



312 - The Heat Is On: Managing the Challenges of Corporate Climate Change Strategies

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Faculty Biographies

Lauren P. Alterman

Lauren P. Alterman is associate general counsel of Saint-Gobain Corporation (SGC) in Valley Forge, Virginia. Saint-Gobain Corporation is a Fortune 100 multinational diversified manufacturer. She is the sole attorney responsible for environment, health and safety matters, which includes 185 manufacturing facilities in North America. In her role, she reviews and approves environmental reports, assessments, and recommendations in addition to providing guidance and legal counsel to the corporation on sensitive environmental, health, and safety issues, including development of new policies or procedures. She negotiates and resolves federal and state issued NOV's and NONs for environmental matters, including FIFRA, TSCA, Clean Air Act, Clean Water Act, and RCRA. She negotiates and conducts informal conferences and hearings, if necessary, to resolve federal and state issued OSHA citations. She has defended citations issued to the company facility where accidental death occurred, resulting in decision for the company and written decision setting precedent on strict liability in OSHA matters in North Carolina. She also serves as legal counsel and representative for Saint-Gobain on industry group committees, including, Silica Panel, North American Insulation Manufacturers Association, Glass Packaging Institute and Glass Manufacturing Industry Council. Additionally, she drafts and negotiates contracts with contractors who perform decontamination activities and crisis management and provides guidance to corporation regarding changes in regulations affecting various corporate businesses. She also has experience in transaction, due diligence, litigation, and crisis management.

Ms. Alterman received her B.A. from Mount Union College and her J.D. from Capital University Law School.

Mary Morningstar

Mary Morningstar is assistant general counsel, environmental law at Lockheed Martin Corporation in Bethesda, Maryland. She manages Lockheed's asbestos litigation caseload, supervises and assists on existing or potential toxic tort litigation, provides legal counseling and support to the energy, environment, safety, and health ("EESH") department, and provides ESH due diligence on all transactions (mergers, divestitures, and joint ventures).

Prior to Lockheed Martin, Ms. Morningstar worked for small firms in Washington, DC.

Mary received her J.D. from Case Western Reserve University School of Law.

Carolyn E. Shellman

Vice President & General Counsel
CPS Energy



Background: What are Greenhouse Gases?

- GHGs are transparent to solar radiation but opaque to longwave radiation (the earth's radiation). Their action is similar to that of glass in a greenhouse...
- GHGs are the six gases listed in the Kyoto Protocol: carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF₆)
- A greenhouse gas is a gas that contributes to the greenhouse effect by absorbing infrared radiation. (By that definition, water vapor would be added to our list.)

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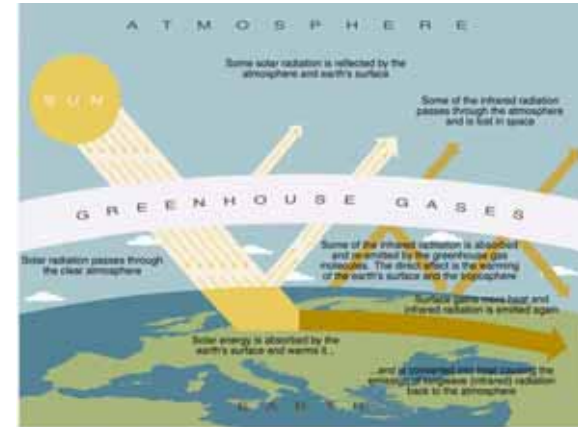
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Background: The Greenhouse Effect



Source: Raskovitz (2000);
PEW Center for Global Climate Change (2001)

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Background (cont): Gases, Sources, and Global Warming Potential

GHG	Major Sources	Global Warming Potential
Carbon dioxide (CO ₂)	Fossil fuel combustion, certain manufacturing processes, and waste combustion	1
Methane (CH ₄)	Agriculture, waste (e.g., landfill gas), gas distribution, and coal mining	21
Nitrous oxide (N ₂ O)	Agriculture, transport, and nitric and adipic acid production	310
Hydrofluorocarbons	Refrigerants, foam blowing, and fire fighting	140-9800
Perfluorocarbons	Electronics manufacturing, refrigerants, and aluminum smelting	4800-9200
Sulfur hexafluoride (SF ₆)	High voltage switch gear, magnesium smelting, gas-filled training shoes	23900

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Background (cont.)

- On April 2, the Supreme Court decided *Massachusetts v. Environmental Protection Agency*, 127 S. Ct. 1438 (2007)
 - Decided that carbon dioxide could constitute a “pollutant” under the Clean Air Act
 - EPA abused its discretion when EPA determined that even if it could regulate carbon dioxide, it would not
- Intergovernmental Panel on Climate Change concludes that “[m]ost of the observed increase in global average temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic greenhouse gas concentrations”

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Background (cont.)

- While EPA studies the problem, States have taken several steps toward greenhouse gas regulation
- What are the implications for business?
 - Opportunities?
 - Risks?
 - Impacts and disclosures?

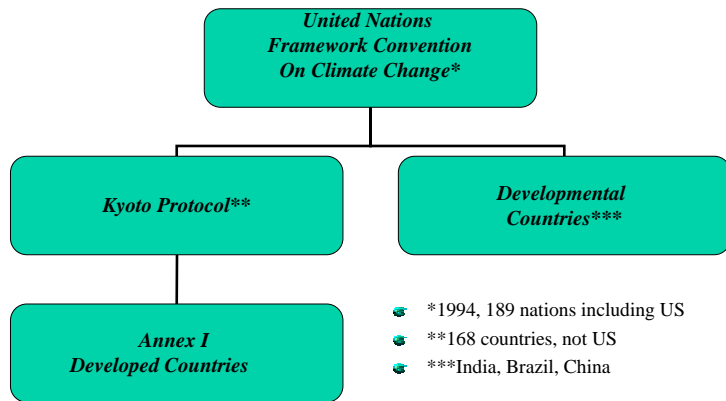


Government Action on Climate Change

- United Nations Framework Convention On Climate Change
- Kyoto Protocol
- U.S. federal laws
- U.S. state actions



Kyoto History



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Kyoto Protocol

- Direct obligation is on signator countries
- Indirect obligation on companies within signator country, such as CSG/SCG
- 25-30 billion tons of CO2 worldwide - includes emerging and developed countries
- 4 billion CO2 emissions captured under Kyoto – EU is 50% (2 billion)
- Involves 11,000 facilities in EU
- CO2 reductions under Kyoto -8% for EU (would have been -7%) for US

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Kyoto Periods

- 2005-2007 (Allowances are free)
 - Countries reduce CO2 to allocated amount
 - 2005 trading started but - no real market for CO2
 - 1 ton = 0.1 Euro - due to excess allowances
 - Concerned about growth, companies requested excess allowances, coupled with mild winter flooded CO2 market
 - Many countries will meet allocations, France, UK; others will not, Spain (15-20% behind)
 - Have to buy Joint Implementation Credits or conduct CDM
- 2008-2012 reductions of CO2 to begin
 - -10% in second period for EU (was -8% in 1st period)
 - 90% of allowances are free; 10% to be auctioned
- 2013 between 2nd and 3rd periods – bank emissions for future use and or sale

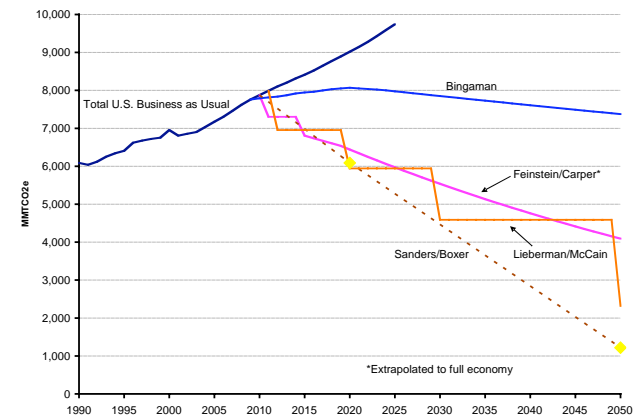
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Timing and Levels – 2007 Federal GHG Proposals



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Leading Current Federal GHG Proposals

	Boxer	Waxman	Feinstein	McCain	Bingaman
Level	80% below 1990 in 2050	80% below 1990 in 2050	45% below current in 2020	67% below 2000 in 2050	-2.6 – 3.0% intensity
Coverage/ Point of Regulation	Performance standards for power plants and cars	Cap and trade on largest sources. Performance standards for cars.	Cap on direct emissions from large emitters, performance standards for cars. Bills for other sectors soon.	Cap on direct emissions from large emitters, indirect from refineries	Cap on indirect emissions at coal mines, refineries, gas processors, importers
Starting	2010	2011	2011	2012	2012
Allocation	Trading optional	Mostly Auction	Mostly Auction	TBD	Mostly Auction
R&D Funding and Incentives	Yes	Yes	Yes	Yes	Yes
Safety Valve	None	None	None	None?	\$7/tonne

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Federal Government

- Bush Administration's Voluntary GHG Emissions Intensity Reduction Target
 - 18% by 2012 (emissions/GDP)
- 1605(b) voluntary GHG reporting program
- Voluntary Initiatives
 - EPA Climate Leaders
 - DOE Climate VISION
- Technology R&D and Scientific Research
- International Partnerships -- Asia-Pacific Partnership focused on U.S. exports
- Federal legislation – 6 bills - 3 regarding standards for automotive sector and 3 involve inventory/tracking/market-based GHG reduction issues similar to California

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State Action

- State action due to lack of federal government action
 - Patchwork of proposals
- Northeast/Mid-Atlantic Carbon Cap-and-Trade – RGGI
 - targeting power plants, then other sources
 - emission caps, trading program, 10% reduction by 2019
- California -- AB 32
 - cap-and-trade reduction program and working on GHG reporting rule.
- NJ – attempting to be more stringent than CA
- FL – me too?
- Western States Alliance
- 33 States agree to develop joint greenhouse gas emissions registry

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Saint-Gobain – How a Multi-National Company Deals with Climate Change

- Diversified manufacturer and distributor
 - Building products – insulation, shingles, siding, decking, railing, wallboard and ceiling panels
 - Glass containers
 - Flat glass for automobile industry
 - Iron duct pipe (not in US)
 - Building Distribution (recent US acquisition 150 sites)
 - Ceramic and Plastics
 - Abrasive products – grinding wheels, sandpaper

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Saint-Gobain – How a Multi-National Company Deals with Climate Change

- Total employees: 207,000; U.S./Canada: 24,000
- Sales worldwide: \$52.2B; U.S./Canada: \$8.5B
- 1,400 manufacturing sites worldwide, plus >3,000 building distribution locations
- EHS policies established in U.S. and parent headquarters in Paris, France
- Company goals require
 - tracking of EHS indicators, including CO2
 - Reduction and or elimination of some EHS issues



Saint-Gobain's Carbon Footprint -2006

- Total CO2 emissions worldwide: 14.7MM (metric) tons (9.2MM from glass sites)
- 6.5MM tons of SGC's 14.7MM tons in EU Emission Trading System are from 75 facilities – (70 glass facilities)
- SGC represents only 0.3% of the total CO2 allowances within EU. (6.5MM of 2B)



Creating a CO2 Baseline

- **WHO?**
 - Kyoto – country gets allocation of CO2 emissions
 - U.S. – currently utilities, but soon to impact many other industries, i.e., CA AB 32 – emitters of over 50,000 lbs of CO2
- **WHAT?**
 - CO2, but could include other GHGs (CH4, N2O, etc.)
 - Tracking utility bills, fuel usage – NG, propane, fuel oil
- **WHY?**
 - Legally required (or soon to be)
 - Energy savings results in \$\$ savings
 - Lower emissions means less carbon credits to buy or more credits to sell
 - Improved environmental image can result in better shareholder value
 - Create baseline so you are prepared to request allocation and prove you are meeting allocated amount

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Creating a CO2 Baseline

- **WHICH YEAR?**
 - 1990 vs. 2000 - some do not like 1990 (France)
 - In U.S. 1990 will be extremely difficult to meet
- **HOW?**
 - Need accurate figures, but not always correct
 - Monitoring becomes more and more precise as businesses get educated
 - Measurement must be precise for trading.
 - Electricity and natural gas from utility bills
 - Create database, or use third party

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The Importance of Efficiency

- Energy efficiency is the *quickest, cheapest* and *cleanest way* to meet growth in energy demand and reduce air quality and greenhouse gas emissions
 - Buildings account for 40% of total U.S. carbon emissions per year
 - Energy efficiency measures and products and technologies can reduce energy use in buildings by 25%, and emissions by 10%



Industry

- Voluntary reporting of GHG emissions
- Voluntary GHG reduction targets
- Voluntary trading/offset purchases – prices under \$2/ton CO₂
 - Chicago Climate Exchange
 - Renewable energy offsets from Brazil
 - Limited offset purchases to meet state requirements
 - Verified Emission Reduction (VER) purchases to meet voluntary targets



Emerging US Climate Markets

- Voluntary Markets
 - Chicago Climate Exchange
 - VER transfers
- State & Regional
 - RGGI Carbon Cap and Trade Program
 - California and Western States - TBD
 - MA, NH Carbon Trading
 - OR and WA Carbon Offset Requirements
- Federal
 - Timing less certain
 - Cap-and-trade gaining traction

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Now What?

- Ultimately track energy reduction projects as they relate to CO2 for future regulatory tracking and possibly banking and trading.

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Now What (cont.)?

- Obtain and evaluate basic GHG information
- Conduct screening-level GHG audit/design inventory, including opportunities for emissions reductions related to products or services (fiberglass insulation, E-glass) and identify importance of GHG issues to company
- Develop GHG emissions inventory
- Identify alternative GHG emissions reduction measures and costs
- Determine value of GHG emissions trading (e.g., buyer or seller determination)
- Develop optimal corporate strategy, including GHG “balance sheet”



Lockheed Martin, its Customers and Climate Change

- Description of Lockheed Martin Business
- Commitment of Customers
- ESH Philosophy of “Beyond Compliance” and its Impact on Climate Change Policy
- Establishment of Energy Task Force and Company Goals
- Implementation of Climate Goals
- Implementation at Company Level



Lockheed Martin Business

- Traditional Aerospace Company/Defense Contractor
 - Sole provider of fighter jets (US)
 - Principal provider of cargo/troop carriers (US)
 - Mfr of External Fuel Tank for Shuttle; partner in Shuttle program
- Migrating to IT and Global Services Model
- Manufacturing and Operational Challenges

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Commitment of Customers

- U.S. DoD manages global infrastructure (2% of nation's energy), consisting of:
 - 3M military personnel
 - 36M acres of land
 - >250 installations, 40,000 additional properties, 550 public utility systems
 - >10,000 vehicles, 22,000 aircraft, 100s ships
- B/t 1990 & 1996, reduced GHG emissions by 20%
- Initiative to develop efficient weapons and technologies; improve fuel efficiency of all systems by 2010

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ESH Philosophy of Beyond Compliance

- Company adoption of DoD commitment to reduction in GHG emissions at manufacturing operations
- Customer drive to reduced emissions from its products (e.g., F-22 and F-35 programs, “clean missile” technology, reduction of GHG from Shuttle launch operations)
- Establishment of Energy Task Force



Energy Task Force and Goals

- Charter: Responsible for guiding company to energy/climate policy, leading to reduced energy demand and GHG emissions
- Three aspects of energy management
 - Capital improvement
 - Technology
 - Procurement
- GHG commitments submitted to EPA: 30% reduction in GHG by 2010 from 2001 baseline
- On track—66.5 tons CO2/\$M sales in 2001; 48.6 tons CO2/\$M sales in 2006



Implementation of Climate Goals

- Corporate ESH Department provides resources to business units, including:
 - Services, systems to acquire supplies, manage price and supply risk
 - Practices promoting energy operational excellence
 - Notification of emerging requirements and trends in energy supplies
 - Communication tools to promote conservation
- Engage stakeholders, both internal (investor relations, finance, leadership) and external (customer, NGOs, utilities, industry partners)



Implementation at Space Systems

- Mission Statement: SSC facilities should serve as models for healthy workplace with minimal environmental impacts.
- Construction activity pollution prevention
- Commute alternatives to encourage public, bicycle and fuel-efficient transportation
- Program to reduce site disturbance to protect and restore habitat



Prospectives on Climate Change from the Electric Power Industry

- Changes to the Business Plan
- Impacts on Existing Fleet
- Impacts on Generation Planning



Leadership in the Electric Utility World Get It

- Jeff Sterba, CEO of Public Service of New Mexico and Chairman of the Electric Power Research Institute states in EPRI's annual report:
 - "The US electric power industry stands on the threshold of its most fundamental transition in a generation.
 - "A scientific consensus has formed around the contribution made by greenhouse gas emissions to global warming....
 - "Because the industry accounts for approximately 33% of GHG emissions in the US and 8% of global emissions, it will need to play an essential role in stabilizing atmospheric GHG concentrations..."
- Jim Rogers, CEO of Duke Energy and former Chairman of the Edison Electric Institute, is credited with steering the shareholder-owned utilities toward a proactive role in the global warming world.



How Should the Utility Business Model Change?

- Increasing end-use energy efficiency in homes, building and industry
- Boosting deployment of cost-effective large-scale renewable energy resources
- Continuing the operation of all existing nuclear generating plants and adding substantial new generation from advanced light-water reactors by 2020
- Improving the efficiency of new coal-based generating plants
- Deploying CO2 capture and storage technologies at most new coal-based generating plants by 2020
- Accelerating the wide-scale adoption of “plug-in” hybrid electric vehicles
- Expanding deployment of distributed energy resources including solar photovoltaic

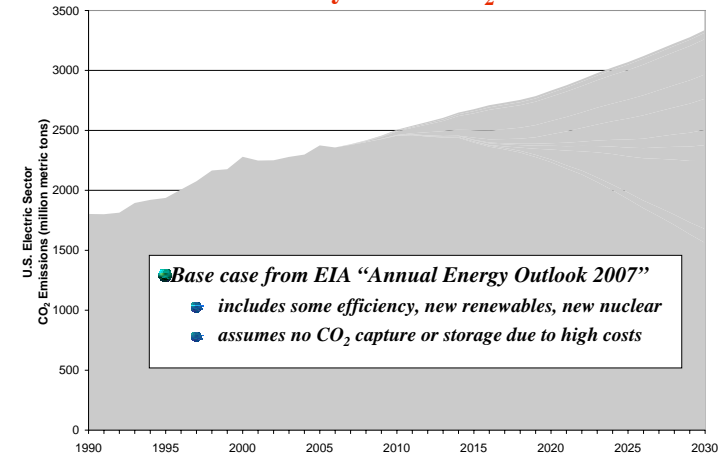
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Forecasted U.S. Electricity Sector CO₂ Emissions



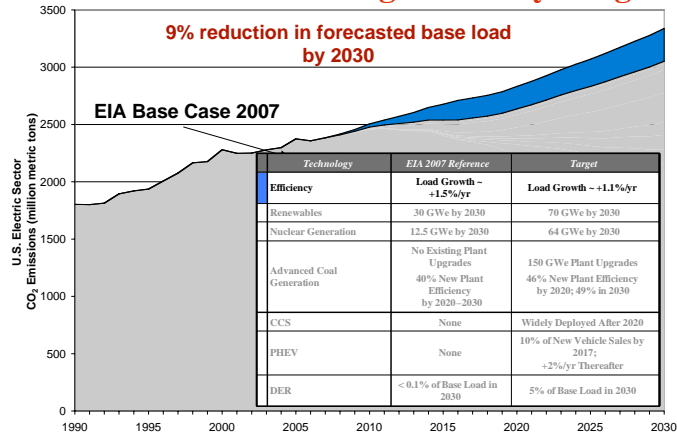
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EPRI: Benefit of Achieving Efficiency Target



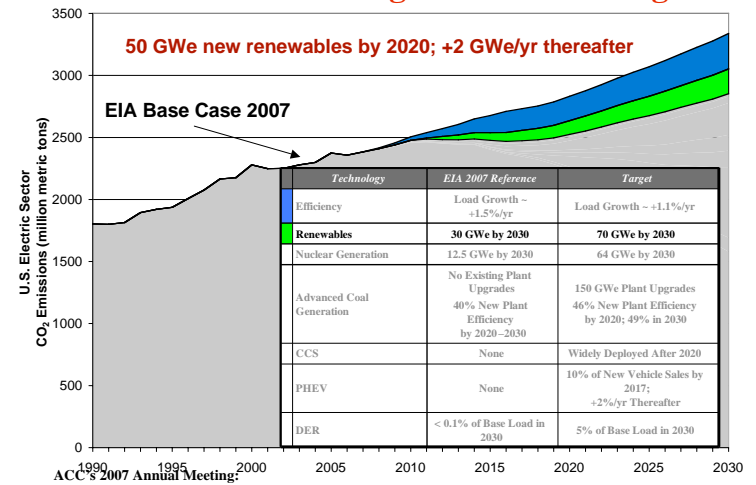
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EPRI: Benefit of Achieving Renewables Target



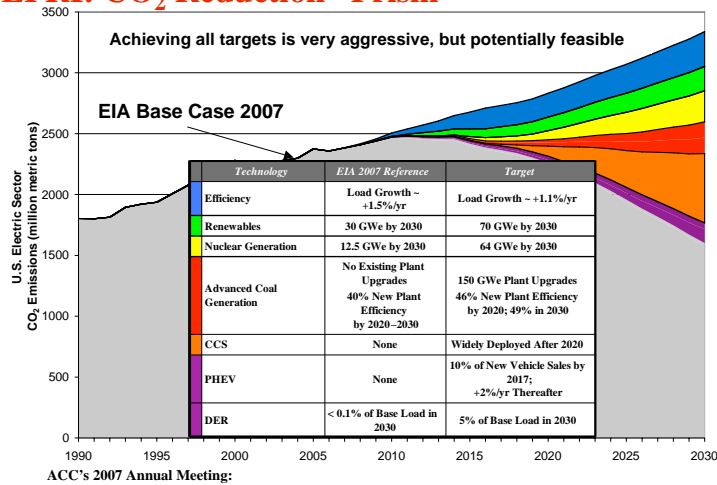
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EPRI: CO₂ Reduction “Prism”



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Impacts on Existing Fleet

- What is the Current Generation Mix and Carbon Footprint?
 - What is the exposure to a carbon tax?
 - Can coal units be retrofitted to capture carbon?
 - Even if they can be retrofitted, what do you do once you have “caught it”?
 - Sequester
 - Beneficial re-use

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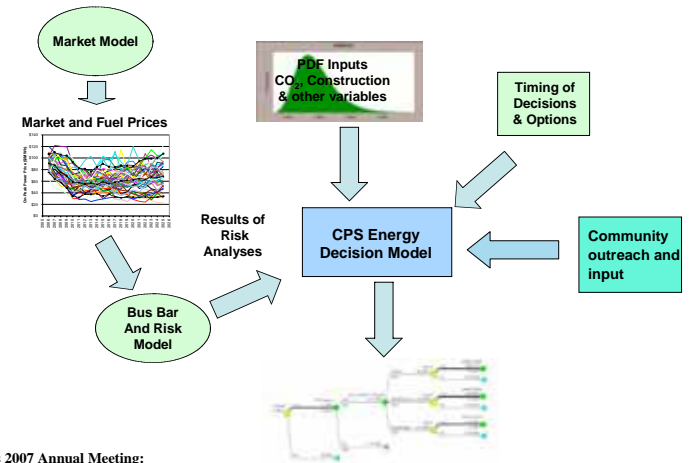


Decision Model for New Generation

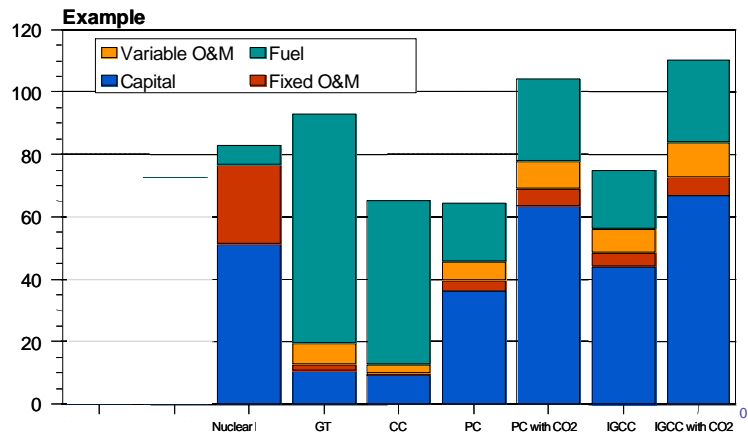
- Goes one step further than risk analysis
- Factors in distribution of traditional risk analysis variables
 - Natural gas and market power prices
 - Capital cost distribution
- Allows for key events or outcomes to be modeled that do not lend themselves to traditional risk analysis
- Recognizes the “off-ramps” options to discontinue ownership participation in the project
 - Using decision tree-based risk analysis software
- New consideration: how to account for Carbon?



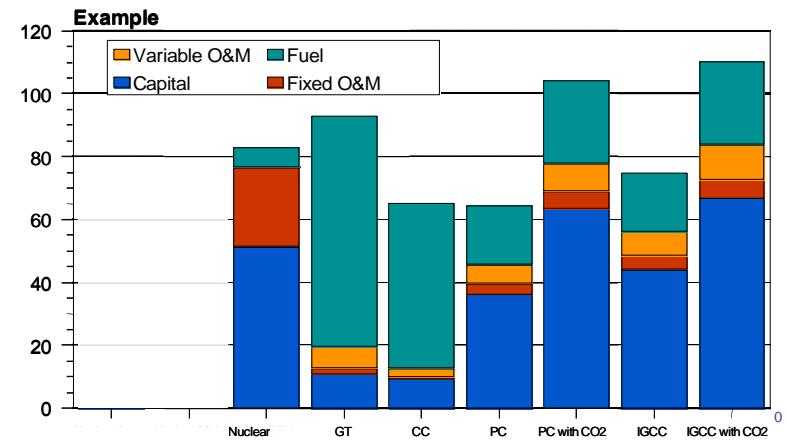
Selecting New Generation



Busbar Costs – without CO2 Tax



Busbar Costs – with a CO2 Tax (\$10/t)





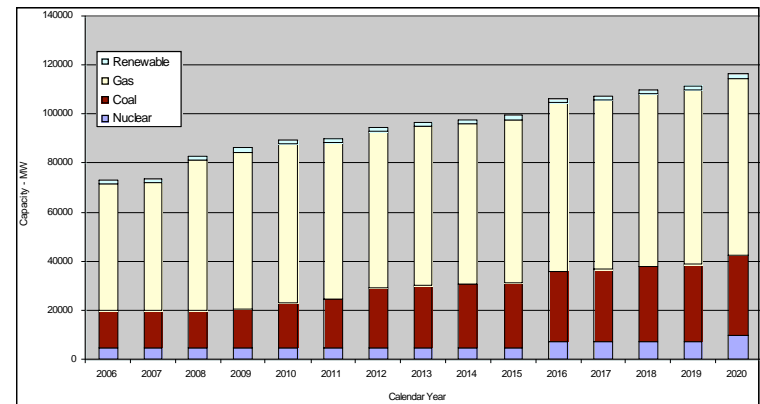
What are the alternatives to adding traditional baseload generation?

- Add more renewables, and
- Take another look at and set more aggressive goals for conservation/energy efficiency
 - Treat conservation and energy efficiency as another fuel source/generation alternative
 - Cost basis is comparable to construction of a new power plant
 - Limitations on effectiveness at a certain point, however
- Evaluate non-emitting technologies

At our rate of growth, conservation will delay, but not replace the need for additional baseload generation

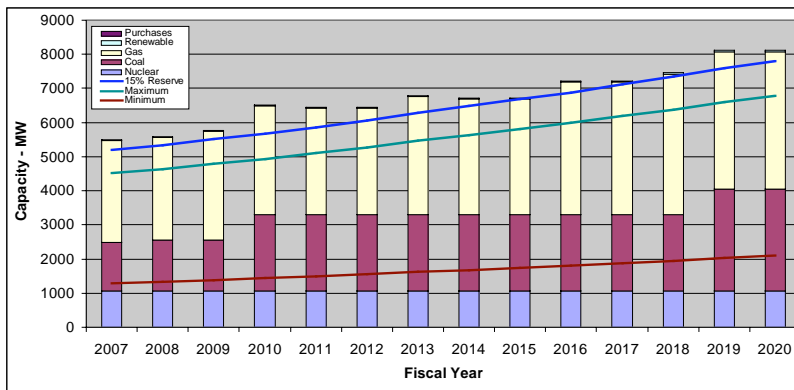


ERCOT generation fuel mix (projected)





CPS Energy fuel mix (old generation plan)



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CPS Energy's diverse fueled generation keeps rates and emissions low

- 5,500 megawatt system; re-evaluating our “base case”
 - Over 500 MW from renewable resources, and growing
 - Most aggressive conservation program in Texas
 - View IGCC and carbon capture technologies as being in their infancy
 - Will still need to add baseload generation, but next plant will almost certainly be a non-CO2 emitting source
- Electric utilities can still keep rates reasonable while being environmentally responsible

40-50% of CPS Energy Generation Is Emissions Free

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Consumers & Carbon Impact

- EPA offers a way for consumers to estimate the effect use of electricity has on the environment
 - By entering a ZIP code, the agency's Power Profiler calculates how much air pollution results from individual electricity use, based on the fuels used to produce the electricity
 - Consumers also can get tips on how they can reduce their impact on the environment

- The emissions used in the calculator are carbon dioxide, sulfur dioxide and nitrogen oxides
 - It is not just GHG; CO2 contributes to global warming, while NOx and SO2 contribute to unhealthy air quality and acid rain



Changes to the Business Plan

- Evaluate climate-friendly changes as an asset
 - How valuable is that asset?
 - When and how should it be liquidated?
 - What changes should be made in your portfolio to maximize the value of that asset?

- Evaluate climate changes as a risk
 - What are the risks that will impact your business?
 - Rising sea levels, falling lake levels, increased intensity and frequency of storms, changes in flooding and droughts, increases or decreases in temperatures and growing seasons
 - What regulatory costs will be imposed on your business?
 - Controls for emissions of carbon dioxide and other greenhouse gases
 - Taxes or other increased regulatory costs



Changes to the Business Plan (cont.)

- Determine whether there is a disclosure obligation for your business
 - Public companies must meet disclosure obligations; for what?
 - Contingent assets or liabilities
 - Corporate disclosures or accounting treatment
 - How? See 10 CFR Part 300
 - Emission inventories; emission reductions; reporting
 - Litigation for failure to assess climate change impacts
 - Potential shareholder resolutions



Conclusion: What can you do?

- Join an industry group that is working on the regulations
- Quantify your current and 1990 GHG emissions
- Look for opportunities to reduce energy consumption
 - Save money
 - Reduce air pollutant emissions
 - Reduce GHG emissions
- Follow the state and federal legislative efforts