

Governor's Energy Summit Renewable Energy A Realistic View

**Presented By Bob Percopo, Senior Vice President
AIG Project Finance Advisory Unit
2007**

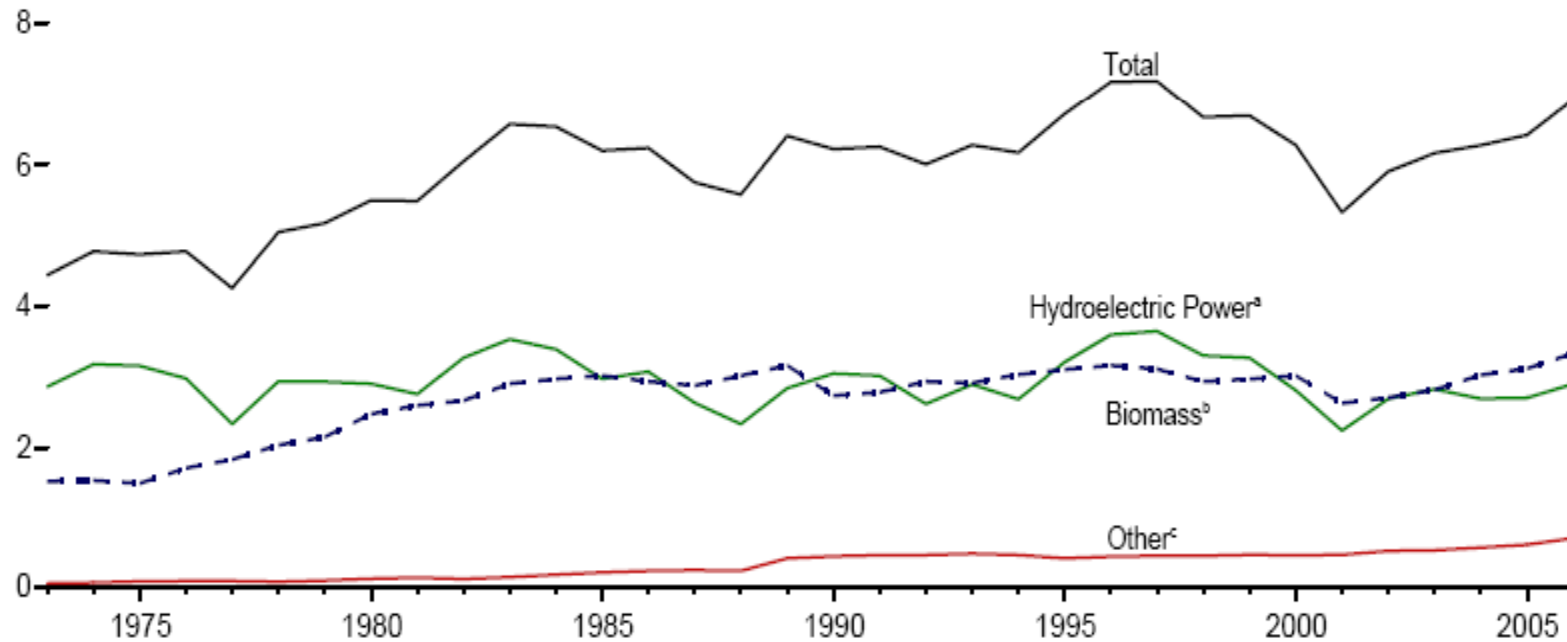
The Energy Issues

- **Renewable versus Conventional**
- **Independence and Security**
- **Carbon Constraints**

Growth in Renewables in Quadrillion Btu

(Source EIA)

Total and Major Sources, 1973-2006



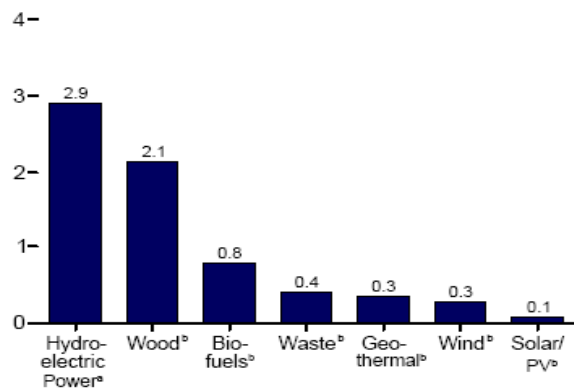
^aConventional hydroelectric power.
^bSee Table 10.1 for definition.
^cGeothermal, solar/PV, and wind.

Project Finance Advisory Unit

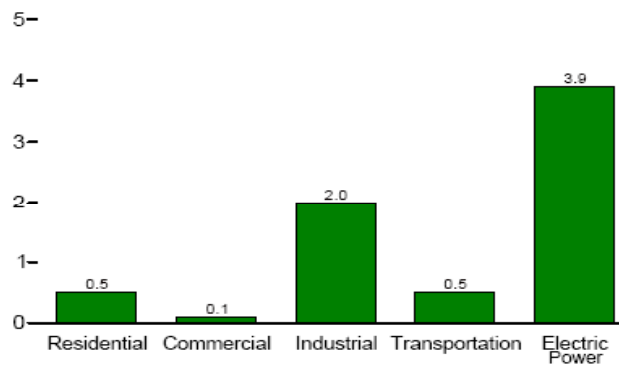
Renewable Energy Consumption in Quadrillion Btu

(Source EIA)

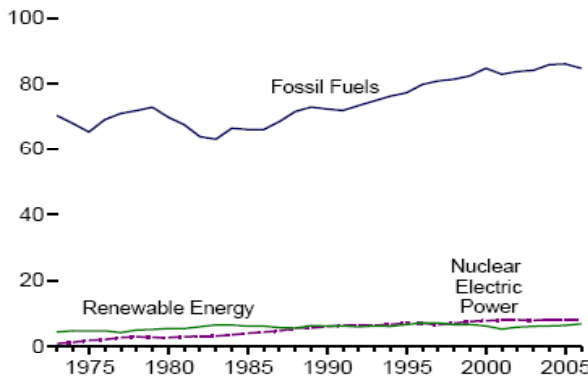
By Source, 2006



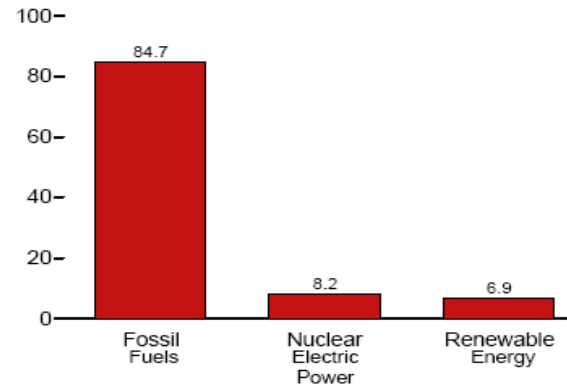
By Sector, 2006



Compared With Other Resources, 1973-2006



Compared With Other Resources, 2006



^aConventional hydroelectric power.
^bSee Table 10.1 for definition.
^cGeothermal, solar/PV, and wind.

Project Finance Advisory Unit

Power Generation and Renewables Corporate Conscience

Wind

- **Spatial requirement per NEI to match annual nuclear energy production – THE AREA OF WEST VIRGINIA**
 - 1,000 mw plant nuclear = 2.35 sq miles
 - 1,000 mw plant solar = 235 sq miles
- **Cost per MW of installed capacity (\$1.5 mm to \$1.7mm)**
- **Load Balancing**
- **Turbine availability**

Solar

- **Spatial requirement per NEI to match annual nuclear energy production – THE AREA OF NEW JERSEY**
- **Cost per MW of installed capacity (approx. \$6mm for Photovoltaic technology)**
- **Load Balancing**

Hydro

- **Environmental Issues**
- **Cultural and dislocation issues**
- **Limited site availabilities**
- **Cost per MW of installed capacity (\$1.6 mm to \$2.3mm)**

Transportation and Renewables

- **Biodiesel**

- Relatively new but will likely be key in our country's long-term energy program
- Europe is currently largest producer and user of this fuel
- About 10% lower carbon emissions than conventional diesel
- Relatively simple pressing process
 - Palm Oil is the most prevalent feedstock
 - Indonesia and Malaysia
 - Burning off of rain forest - 1.4 billion tons of carbon
 - Cultivation of plots - 600 million tons of carbon
 - 2 billion tons of carbon - 8% of total fossil fuels emissions

Transportation and Renewables (cont)

•Ethanol

- Consumption of Ethanol is predicted to increase by 100% in next 5-6 years
- Max sustainable – 17%
- Most prevalent feedstock corn
 - Current market negative margins
 - High Corn Prices
 - Low Gasoline Prices
 - Social Unrest in Mexico

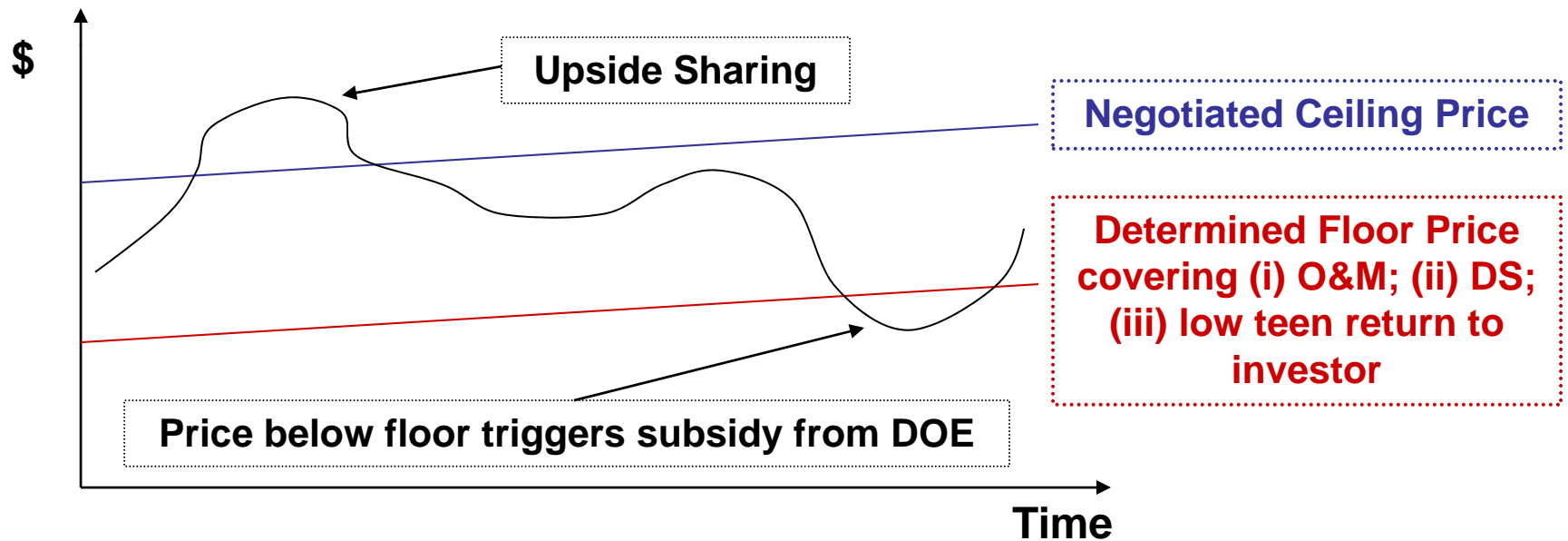
•Problems

- Phase separation
- Affinity for moisture
- Solvent

The Reality

- Focus on renewables is fine
- But a realistic energy program has to also consider coal gasification and liquefaction
 - Electricity Generation
 - Syn Gas
 - Transportation Fuels
 - FT 1931
 - WW II Germany
 - Sasol South Africa
 - Products - Diesel, Gasoline, and Jet Fuel

Collar arrangement – Federal government support warranted



Nuclear Facts

- America's 103 nuclear power reactors provide emission-free electricity for one in five homes and businesses
- The uranium fuel they use is so efficient that just ONE fuel pellet provides as much energy as:
 - 17,000 cubic feet of natural gas
 - 149 gallons of oil
 - 1 Ton of Coal
- FIVE fuel pellets meet a household's electricity needs for an entire year

Summary

- **Coal (Independence and Security)**
 - Base load electricity
 - Transportation

- **Nuclear (Carbon Footprint)**
 - Electricity power generation
 - Nuclear allows for utilization of coal to meet both objectives

- **Last Year's Assessment**
 - Wealth transfer from developed to developing superpowers
 - 1991 vs. 1992
 - 2007 update – carbon factor
 - Continuation and acceleration of wealth transfer
 - China position on carbon emissions

QUESTIONS??????????

Project Finance Advisory Unit

Contact Information

Bob Percopo, Senior Vice President

AIG Project Finance Advisory Unit

Phone: 212-458-5994

Email: bob.percopo@aig.com

APPENDIX

The Volume of CO₂

1 million metric tons of CO₂ is close to the volume of the Empire State building in New York city

US emits roughly 6 billion tons of CO₂ per year

Stabilization through year 2100 under an EIA reference scenario would fill lake Erie twice (equals 5% of contiguous US land mass)

Project Finance Advisory Unit

Disclaimer

To the fullest extent permissible pursuant to applicable law, this presentation handout from AIG Global Marine and Energy (“AIG Global Marine and Energy Presentation Handout”) is provided “as is” and without warranties of any kind either expressed or implied and American International Group, Inc. and its subsidiaries and affiliates (collectively, “AIG”) disclaim all warranties, expressed or implied, including, but not limited to, implied warranties of merchantability and fitness for a particular purpose. AIG does not warrant that the AIG Global Marine and Energy Presentation Handout will be error-free or that defects will be corrected. AIG does not warrant or make any representations regarding the use or the results of the use of the AIG Global Marine and Energy Presentation Handout in terms of their correctness, accuracy, reliability, or otherwise. The information and descriptions contained herein are not necessarily intended to be complete descriptions of all terms, exclusions and conditions applicable to the products and services, but are provided solely for general informational purposes; please refer to the actual policy or the relevant product services agreement.

Trademarks and Copyrights

All trademarks, service marks, trade names, logos, and icons are propriety to AIG. Nothing contained in the AIG Global Marine and Energy Presentation Handout should be construed as granting, by implication, estoppel, or otherwise, any license or right to use any trademark displayed in the fraud presentation handout without the written permission of AIG. Your use of the trademarks displayed in the AIG Global Marine and Energy Presentation Handout, or any other content, except as provided herein, is strictly prohibited.

Images displayed in the AIG Global Marine and Energy Presentation Handout are either the property of, or used with permission by, AIG. The use of these images by you, or anyone else authorized by you, is prohibited unless specifically permitted by AIG. Any unauthorized use of images may violate copyright laws, trademark laws, the laws of privacy and publicity, communications regulations and statutes.

Copyright © 2007 American International Group, Inc. All rights reserved.