Fuel Cell Europe

FUELCELLS – A reality for Europe

JM Tixhon

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Fuel Cell Europe

Agenda

- Fuelcell Europe
  - Definition
  - Activities
- Energy needs and trends
- Will fuel cells help Europe meet its energy challenges?
- Conclusion

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FuelCellEurope - Definition

- Set up in 2002, **FuelCellEurope** is an activity of the World Fuel Cell Council, based in Frankfurt, Germany

- An independent, privately funded European industry association, based in Brussels, Belgium, at the heart of the EU decision making.

- **FuelCellEurope** counts 55 member organizations from 10 European countries, USA, Japan, Canada and China

- Membership includes fuel cell equipment manufacturers, energy companies, automotive OEMs, service companies, academia, research institutions and corporate users

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FuelCellEurope - Mission

"Accelerate the research and deployment of world-class fuel cell technologies for application in transport, stationary and portable power.

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Fuel Cell Europe - Activities

1. **Engaging with policy makers** to position fuel cells as a lasting technology option to address energy, climate change and urban mobility issues;
2. **Ensuring adequate and lasting government support** across Europe to enhance the development and deployment of fuel cell technologies and applications;
3. **Working towards the removal of regulatory barriers** that hinder the development of fuel cell technologies across Europe.
4. **Raising awareness** about the availability of fuel cell applications and educating decision makers;
5. **Supporting SMEs** in their efforts to get easier access to European and national government funds; and subsidies.

Fuel Cell Europe – Activities cnt'd.

6. **Fostering industrial cooperation** at European and international level to accelerate the commercial deployment of fuel cells;
7. **Fostering early market opportunities** working in cooperation with corporate user groups.
8. **Enabling collaboration** with European, National and Regional initiatives;
9. **Developing synergies and reinforcing international cooperation** with key industry groups to address joint energy, climate change and urban mobility issues.
10. **Enhancing dialog** with the **finance community.**

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Why Fuel Cells

A unique combination of advantages:

1. Environment:
   - Zero CO2, zero toxic emissions fuelled with H2
   - With fossil fuels, toxic emissions are negligible and CO2 reduced significantly
   - E.G.: FC vehicles fuelled with H2 from natural gas reduce CO2 by ~30%
2. Inherent High Energy Efficiency
3. Improved Energy Security through differentiation of sources and decentralised power supply

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Why Fuel Cells

4. Foster the development of renewable energies
- Renewable energies are limited and very valuable
- FCs provide the most efficient way to use these sources

5. Potential to enhance global competitiveness and sustainable economic growth in Europe

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Applications

1. **Stationary applications:**
   - (Micro)-cogeneration
   - Backup power (telecom, data centers, critical applications)
   - PemPowerPlant

2. **Transport applications:**
   - Special purpose vehicles / scooters
   - buses
   - Vehicle fleets
   - Passenger cars

3. **Special applications:**
   - forklifts
   - Auxiliary Power Units
   - Marine
   - Aerospace

4. **Portable and micro power**
   - Military – Soldier portable FC vs batteries
   - Battery charger

   ……..

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Commercial development

Mercedes-Benz is launching its first series-produced fuel cell car on the road: the new B-Class F-CELL. The environmentally friendly electric car has better a performance similar to than a 2,0-litre petrol car and is fully suited for everyday driving. The zero-emission drive system consumes the equivalent of 3.3 litres of diesel per 100 kilometres in the NEDC (New European Driving Cicle). Production of the B-Class F-CELL will commence in late 2009 with a small lot. The first of around 200 vehicles will be delivered to customers in Europe and the USA at the beginning of next year.

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Commercial Developments

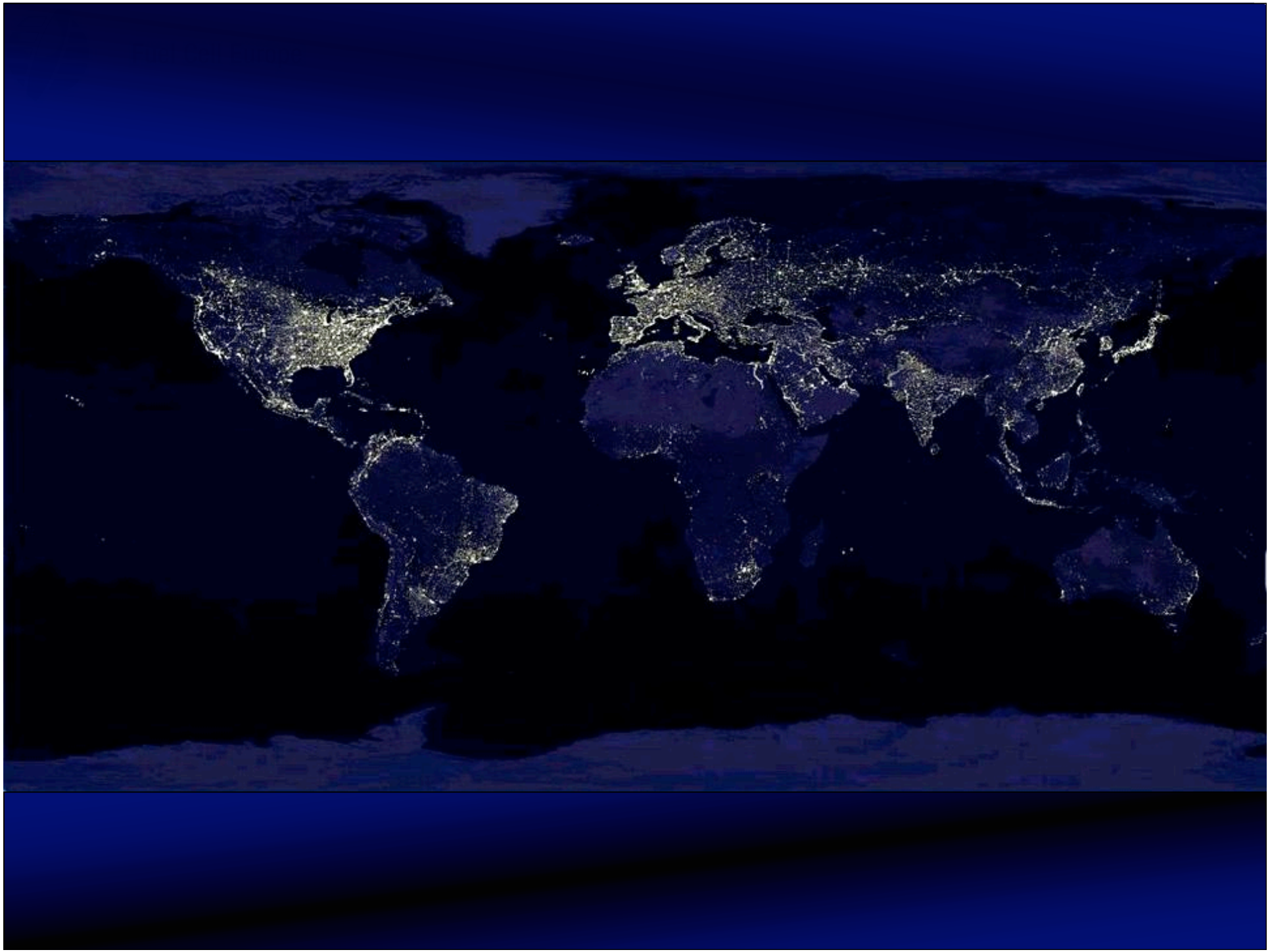
Examples of success stories:

- UTC Power sold +/- 300 systems in 19 countries on 5 continents. Total operating hours > 9 million – 95% availability over the last 5 years. 400KW unit introduced this year.

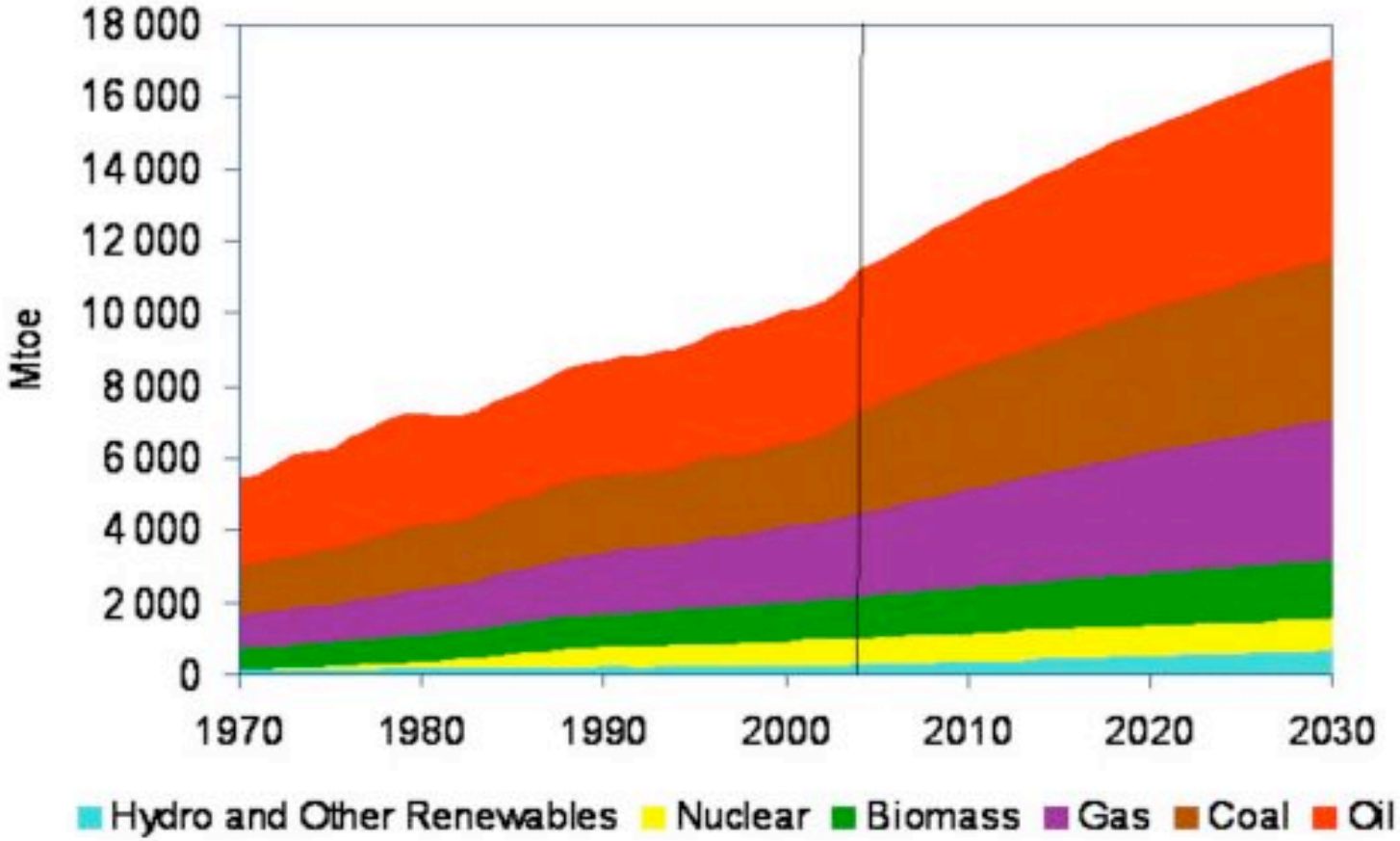
- Smart Fuel Cells announced it had sold its 10,000 fuel cell unit last October

- Idatech / Ballard signed a contract to deliver between 10,000 and 30,000 units over the next 3 years to telecom company ACME in India Ballard fuel cell power forklifts operating at Wart-Mart, Bridgestone, Nissan Motor, Target Corporation, London Drugs

Energy trend - demand



World Primary Energy Demand by Fuel in the Reference Scenario



At 75kW/unit and 50mm units/yr,
the annual automotive energy build is 3,750GW

Ref : AIE

Fossile energy - trends

- “Non-renewable energy sources, do, as their name suggests, run out. Apart from their impact on global warming, they are finite. Based on the data we have today, we can predict the moment they are actually exhausted. Putting a date on these energy sources underscores the world's need for true sustainable energy sources.”

Ref : http://www.energy.eu/

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Fossile energy - specifics

Ref : http://www.energy.eu/

- **Natural Gas** (in cubic meters)
- Total world reserves Jan 1st 2009: 174436171550404
- World usage per second:92653
- Estimated date of exhaustion:07:19 Sep 12, 2068

- **Oil** (in barrels)
- Total world reserves Jan. 1st 2009:1206780968626
- World usage per second:986
- Estimated date of exhaustion:16:36 Oct 22, 2047

- **Coal** (in metric tonnes)
- Total world reserves Jan. 1st 2009 : 841086192000
- World usage per second:203
- Estimated date of exhaustion: 15:35 May 19, 2140

- **Uranium** (in metric tonnes U-235)
- Total world reserves Jan. 1st 2009:18096
- World usage per second:0.0000042222017
- Estimated date of exhaustion:19:56 Nov 28, 2144

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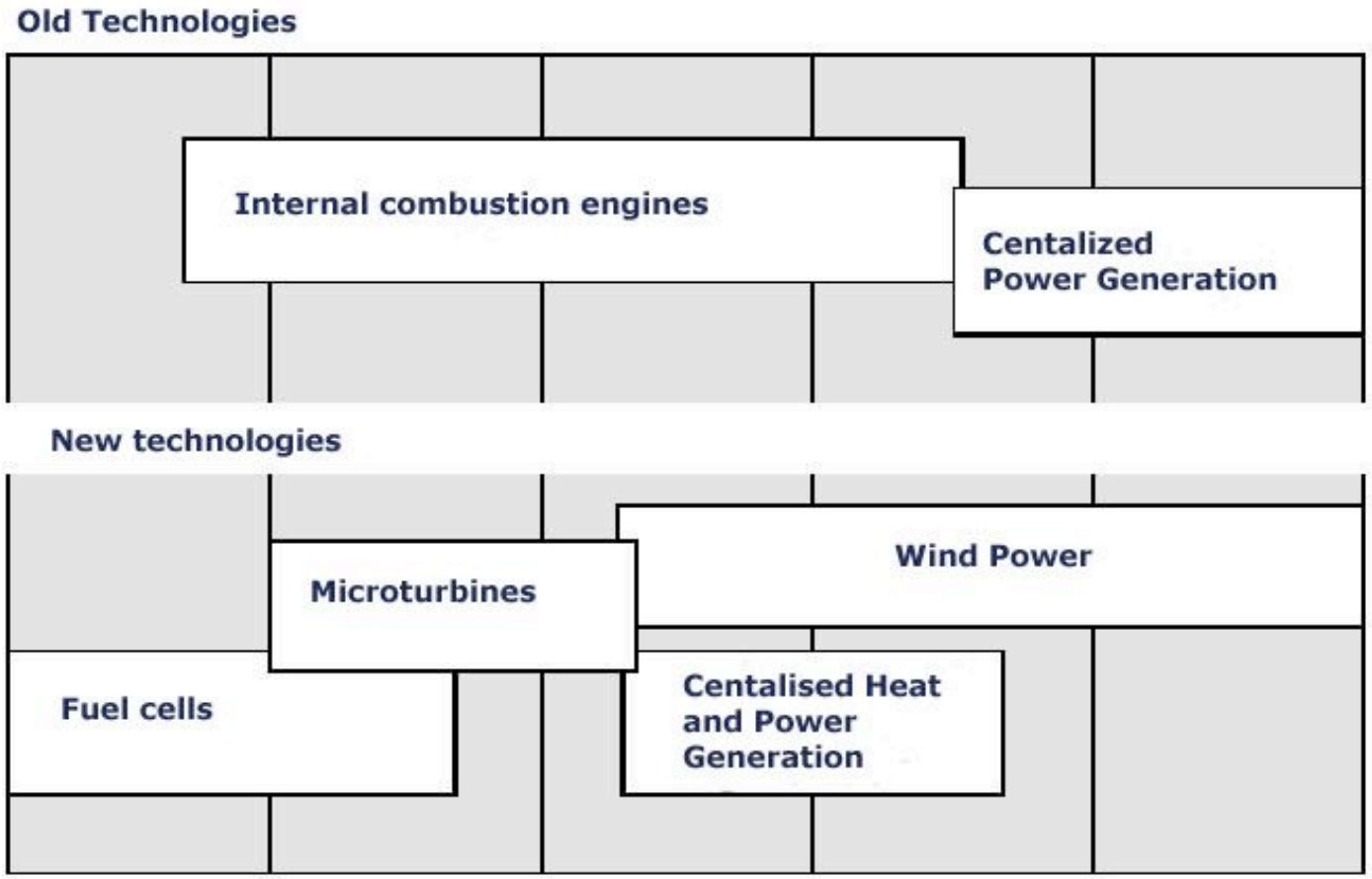
Stationary Power Generation: Competing Technologies



Origin : ABB

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What must Europe do to ensure full participation in an emerging global industry?

Joint Technology Initiative - JTI

- 59 European companies have formed an association called the JTI Industry Grouping
- The JTI is the new way of realizing strong, long-term public-private partnerships for Europe.
- **The proposed JTI will accelerate the development and deployment of cost-competitive, world-class European hydrogen and fuel cell based energy systems and component technologies for applications in transport, stationary and portable power.**

Conclusions – Way forward

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FUEL CELLS CHALLENGES

Barriers to Broad Commercialization of Fuel Cells:

- **Cost: Competitive Initial Investment, $/kW capacity.**
- **Reliability: Hours, Service, Costs.**
- **Fuel Infrastructure: Specific Applications.**

All within the influence of the of fuel cell technology developers

Drivers of Broad Commercialization of PEM Fuel Cells:

- **Energy industry deregulation.**
- **Environmental goals (short term) and sustainability potential (long term).**
- **Electricity demand growth + premium power segment with high value and above average growth.**
- **Large, global growth opportunity.**
- **Gov't tax incentives and R+D funding.**

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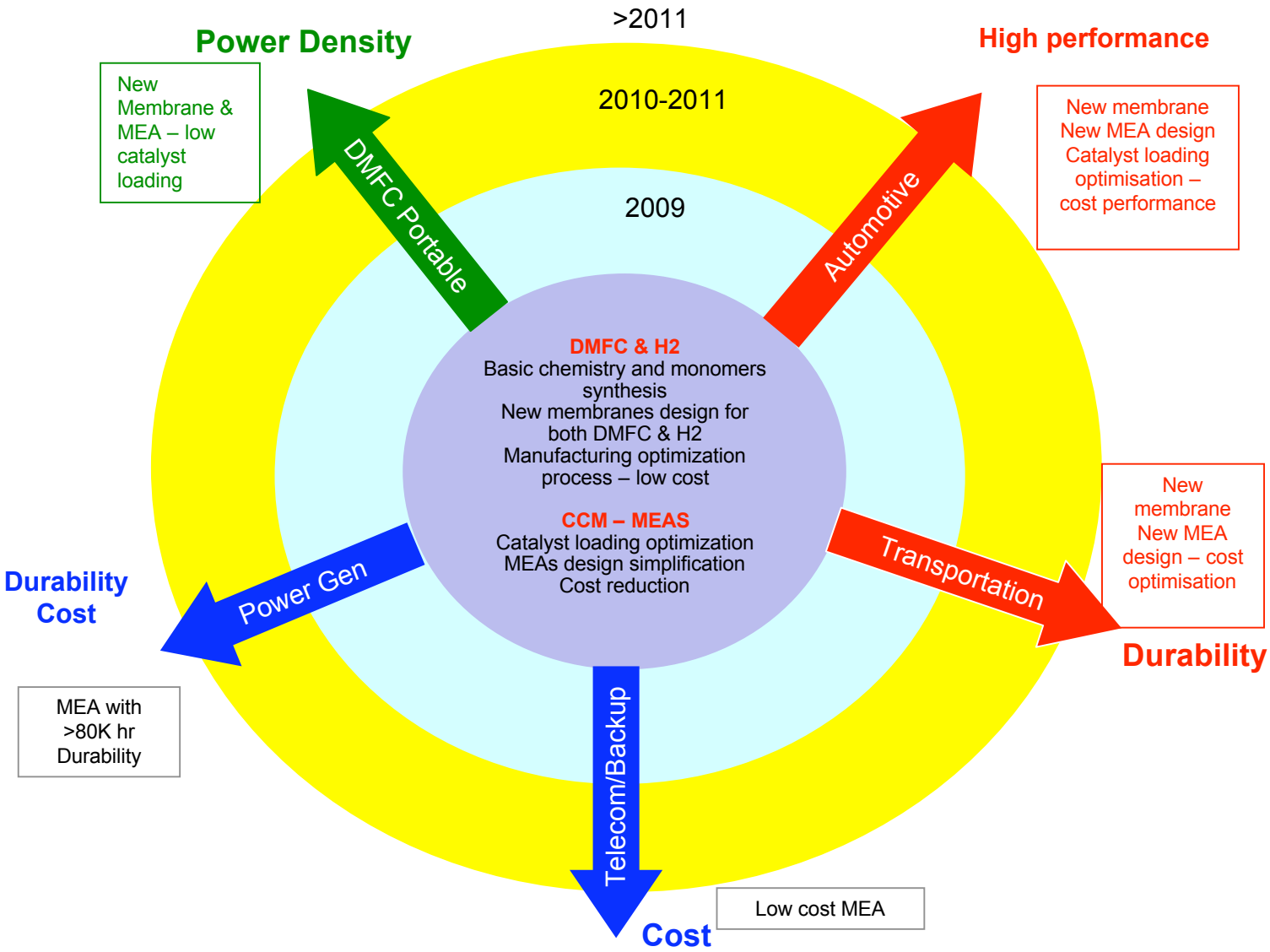
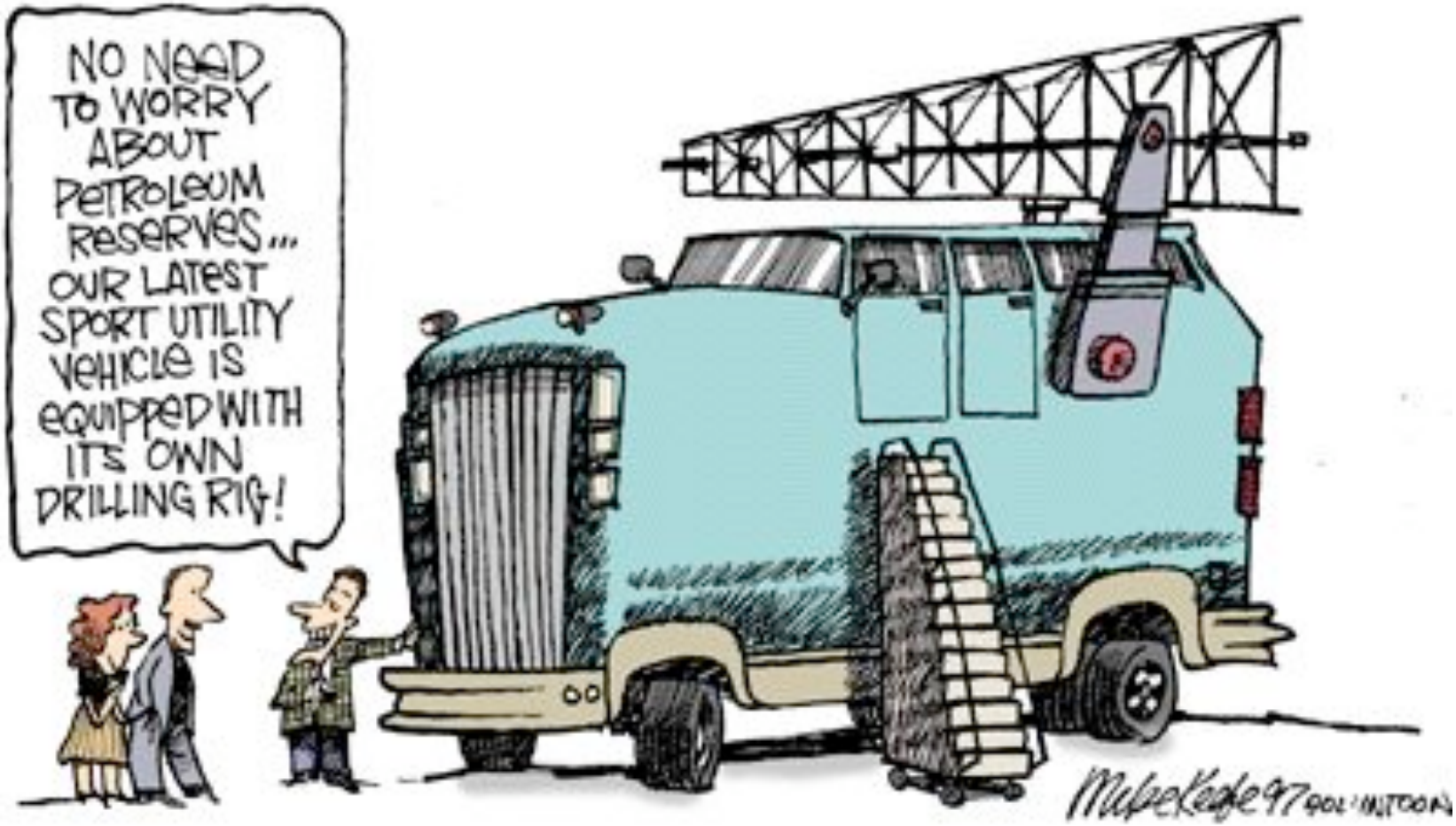
PEM Fuelcells – Technical requirements




NO NEED TO WORRY ABOUT PETROLEUM RESERVES... OUR LATEST SPORT UTILITY VEHICLE IS EQUIPPED WITH ITS OWN DRILLING RIG!

Thank You!