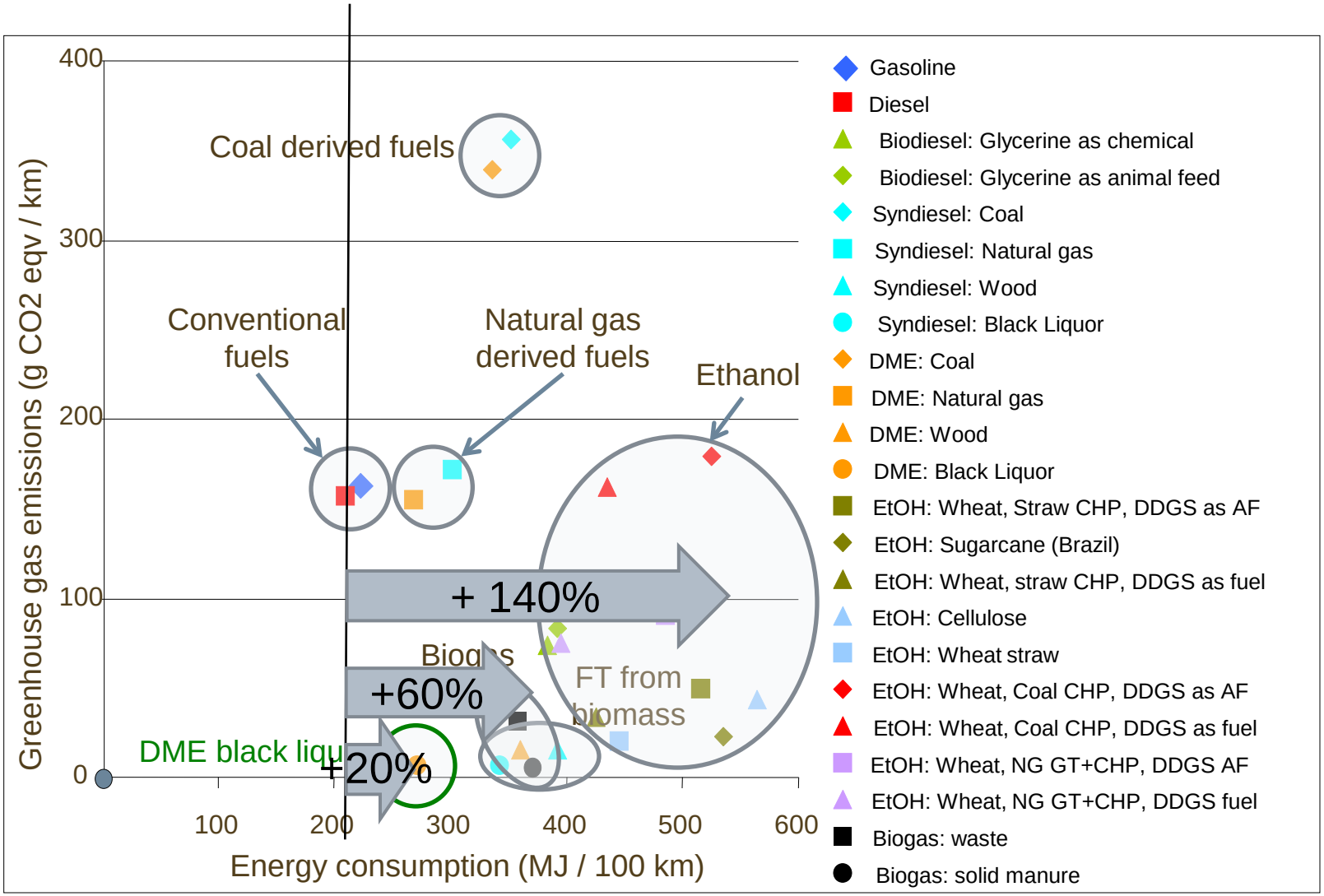
- **Sustainability** and sustainable availability
- Well-to-wheel **energy efficiency** and **CO2 emissions**
- Well-to-wheel regulated and unregulated emissions
- Economy & infrastructure
- Other considerations
  - energy density
  - safety and health (fuel handling)
  - specific issues/concerns related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

Energy efficiency and greenhouse gas emissions



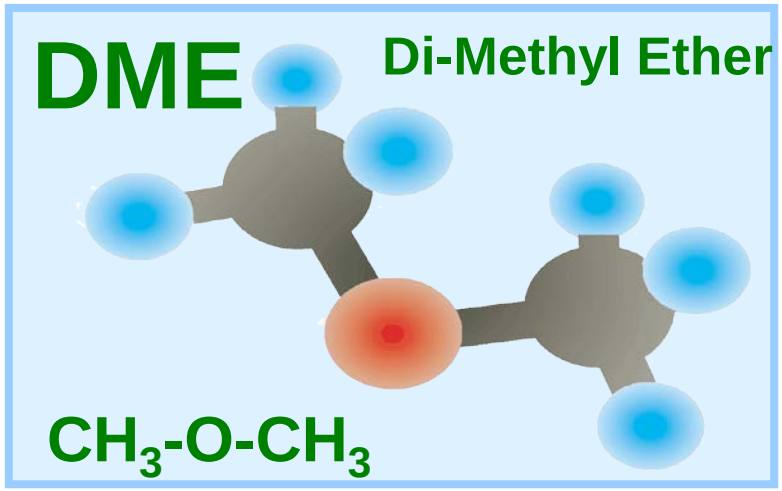
Source: EUCAR/CONCAWE/JRC

Energy efficiency and greenhouse gas emissions



Source: EUCAR/CONCAWE/JRC

DME – An energy efficient future fuel option



- A "*multi source, multi purpose*" fuel
- Very *high well-to-wheel energy efficiency*
- Very *high yields* of transport work per hectare and year
- Infrastructure and safety similar to LPG
- An ideal fuel for the *highly efficient diesel process*
- Potential for *ultra low exhaust emissions* and reduced noise
- Non toxic and environmentally benign

EUROPEAN PROJECT

Grant agreement No: TREN/FP7EN/218923

BIODME

Production of DME from Biomass and utilisation as fuel for transport and for industrial use

Energimyndigheten

SEVENTH FRAMEWORK PROGRAMME

Starting date:	1 September 2008	Total budget	28.4 M€
Duration	48 months	EU funding:	8.2 M€
Contact:	per.salomonsson@volvo.com	Energimyndigheten:	9.6 M€

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BIODME

Demonstration of an environmentally optimized future bio-fuel for road transport covering the full chain from production of fuel from biomass to the utilization in vehicles

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BioDME Project Partners

CHEMREC

- BioDME Plant engineering, construction and operation
- BioDME Plant owner

DELPHI

- DME injection system development

HALDOR TOPSØE

CATALYSING YOUR BUSINESS

- DME production technology provider

ETC

- Laboratory support to plant operation

TOTAL

- DME fuel specification
- Fuel Additive development

VOLVO

BioDME Project Coordinator

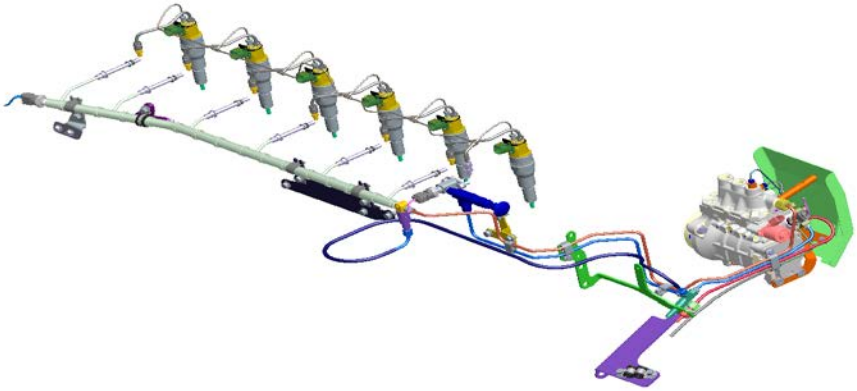
- Engine development
- Vehicle manufacturing
- Field test responsible

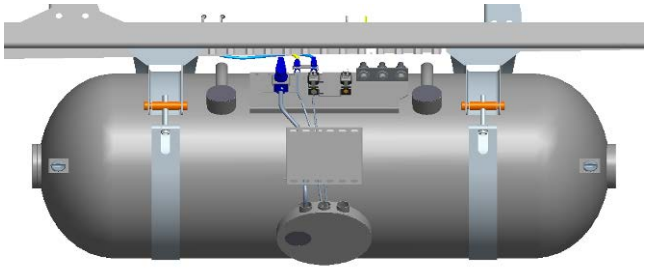
preem

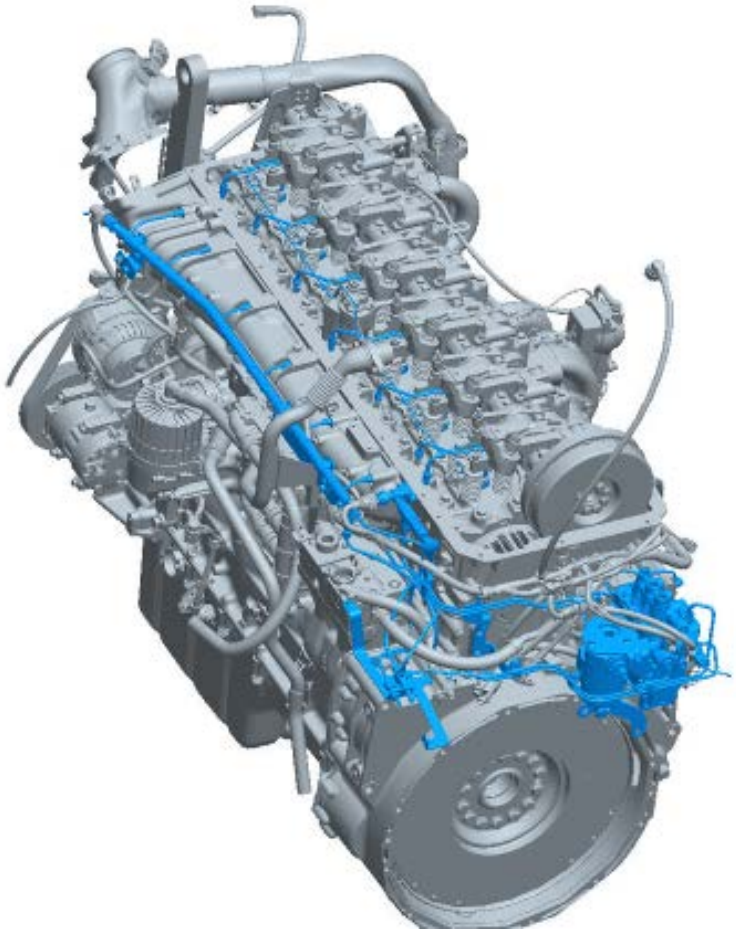
- BioDME distribution
- BioDME filling stations

BIODME

DME technology

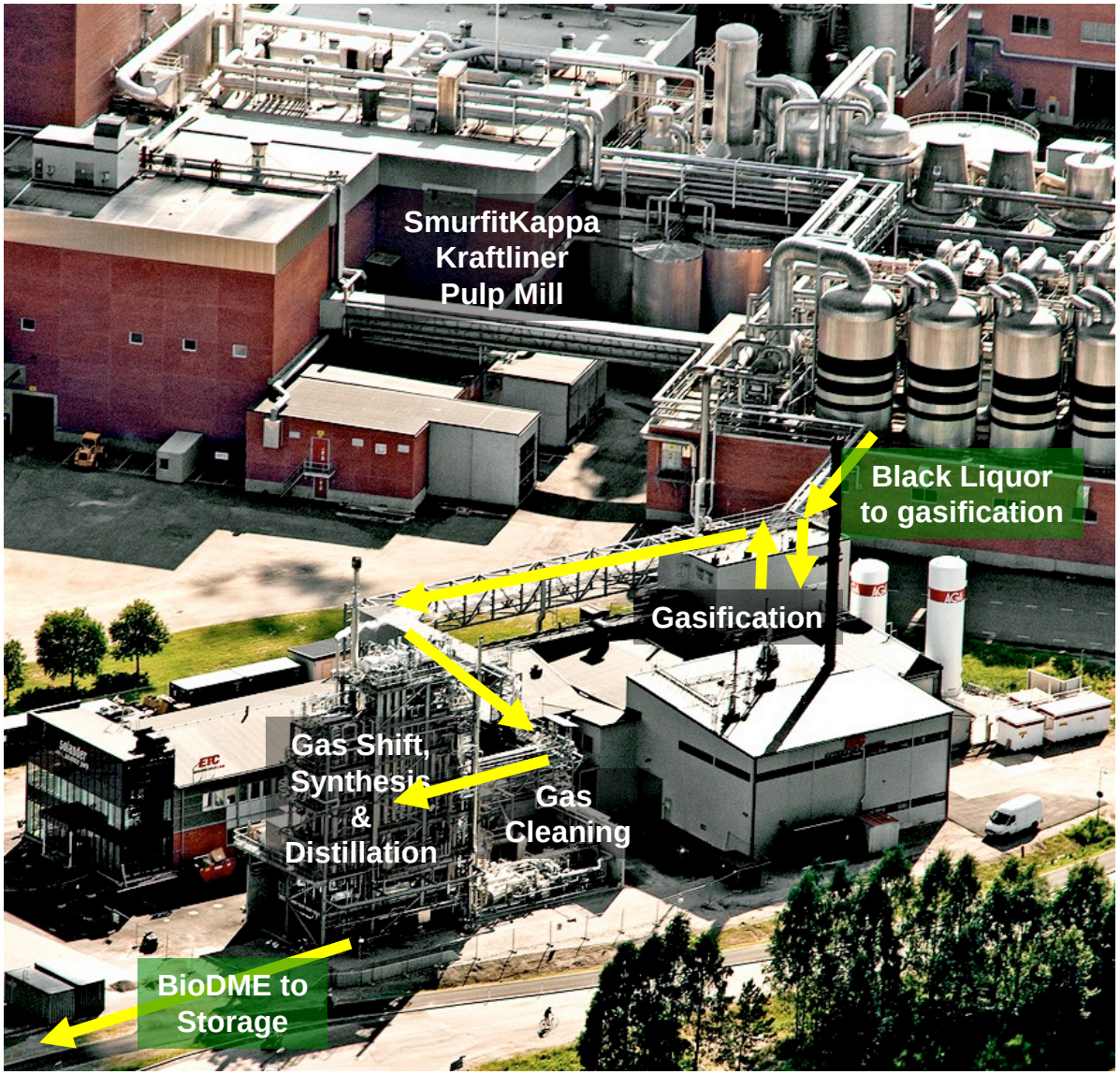






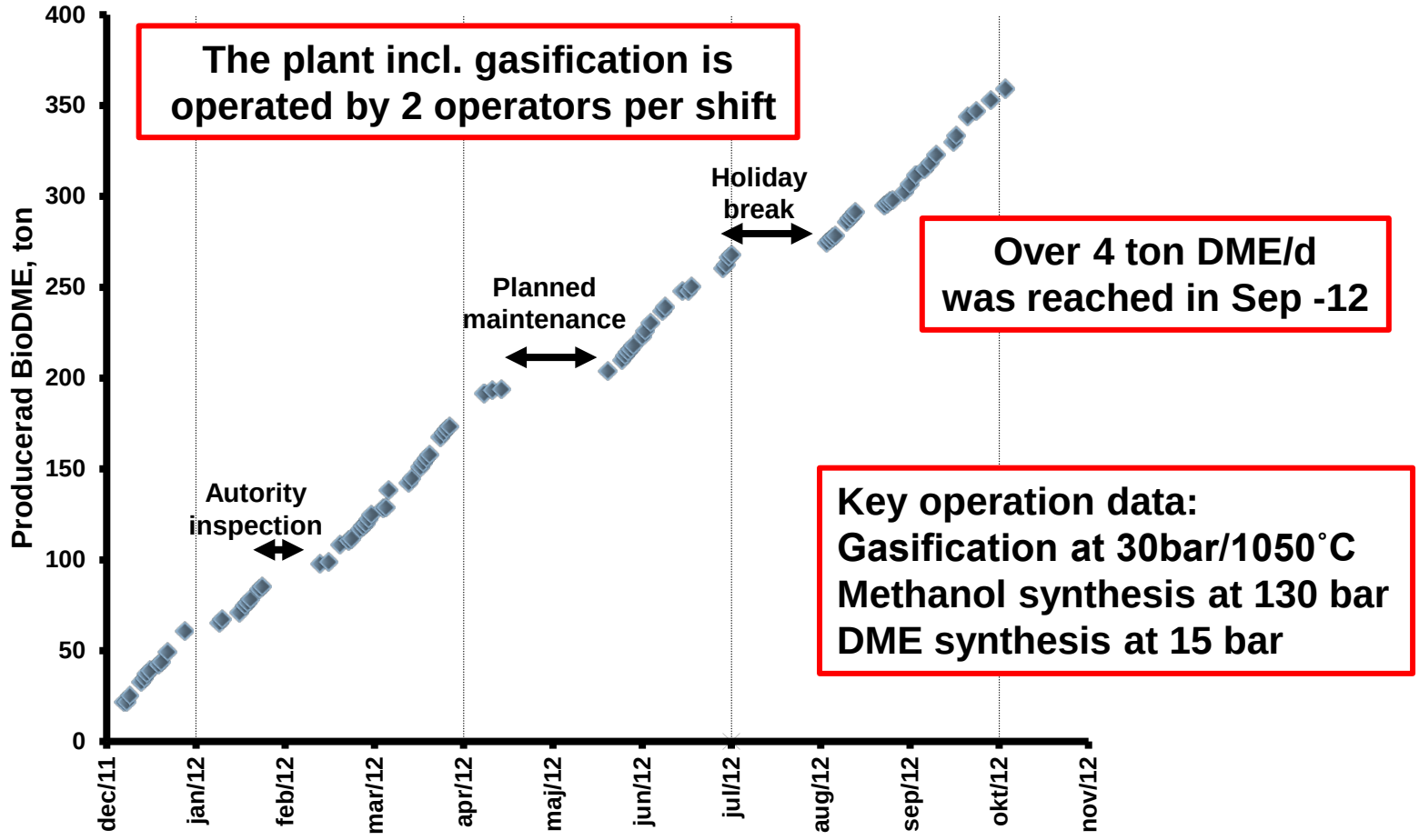
- Diesel base engine unchanged
- Diesel process efficiency preserved
- New fuel system
- System design to keep DME in liquid form
- Modified engine control software
- DME compatible materials where needed

Some facts about the BioDME Plant



DME production capacity:	**4 tons / d**
Pipe installation:	**~ 10 000 m**
Hand valves & on/off valves:	**~ 1400 pieces**
Instruments:	**~ 450 pieces**
Vessels:	**~ 30 pieces**
Heat exchangers:	**~ 25 pieces**
Process Plant Foot Print:	**20 x 30 m**
Investment cost (excl gasification):	**~ 22 million €**

BioDME Production



Fuel distribution

- **Available technology modified for DME**
- **Safety regulations based on LPG**
- **Low cost, ~200 k€ per filling station**
- **Easy to achieve**

200 m^3 storage tank in Piteå

34 m^3 trailer

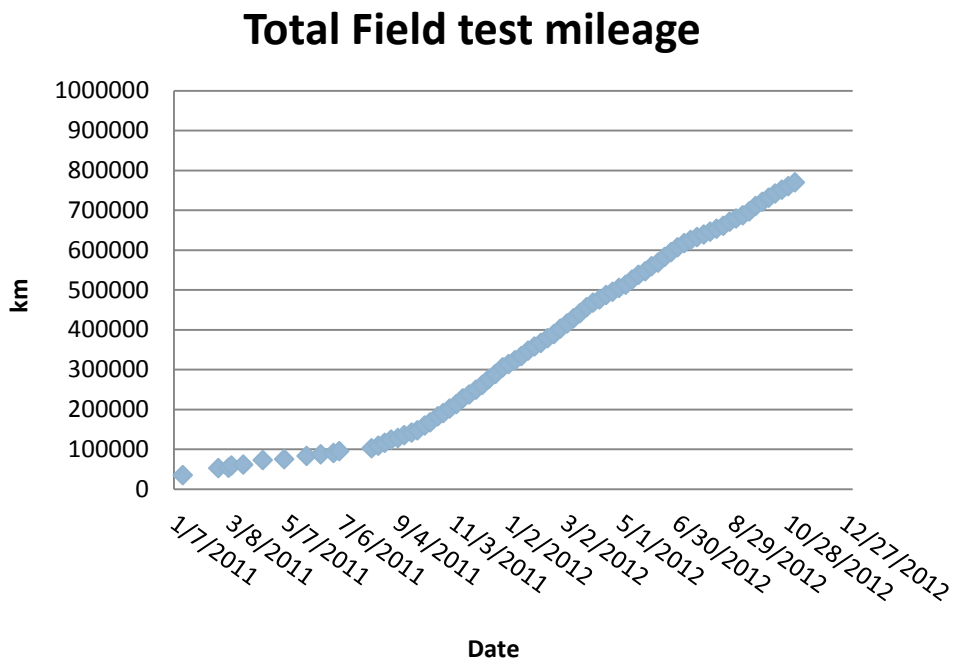
Four filling stations

10 Field test trucks

Trucks leased to selected haulers, used in commercial operation

Field test status 2012-11-05

- **Trucks at customer:** **8**
- **Mileage last week:** **9 303 km**
- **Average last 5 weeks** **9 802 km**
- **Accumulated mileage:** **769 716 km**
- **Max truck mileage :** **170 612 km**



2 HD BioDME trucks in Piteå

1. Wood to the mill
One load = 42 ton wood*
→ DME fuel for ~ 16000 km

16 km

2. Product from mill to harbor
5145 trips or 165 000 km/year

Diesel consumption
2 trucks ←→ 220 Passenger cars**

16 km

* Should be biomass, not logs
**5l diesel /100 km, 15000 km/year

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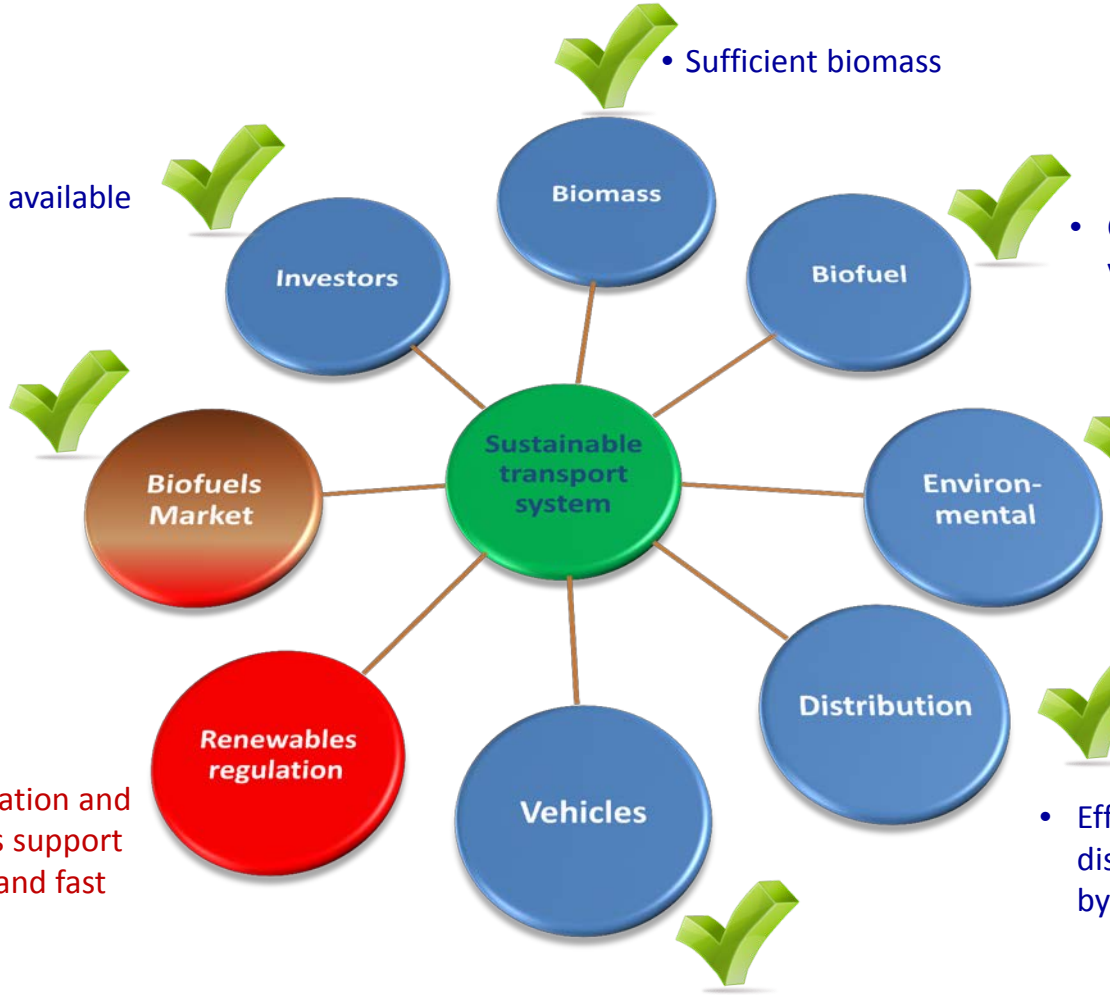
Efficient sustainable transport system developed and demonstrated - A market can be built provided regulation is adequate



- Sufficient biomass
- Plant investors available
- Chemrec technology validated
- New 2G biofuels volumes needed to meet EU objectives
- Vehicle market and distribution hinge on regulation
- Superior CO2
- Not food-competing
- Uncertainty on duration and level of renewables support
- Need for concrete and fast dialogue
- Effective, relatively low-cost distribution demonstrated by Preem
- Volvo DME trucks running

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BIODME

- Excellent environmental properties
- Energy efficient
- Cost efficient
- Global potential for diesel replacement (gasification of biomass)
- Technology demonstrated
- Long term energy carrier

Illustrative film:

http://www.youtube.com/watch?v=7KcHQk2C9HM

Thank you!

www.biodme.eu

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