

ON-BOARD GASOLINE PROCESSOR FOR FUEL-CELL VEHICLE APPLICATION

PROFUEL

21 June 2001

Cluster Meeting, Gothenburg

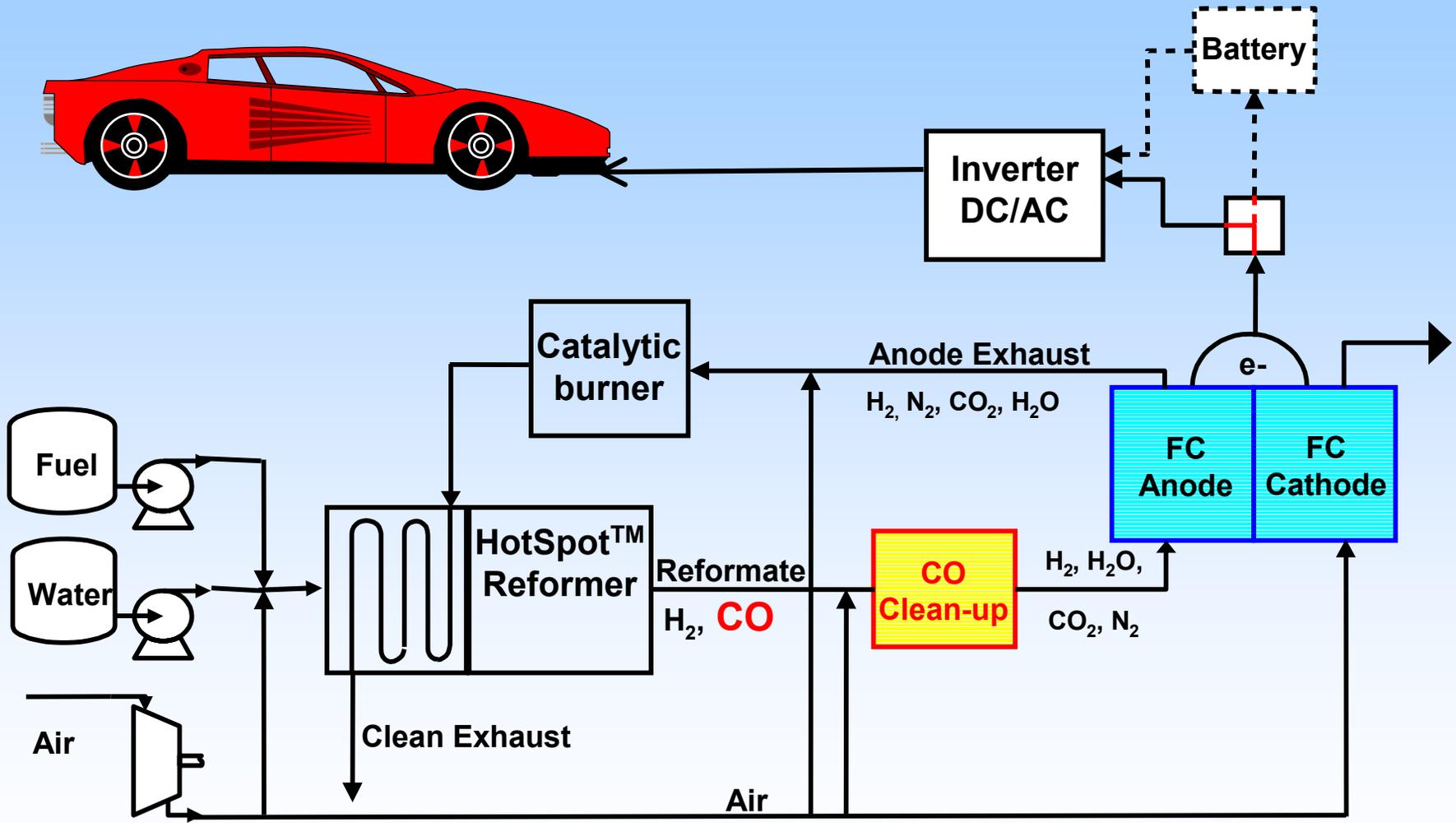
Task ahead.....

- Develop and demonstrate a complete on-board gasoline reformer system on a laboratory scale
- Cost: €6.8 million
- Timescale: 36 months, started July 2000.

Who's involved.....

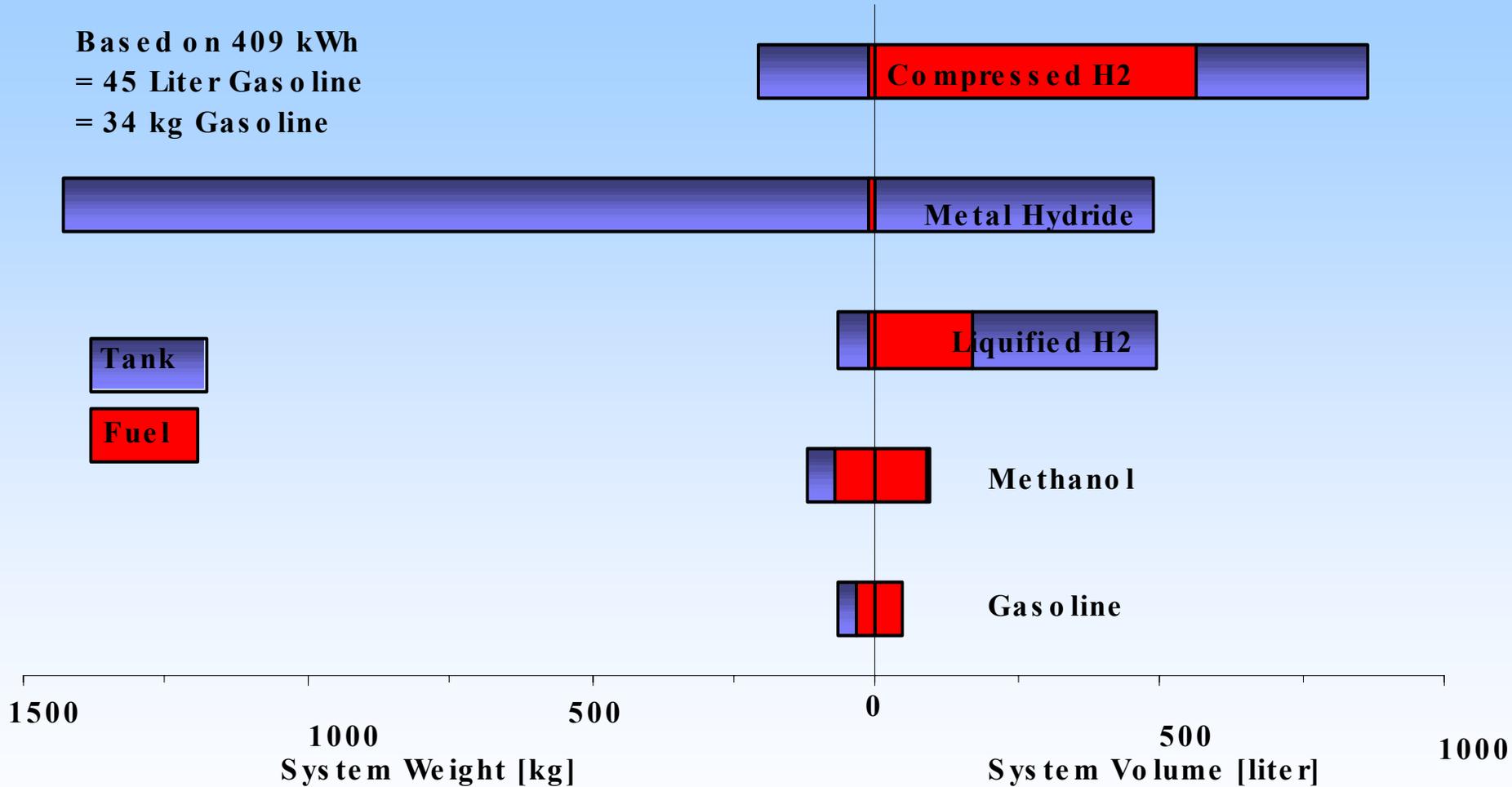
- Johnson Matthey (JM) England
- FEV – Motorentechnik (FEV) Germany
- Ansaldo Recherche (ARI) Italy
- Centro Recherche Fiat (CRF) Italy
- Politecnico Di Torino (PdT) Italy
- Volvo Technological Development Corporation (VTDC) Sweden
- ECN Holland

On-board reforming



Why gasoline reforming?

Based on 409 kWh
= 45 Liter Gasoline
= 34 kg Gasoline



Gasoline.....

- ✓ High energy density
- ✓ Existing infrastructure
- ✓ Liquid fuel

- × Catalyst durability
- × Effective heat integration
- × Start-up
- × Fuel quality

Project deliverables

- Evaluate gasoline as a source for hydrogen production
- Develop
 - ⊗ tailored catalysts
 - ⊗ low-cost sulphur adsorber
 - ⊗ essential ancillary components
- Construct and test of integrated fuel processing unit
- Assess process and scale-up viability

System characteristics

- 10 kWe heat integrated reformer
 - ⊗ Autothermal reformer
 - ⊗ S trap
 - ⊗ CO clean-up
 - ⊗ Afterburner
- Ancillary devices
 - ⊗ Fuel delivery system
 - ⊗ Start-up burner
 - ⊗ On-line gas sensing
- Simulated real gasoline fuel – up to 50ppm S

Roles....

- Fuel (& water) supply and preparation – *FEV*
- Reformer – *JM, FEV, CRF*
- CO cleanup – *ARI, PdT, FEV, CRF*
- Desulphurisation – *PdT, CRF, ARI*
- CO and O₂ sensors – *ECN*
- System integration, testing & design – *VTDC, ECN, PdT, CRF, FEV*
- Project co-ordination - *JM*

Progress to date

- Specification of
 - ⊗ Real system requirements
 - ⊗ Project scope
- Design of fuel supply system
- Evaluation of on-line gas sensors
- Development of durable reformer catalysts
- Screening of CO clean up candidate materials
- System modelling
- Testing of sulphur adsorption materials