

# **Renewable Fuels for Advanced Powertrains**

## **RENEW**

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**department fuels and oils**



**BIO-ENERGY  
ENLARGED PERSPECTIVES**

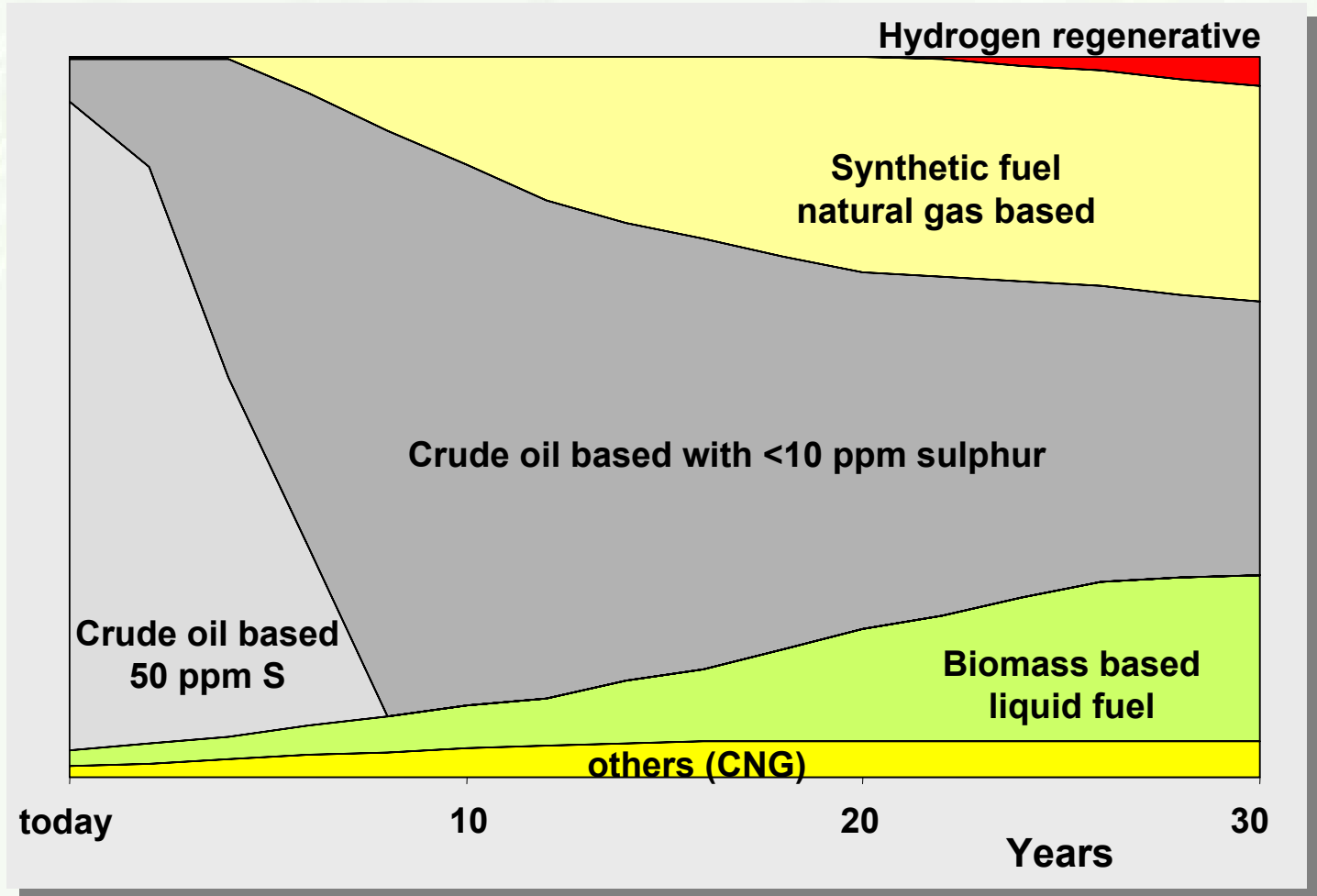
*Budapest ,16-17 October 2003*

## EU-Scenario for Alternative Fuels

(Biofuels-Directive)

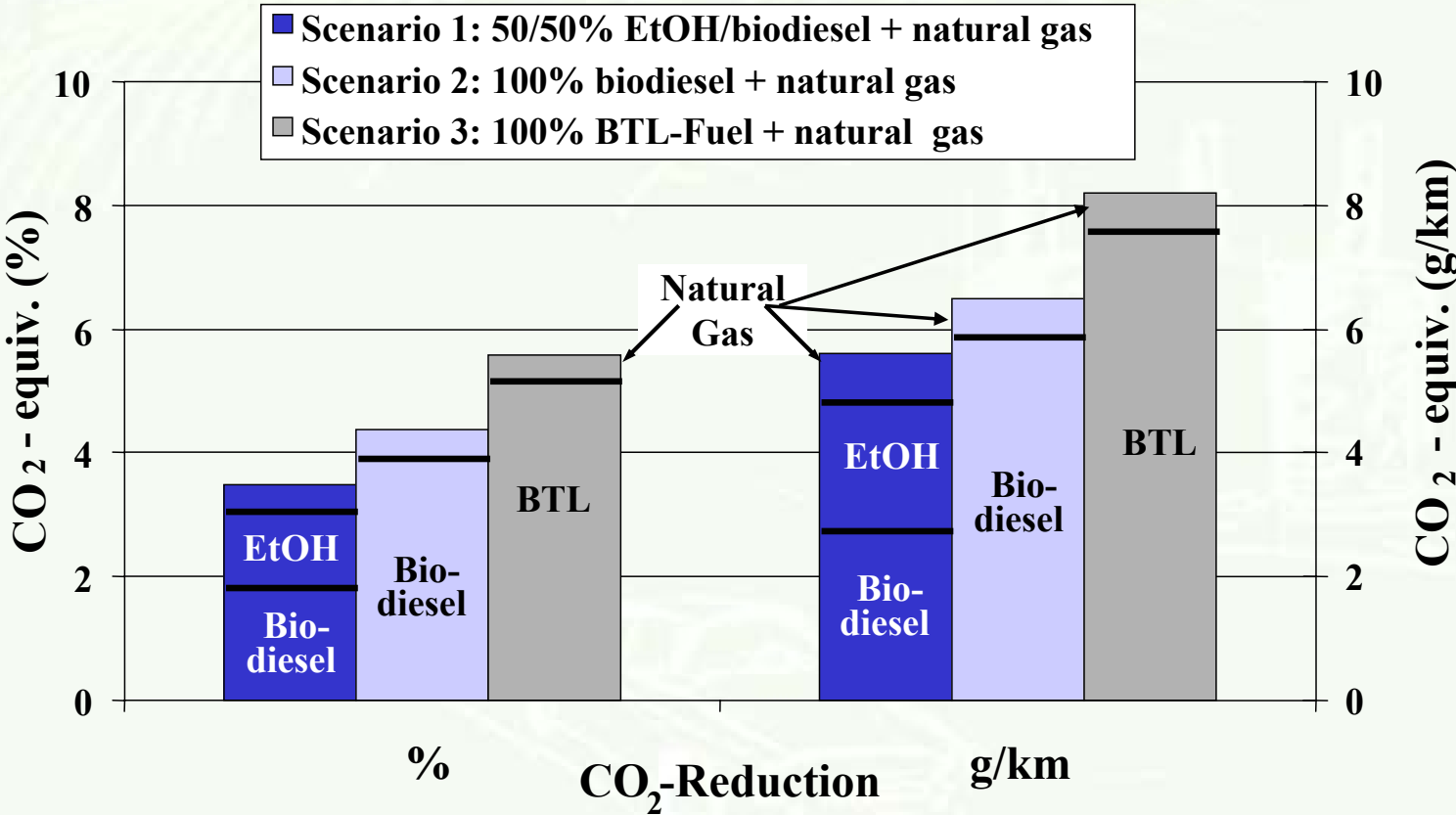
<b>Year</b>	<b>Biofuels</b>	<b>Natural Gas</b>	<b>Hydrogen</b>	<b>Total</b>
	<b>%</b>	<b>%</b>	<b>%</b>	<b>%</b>
<b>2005</b>	<b>2</b>			<b>2</b>
<b>2010</b>	<b>5,75</b>	<b>2</b>		<b>7,75</b>
<b>2015</b>	<b>(7)</b>	<b>5</b>	<b>2</b>	<b>(14)</b>
<b>2020</b>	<b>(8)</b>	<b>10</b>	<b>5</b>	<b>(23)</b>

# Scenario Fuel Diversification Europe



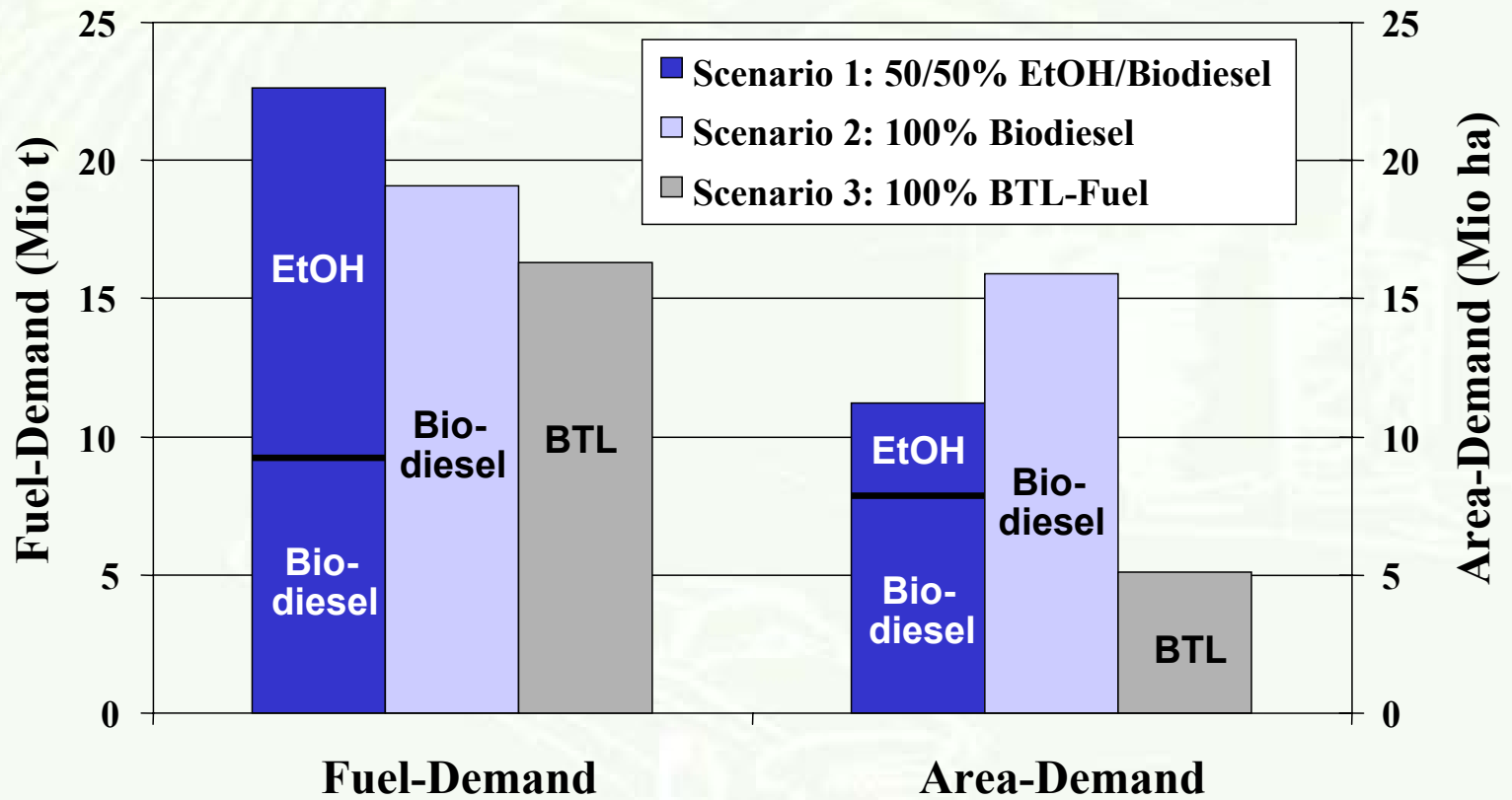
# CO<sub>2</sub>-Reduction by Alternative Fuels WTW (2012)

Share of biofuels: 6,25%, Share of natural gas: 3,2%



## Demand for Biofuels and Agricultural Area (2012)

Share of biofuels: 6,25% of european fuel consumption (passenger + truck)



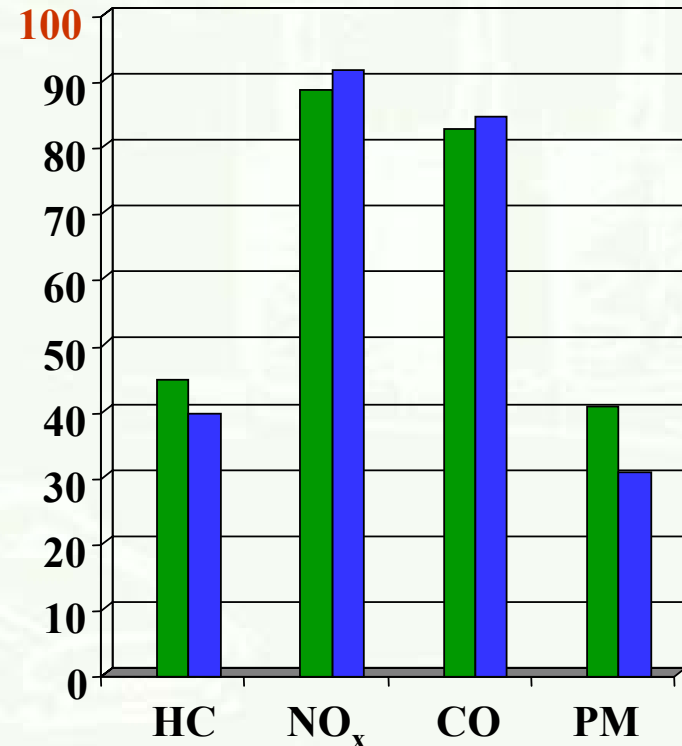
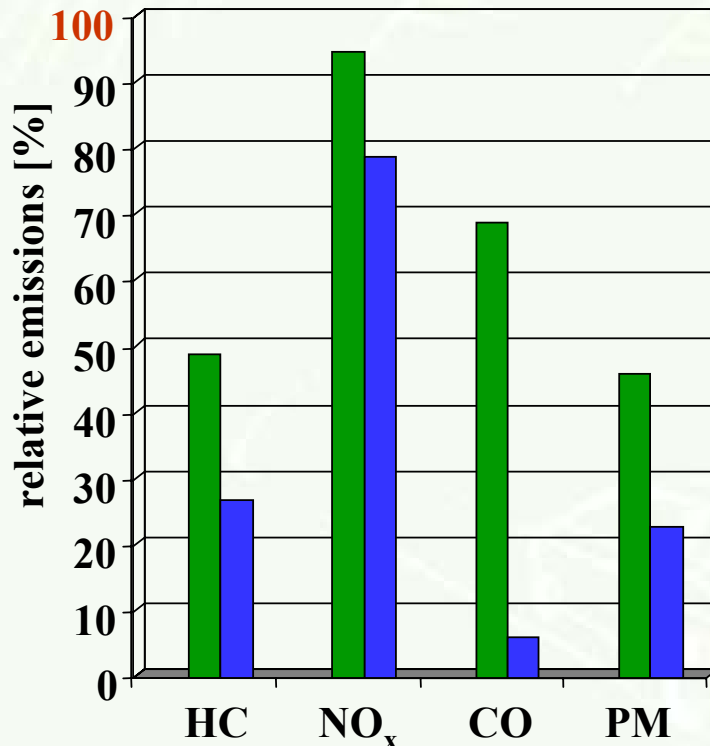
## Emissions of diesel engine with fossil based synthetic fuel

100% reference: diesel  
common rail, EU 3

SynFuel A  
SynFuel B

1500 rpm / 22 Nm

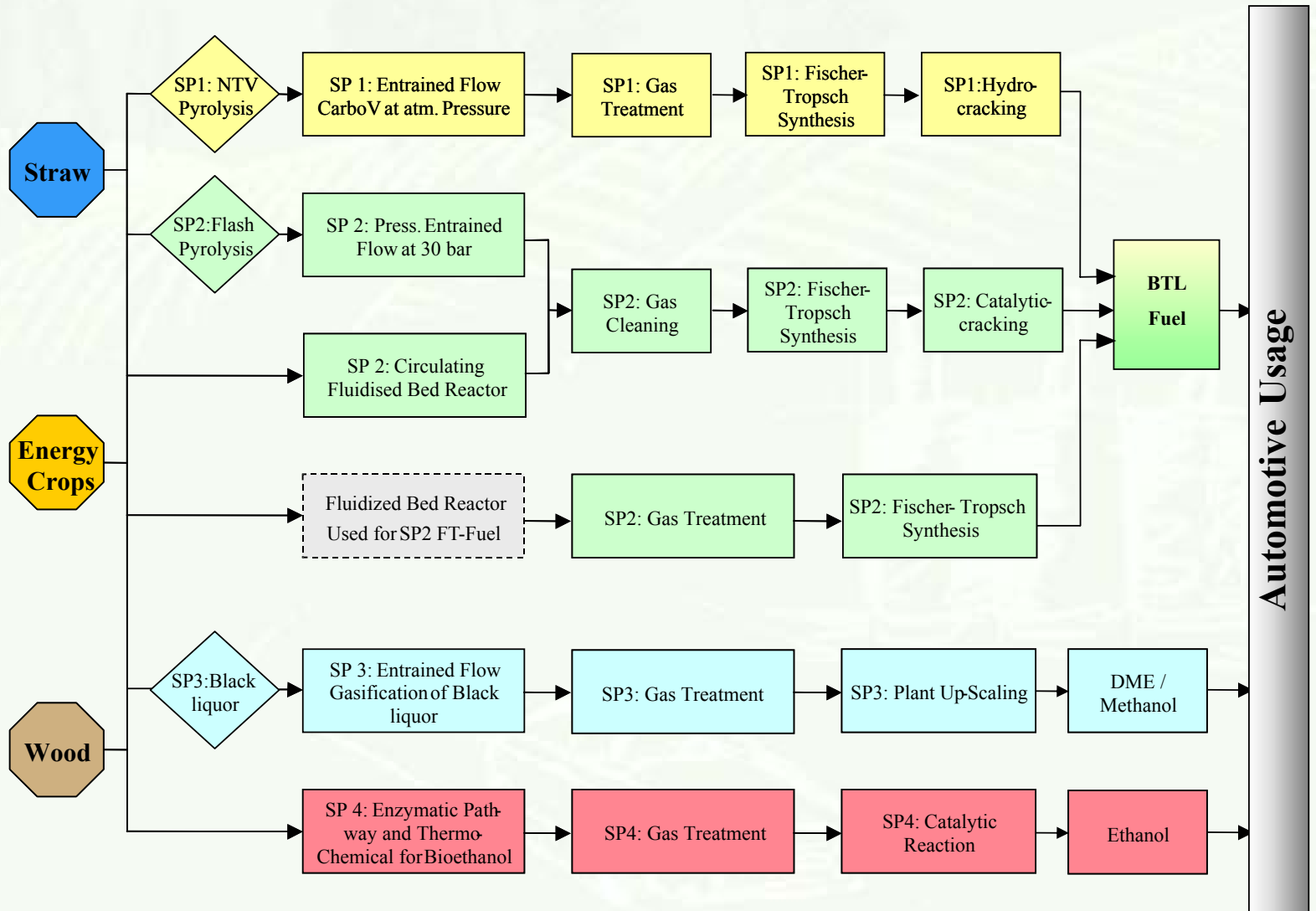
2000 rpm / 94 Nm



## Project Targets

- **Fuel production by cheapest, most efficient energy chain**
- **Production costs 70 cents / litre gasoline equivalent**
- **3.500 litre per ha and year**
- **Premium fuel quality for environmental improvement**
- **Benchmarking of different production processes**
- **Development of optimised demonstration project**
- **Determination of best choice feedstock**
- **31 partners from 9 countries**
- **budget: 20 Mio total costs / 10 M€ EU contribution**

# Renewable Fuels for Advanced Powertrains RENEW





## Co-ordinating Committee

**chairman: coordinator IP**

**member: project leader SPs and industrial key partners**

**IP coordination**

- administration
- daily management
- finances

### SP 1

#### **OPTIMISED FUELS for new drive trains**

- modified synthetic tailored
- early engine tests, fuel specification
- process optimisation with non woody biomass

### SP 2

#### **OPTIMISED PROCESS for FT- fuel**

- process comparison and optimisation
- mid term fuel production
- optimisation of FT catalysts
- exergetic analysis

### SP 3

#### **DME production from black liquor**

- planning of a demo-plant (45 MW)
- process assessment
- cost assessment

### SP 4

#### **Optimisation of bioethanol production**

- data implementation for fermentation to ethanol
- catalytic conversion of syngas to ethanol

### SP 5

#### **Biomass and process assessment**

- biomass potential
- life-cycle assessment
- socio economical impact
- suitability for IC engines
- comparative production assessment
- commonly agreed recommendations
- thermo chemical gaseous fuels production

### SP 6

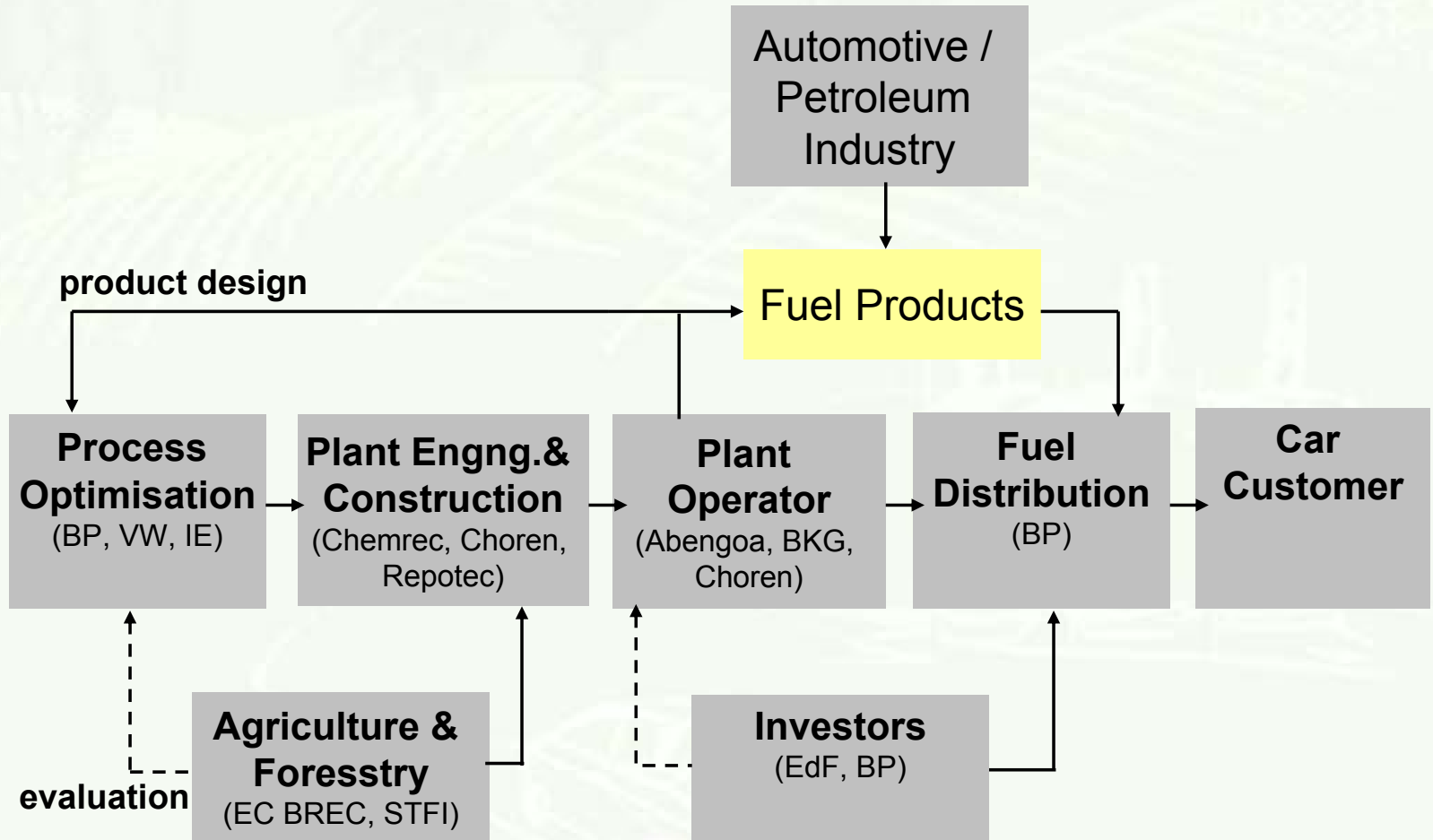
#### **Training**

- 2 summer Schools

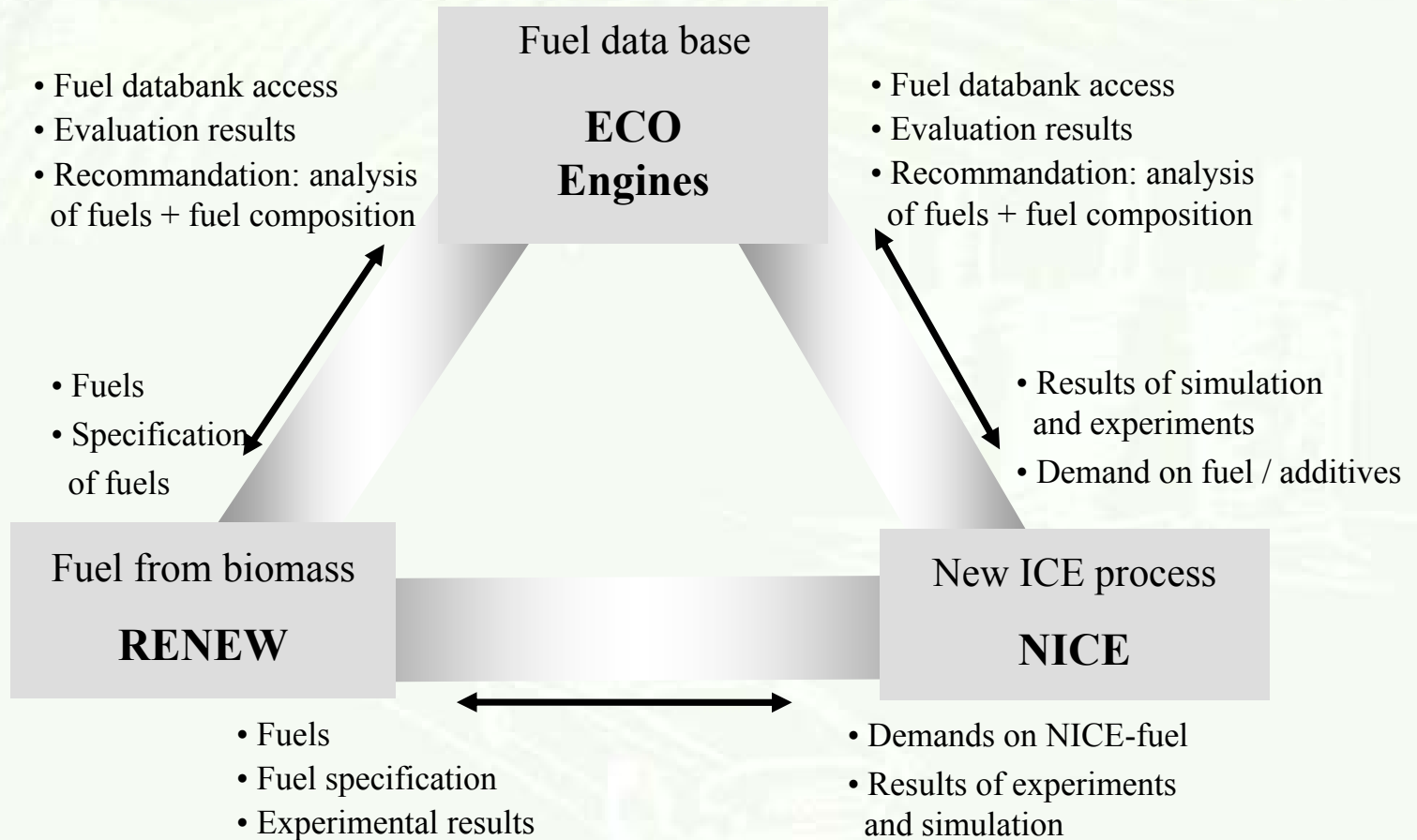
## Project Plan and Deliverables

- 12 month Results of the first fuel tests with BTL have led to a fuel specification
- 18 month Unified methodologies for recent biomass feedstock and energy crops potentials shall be developed. Review of studies and regional experiences shall be reported.
- 24 month Optimised Parameters for the process design for syngas production, FT-synthesis and fuel conditioning (hydrocracking, catalysts, and additives)
- 36 month Summary of experimental results and conclusions for a (preliminary) proposal for an optimized BTL/ conventional fuel blend for the EU
- 36 month Biomass provision chains for the different regions have been defined and the cost of the different biomass conversion technologies have been reported
- 48 month Consolidated data on the suitability of biomass based fuels for use in future powertrains and recommendation arising from a comparative technology assessment of biofuel production pathways are available
- 48 month Commonly agreed strategic recommendations, based on an understanding among relevant players in industry, SME, agriculture, research, etc. have been achieved.

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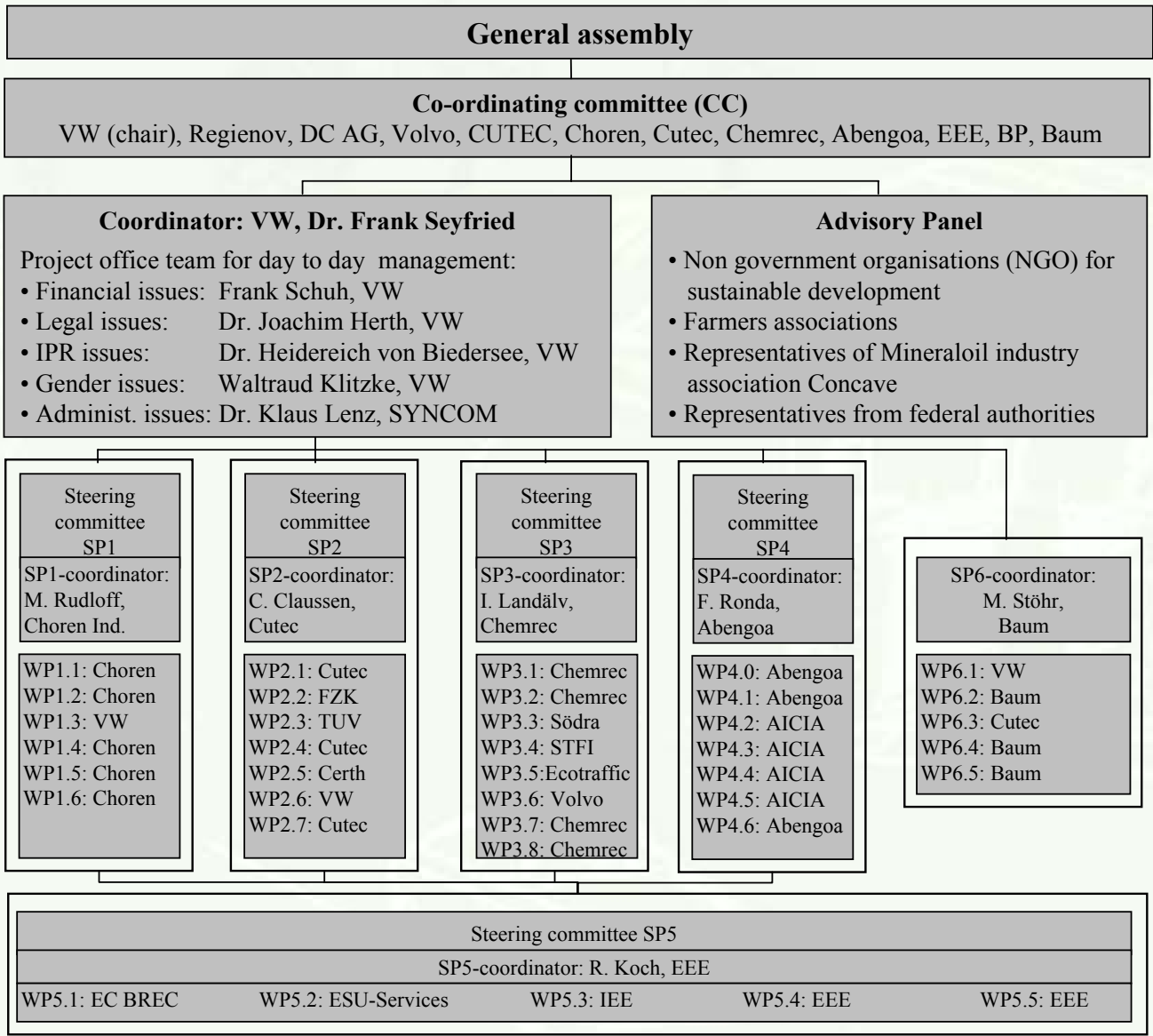


## Synthesis Gas Based Fuels

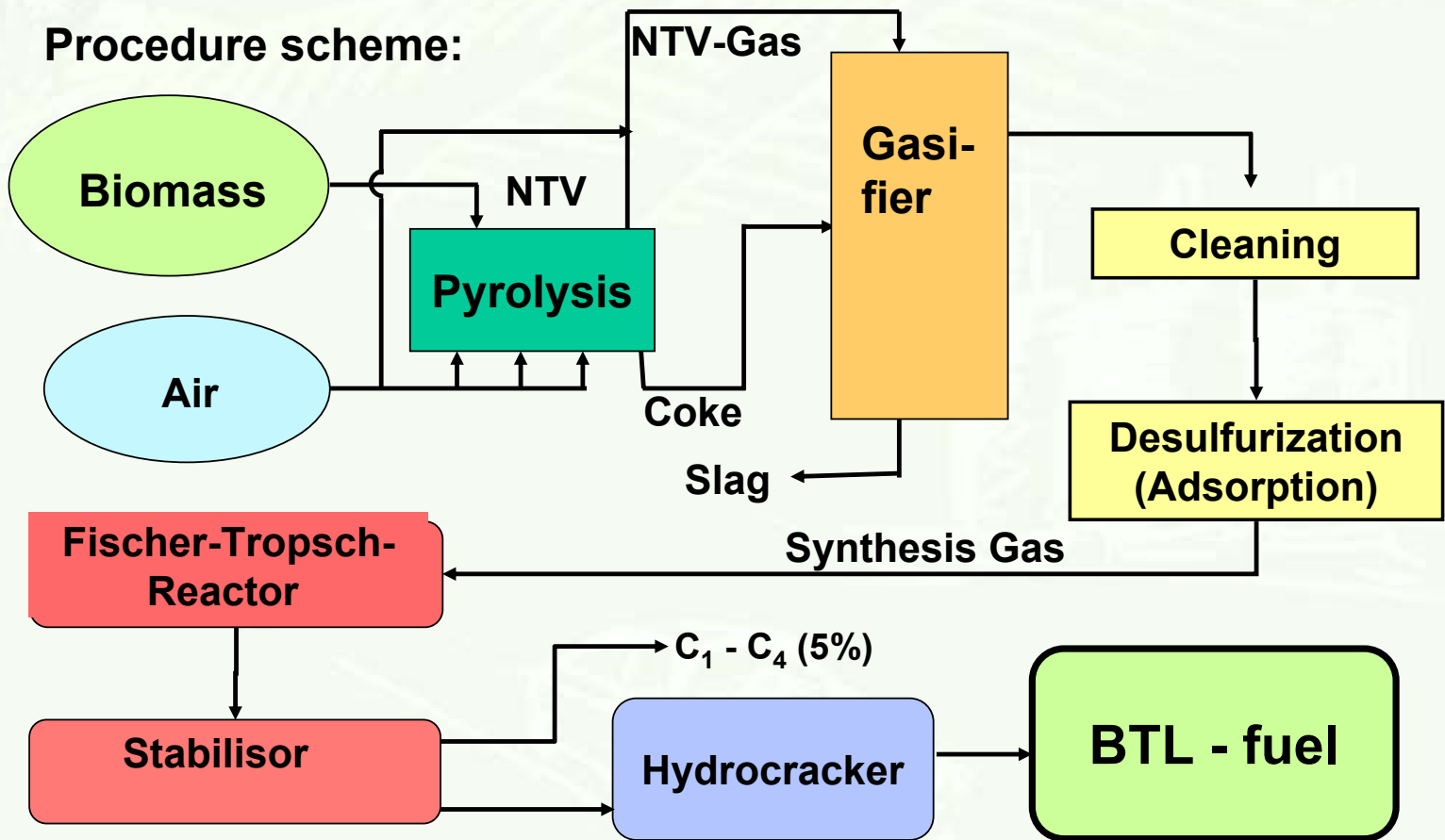


# Back up Charts

<b>Subproj.</b>	<b>SP1</b>	<b>SP2</b>	<b>SP3</b>	<b>SP4</b>	<b>SP5</b>	<b>SP6</b>	<b>Co-ordination</b>
<b>Title</b>	Product optimisation of BTL production	Process optimisation of BTL production	Black liquor to DME/ methanol	Optimisation of Bioethanol production	Biofuel Assessment	Training	Coordination
<b>Duration Months</b>	48	48	48	48	48	48	48
<b>Leader</b>	<b>Choren</b>	<b>Cutec</b>	<b>Chemrec</b>	<b>Abengoa</b>	<b>EEE</b>	<b>Baum</b>	<b>VW</b>
<b>Partners</b>	Certh DC AG ITN REGIENOV VW	BKG Certh EDF FZK IGNG ITN Repotec TUV VW	Ecotraffic Södra Cell STFI VTEC	AICIA	BP CRES DC EC-BREC EDF ESU IEE LU UCD VTEC VW PSI	Cutec VW ZSW	



# BTL -fuel Production





# Fuel Costs and CO<sub>2</sub> Reduction Potential

CO<sub>2</sub>-Emission in g/km (Total Energy Chain/NEDC)

