REFERENCE	US Fuel Cells
Title:	Fuel Cell report to Congress
Date:	February 2003
Author:	US Department of Energy
Funded by:	US Government
Hard copy reference:	
URL:	http://www.eere.energy.gov/hydrogenandfuelcells/pdfs/fc_report_congress_feb2003.pdf
Date accessed:	July 2006
Web Format:	pdf
IEA topics covered	V.2 Fuel Cells V.1.2 Hydrogen storage Hydrogen generation and infrastructure
Geographical focus:	USA
Brief Abstract:	The USA has not produced a national roadmap for fuel cell and hydrogen technologies, though evidence of numerous workshops on this topic abound. This report therefore captures some thinking of the USA, who are a critical player in the field, both in terms of development and deployment. Whilst not a roadmap as such, the report does address critical development issues, with a focus on technical, economic and infrastructure issues. The report concludes that public and private partnerships are needed, and identifies several technical barriers which need to be overcome.

OUTPUTS	
Short Report?	No
Major report?	Yes
Visualisations?	Yes
Information held on dedicated software?	No
- which package?	

ARCHITECTURE	
Timescales used:	No
Trends and drivers?	Yes
- list	• Reduction in energy use • Reduction of greenhouse gas emissions • Reduction on the dependence on imported oil • Improvement of air quality • Increase in energy feedstock diversity utilising domestic fossil, nuclear and renewable resources
Enablers?	
- list	
Performance measures/targets?	Yes
- list areas	• Reduce costs • Increase durability • Improve reliability
Mapping of RD&D activities?	No

Critical assessment of capabilities?	No

PROCESS	
Methods used:	
- Desk study?	
- Consultation	Yes
- Interviews?	
- Facilitated workshop(s)	Yes
- Working groups/task force	No
- Integrated Process	Yes
Stakeholders engaged:	
– **University based researchers**	Yes
– **Other public sector researchers**	Yes
– **Business – technology**	Yes
– **Business – other**	
– **Government - energy**	Yes
– **Government – SET**	
– **Government - other**	Yes
– **NGOs**	
No of people engaged:	Workshop participants and other reviewers included representatives from around 100 organizations
Budget (if known):	Not known
Commitment to re-visit?	It is stated “These program adjustments have been initiated, and future adjustments may be made based on ongoing feedback from stakeholders and progress toward achieving the program goals.”

ACTIONS IDENTIFIED	
List of actions?	Yes
Actions listed according to timescale?	No
Actions prioritised?	No
Sequencing/dependencies identified?	No
Responsibility for actions identified?	No
Types of actions identified:	
- Basic research?	
- list areas	Polymer Electrolyte Membrane Fuel Cells • Slightly higher temperature (80-120 °C), lower cost membrane materials for more efficient waste heat utilization for cogeneration in stationary/distributed applications or as process heat in a fuel reformer, reducing radiator size for transportation applications and for reduced carbon monoxide management requirements. The result would be a simplified balance of plant and increased life (due to reduced sensitivity to reformate impurities).

	• New, low-cost catalyst materials (reducing or possibly eliminating precious metals) that achieve useful power densities and are resistant to damage from CO or sulphur compounds would benefit both fuel cell and fuel processor technologies. • Long life, low cost, and high efficiency air handling equipment to allow operation within weight, volume and cost requirements. Solid Oxide Fuel Cells • Stack material and architecture combinations that allow for effective sealing and reduction in life-limiting thermal stresses during thermal cycles. • Electrolyte/electrode/separator plate material combinations allowing high (over 500 mW/cm^2) power densities at the stack level (not just cells) for achievement of low cost goals. • Long life, high effectiveness, high temperature heat exchangers for process flow heat recovery subsystems for high system efficiency. • Stack architectures (including material combinations) that can realistically implement internal reforming leading to reduced costs and long life. Molten Carbonate Fuel Cells • Stack materials and configurations to significantly increase power densities above current levels to approach cost targets consistent with large markets. • Advanced corrosion-resistant materials for stack construction that can result in stack lifetimes in excess of 40,000 hours. Sensors • Sensor and control technology with the proper ranges and selectivities for integrated fuel cell system application. • Low cost sensors for detecting hydrogen leaks and other safety related requirements.
- Applied research?	
- list areas	
- Development & demonstration?	Not mentioned
- list areas?	
- Other types of action?	Yes
- list other types	• Codes and Standards Development • Education • Establishment of public-private partnerships to accelerate the generation of information necessary to determine if commercialisation is warranted