

# **Bio-methanol...the other biofuel**

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September 25, 2008

## Driven by nature

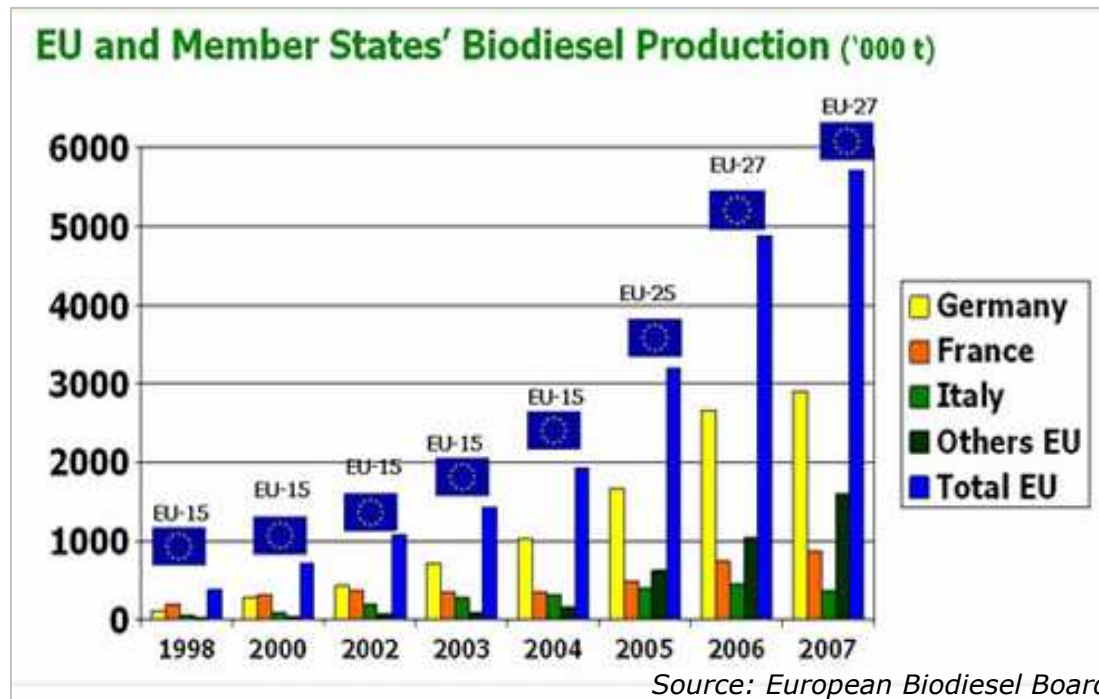
BioMCN is the first company in the world to start commercial production of bio-methanol on a large industrial scale

Driven by innovation and a commitment to sustainability, we have developed an innovative process which enables us to convert crude glycerine – a by-product of biodiesel – into methanol

By converting glycerine into methanol, its full energy potential can be utilized, thus enabling further reductions in CO<sub>2</sub> emissions

**Our target is to reduce CO<sub>2</sub> emissions by at least 70%**

## Growing supply of glycerine



As biodiesel production grows, the amount of available glycerine increases as well

Existing applications can hardly cope with these vast new quantities

## Capturing full energy potential



Current glycerine applications range o.a. from tooth paste to soaps, and are hardly ever used for energy purposes

By converting glycerine into methanol, the energy value can be maintained for transportation fuels, thus improving potential for CO<sub>2</sub> emission reductions even further

## Fresh start with strong backing

- BioMCN was founded in November 2006
- Shareholders are:
  - Econcern
  - Teijin
  - NOM
  - ChemieInvest
- BioMCN acquired two existing Methanol plants (500 kton each) in Delfzijl, the Netherlands
- Objective: bio-methanol production by Q1 2008



## New process to produce bio-syngas

- Methanol production process remains unchanged
- A new - patented – process is introduced which turns crude glycerine into bio-syngas
- Bio-syngas is fed into the existing methanol reformer
- Process is proven
- Biodiesel:glycerine ratio approx. 10:1
- glycerine:bio-methanol ratio approx. 1-1.5 : 1



*First sample of bio-methanol  
March 2008*

## Transition in stages

2008

20 kton

*(Pilot plant)*

2009

200 kton

2010

200 kton

2011

200 kton

200 kton

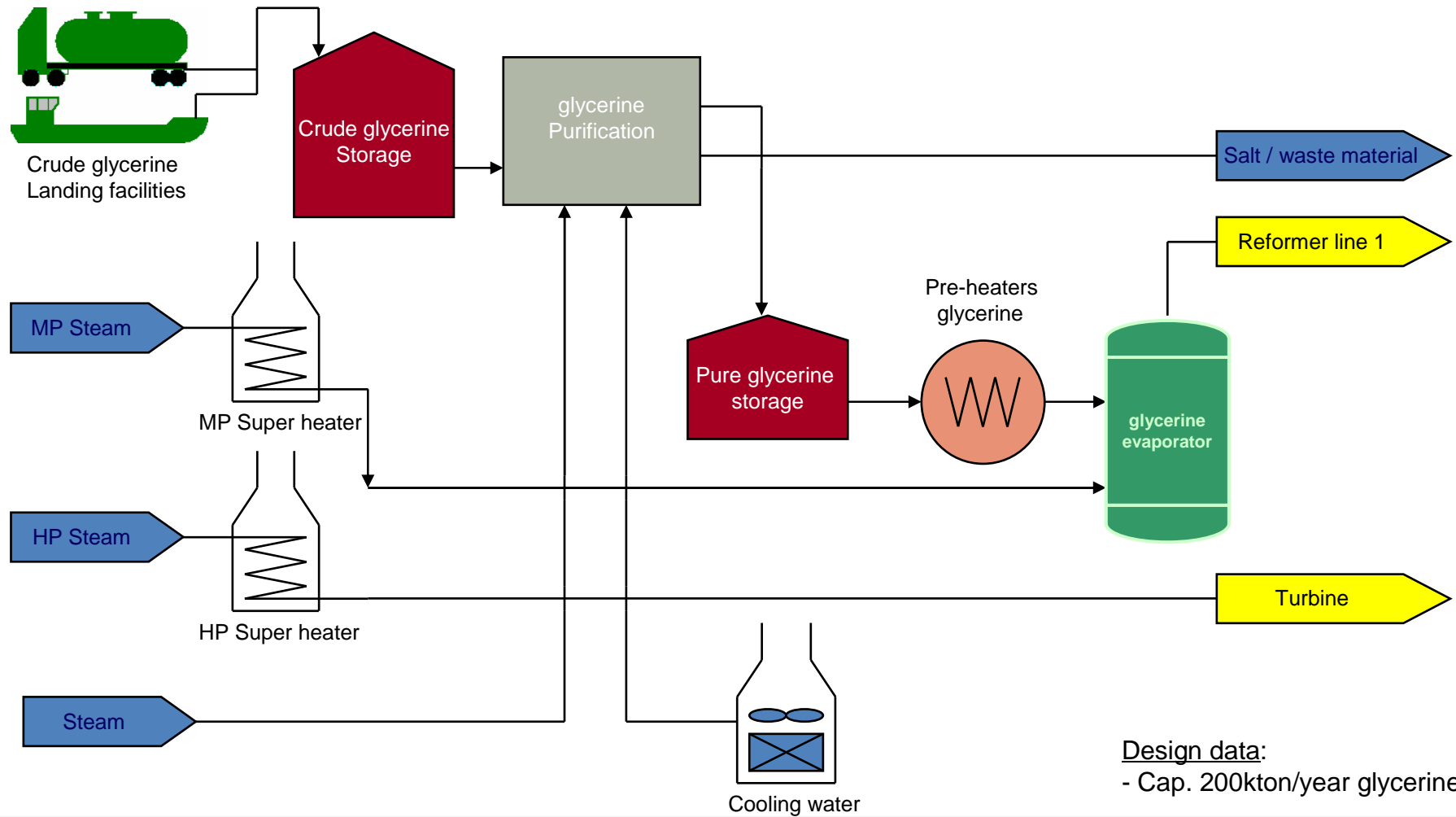


MEOH1



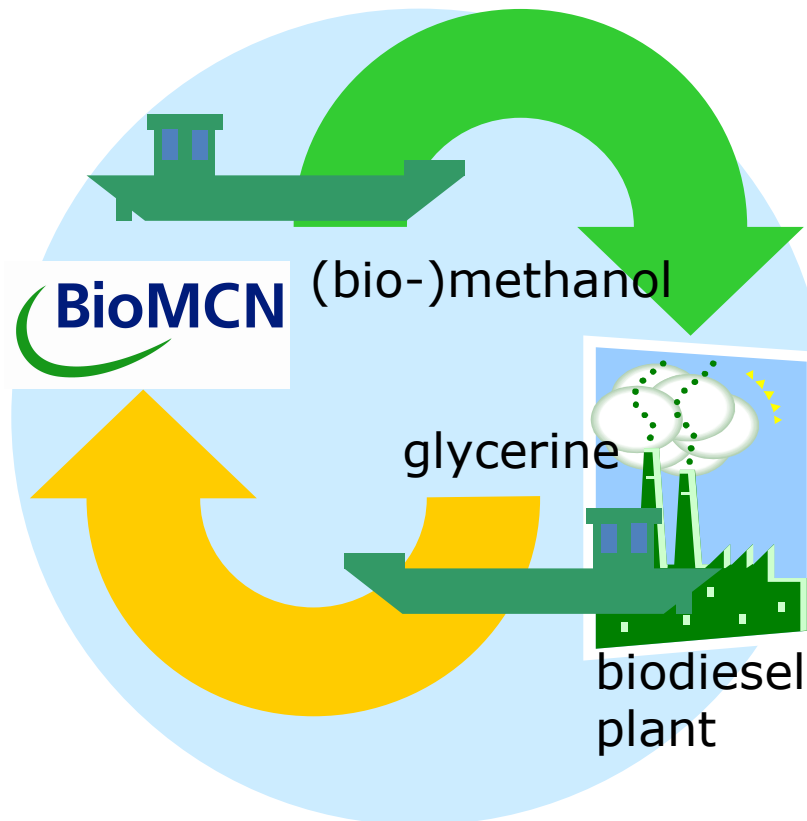
MEOH2

# From glycerine to bio-syngas





## Optimized logistics



### ADVANTAGES

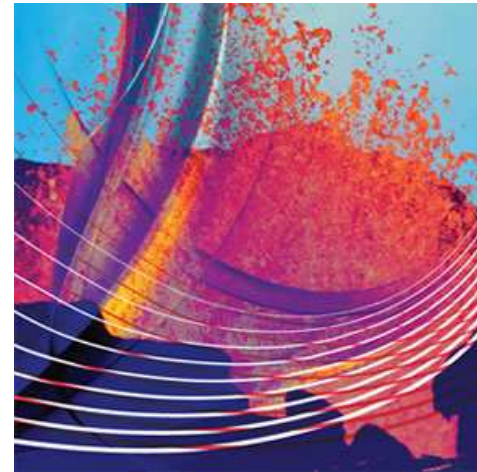
- Optimized logistics results in lower cost
- No need to invest in purification at biodiesel plant
- Less traffic, i.e. lower CO<sub>2</sub> emissions
- Less order handling

## Chemically identical

Bio-methanol is chemically identical to regular methanol  
It can be used in the same way and for the same applications  
as methanol made from natural gas

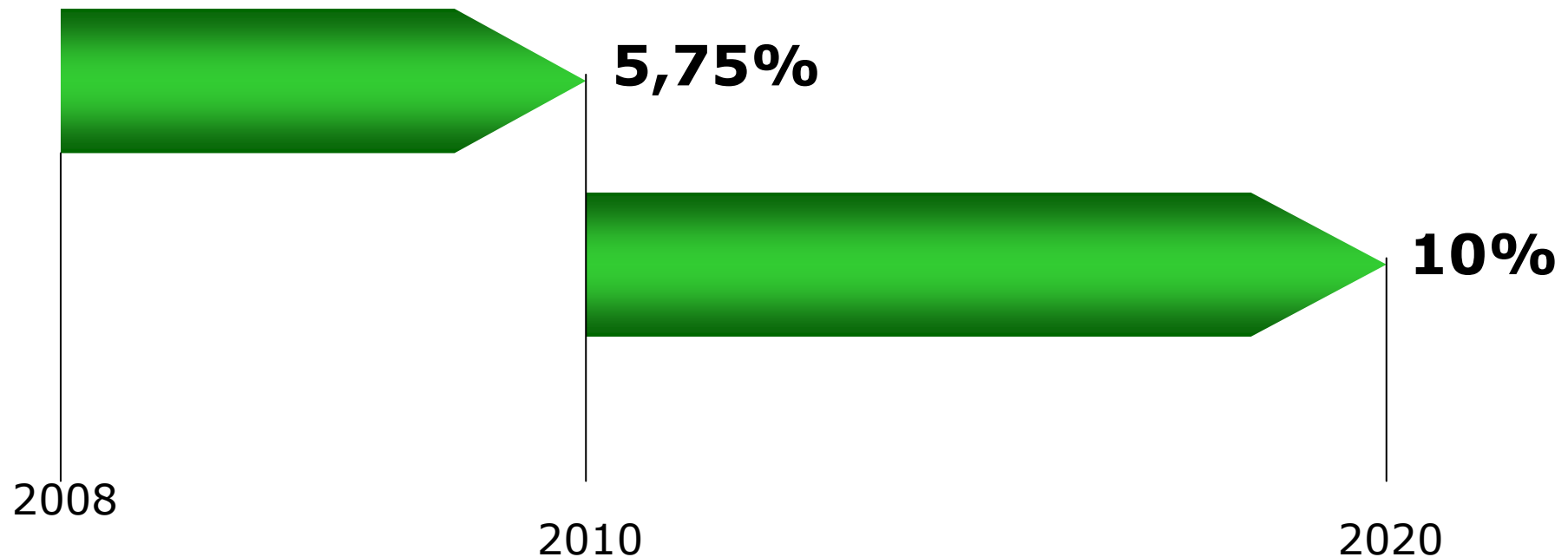
### **with a difference....**

Because bio-methanol is made from biomass, it is supplied with a green certificate which guarantees the origin and sustainability information of the renewable resources used



## Meeting ambitious EU targets

The EU renewable energy directive has set **clear targets** for EU member states regarding the **use of biofuels**

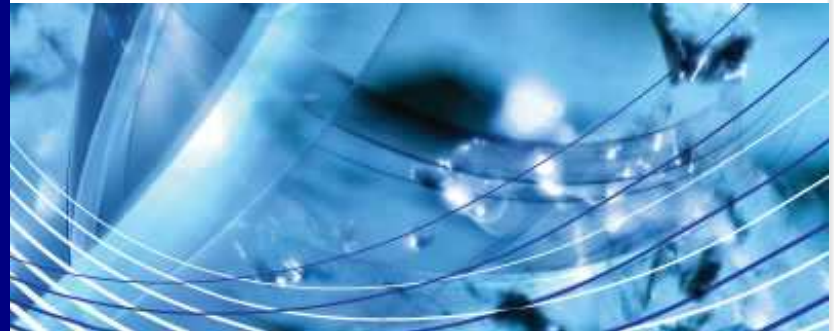


## Bio-methanol enables new options

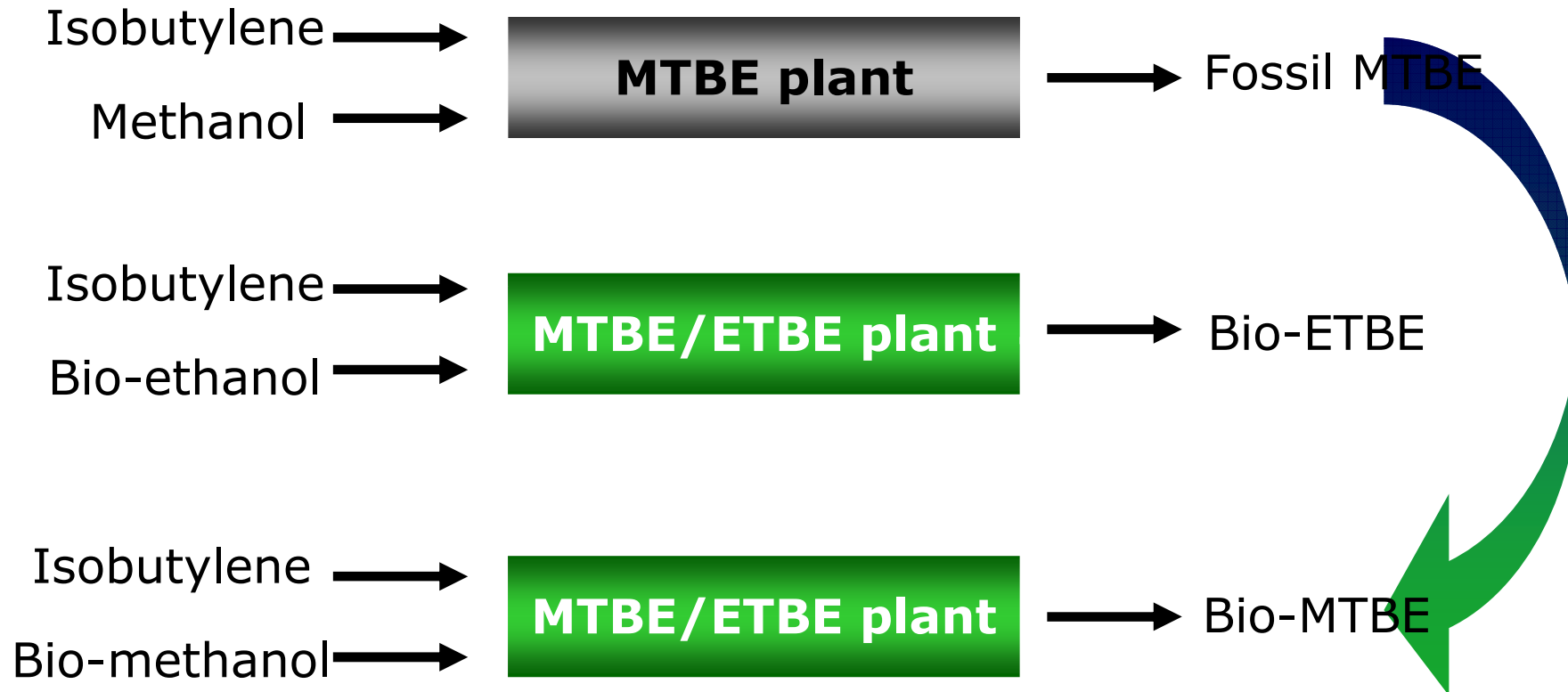
Bio-methanol is an extremely versatile product, which can either be used as a fuel in its own right or as a feedstock for other environmentally friendly fuels

The Renewable Energy Directive (RED) includes several fuels which can be made from bio-methanol:

- Fuel blends (incl. bio-methanol)
- Bio-MTBE
- Bio-DME
- Bio-hydrogen
- Synthetic biofuels

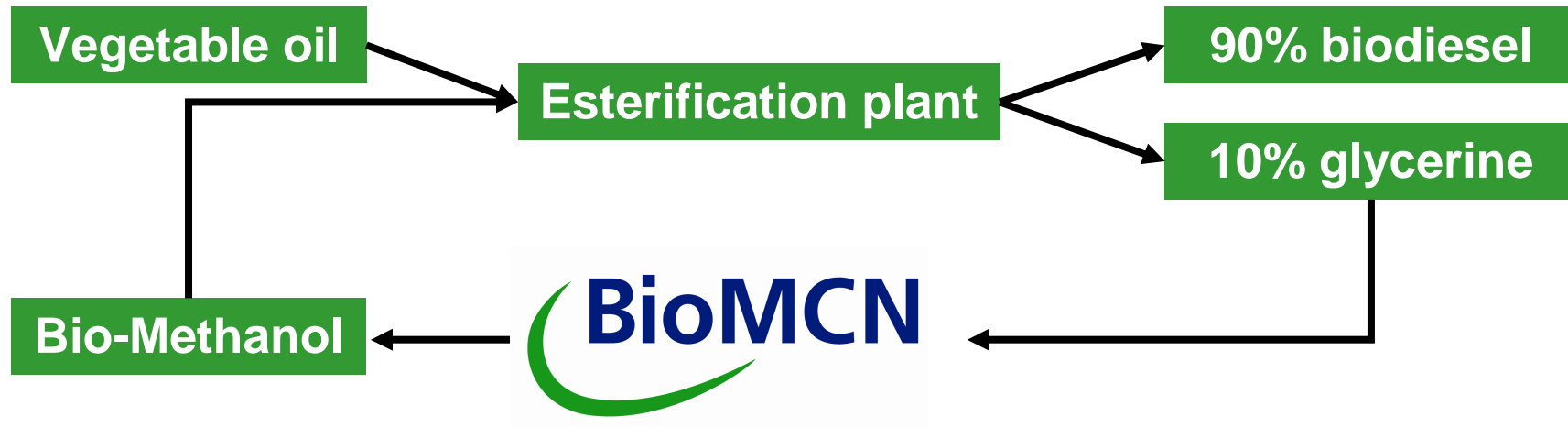


## Enables bio-MTBE



**Bio-methanol enables the use of MTBE fuel formulations as an additional way to meet the RED requirements**

## Improves biodiesel CO<sub>2</sub> emission reduction



**When using bio-methanol to produce bio-diesel, CO<sub>2</sub> emission reduction potential is further increased**

## Supports hydrogen route

Because hydrogen is a gas, transportating hydrogen from production sites to filling stations is highly inefficient

Several possibilities exist to produce hydrogen on site at the filling station

One such solution is the conversion of methanol to hydrogen, either at the filling station or in the car itself  
By using bio-methanol, the resulting hydrogen therefore also qualifies as renewable



*Picture courtesy of Wikipedia*

## Enables bio-DME

Over the last few years several research projects have been performed to demonstrate the feasibility of DME as transportation fuel

Volvo trucks and Isuzu are both very positive about DME



### Main conclusions:

- DME is one of the cleanest fuels available, especially when made from biomass (e.g. bio-methanol)
- Relatively minor adjustments needed to diesel engines



## Converting bio-methanol to gasoline



Converting methanol to gasoline was first introduced by ExxonMobil in the 1970's

Obviously, when using bio-methanol instead of regular methanol, the resulting gasoline is also 'renewable'

## Easy to use in fuel blends



**Lotus** Engineering  
fueled by **BioMCN**

"As well as being green, the great benefit of synthetic methanol is that it would use similar engines and fuel systems to those in current cars; and synthetic methanol can be stored, transported and retailed in much the same way as today's liquid fuels such as gasoline and diesel.

Synthetic methanol also possesses properties better suited to internal combustion than today's liquid fuels, giving improved performance and thermal efficiencies. And it is ideal for pressure-charging (turbocharging and supercharging) already being introduced by manufacturers to downsize engines in a bid to improve fuel consumption..."

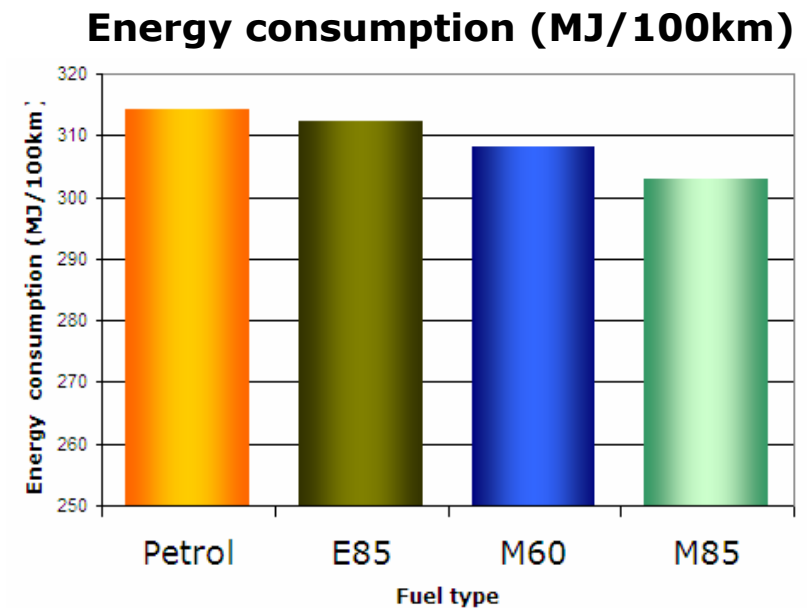
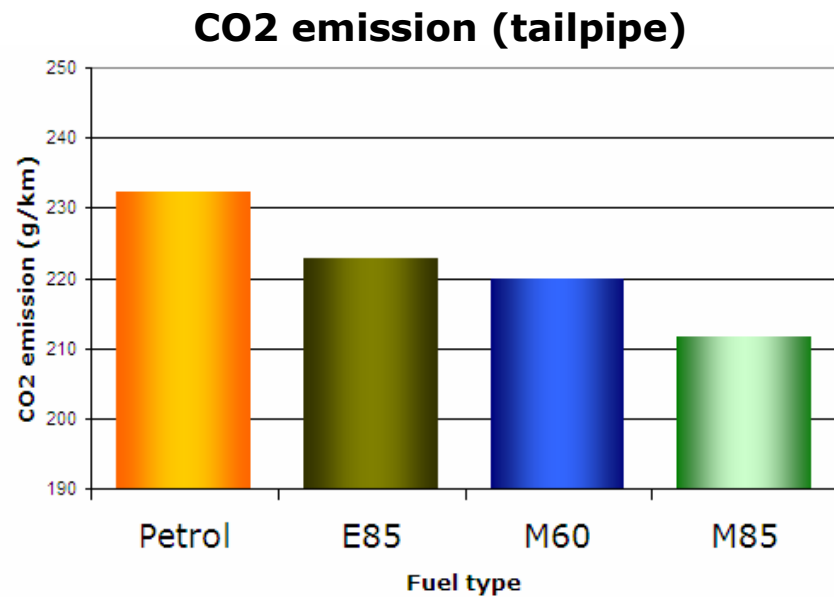
**FROM: <http://www.grouplotus.com/engineering/casestudies.html>**

## High level interest



Picture courtesy of Hans Hordijk

## Test results show benefits



Tests performed with a 2.0 liter FFV engine (Euro 4)



## Renewable feedstock in abundance

Many ideas exist what to do with CO<sub>2</sub> output from the industry and power plants

Together with industrial partners, BioMCN is working on the concept of capturing CO<sub>2</sub> and converting it into methanol, rather than storing in the ground

Ultimately, extracting CO<sub>2</sub> from the atmosphere would truly close the loop, allowing for carbon neutral combustion



**Thank you for your attention**



For further information please visit our website:

[WWW.BIOMCN.EU](http://WWW.BIOMCN.EU)

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