European Council for Automotive R&D (EUCAR)

Ulf Palmquist

CO_2 and EUCAR Office

EUCAR Members: European Manufacturers of Cars and Commercial Vehicles

EUCAR Organisation

System Integration Groups

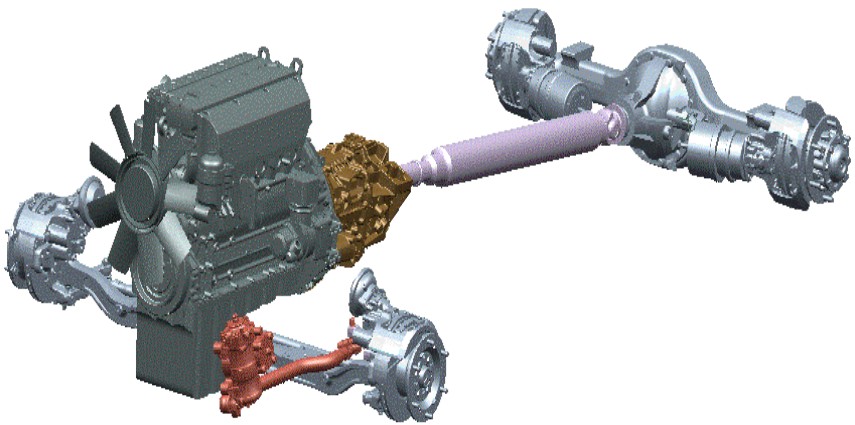
SGI	SGP	SGV	SGA	SGD
Human/ Vehicle Interaction	Powertrain	Overall Vehicle	Adv. Control & Vehicle Information	Vehicle Development & Production
Svensson, *VOLVO* CC : **Diquelou**, *Renault*	**Aust**, *DC* CC : **Pera**, *FIAT*	**Gilardi**, *FIAT* CC : **Flegl**, *PORSCHE*	**Clarke**, *FORD* CC : **Haug**, *BMW*	**Stahl**, *PORSCHE* CC : **Mertens**, *OPEL*

Enabling Technology Groups

EGR	EGM	EGC	TF
LCA & Recycling	Materials Structures & Related Processes	Technologies for Control Systems	Mobility
Liljenroth, *VOLVO* CC : **Schnehage**, *VW*	**Baur**, *DC* CC : **Larsson**, *VOLVO*	**Passeron**, *PSA* CC : **Reiniger**, *DC*	**Nicolai**, *DC*

EUCAR Fuel Cell R&D belongs to the System Group Powertrain

SUSTAINABLE DEVELOPMENT



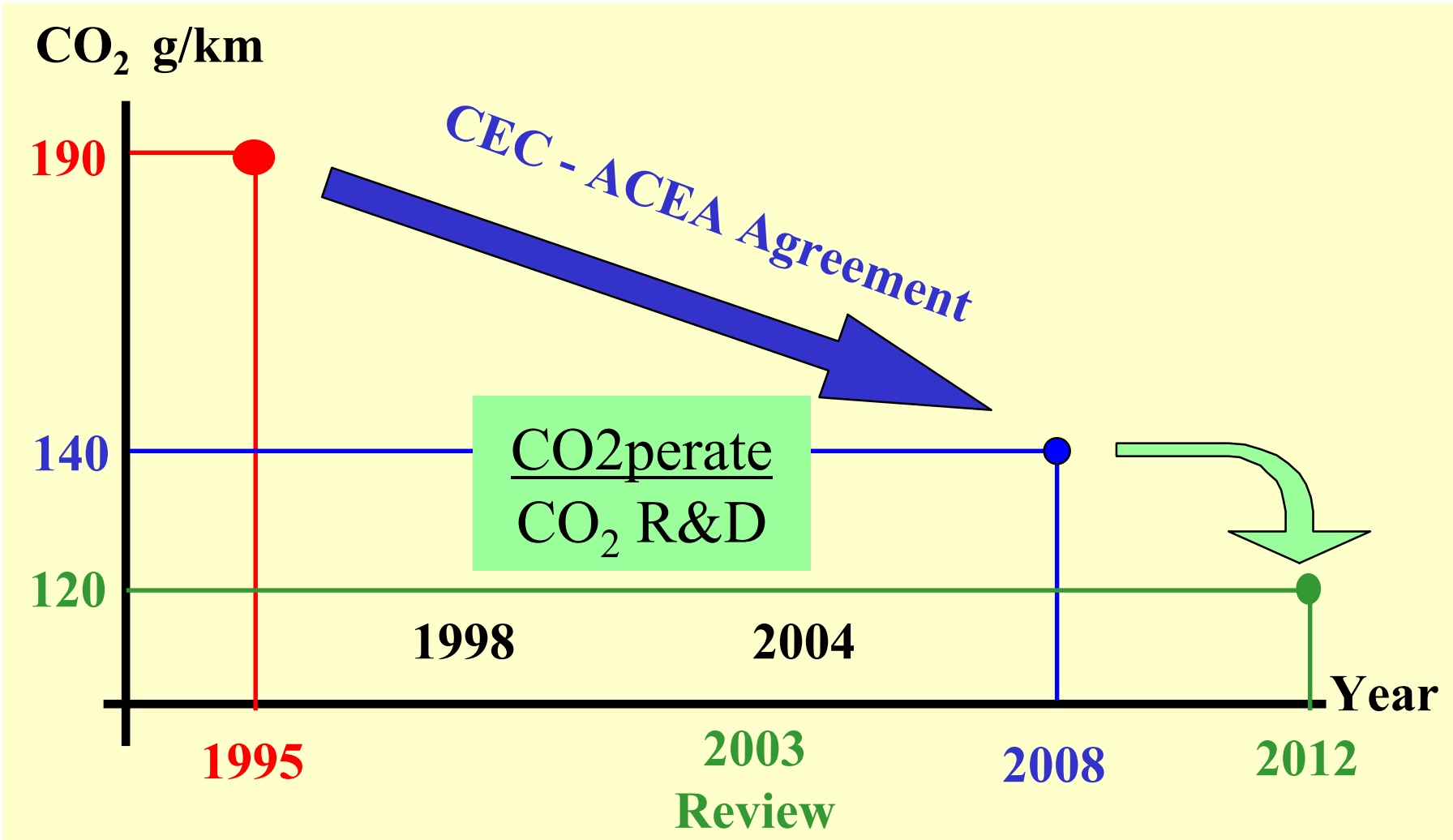
- Low emission vehicle
- Low fuel consumption
- High driving performance
- Good driveability
- Overall energy optimisation

- Overall cost reduction
- Systemic approach and competencies integration

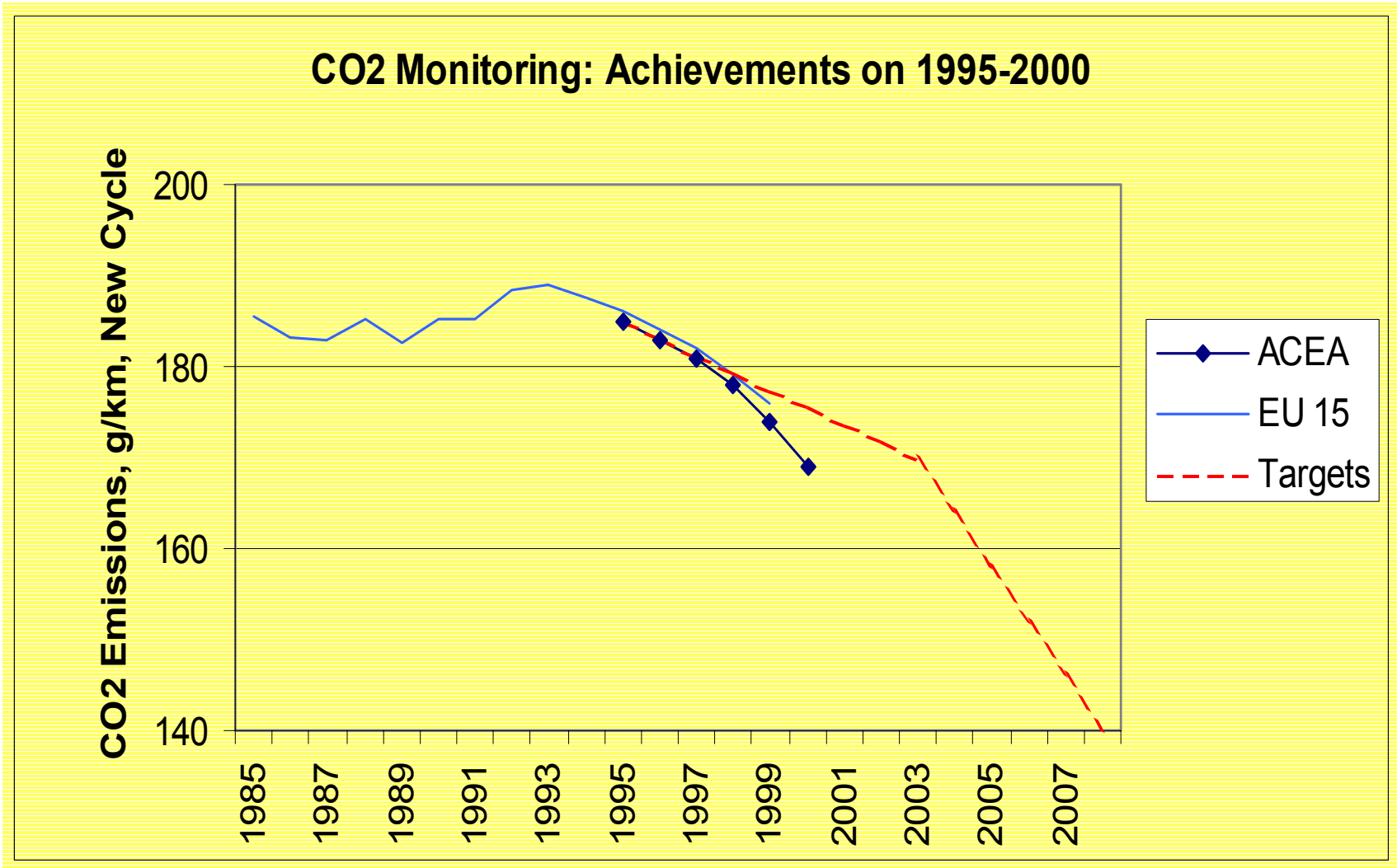
CO_2 Emission Reduction

EUCAR - ACEA R&D Program

Why a CO_2 R&D Programme?



Monitoring the CO_2 Emission Reduction



Top-Down Requirements, Bottom-Up Integration

Requirements Complete Vehicle

- CO_2 reduction
- Safety
- Affordability
- Functionality
- …

Assessment Complete Vehicle

- CO_2 reduction
- Safety
- Affordability
- Functionality
- …

System Assessment

- LCA
- Recycling

Requirements

Integration

Technology Areas

- Powertrain
- Material
- Manufacturing
- System Efficiency
- Mobility

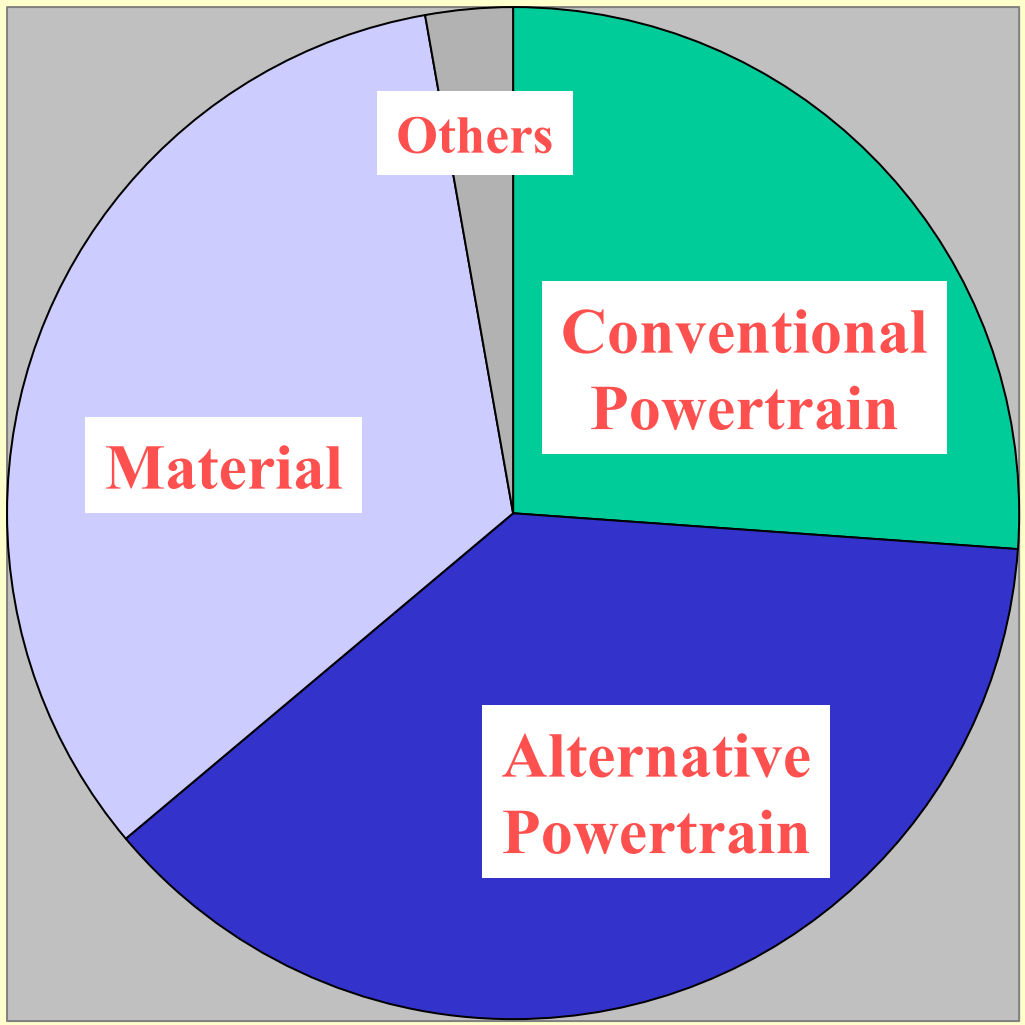
Technology R&D

- Sub-Systems
- Components
- Methods
- …

Demonstrators

- Virtual
- (Sub-) system
- Vehicle system

CO2perate: Over-all status end of 2000



 # Projects = 33
Total Budget = 108 MEuro
EU funding = 54%

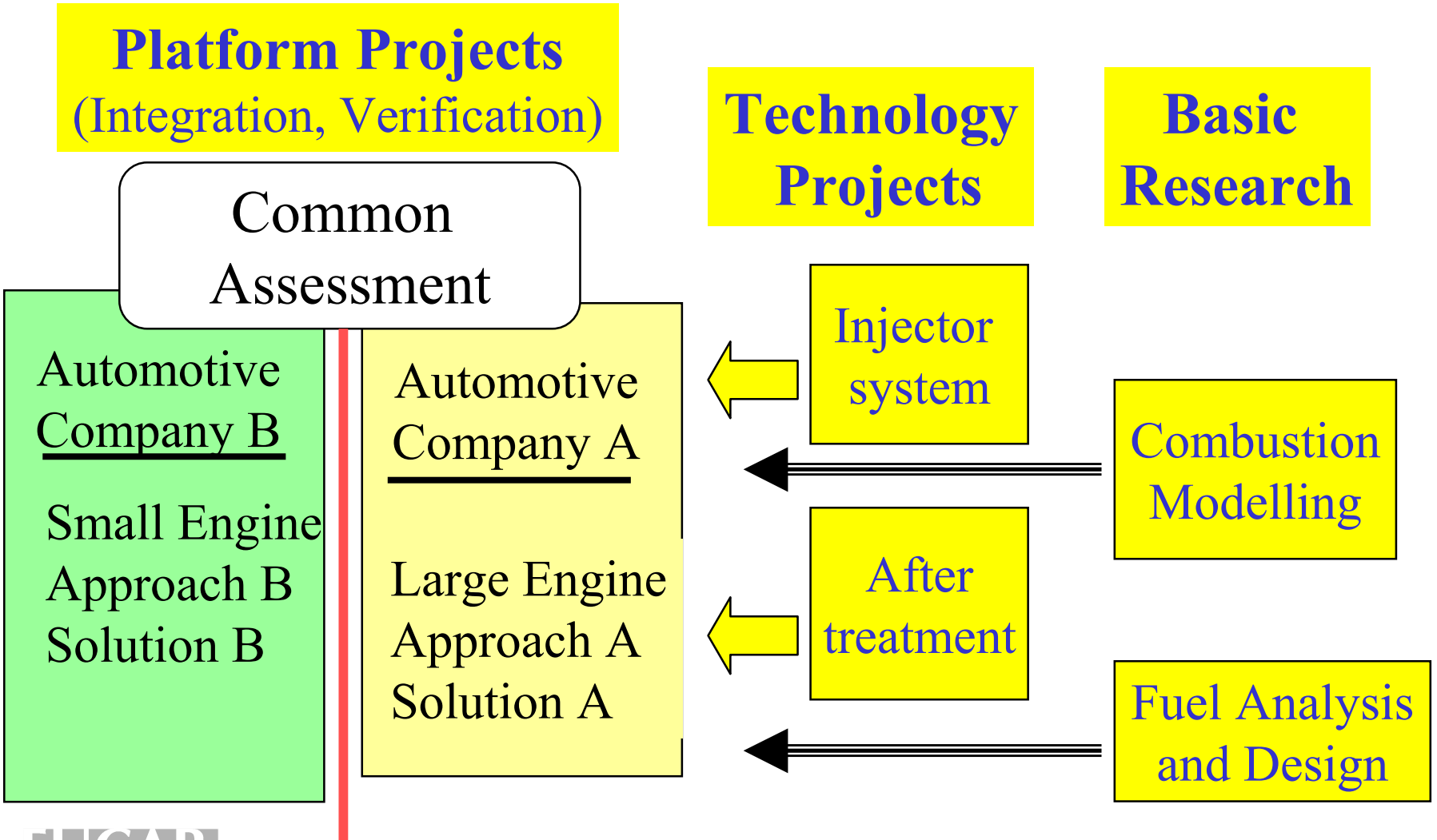
- Conv. Powertrain
- Altern. Powertrain
- Material
- Others

Three Powertrain Platforms

- GET — Downsized, supercharged gasoline
- EUDIESEL — Low emission diesel
- SUVA — Hybrid / Electric

TREMOVE — *Assessment of cost effectiveness of CO_2 reduction*

Sharing Assessment while Protecting Solutions



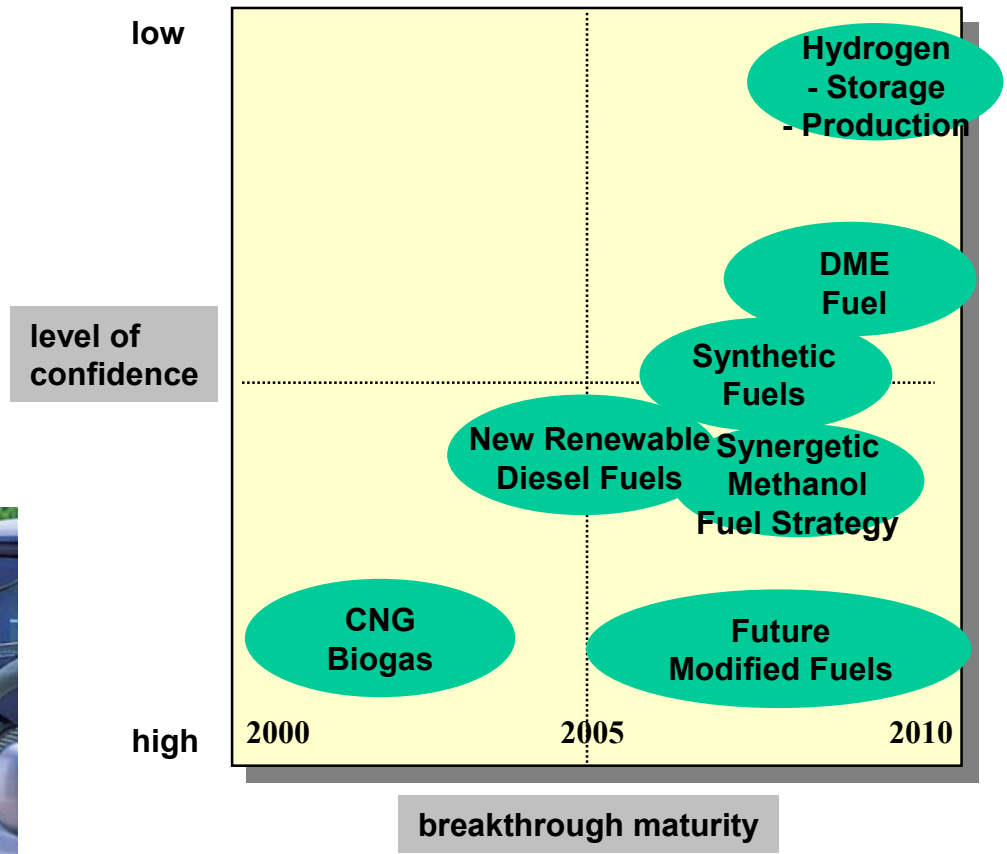
Energy Supply and Future Fuels

- This is a "hot potato"
- Automotive industry is conservative
- Automotive industry is protective

Roadmap of EUCAR Interest Group -Fuels-

Fuels for engines of the future:

- **Clean combustion products with clean fuels / fuel components**
- **Search for performance and production paths of alternative liquid fuels**
- **Renewable fuels in large quantities and high qualities**
- **Can we produce and use hydrogen at large scale at reasonable costs?**

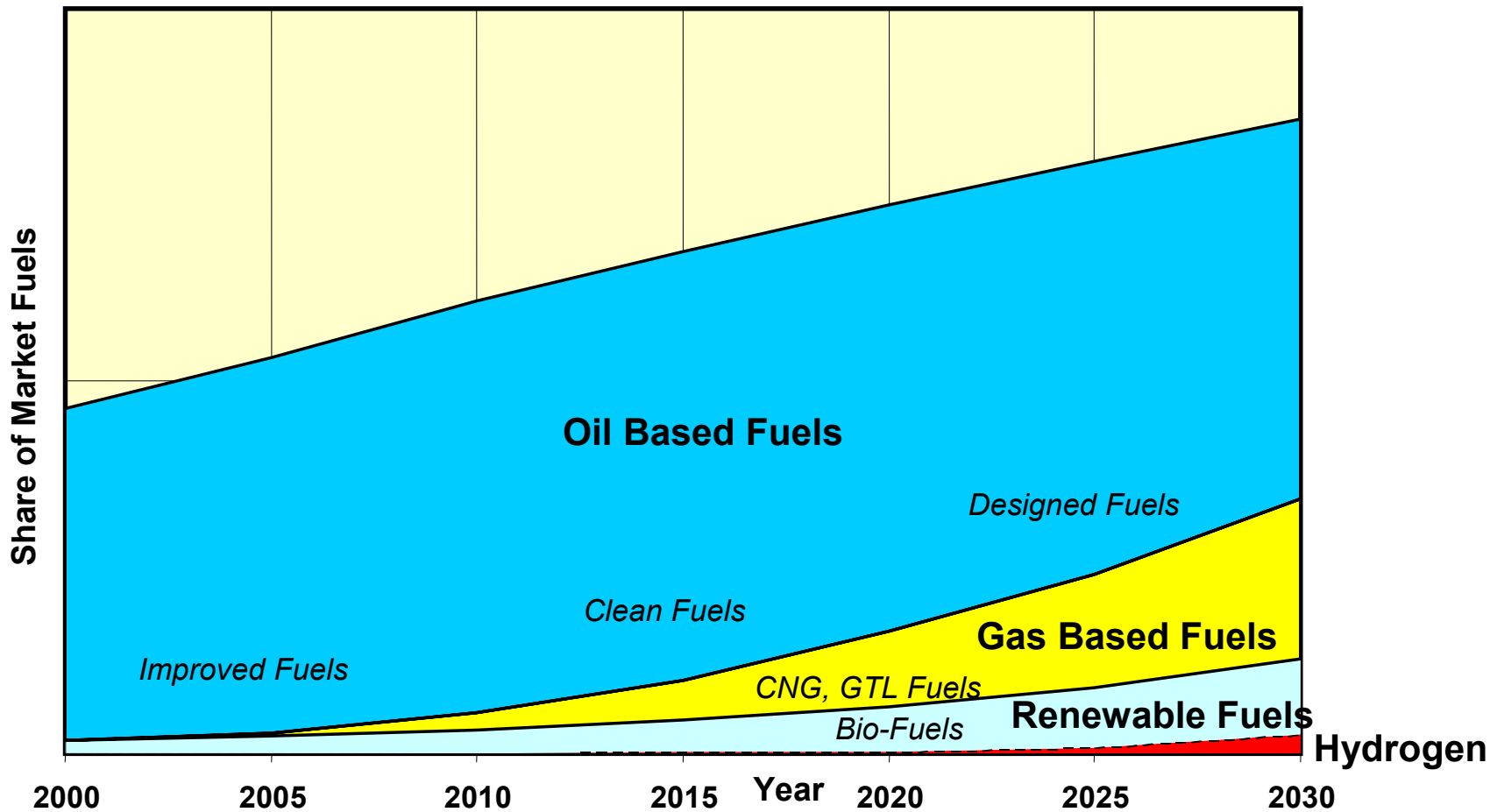


Source: IG Fuels 1999

Evolution of Fuels

- evolutionary development
- no sudden steps in technology
- gradual introduction of maturated technologies (fuels, powertrains)
- market forces (costs, availability, consumer acceptance) will ensure longest use of proven technologies with existing infrastructures

Fuel Scenario of the IG Fuels



Hydrogen

from regenerative production

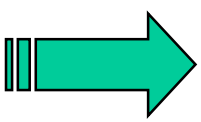
⊕

- sustainable and ecologically favourable perspectives
- CO_2-free or CO_2-neutral along the whole energy chain
- inexhaustible resources

but: 3 critical technical and economical barriers

⊖

- storage systems for mobile application is lacking
- infrastructure not available
- sustainable production from regenerative energy at competitive costs unsolved



Long- Range Solution

Conclusions

Combustion engines (Gasoline and Diesel) will be the main propulsion systems for passenger cars even in 20 years

Development of Fuel-Cell Vehicles will take a long time still (weight and costs), mass production not likely before 2015

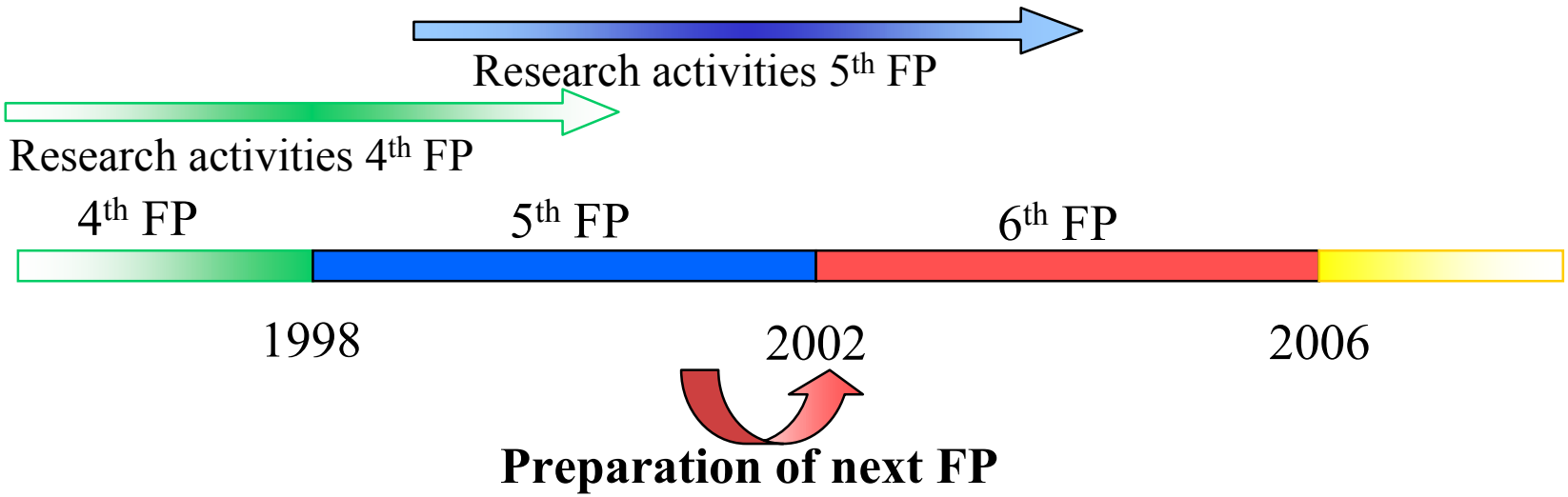
Use of Hydrogen for mobile application is only feasible, after all technical and economical barriers have been overcome (past 2020)

So what should and can FUERO do to break this conservative outlook ?

Future Research for

Vehicle and Road Transport

EU's 4 Year Framework Programs (FP) for R&D



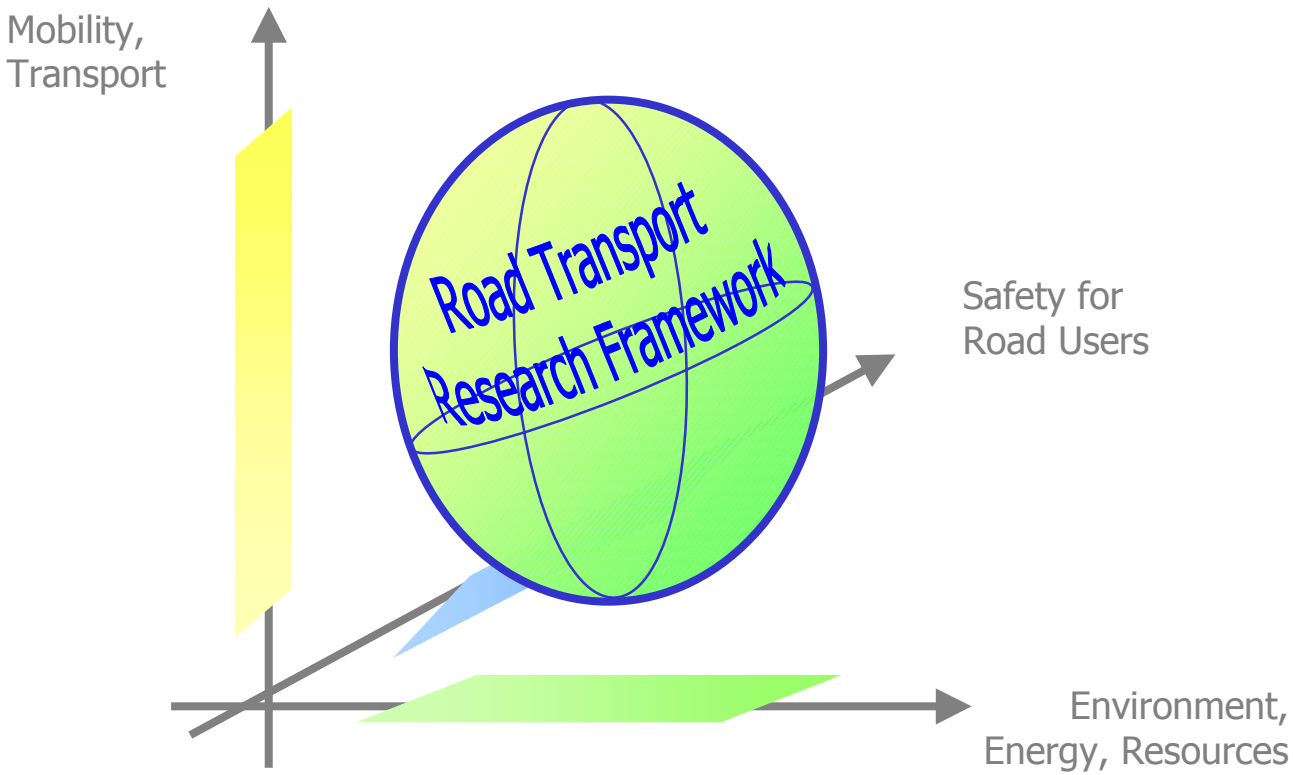
EUCAR Task Force FP6

- Provide one common approach
- Formulate agreed R&D topics
- Communicate

Future Road Transport Research:
Main Messages by EUCAR - ACEA CV Dec. 2000

- **Major Challenges for the Road Transport System**
  - Environment, Energy and Resources
  - Safety for Road Users
  - Mobility and Transport
- **Framework needed for Road Transport Research**
  - Initial 4 year phase in FP6
  - Annual budget of order 600 MEuro (50% funding from FP6)
  - Linking and cooperation with National R&D
- **Industry offers to be**
  - a partner of the Road Transport R&D Framework
  - an active contributor to the solutions

Automotive Position Paper on Road Transport RTD



Identified Dimensions of Needed Research

Dimension	**Objectives** and **Research Priorities**
ENVIRONMENT ENERGY RESOURCES	Environmentally compatible and sustainable transport systems based on renewable resources. • Solutions towards the use of clean conventional and renewable energy. • Road and traffic noise reduction. • Lean production and recycling.
SAFETY FOR ROAD USERS	Steady trend of decreasing number of traffic accidents. Affordable safety systems for vehicle, infrastructure and road users through development and integration of • preventive, active and passive safety and • post-crash assistance.
MOBILITY TRANSPORT	A sustainable and efficient traffic and transport system providing mobility and goods delivery services to the citizens. • Intermodal concepts and supportive systems. • Monitoring and management of traffic and goods for efficiency. • Global harmonisation and standards.

Commission's proposal & structure on FP6

INTEGRATING EUROPEAN RESEARCH

PRIORITY THEMATIC AREAS

- Genomic and biotechnology for health
- **Information society technologies**
- Nanotechnologies, intelligent mat., new production processes
- Aeronautics and space
- Food safety and health risks
- **Sustainable development and global change**
- Citizens and governance in the knowledge society

ANTICIPATING SCIENTIFIC & TECHN. NEEDS

- Research for policy support
- Frontier research, unexpected developments
- Specific SME activities
- Specific international cooperation activities
- JRC activities

STRUCTURING THE ERA

- Research and innovation
- Human resources & mobility
- Research infrastructures
- Science and society

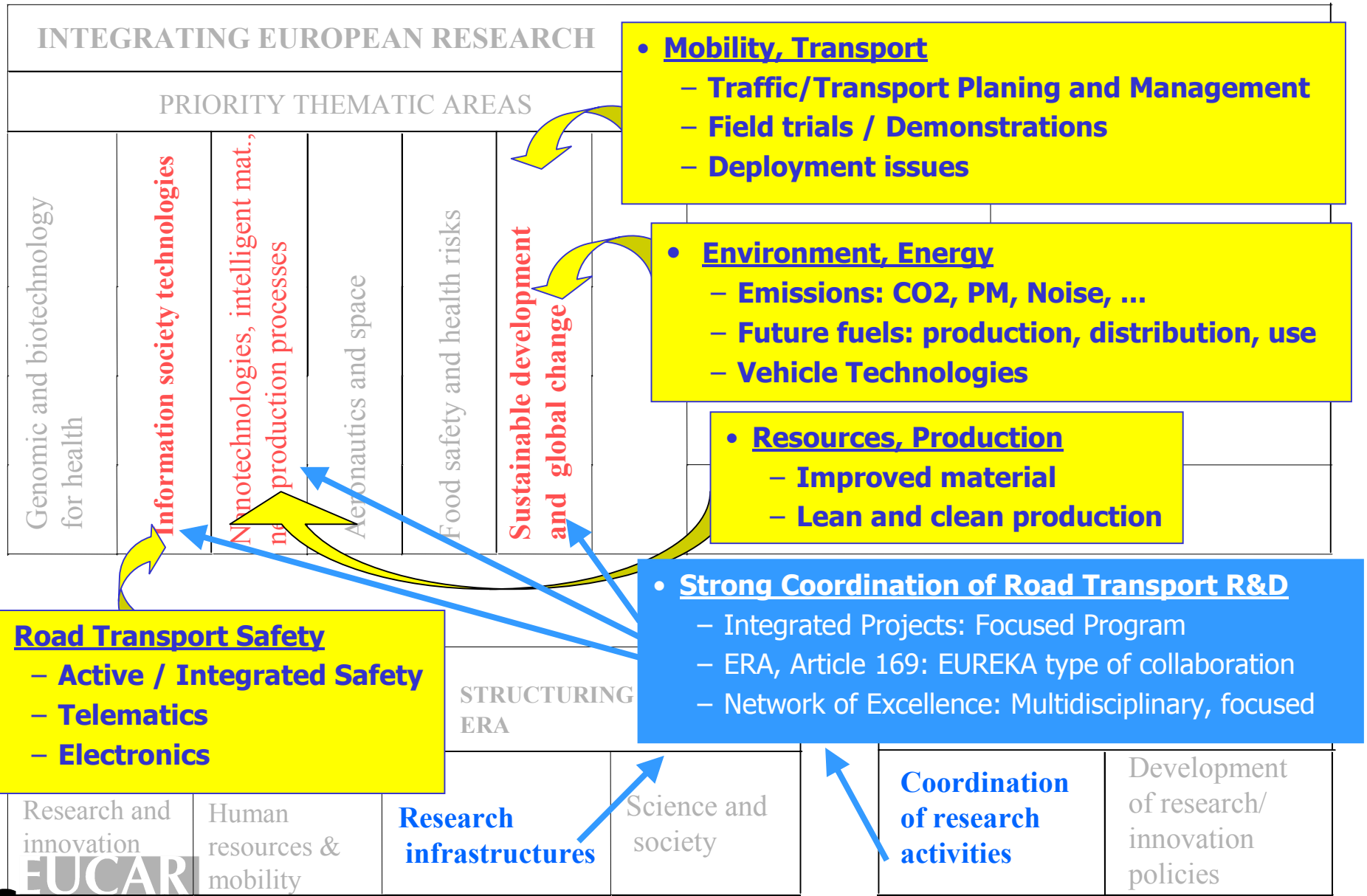
STRENGTHENING THE FOUNDATIONS OF ERA

- Coordination of research activities
- Development of research/ innovation policies

EUCAR - ACEA Concerns;
Road Transport in FP6

- The need of technological developments for preserving environment, energy and resources is not sufficiently acknowledged.
- R&D on measures for increasing safety in traffic (cf Liikanen 23 April in EP) need to be clarified and confirmed.
- The complexity, magnitude and impact of mobility and goods transport are far greater than recognised.

Expanding / Amending Road Transport into FP6



Concluding Remarks

FUERO

- is the centre point of the European Fuel Cell collaborative research done among the EUCAR members
- has a strategic role to deliver technology breakthroughs

What is expected from FUERO?

- Clear direction of Fuel Cell R&D
- A vehicle system approach
- Demonstrators: Functional vehicles
- Infrastructure and supply considerations
- Deployment strategies
- An European "leadership" for mobile FC

END PRESENTATION

CO2perate: The CO_2 R&D Programme

Objective:

- Identify, develop and demonstrate new technologies and system concepts of CO_2 reduction relevance.

Constraints:

- Other environmental factors
- Safety
- Affordability and customer acceptance.

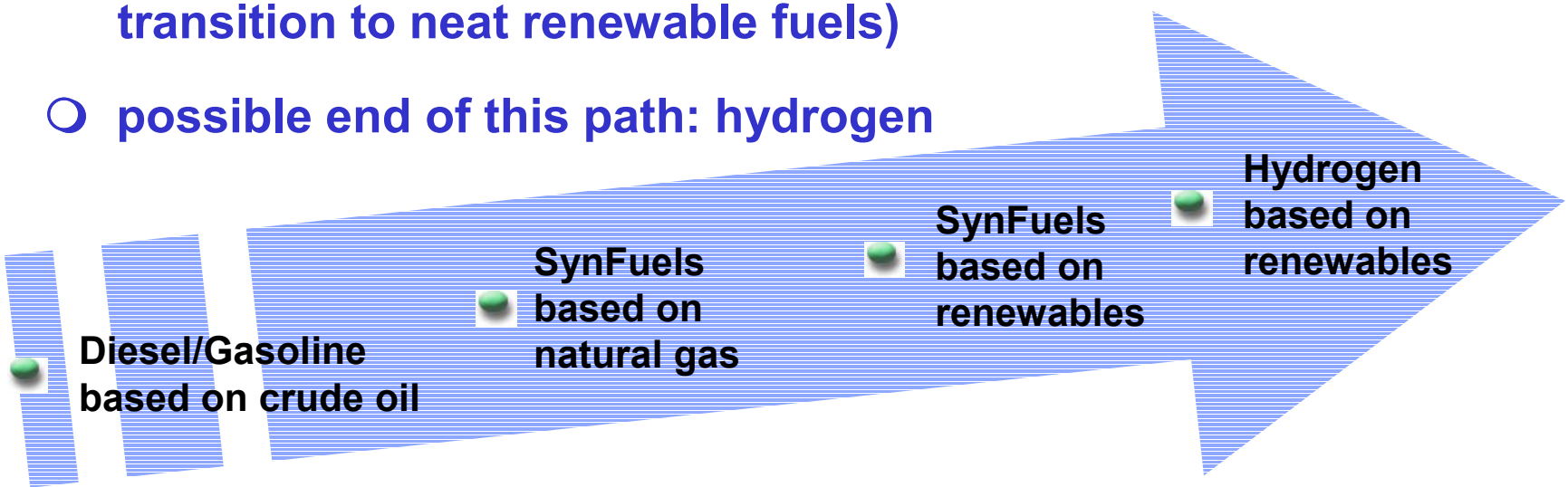
Cooperation:

- Automotive manufacturers
- System and component suppliers, fuel suppliers, ….
- Research institutes and academia.

Evolution of Fuels

Fuel evolution will occur in phases:

- improvement of oil-derived fuels (clean fuels, designed fuels)
- supplement by gas-derived fuels (blending into existing fuels, niches for neat GTL)
- supplement by renewable fuels (blending into existing fuels, transition to neat renewable fuels)
- possible end of this path: hydrogen



CEC's FP6 Budget Proposal: 17,5 billion Euro

Seven Priority Thematic Areas	**Budget, M Euro**
1. Genomics and biotechnology for health	2 000
2. **Information society technologies**	**3 600**
3. *Nanotechnologies, intelligent materials and new production processes*	*1 300*
4. Aeronautics and space	1 000
5. Food safety and health risks	600
6. **Sustainable development and global change**	**1 700**
7. Citizens and governance in European knowledge-based society	225
Additional to these areas is the activity:	
8. Anticipating the EU's scientific and technological needs	2 345
	12 770
and the actions to establish ERA:	
Structuring and Strengthening the European Research Area.	3 500