I. Commenter Information

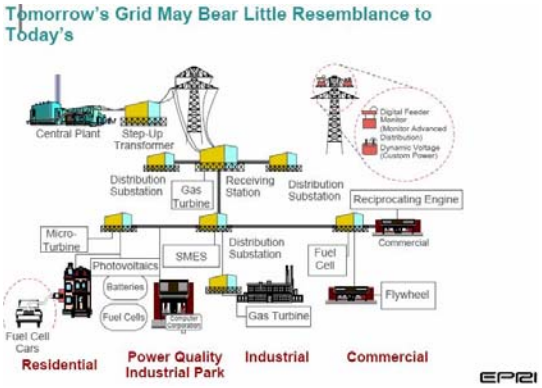
Name(s): Mario Valentino Romeri
Organization(s): independent expert
Mailing Address(es): 9 Via Baleani, 60027 Osimo (AN), Italy
Phone(s): +39 339 4980033 (mobile)
Fax(es): +39 071 715257
E-mail(s) valentino.romeri@alice.it or v_romeri@virgilio.it
Area of Expertise: Fuel Cell, Hydrogen

II. General Comments between different Chapters: (Inconsistencies).

Chapter 10: Conclusions and Next Steps - 10.1 Portfolio Priorities and Current Emphasis
Figure 10-1: Roadmap for Climate Change Technology Development and Deployment for the 21st Century, Page 3
Chapter 4: Reducing Emissions from Energy End Use and Infrastructure - 4.1 Transportation
Page 3, Line 7 - Page 4, Line 21 - Page 5, Line 1 to 19
Chapter 5: Reducing Emissions from Energy Supply – 5.2 Hydrogen
Page 9, Line 10 to 14
Technology Options for the Near and Long Term Report
Section 1.1.1 Page 2 and Section 2.2.5 Page 14
Cost and durability are the major barriers to Fuel Cell commercialization. The vehicle technologies research programs have a number of specific goals (see: Chapter 4: Reducing Emissions from Energy End Use and Infrastructure - Page 5, Line 5 to 16). For transportation applications, which have the most stringent cost and durability requirements, fuel cell costs need to be decreased by a factor of 5,1 and durability needs to be increased by a factor of 3 to be competitive with current vehicle technologies (see: Technology Options for the Near and Long Term Report: Section 2.2.5 Page 14).
Actually the vehicle technologies research programs fixed these goals for the year 2015 (see: Chapter 5: Reducing Emissions from Energy Supply, Page 9, Line 10 to 14) **and also the 2005 U.S. Energy Bill[1] decrees that: "the Secretary shall submit to Congress a report describing ...(4) progress, including progress in infrastructure, made toward achieving the goal of producing and deploying not less than — (A) 100,000 hydrogen-fueled vehicles in the United States by 2010; and (B) 2,500,000 hydrogen-fueled vehicles in the United States by 2020".**
From my point of view if all actual RD&D, technical and cost barriers are overcame by 2015 and the U.S. Energy Bill goals are achieve by 2020, the H2 Fuel Cell Vehicles will be a "Near Term[2]" technology and not a "Mid[3] or Long Term[4]" technology (as indicated in Chapter 10: Conclusions and Next Steps in Figure 10-1: Roadmap for Climate Change Technology Development and Deployment for the 21st Century, Page 3; and Chapter 4: Reducing Emissions from Energy End Use and Infrastructure Page 3, Line 7 and Page 4, Line 21).

III. Specific Comments on Chapter 4: (Omission).

Chapter 4: Reducing Emissions from Energy End Use and Infrastructure - 4.4 Electric Grid and Infrastructure
Page 19, Figure 4-4: A Distributed Energy Future
Stephen Gehl (EPRI), in the 2004 presentation "Generation Technology Choices: Near and Long Term"[5], **shows a more comprehensive figure that include also the Vehicle-to-grid power (V2G)** that uses electric-drive vehicles (battery, fuel cell, or hybrid) to provide power for specific electric markets.



I suggest to include the V2G option in the figure 4-4: A Distributed Energy Future.

IV. Specific Comments on Chapter 5: (Suggestion).

Chapter 5: Reducing Emissions from Energy Supply - 5.2 Hydrogen
Page 13, Line 18:
Considering the strategic relevance of this Plan, especially in the medium and long term, I underline the importance that great attention is paid to the analysis of innovative solutions regarding the possible use of new products.
In particular, I think to the possible use of Fuel Cell Vehicles (FCV) as a new power-generation source, supplying electricity to homes and to the grid like a new different type of Distributed Generation[6], especially at peak times (Vehicle-to-Grid – V2G). This innovative use of FCV could be able to reduce the costs related to the introduction of the new products[7], and will represent a huge amount of new installed peak power generation capacity[8]. As above

mentioned, based on U.S. Energy Bill data, on 2,5 million FCV (little more than 1% of the U.S. veichle stock), in 2020, will be installed (based on 80 Kw stack) 200 GW of V2G power generation capacity (i.e. 21% of the U.S. total power generation installed capacity in 2003[9]).

Based on these considerations, and assuming the CCTP Portfolio Planning and Investment Criteria (as indicated in Chapter 2, Page 12, Line 30 – the CCTP focuses on technologies with potential for large-scale application- and in Chapter 2, Page 13, Box 2-1: CCTP Portfolio Planning and Investment Criteria, -Criterion #3- Focusing on Technology with Large Scale Potential), **I suggest to add a new paragraph** (on Page 13, Line 18)**: "Develop Fundamental Understanding of the Vehicle-to-Grid (V2G) impact on global energy sector and climate change".**

I think it's time to take into consideration the new scenarios regarding the future FCVs' total installed peak power generation capacity and include them in the analysis of the global energy sector and of the climate change for two reasons. First, because the hydrogen carrier has the potential to play a major role in the United States' future energy system. Second, for the huge dimension of the FCV total future installed peak power generation capacity.

Also, as Ms Loyola de Palacio at the IPHE Ministerial meeting (2003) note that: "**The introduction of hydrogen in the energy market cuts across many policy areas.** Energy, industrial, environmental, research, transport, and even taxation or education policies are in the hydrogen loop. **The need to aligne all these policies to enhance each other is a must.** *The leaders (CCCSTI)* should bear this in mind and favour holistic approaches that will take into account all the dimension of developing an hydrogen economy.[10]„

Finally, **I think that a lot of work regarding V2G, including research and analysis, must be concerned, coordinated and finally completed under the auspices of the U.S. Climate Change Tecnology Program**.

V. Specific Comments on Chapter 9: (Suggestion).

Chapter 9: Bolster Basic Science Contributions to Technology Development - 9.3 Exploratory Research

Page 14, Line 10 to 15

Integrative concepts*. Integrative concepts cut across R&D program lines and attempt to combine technologies and/or disciplines. An example might be a scheme that combines sequestration of carbon in soils with the development of a novel form of bio-energy.*

My suggestion is: "Another example might be the development of fundamental understanding of the Vehicle-to-Grid (V2G) impact on global energy sector and climate change".

Integrative concepts might be difficult to coordinate across agencies or across traditional R&D program or mission areas; hence more concerted effort might be required to explore such concepts and manage research in these multi-mission areas.

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1 U.S. Energy Bill, 2005, http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=109_cong_bills&docid=f:h6enr.txt.pdf Sec. 811, Page 259.

2 Near Term: "near-term" envisions significant technology adoption by 10 to 20 years from present, "midterm" in a following period of 20-40 years, and "long-term" in a following period of 40-60 years. See: Chapter 10: Conclusions and Next Steps - 10.1 Portfolio Priorities and Current Emphasis Figure 10-1: Roadmap for Climate Change Technology Development and Deployment for the 21st Century, Page 3.

3 Idem

4 Idem

5 See: "Generation Technology Choices: Near and Long Term" - U.S. DoE EIA Annual Energy Outlook Conference Washington DC, 2004 http://www.eia.doe.gov/oiaf/archive/aeo04/conf/pdf/gehl.pdf , Page 15.

6 See:"Vehicle-to-Grid Power: Battery, Hybrid, and Fuel Cell Vehicles as Resources for Distributed Electric Power in California" 2001. California Air Resources Board, California Environmental Protection Agency http://www.udel.edu/V2G/V2G-Cal-2001.pdf .

7 See: "Vehicle-to-grid power fundamentals: Calculating capacity and net revenue" http://www.udel.edu/V2G/KempTom-V2G-Fundamentals05.PDF .

8 See: "Hydrogen: a new possible bridge between mobility and distributed generation (CHP)" 19th World Energy Congress, Sydney, 2004 http://www.worldenergy.org/wec-geis/congress/papers/romeriv0904.pdf ; for U.S. Data only, see also: "Vehicles as a New Power-Generation Source. Hydrogen a Possible Bridge Between Mobility & Distributed Generation (CHP)", World Renewable Energy Congress VIII (WREC 2004), Denver CO.

9 EIA Annual Energy Outlook 2005, http://www.eia.doe.gov/oiaf/aeo/pdf/0383(2005).pdf .

10 See: "Hydrogen, a universal energy carrier – a crossroad for global Energy policies" - IPHE Ministerial Meeting, Washington DC, 2003 http://www.iphe.net/IPHE%20Presentations/European%20Union.pdf .