

# HyLights Workshop.

## Strategies for Successful Hydrogen Implementation in the Transport Sector.



**Transport Energy Strategy (TES) and CEP Berlin.**  
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**BMW Group**



# Challenges on the Way to Hydrogen. Requirements in transportation sector.



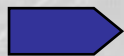
**Air Quality**



**Global Warming**



**Energy Security**



**Increasing need for sustainable mobility**

# Pioneering the H<sub>2</sub>-Infrastructure. Transport Energy Strategy (TES).



**VOLKSWAGEN AG**

**BMW Group**



**VATTENFALL**



**DAIMLERCHRYSLER**



# Transport Energy Strategy (TES). Vision.



**Set-up of a sustainable energy supply  
with a high part from renewable energies**



**Realisation of a sustainable mobility in  
the road traffic**

# Transport Energy Strategy (TES).

## Goals.

- 
- ✓ **Emissions reduction and contribution for long-term sustainable CO2 reduction**
  - ✓ **Saving of finite fossile fuels**
  - ✓ **Reducing dependency of road transport on mineral oil**
  - ✓ **International leading position on renewable energies, with focus on production and usage in road transport**
  - ✓ **Strengthen the business location Germany and Europe**
  - ✓ **Enlargement of the initiative across Europe**

# Transport Energy Strategy (VES)

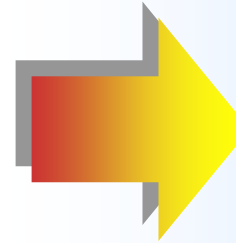
## Fuel selection procedure (2001)

### Step 1: Pre-selection

### Result:

criteria:

- o security of supply
- o production and distribution
- o vehicle technology
- o Customer benefits



natural gas \*)  
methanol \*)  
hydrogen

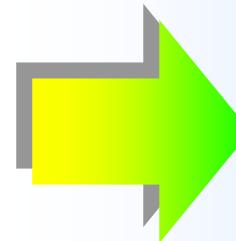
\*) not regarded in further selection process (NG: not sustainable, methanol: toxic)

### Step 2: Final decision

### Result:

criteria:

- o economics
- o environment
- o meeting strategic goals

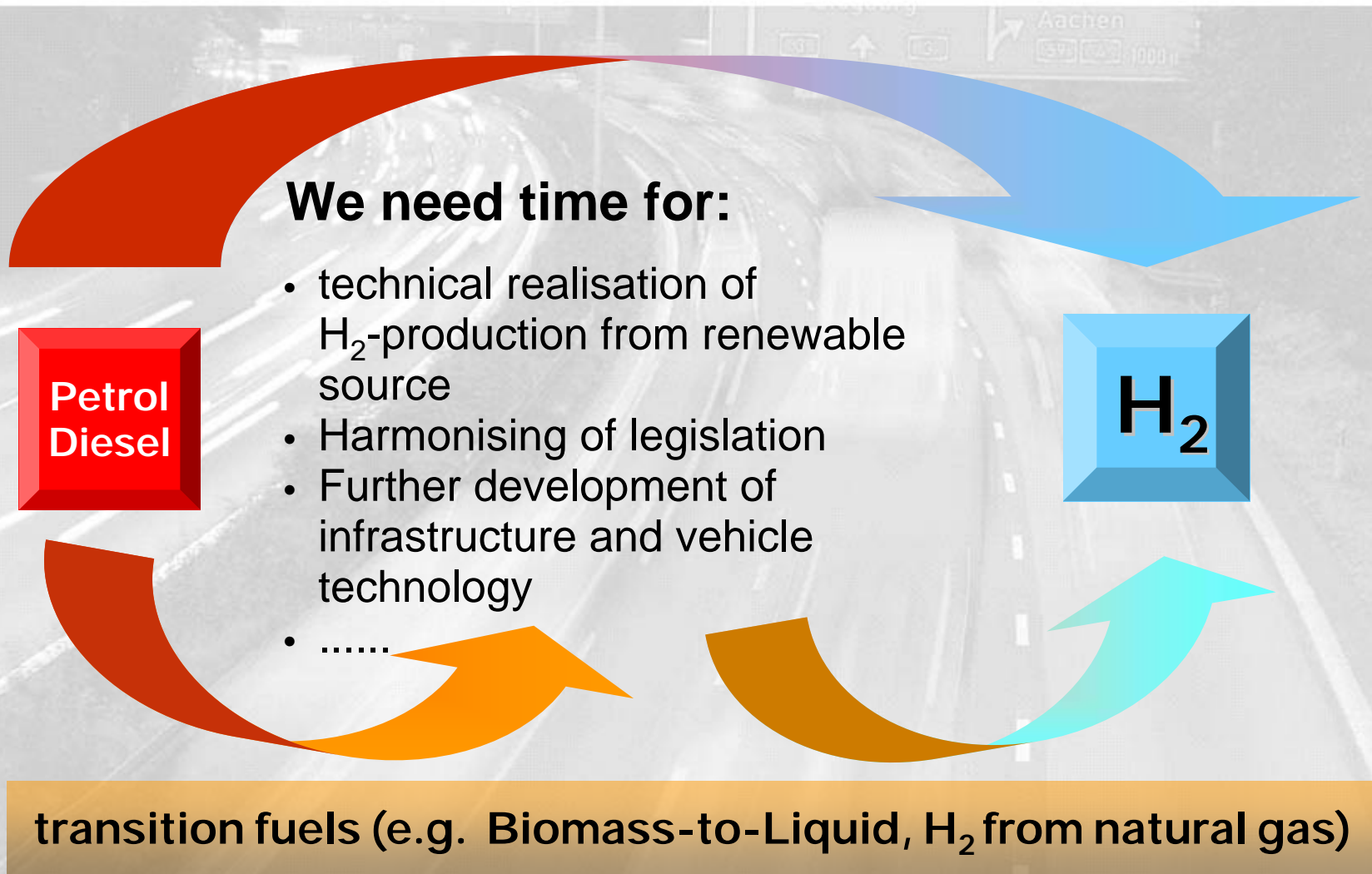


**RENEWABLE  
HYDROGEN**

most prospective future  
fuel with high substitution  
potential

# Transition strategy towards hydrogen

## Background, criteria



# Two Basic Scenarios.

## Potentials for sustainable CO<sub>2</sub>-Reduction.

### Natural Gas / Power mix



**significant CO<sub>2</sub> reduction** (approx. 25 % per km travelled)

50 %

Clean Energy 50

8 %



Hydropower

+ 14 %



Biomass

+ 28 %

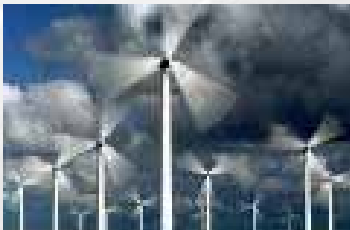


Wind offshore

100 %

Clean Energy 100

**maximum CO<sub>2</sub>-reduction** (approx. 90 % per km travelled)



Wind offshore

# TES Conclusions 2000/2001.

## Key issues.

- Election of one or maximal 2 sustainable fuels
- Concept of the set-up of a new infrastructure (production, distribution and refueling)
- Development of a market introduction strategy with realistic time schedule
- Definition of the necessary political framework
- Deployment of a demonstration project in Berlin (CEP Berlin)

# TES .

## Criteria for Success.

- Cooperation instead of competition
- Open discussions
- Atmosphere of mutual trust
- Strong committment to common goals

# TES .

## Achievements since 2001.

- Contribution of TES members to all activities on european level (e.g. HFP, AFCG, HLG, Hylights)
- Preparation of the third intermediate report, containing
  - Analysis of bridging-technologies for Hydrogen
  - Study of the european potential for future fuels from renewable sources (BTL, Ethanol, Hydrogen)
  - Analysis of the legal framework for the introduction of a hydrogen infrastructure in Germany
- Publication planned in mid'06

# Clean Energy Partnership (CEP) Berlin. Hydrogen Demonstration Project.

- Unites 11 companies from France, Germany, Norway, Sweden, the United Kingdom and the United States
- Potential European Light-House-Project
- International Public-Private Partnership
- Supported by the Federal German Government
- Project duration: 2002 – 2016  
(2008-2016: part of National Innovation Program, NIP)

# Clean Energy Partnership (CEP) Berlin. Hydrogen Demonstration Project.

Publicly available, integrated Hydrogen Filling Stations:  
ARAL Messedamm TOTAL Heerstraße



Test and Demonstration of:

- ➔ Production, Transport and Distribution of H<sub>2</sub>
- ➔ Storage and Refuelling of H<sub>2</sub>
- ➔ Operation, Service & Maintenance of H<sub>2</sub> Vehicles

# Clean Energy Partnership (CEP) Berlin.

## Challenges in hydrogen vehicle operation.

**2004-2007:** Prove of everyday suitability of hydrogen in transport sector by

- H<sub>2</sub> integrated into conventional filling stations
- reliable H<sub>2</sub> vehicles in customer operation
- fast, convenient and safe fuelling of H<sub>2</sub> vehicles

**2008-2016:** System validation & optimisation in operation, durability and costs. Depending on infrastructure and vehicle development

- increasing fleet operation
- market preparation

# Clean Energy Partnership (CEP) Berlin. Benefits.

CEP is a successful public private partnership:

- Fruitful co-operation of Federal German Government with mineral oil, energy and automotive industry
- Nucleus for National Innovation Program on Hydrogen and Fuel Cells
- Open for new infrastructure and / or vehicle partners
- Candidate for a European Lighthouse Project

# Thank You for Your Attention!

