



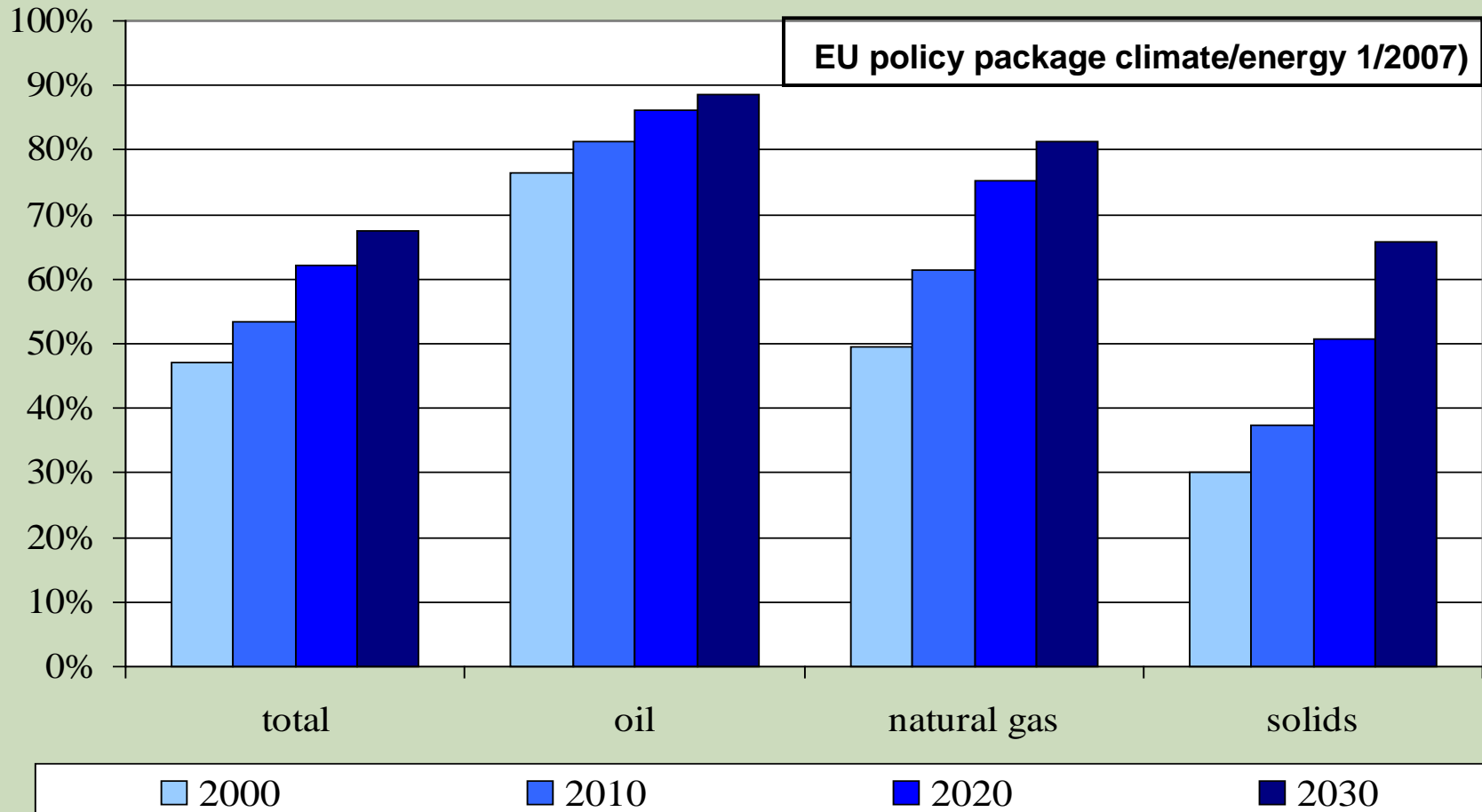
European Policy on Alternative Fuels

- **Policy Drivers**
- **Policy Actions**
- **Technology Support**

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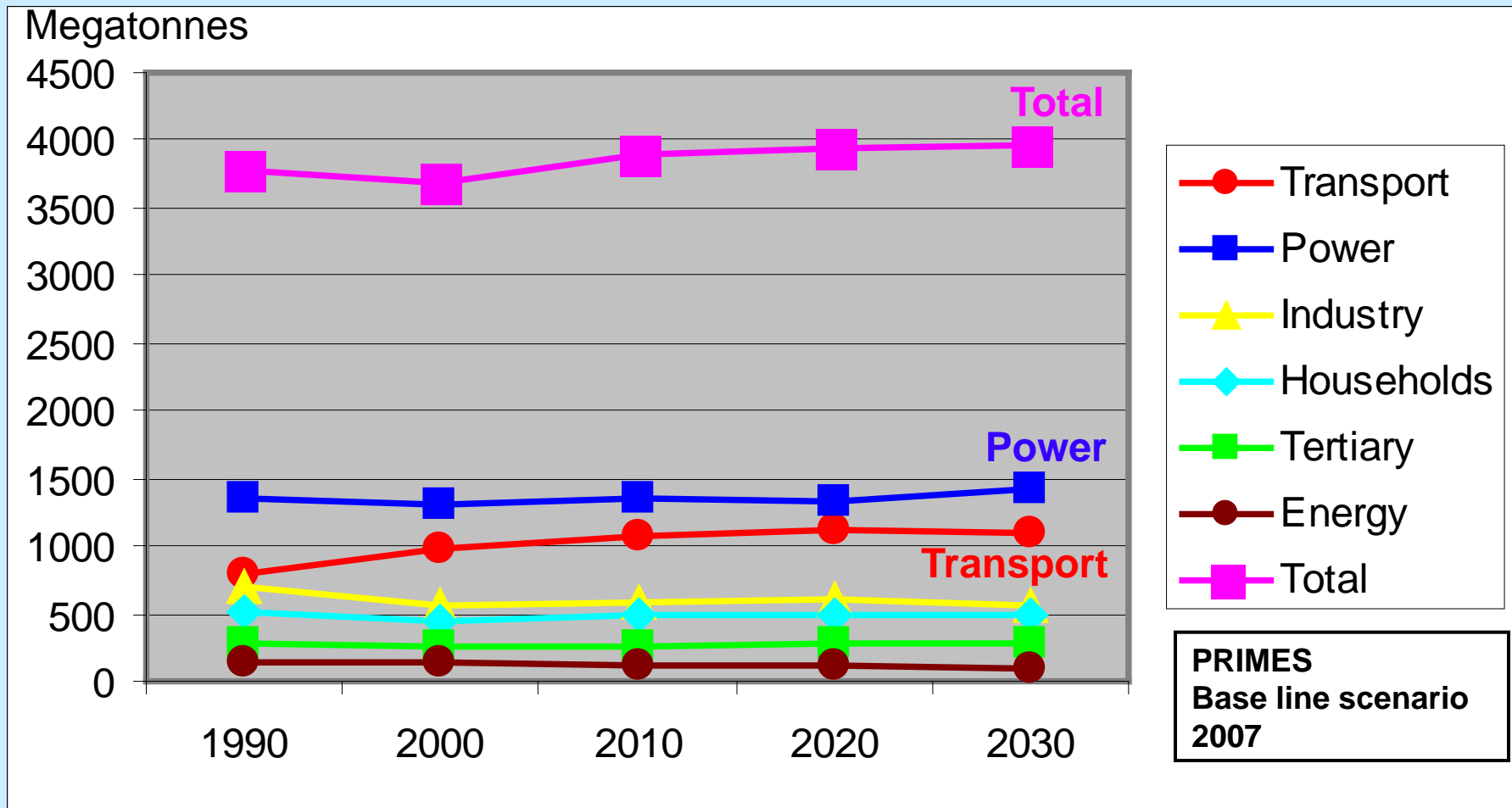


EU Energy Import Dependency





Trends in EU CO₂ Emissions



Power production and transport are the main emitters



Policy Fields for Support of Alternative Fuels

- **Research and Technological Development**
- **Market Introduction**
- **Market Regulation**
- **Funding**



EU-Activities on Alternative Fuels

- ◆ **Communication on alternative fuels (11/2001)**
Biofuels, natural gas, hydrogen
- ◆ **Directive on the market share of biofuels (5/2003)**
market share 2% in 2005, rising to 5.75% in 2010
- ◆ **Directive on the taxation of energy products (10/2003)**
lower taxation of alternative fuels enabled
- ◆ **Renewable Energy Directive**
Binding target: 10% share by 2020 (April 2009)
- ◆ **Technology Platforms, Joint Technology Initiatives**
Hydrogen/fuel cells(TP:2004; JTI:2008), Transport(2004), Biofuels(2005)
- ◆ **Green Cars Initiative**
Electromobility projects (call in June 2009)



Measures in Support of Clean Vehicles

Supply side measures

- **Regulation of pollutant emissions**
Reduction of pollutant emissions through EURO standards
- **Regulation on CO₂ emissions from cars**
130 g/km phased in 2012-2015; 95 g/km by 2020
- **Renewable Energy Directive**
10% share of motor fuels from renewable energy sources by 2020
- **Fuel Quality Directive**
6% reduction of CO₂ intensity of fuels by 2020

Demand side measures

- **Greening Transport**
Internalisation of external costs into vehicle operation
- **Clean Vehicle Directive**
Promotion of clean and energy efficient vehicles in public procurement



Clean Vehicle Directive

- **Lifetime impacts** have to be taken into account in purchase decisions on public transport vehicles
 - Energy consumption
 - CO₂ emissions
 - Pollutant emissions (NO_x, NMHC, PM)
- **Options**
 - Technical specifications on energy and environment
 - Energy and environmental impacts as award criteria
- **Monetisation of impacts** with harmonised methodology



Vehicle Price and Operational Lifetime Costs

Examples for vehicles with emission standards EURO IV (bus), EURO 4 (car)

Vehicle type		Bus (lifetime 800.000 km)		Diesel Car (lifetime 200.000 km)		Petrol Car (lifetime 200.000 km)	
Vehicle price		150.000 €	100%	17.000 €	100%	15.000 €	100%
Lifetime costs	Fuel	282.150 €	188%	6.188 €	36%	7.700 €	51%
	CO ₂	24.168 €	16%	530 €	3%	669 €	4,5%
	NOx	70.224 €	47%	220 €	1%	70 €	0,5%
	NMHC	2.098 €	1%	10 €	0,1%	20 €	0,1%
	Particulate matter	7.934 €	5%	435 €	3%	87 €	1%
Vehicle price + lifetime costs		536.574 €	358%	24.383 €	143%	23.547 €	157%



Support for Innovation with Lifetime Costing

Competitive advantage for clean technology

Lower pollution emission

→ Euro V bus ~100.000 € cheaper than Euro III bus:

New vehicle cheaper than second hand vehicle

→ CNG bus at 0 pm emissions ~8.000 € cheaper than Euro V diesel bus: compensates for total cost of pm filter on diesel bus

Lower energy consumption

→ Electric car ~5.000 € cheaper than petrol car:

compensates for ~ 50% of additional cost of the battery



Funding

- **R+D Community Framework Programme**
Priority support to alternative fuels
 - Hydrogen+Fuel Cells (since FP-2); in FP-7: 470 M€
 - CIVITAS (since 2002): 180 M€
- **Structural and Cohesion Funds**
Dedicated support for clean vehicles
- **European Investment Bank**
Loans for clean vehicles in Green Cars Initiative
- **State aid**
Community guidelines allow state aid for environmental protection



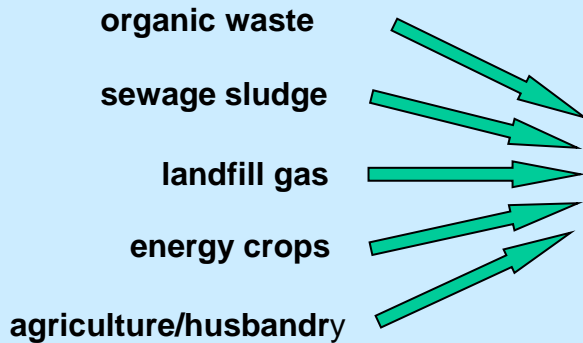
BEST - Bioethanol for Transport





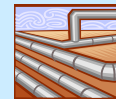
BIOGASMAX

Production



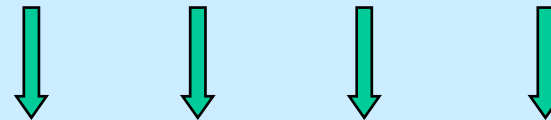
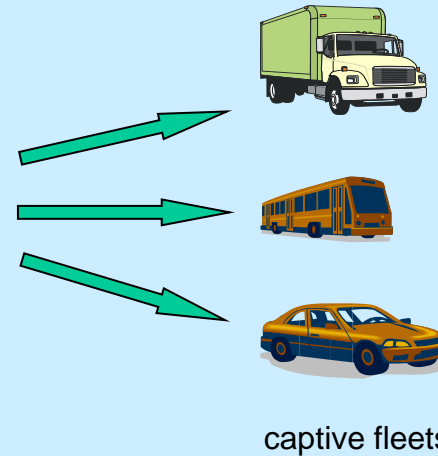
Distribution

filling stations



gas grid

Consumption

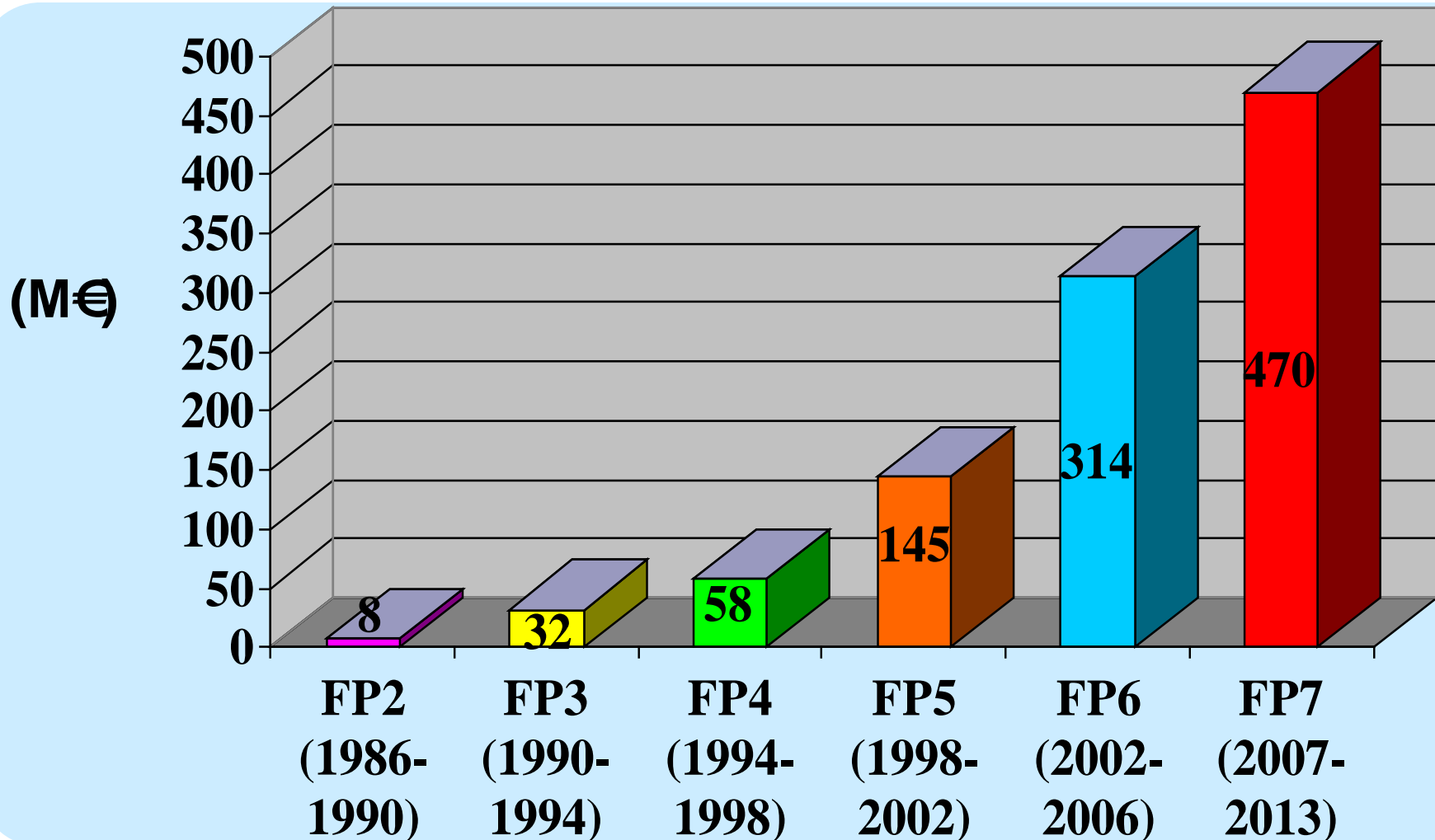


Evaluation of Well-to-Wheel impacts

Dissemination, public awareness, training, commercial exploitation



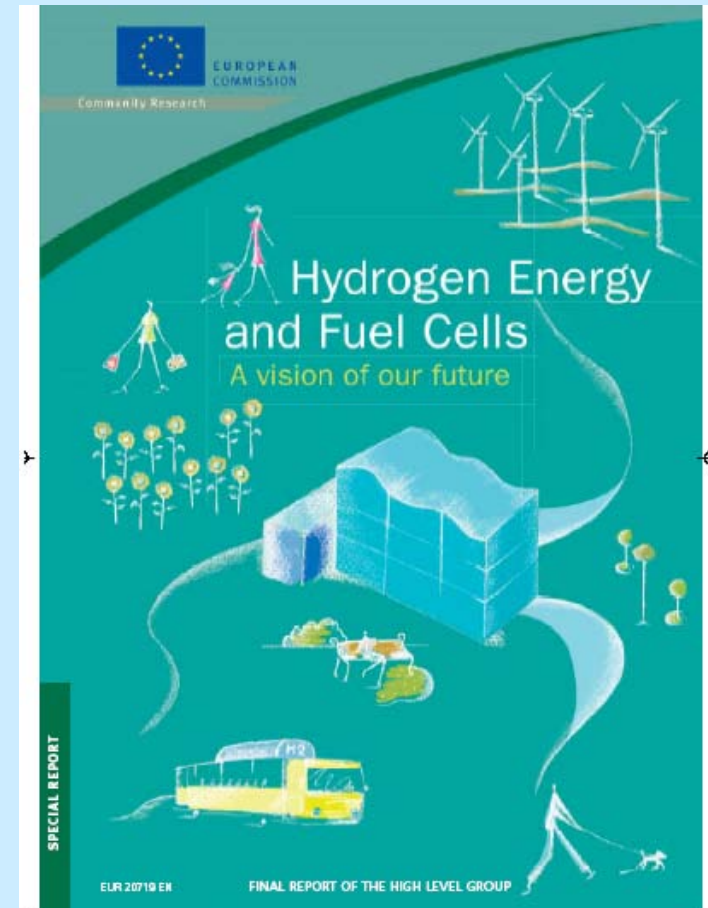
EU-Support to Hydrogen and Fuel Cells





Milestones of a European Strategy for Hydrogen and Fuel Cells

- **High Level Group (2002-2003)**
Vision report : *“Hydrogen energy and Fuel Cells – A vision of our future”*
- **President Prodi’s Communication**
proposing European Hydrogen Partnership
(September 2003)
- **European Technology Platform**
on Hydrogen and Fuel Cells
(January 2004)
- **Strategic documents** of the Platform
“Strategic Research Agenda”
“Deployment Strategy”
“Strategic Overview”
(March 2005)
“Implementation Plan”
(January 2007)
- **Joint Technology Initiative**
on Fuel Cells and Hydrogen (June 2008)





Hydrogen for Transport Demonstration Projects

Buses

HyFLEET:CUTE



Cars

ZERO REGIO



Zero Regio
H2-MotorFuel



Mini vehicles

HyCHAIN



> 100 vehicles

- Investment: 105 M€ (EC: 48 M€)

Coordinated Action



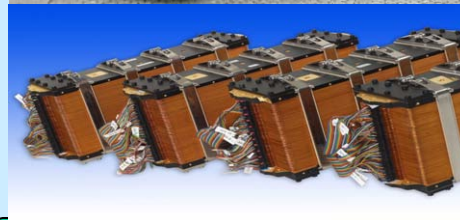
Project assessment, preparation of »Lighthouse Projects«



Hydrogen Bus Project HyFLEET:CUTE

Continued operation of 33 H2 powered Fuel Cell Mercedes-Benz Citaro buses in 7 European cities, Perth (Western Australia) and Beijing (China)

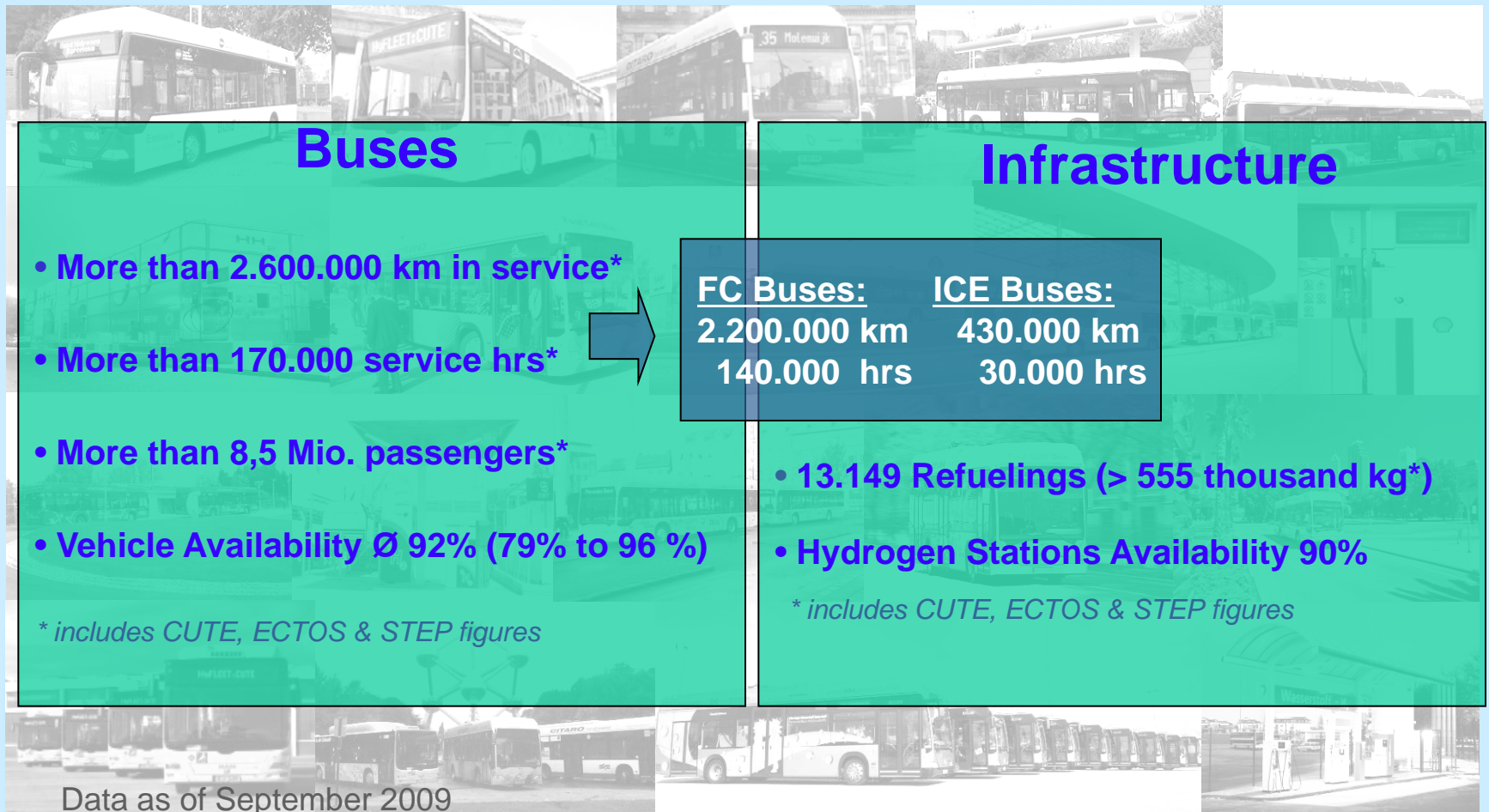
Operation of 14 H2 powered Internal Combustion Engine MAN buses in Berlin (Germany)



Design, Construction and Testing of “next generation” H2 powered Fuel Cell buses and Internal Combustion Engine buses



Achievements of HyFLEET:CUTE





Hydrogen/Fuel Cell Project HYCHAIN

50 vehicles deployed in 4 European regions

one of the largest single demonstrations of hydrogen technologies for transport in Europe (duration: 2006 – 2011)



Budget: 37.7 M€ (EC contribution 17 M€)



Hydrogen/Fuel Cell Project ZEROREGIO

Development and demonstration of hydrogen infrastructure systems for passenger cars (duration 2006 – 2011)

Budget: 20 M€ (EC contribution: 7.5 M€)



Rhein-Main:
November 2006



Mantova (Lombardia):
September 2007



Electromobility Demonstration Project

Part of Green Cars Initiative

- Vehicles
- Infrastructure
- Standards



Call open until 14 January 2010

EC contribution: 23M€ (46M€ total budget)

1 project will be funded



Summary

- ◆ **Need for oil substitution in transport growing**
 - ◆ Concerns on security of energy supply
 - ◆ Necessity of CO₂ emission reductions in transport
- ◆ **Transition to multiple fuel mix expected**
 - ◆ Staged oil substitution with combination of new fuels
 - ◆ Biofuels, natural gas, hydrogen, electricity
- ◆ **Package of policy actions in place**
 - ◆ Support to R&D
 - ◆ Promotion of market introduction; public procurement
 - ◆ Market regulation (targets on energy and CO₂)
 - ◆ EIB loans; Structural Funds; State aid; tax relief



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