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15.992 S-Lab: Laboratory for Sustainable Business
Spring 2008

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Sustainability
Dr. Roger Saillant
April 3, 2008

Clean, Reliable On site Energy

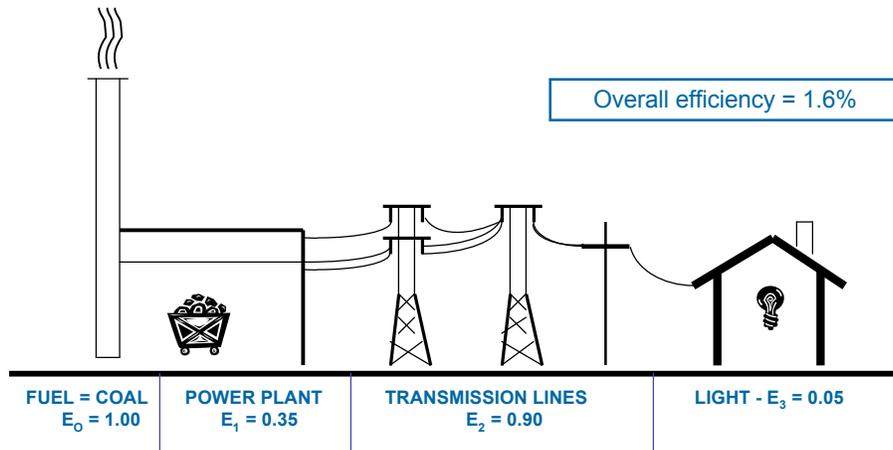
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SAFE HARBOR STATEMENT

This communication contains forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995, including but not limited to our 2008 milestones and statements regarding our growth plans. We believe that it is important to communicate our future expectations to our investors. However, there may be events in the future that we are not able to accurately predict or control and that may cause our actual results to differ materially from the expectations we describe in our forward-looking statements, including, without limitation, the risk that the anticipated synergies of the Cellex Power Products, Inc. and General Hydrogen Corp. (now amalgamated as Plug Power Canada Inc.) acquisitions are not realized; the risk that unit orders will not ship, be installed and/or convert to revenue, in whole or in part; Plug Power's ability to develop commercially viable on-site energy products; the cost and timing of developing Plug Power's on-site energy products; market acceptance of Plug Power's on-site energy products; Plug Power's ability to manufacture on-site energy products on a large-scale commercial basis; competitive factors, such as price competition and competition from other traditional and alternative energy companies; the cost and availability of components and parts for Plug Power's on-site energy products; Plug Power's ability to establish relationships with third parties with respect to product development, manufacturing, distribution and servicing and the supply of key product components; Plug Power's ability to protect its Intellectual Property; Plug Power's ability to lower the cost of its on-site energy products and demonstrate their reliability; the cost of complying with current and future governmental regulations; the impact of deregulation and restructuring of the electric utility industry on demand for Plug Power's on-site energy products; and other risks and uncertainties discussed under "Item 1A—Risk Factors" in Plug Power's annual report on Form 10-K for the fiscal year ended December 31, 2007, filed with the Securities and Exchange Commission ("SEC") on March 17, 2008, and the reports Plug Power files from time to time with the SEC. Plug Power does not intend to and undertakes no duty to update the information contained in this communication.

OVERALL EFFICIENCY FOR CONVERTING CHEMICAL ENERGY TO LIGHT ENERGY



Sustainable Energy – pg. 58

COMPETING MENTAL MODELS

Centralized generation with de-centralized use



Generation at point of use



GLOBAL PERSPECTIVE

North America

Focus on back-up power (power following)

Protecting the Source

US Government support

Europe

Focus on Combined Heat & Power (heat following)

Reducing Consumption

Gas Utilities are involved with fuel cell promotion

European union support

Asia

Focus on Combined Heat & Power (heat following)

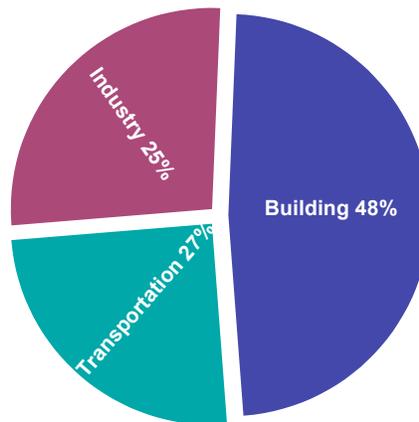
Reducing Consumption

Gas Utilities are involved with fuel cell promotion

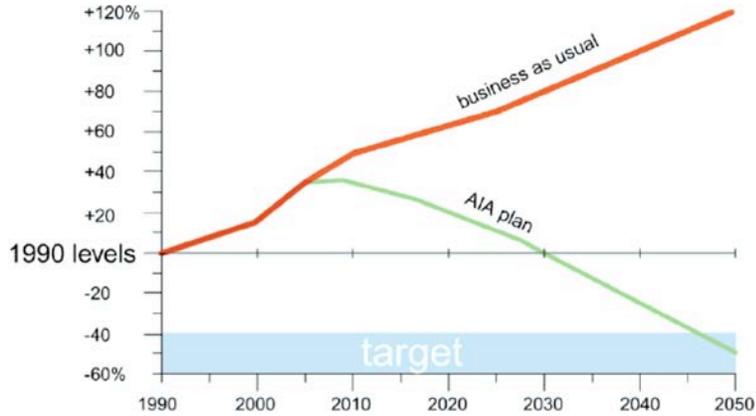
Japanese government budget for fuel cell research, development, & demonstration (\$1 billion from 2005-2007)

Activities Span 3 Continents

BUILDINGS ACCOUNT FOR HALF OF ALL GREENHOUSE GAS EMISSIONS



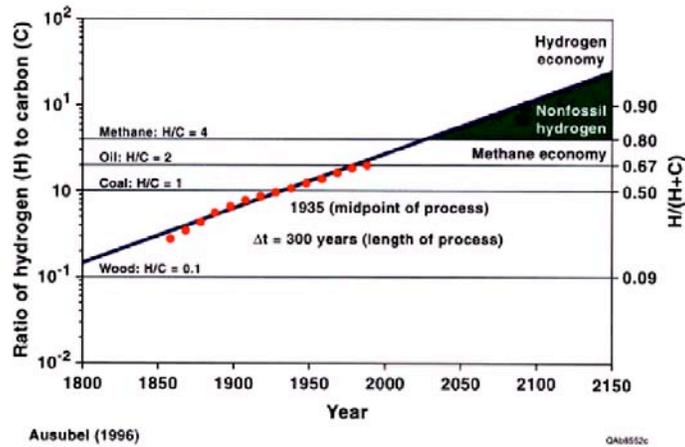
AIA GOALS



TRANSPORTATION POSSIBILITIES

TECHNOLOGY	YR. ONSET OF DOMINANCE (Est.)	FE IMPACT % (Est.)
Hybrid	2026 – 31	40 – 50
Electric Hybrid	2026 – 31	10
Light Weight	2026 – 36	15
Fuel Cells	2050	5 – 7

A PATH FORWARD



“The most important, surprising, and happy fact to emerge from energy studies is that for the last 200 years, the world has progressively favored hydrogen atoms over carbon... The trend toward “decarbonization” is at the heart of understanding the energy system”

SOURCE: Jesse Ausubel - Senior Research Associate - Rockefeller University

NATIONAL HYDROGEN VISION

Major Findings

- ❖ Hydrogen has the potential to solve two major challenges for America: energy security and environmental emissions (pollution and greenhouse gas emissions).
- ❖ Hydrogen is an energy carrier that provides a future solution for America.
- ❖ The transition toward a “hydrogen economy” has already begun.
- ❖ The “technology readiness” of hydrogen energy systems needs to be accelerated.
- ❖ There is a “chicken-and-egg” issue regarding the development of a hydrogen economy.

http://www.eere.energy.gov/hydrogenandfuelcells/pdfs/vision_doc.pdf

BARRIERS FACING THE HYDROGEN ECONOMY

H₂ generation

- Water supply
- Safety perceptions
- CO₂ emissions
- Regional (electrolysis) power and/or CH₄ availability
- Costs/kW; coupling PV with electrolysis and a fuel cell triples the costs

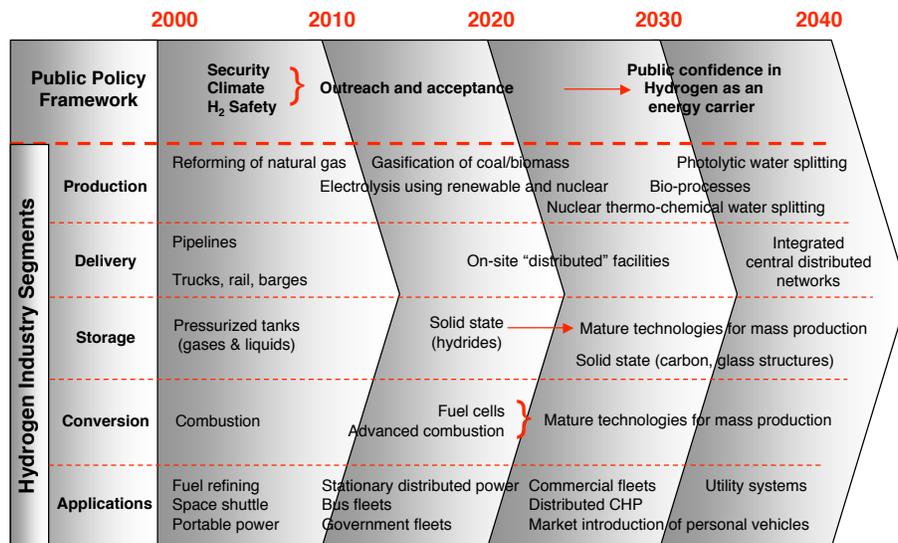
Storage

- High pressure storage vessels (materials)
- Low wt% H₂/storage system (metal hydrides)
- Cost of compression

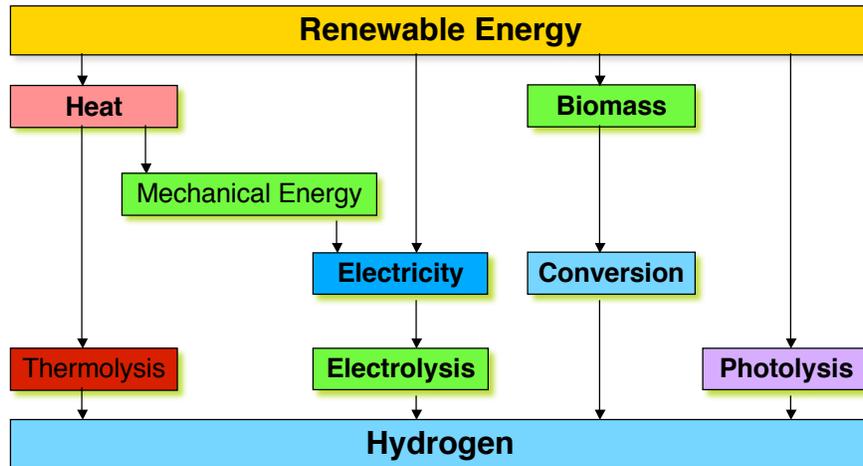
Distribution

- Cost of “new” delivery infrastructure
- Materials issues – embrittlement
- Pipeline availability and location
- Continued availability of low cost gasoline/natural gas

DOE HYDROGEN ROADMAP



Sustainable Paths to Hydrogen



Source: John Turner

DOLLARS FOR MAJOR PROJECTS

<u>Projects</u>	<u>In billion 2006 \$'s</u>
Federal Highway System	\$418
NASA Moon Program	\$106
Rural Electrification and Telephone (loans)	\$57
Yucca Mountain	\$50 (projected)
World War I	\$349
World War II	\$3245

MILITARY BUDGET VS. PLAN B

Military Budget

World Military Expenditure
\$975 Billion

Total \$975 Billion

Plan B

Basic Social Goals
\$68 Billion

Earth Restoration Goals
\$93 Billion

Total \$161 Billion

**Plan B could be funded by 15%
of the Military Budget**

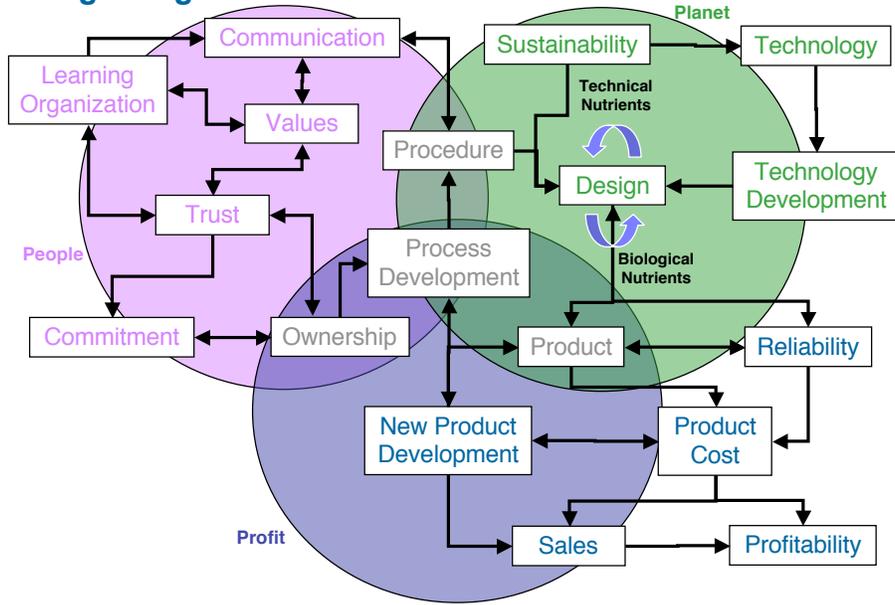
Plan B 2.0, Lester R. Brown

MILITARY BUDGET VS. PLAN B

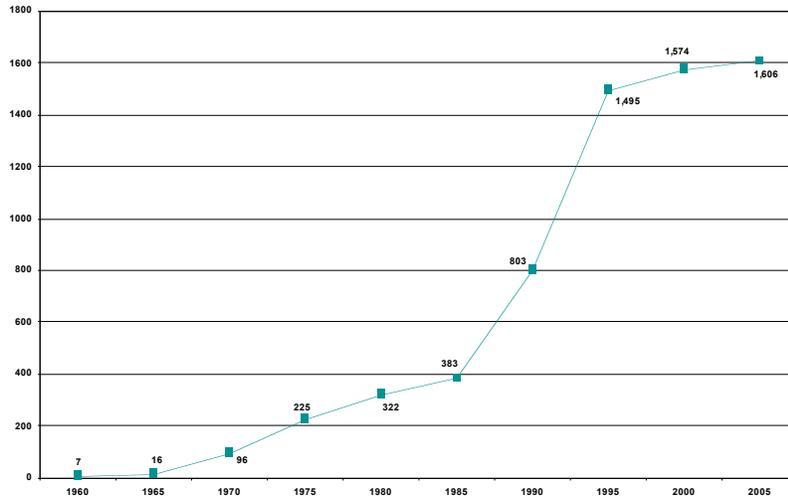
MILITARY BUDGET		BASIC SOCIAL GOALS (PLAN B)		EARTH RESTORATION GOALS (PLAN B)	
Country	Budget (\$ billion)	Goals	Funding (\$ billion)	Goals	Funding (\$ billion)
United States	492	Universal primary education	12	Reforestation of the earth	6
Russia	65	Adult literacy	4	Protecting topsoil on cropland	24
China	56	School lunch programs for 44 poorest countries	6	Restoring rangelands	9
United Kingdom	49	Assistance to preschool children and pregnant women in 44 poorest countries	4	Stabilizing water tables	10
Japan	45	Reproductive health and family planning	7	Restoring fisheries	13
France	40	Universal basic health care	33	Protecting biological diversity	31
Germany	30	Closing the condom gap	2	Total	93
Saudi Arabia	19	Total	68		
India	19				
Italy	18				
All Other	142				
World Military Expenditure	975				

Plan B 2.0, Lester R. Brown

Putting it Together



TREND IN ENVIRONMENTAL BOOK PUBLISHING



Data provided by R.R. Bowker LLC from the BISAC Subject Headings Listing, 2006.
 The BISAC subject areas include: Business & Economics / Environmental Economics, Business & Economics / Green Business, Nature / Ecology
 Nature / Environmental Conservation & Protection, Science / Environmental Science, Science / Life Sciences / Ecology, Technology / Agriculture / Sustainable Agriculture

HOW OPTIMISTIC ARE YOU THAT THE PRISM CO₂ EMISSIONS REDUCTIONS CAN BE MET?

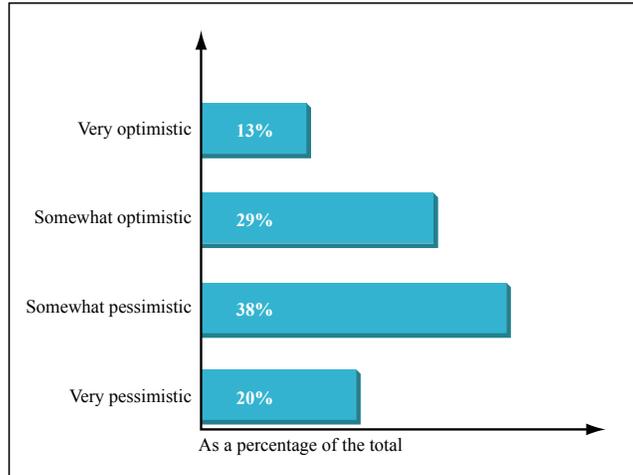


Image by MIT OpenCourseWare.

Source: Electric Power Research Institute Journal, Fall 2007

HOW OPTIMISTIC ARE YOU THAT THE PRISM CO₂ EMISSIONS REDUCTIONS CAN BE MET?

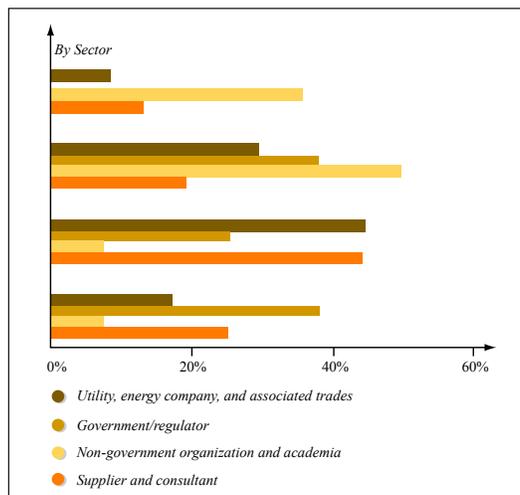


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Source: Electric Power Research Institute Journal, Fall 2007

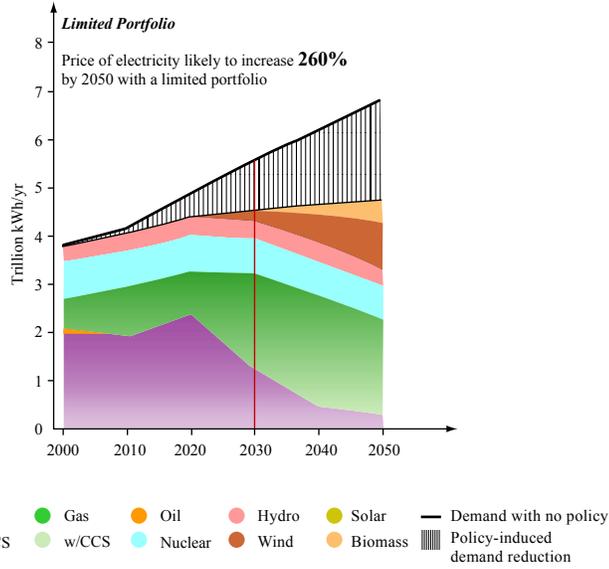


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Source: Electric Power Research Institute Journal, Fall 2007

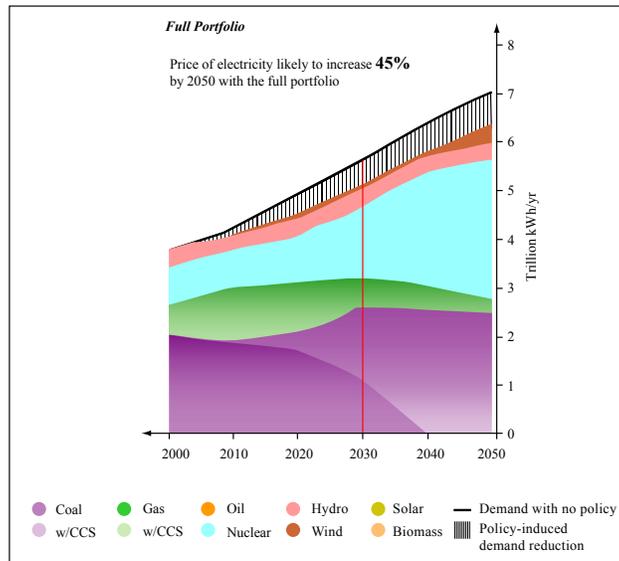
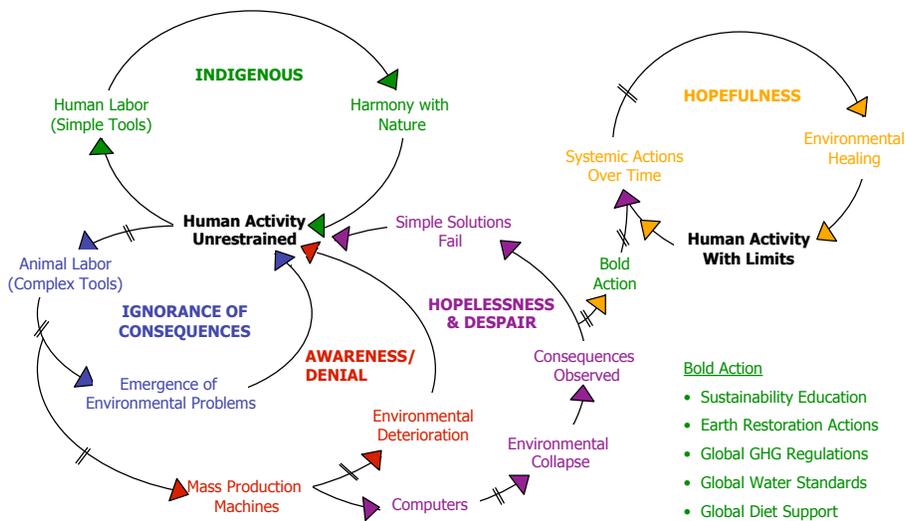
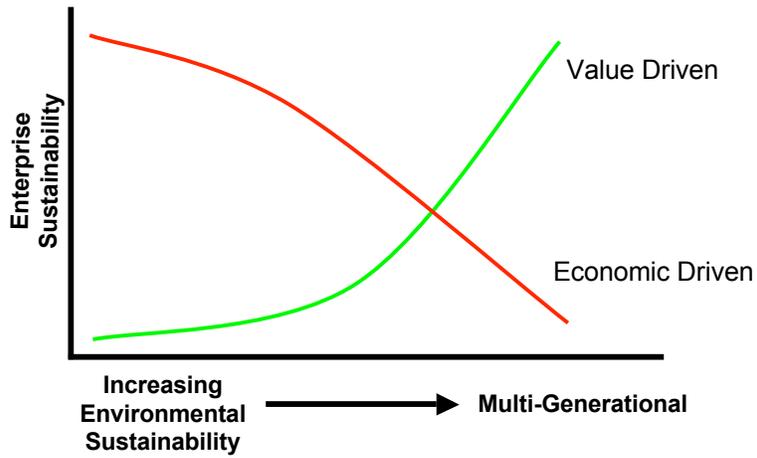


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Source: Electric Power Research Institute Journal, Fall 2007

WHY ENGAGE IN THE TRIPLE BOTTOM LINE



PLUG POWER. PLUG WILL.



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