Sustainable and Alternative Energy at Dow

Gordon Slack
Business Director – Energy
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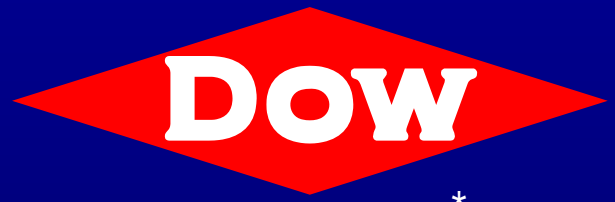
About Dow

- Leader in Chemicals, Plastics and Ag Products
- Annual sales of $40 billion
- Serve customers in 180 countries
- 43,000 employees
- 10 essential markets:
  - **Food**
  - **Building and Construction**
  - **Transportation**
  - **Furniture and Furnishings**
  - **Paper and Publishing**
  - **Home Care and Improvement**
  - **Personal and Household Care**
  - **Health and Medicine**
  - **Water Purification**
  - **Electronics and Entertainment**

A 108 year old company committed to Sustainable Development

Living.



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Chemicals & Plastics in everyday life









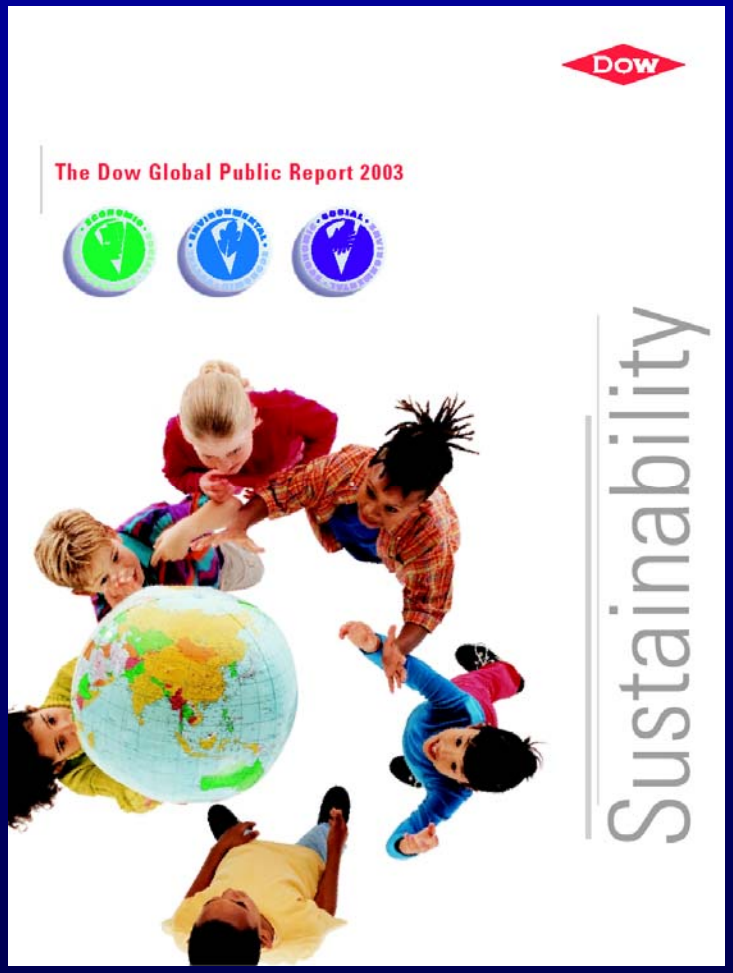



The Dow Chemical Company

12 Point Sustainable Development Operating Plan

1. People	4. Integration	7.Globalization	10. Six-Sigma
2. Brand	5. Dialogue	8. Solutions Development	11. EH&S
3. Transparency	6. Advocacy	9. Community	12. Industry Alignment

Enhanced Public Reporting



www.dowpublicreport.com

The Dow Public Report

Long-term competitiveness is critical to sustainability

*Trademark of The Dow Chemical Company

Critical Context: U.S. Natural Gas Crisis

Fast Facts:

- **70% of U.S. chemical industry is NG/NGL-based**
- **36% of Dow cost is feedstock & energy**
- **Dow feedstock & energy costs increased $3.4B in 2004; $2.7B in 2003**

The U.S. now has highest natural gas prices in the world !

World Natural Gas Costs

$U.S./MMbtu

Dow “Alternatives” to Natural Gas

- Use much less of it:
  Energy Efficiency and Conservation
- Shutdown U.S. facilities
- New investment in gas rich areas
- LNG import
- NUCLEAR
- Renewable/alternative sources of energy

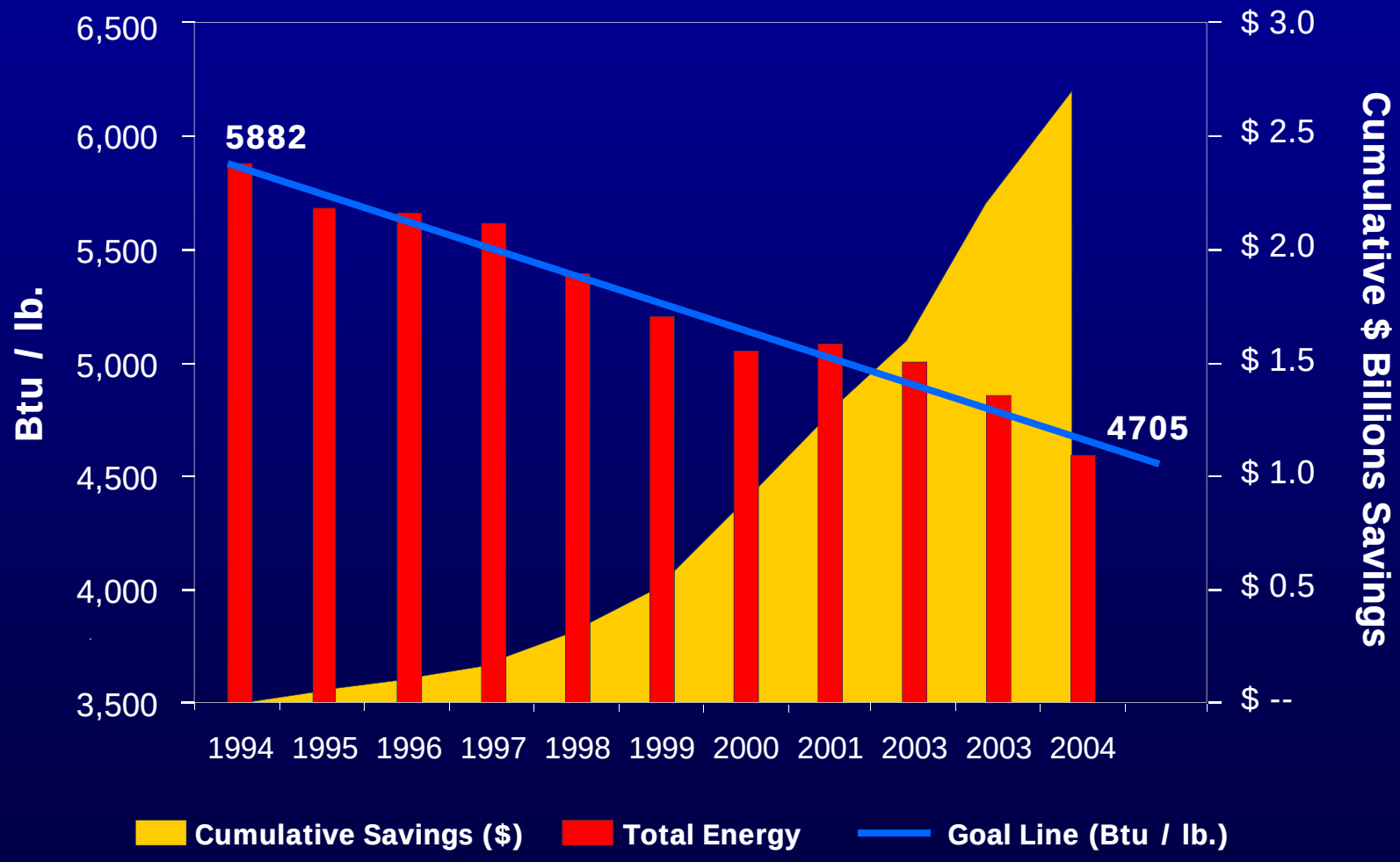
21%

1990 - 1994

Reducing Energy Intensity

21%

1995 – 2004



Shutdown U.S. Facilities

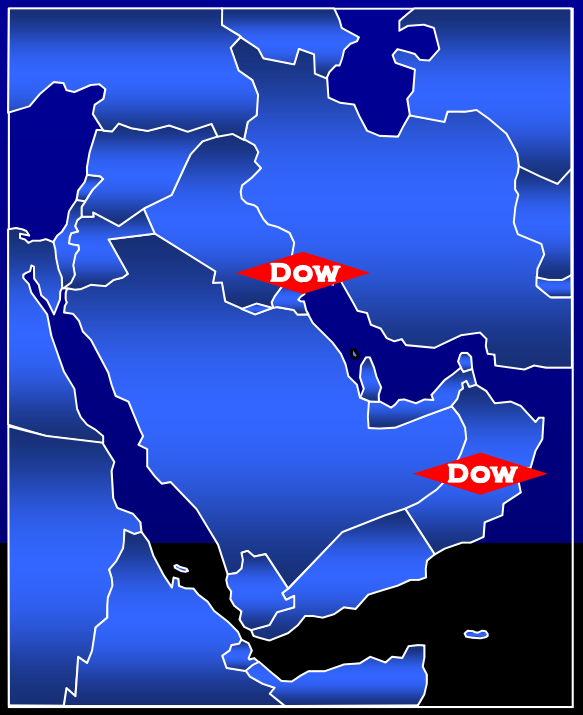
2002

- 1.5B lbs Chlor-Alkali in U.S. Gulf

2003

- 1.1 MM tons UCC ethylene in Texas

New Investment In Gas Rich Areas



May 2003 - Kuwait Expansion

- Ethylene gas cracker
- EO/EG plant
- Polyethylene expansion
- EB/Styrene unit
- JV with PIC June 2004

July 2004 – Oman new site

- JV with OOC and government
- Ethylene gas cracker
- 3 Polyethylene units
- Downstream production

Freeport LNG

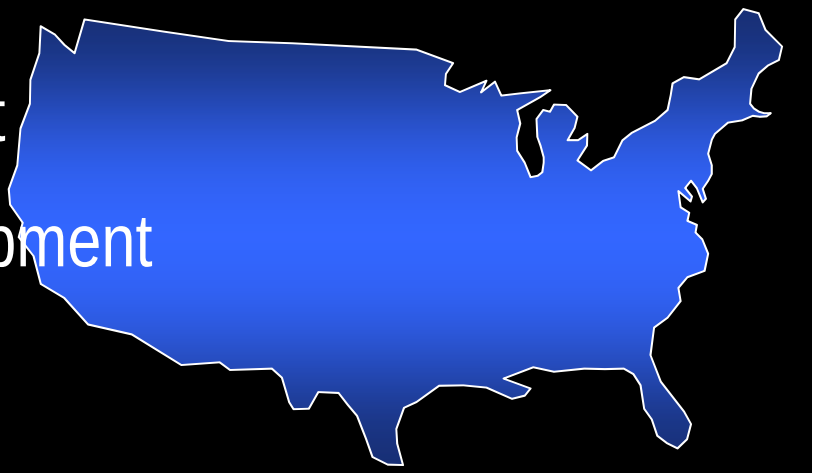
- **New LNG terminal for US gas requirements**

- Location ideally suited for LNG receiving terminal
- Project defined and FERC approved
- Dow 1/3 of 1.5B SCFD
- Dow 15% owner

U.S. Needs Nuclear Power

Dow participated in *Decision-Makers' Forum on a* ***Unified Strategy for Nuclear Energy***

- **Need national priority on Nuclear**
  - Permits, licensing
  - Generation III reactor deployment
  - Generation IV technology development
  - Public confidence and support



Renewable/Alternative Sources of Energy

GM Fuel Cell Project

Coal Gasification

Landfill Gas

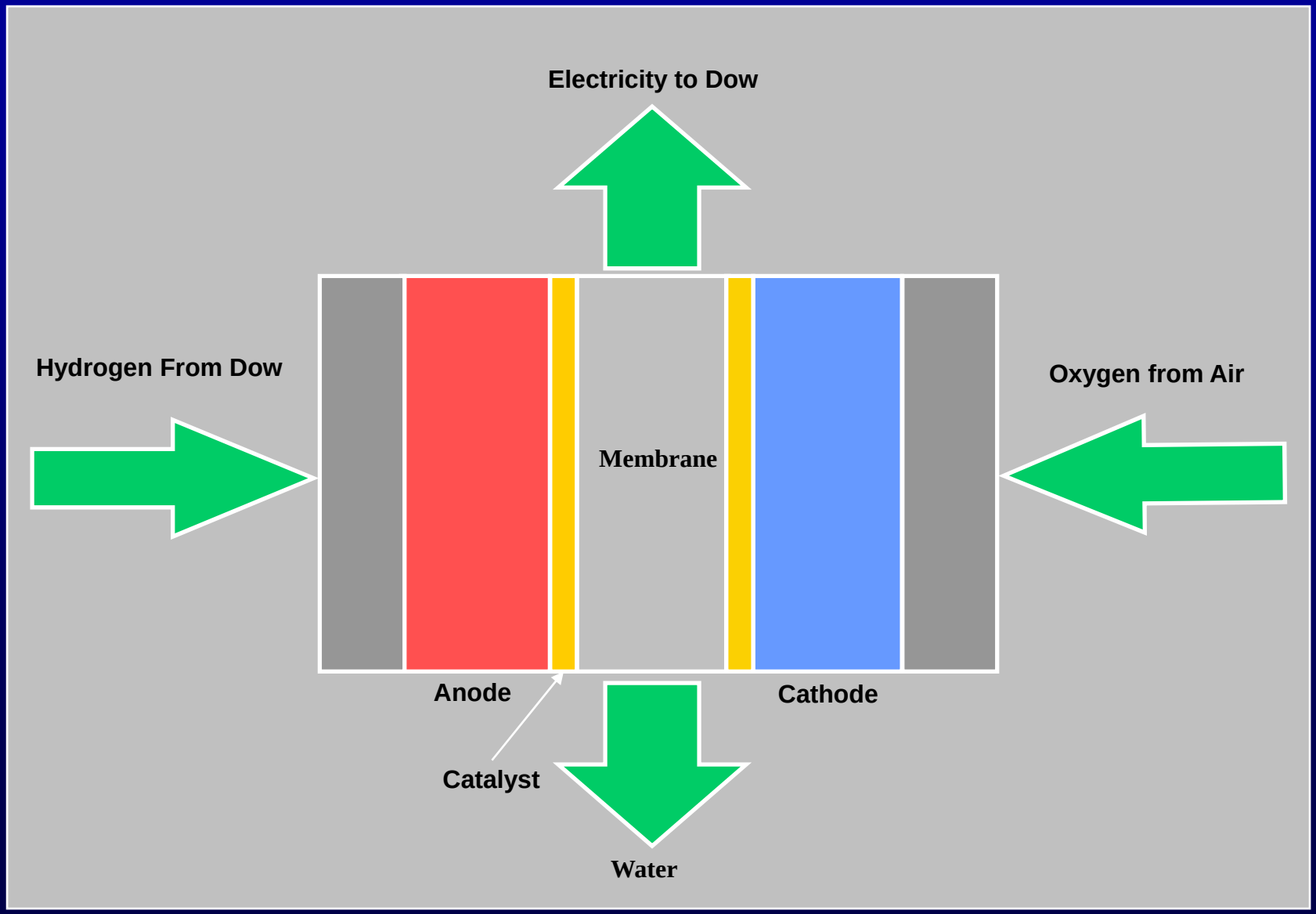
Biodiesel Production

On-site Wind

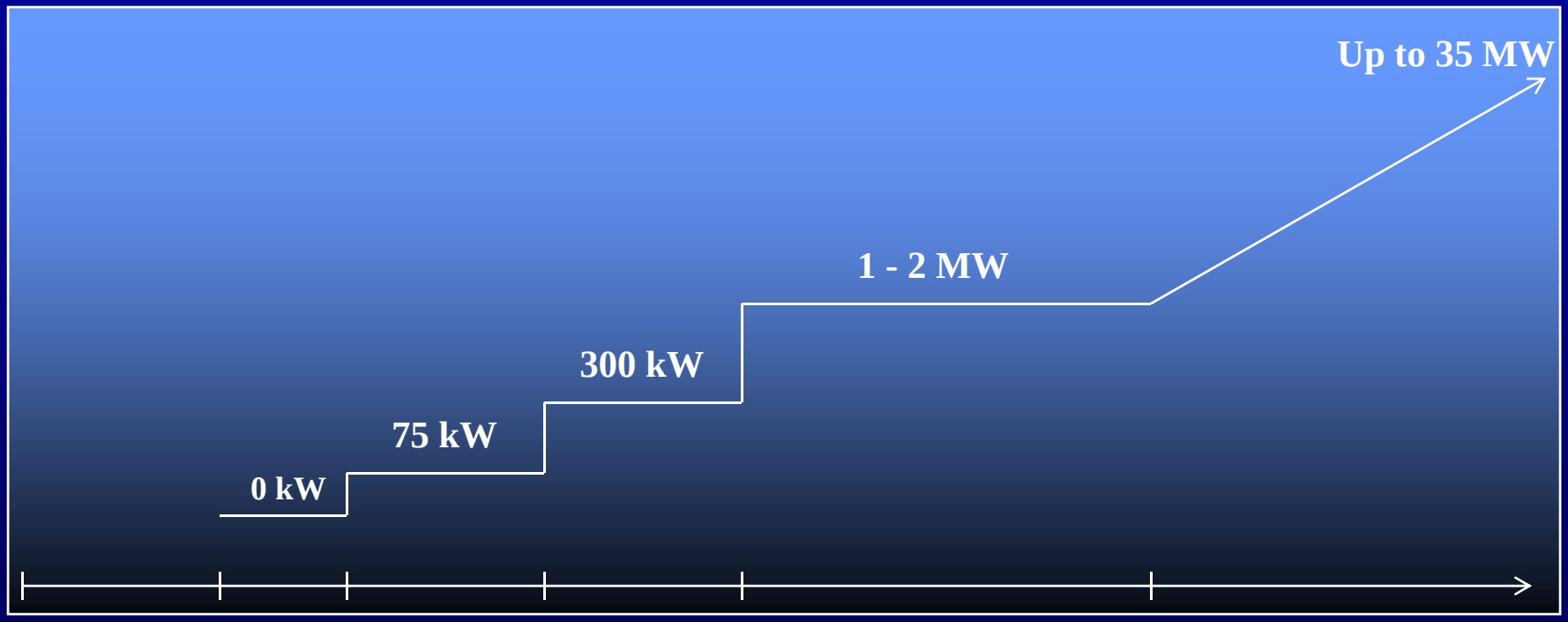
Dow/GM Fuel Cell Project

- Long term contract for up to 35 MW
- GM PEM fuel cell technology
- Dow co-produced hydrogen
- Power to be consumed by Dow

H_2 PEM Fuel Cell



Dow/GM Project Timeline



5/03 10/03 2/04 10/04 7/05 7/06

Project Announced	Phase 1 Test Unit	Phase 2 Pilot Plant	Phase 3 Commercialization

Phase 1 - Test Unit

- EH&S (Environmental, Health, & Safety) review
- Demonstrate GM fuel cell technology
- Investigate various hydrogen feed streams
- Identify and prove hydrogen clean-up technology
- Remote operation in an industrial setting
- Integrate unit into industrial facility
  - Electrical grid, Hydrogen feed, Utilities
- Accelerate Phase 2 installation from learning's

Phase 2 - Pilot Plant

- Explore various by-product H_2 sources
- Demonstrate fuel cell capabilities for Distributed Generation
- Integrate fuel cell plant into an industrial facility - power distribution grid, hydrogen clean-up & distribution systems, utilities
- Improve/optimize reliability of PEM fuel cells
- Investigate fuel cell waste heat recovery opportunity
- Multi-stage progression to large scale commercialization

Phase 3 - Commercialization

- Installation of up to 35 MW of fuel cells
- GM to operate and maintain fuel cell facilities
- Dow to deliver hydrogen to fuel cells
- Dow integrate the power from the fuel cells into Freeport system
- Opportunity at other Dow plants
  - Canada
  - South America
  - Europe
  - Asia

Dow/GM Project Benefits

- Continuation of Dow's commitment to Sustainability.
- Leading edge of emerging technology.
- Beginning steps towards a H_2 economy.
- Accelerate fuel cell development for automotive application.
- Validation of co-product hydrogen feed .
- Development of cost effective alternative power generation.
- Cleaner air due to zero emissions for HGA.
- Entrée to other fuel cell technologies for stationary power.

Clean Coal

Coal Gasification

- Dow history with gasification
- U.S. must take advantage of huge resource
- Dow must find alternative feedstock in U.S.
- “Clean” can include CO2, NOx, Sox, Hg

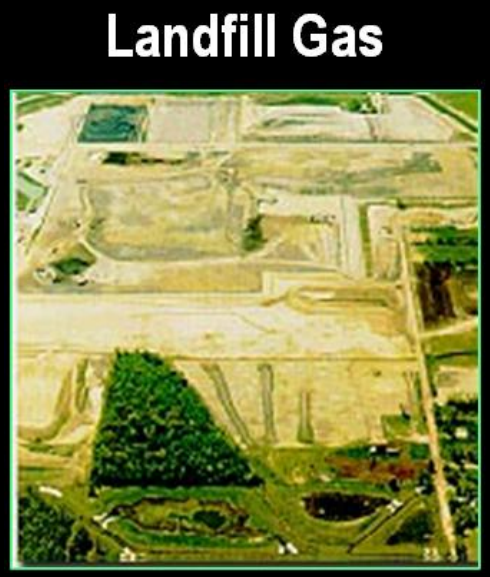
Clean Coal: Dow's Interests

- China: Shenhua study
  - Coal-to-olefins for China facility
  - Study technology, economics, market
- U.S. advocacy
  - Fuel diversity addressing national power need
- U.S. Dow raw material need
- Part of the solution: climate change

Biodiesel

- Dow exclusive production agreement for biodiesel to World Energy
  - World Energy the leader in biodiesel fuel industry
  - Vegetable oil-based
  - 20% blend ⟶ 16% CO_2 reduction; 10% particulates

Landfill Gas



- Potential projects in U.S.
  - Landfills local to Dow plants
  - Gas for Dow boilers for production processes
  - Exploring GHG reduction credits

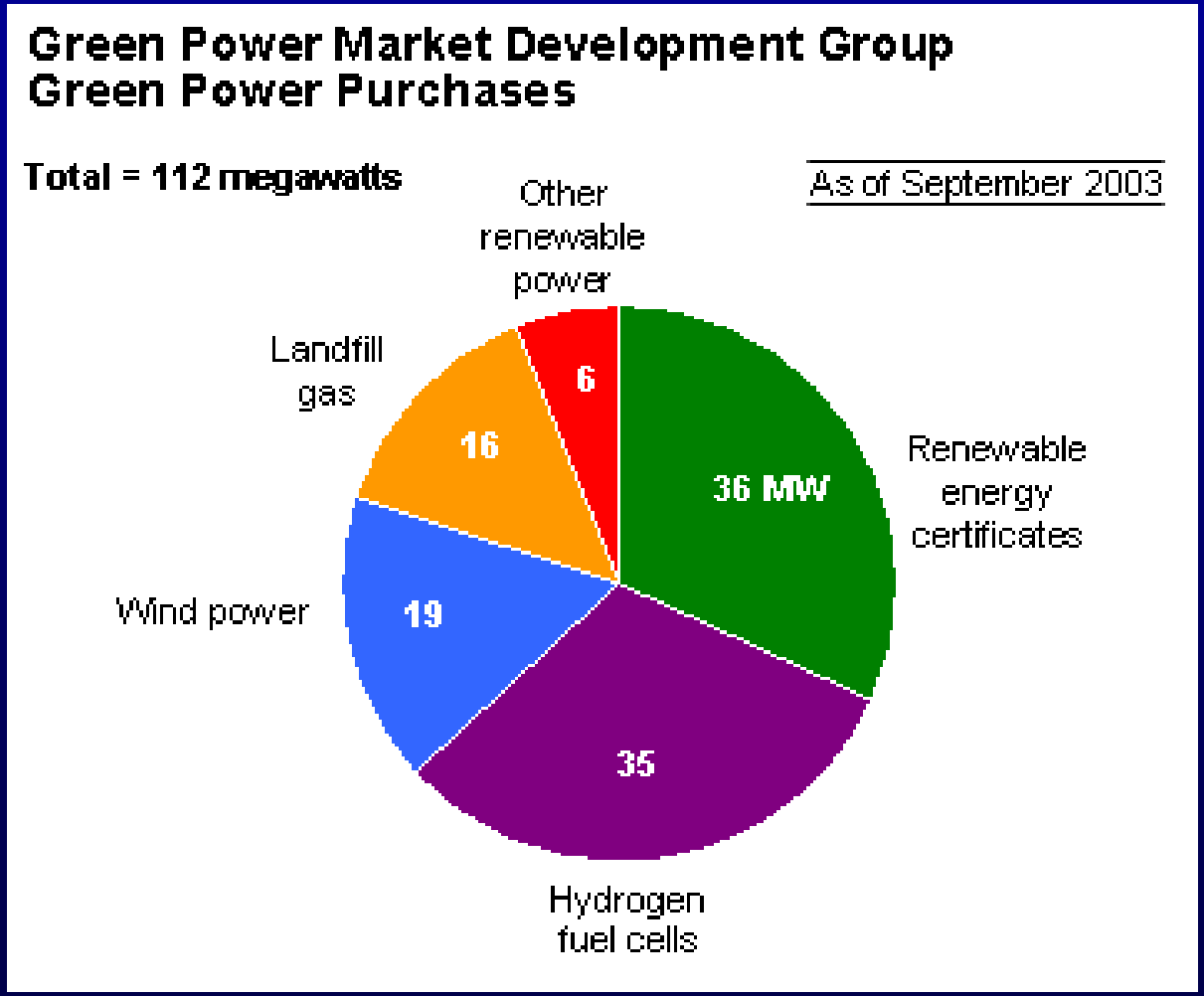
On-site Wind

On-site Wind

- Potential projects in Texas, Michigan
  - On-site brings special benefits
  - Difficult to match specific sites to adequate wind resource
  - Government incentives necessary for positive economics
    - Production Tax Credit

Other Dow Renewable Efforts

WRI Green Power Market Development Group



Corporate Partners

Alcoa Inc.
Delphi Corporation
Dow
DuPont
FedEx Kinko's
General Motors
IBM
Interface
Johnson & Johnson
NatureWorks LLC
Pitney Bowes
Staples

Other Dow Renewable Efforts/Issues

- Hydro power in Brazil
- “Forced” renewables in Europe
- Active Federal / State advocacy

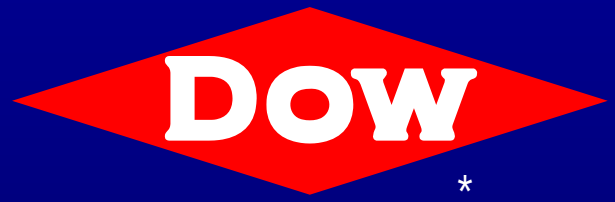
Sustainability ⟷ Competitiveness

Our Goal: A Natural Gas Bill in 2005

Potential key elements

- Increased emphasis on Energy Efficiency and Conservation.
- Greater Fuel Diversity. Promote increased use of clean coal, nuclear, and renewable energy.
- Improved Infrastructure. Increased transmission and storage capacity.
- Additional gas supply. LNG imports, coal-bed methane, a new political consensus on development of domestic natural gas resources.

Living.



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