

Business Aspects of Climate Change

Professor Annette Nellen
College of Business

http://www.cob.sjsu.edu/nellen_a/

October 6, 2007 – Alumni College

Objectives

To understand

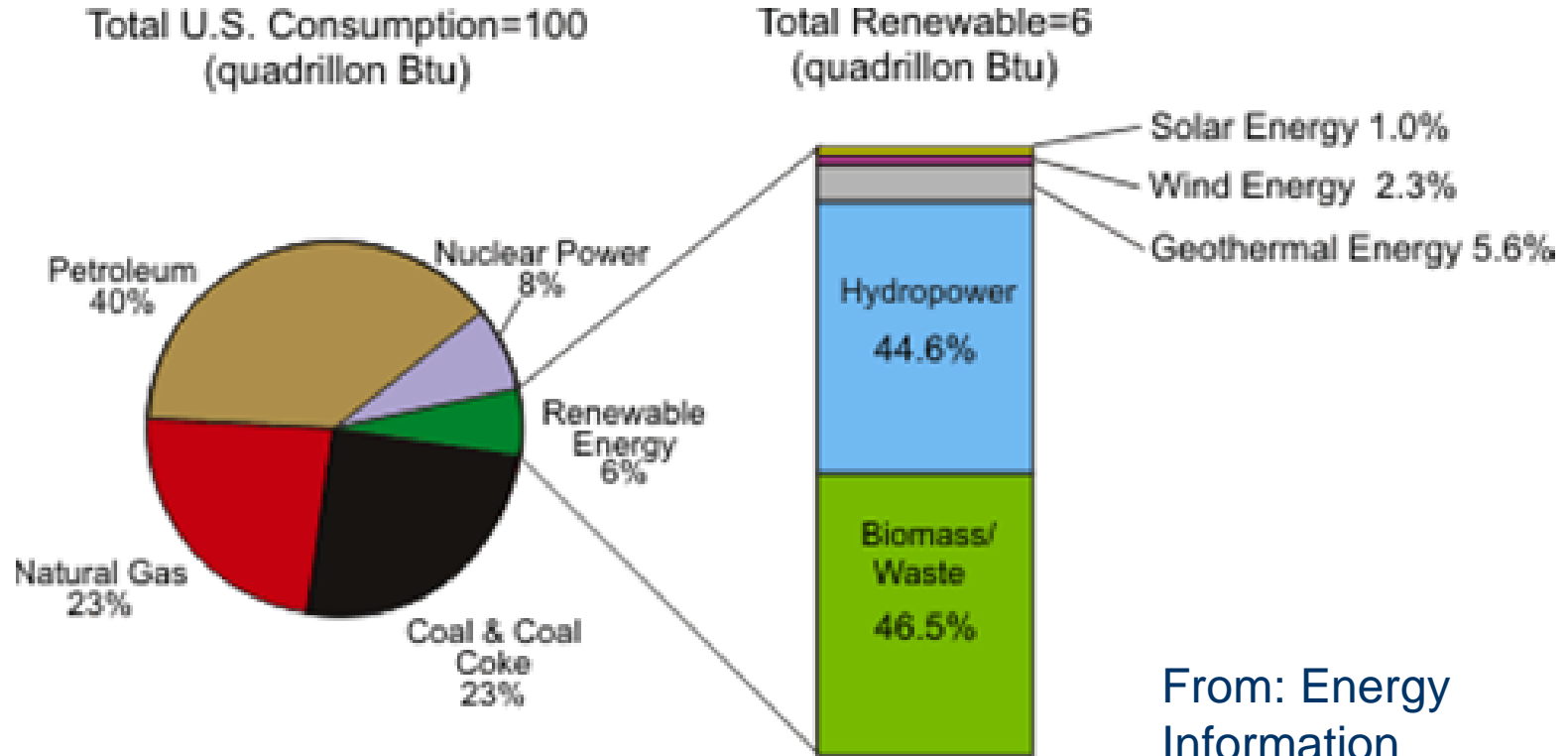
1. Why businesses might be interested in climate change.
2. Techniques to address climate change, particularly market-based ones (such as taxes) and a few current examples.
3. How to evaluate proposed solutions.



Why businesses might be interested in climate change



U.S. Energy Consumption, 2004



From: Energy
Information
Administration (EIA)

Passenger cars worldwide

Year	#cars	People per car
1950	53 million	48.2
1970	193 million	19.2
2000	509 million	11.9
2004	551 million	11.6

Source: Worldwatch Institute;
<http://www.worldwatch.org/pubs/globaltrends/#5>.

More - # cars

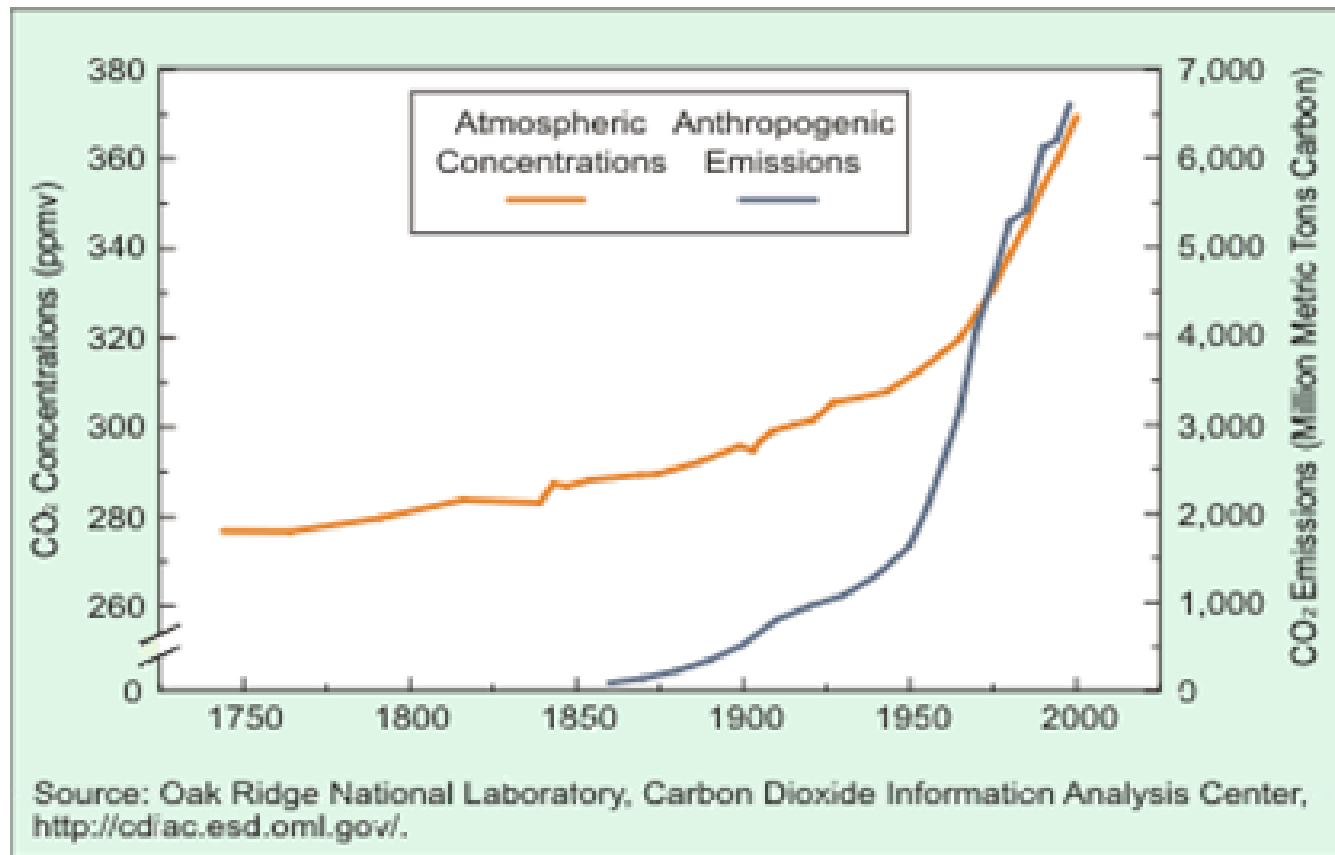
- I April 2006 *Wall Street Journal* article estimated that by 2020, there would likely be one billion cars and light trucks in use globally which would be about one car per every 6.5 people
 - Joseph B. White, “One Billion Cars,” *Wall Street Journal*, 4/17/06, p. R1.
- I In 2000, CA had 23.4 million cars (4.6% of worldwide total, yet only 0.57% of worldwide population)
 - Air Resources Board;
<http://www.arb.ca.gov/html/brochure/history.htm>.

Oil consumption

- | U.S. oil consumption is expected to increase by 32% by 2025
- | China's oil consumption is expected to increase 119% by 2025, which means it will be using about 50% as much oil as the U.S. uses
- | The U.S. uses about 400 million gallons of gas daily with most of that being used for cars and trucks.

Source: Time (8/29/05), they obtained data from Energy Information Administration: Bureau of Labor Statistics.

Trends – Carbon Emissions



So, why might businesses be concerned? 1

- I Growth in car usage (particularly outside of US) will put pressure on oil supplies. US already relies on other countries for over $\frac{1}{2}$ of its oil.
 - Increase in costs of doing business
 - Uncertainty of too much reliance on foreign oil
- I Opportunities for designing technologies to replace oil and to increase its MPG yield.

So, why might businesses be concerned? 2

- | GHG emission reduction targets may lead to increased taxes on oil or limits on amount allowed to use (such as with a tradable permit system).
- | Opportunity to address the issue early and be viewed as a good corporate citizen.
- | Addressing the problem (high energy use in US) may lead to reduced energy costs and **INCREASED** profits!

So, why might businesses be concerned? 3

- I Increased insurance costs due to:
 - Problems that may stem from global warming (more hurricanes, for example)
 - Air pollution and related health problems
- I Emerging markets (such as China) may have to address these problems early, may find lower-cost ways and pose competitive problems for US businesses.

So, why might businesses be concerned? 4

- I Gov't may not do a good job picking winners and losers in approaches to reduce GHG emissions so businesses want to be informed and ready to help gov't identify appropriate remedies.
 - EX – concern today over too many subsidies for corn for ethanol when other biomass materials would also work



**Techniques to address
climate change
(or other environmental problems)**

5 Categories of Techniques

1. “Command and Control”
2. Market-Based Approaches & Other Incentives
3. Education and Information
4. Personal and Corporate Values
5. Development and Use of New Technologies

1. “Command and Control”

- I Laws and regulations
 - You **MUST** do something or suffer a penalty of some type.
 - EX – CAFÉ standards requiring auto manufacturers to have their cars meet certain MPG targets or face a fine.
 - EX – mandating a specified reduction or limit on GHG emissions

“Command and Control” Advantages

- I May work well where the number of polluters is small making it easier for government to monitor compliance with the rules.
- I May enable the government to “do what is best” even when people don’t want it.

“Command and Control” Disadvantages

- | May prevent those subject to rules from identifying best and most cost effective approach for meeting an environmental target or goal.
- | Compliance costs may be high.
- | Can be costly for government to enforce and therefore costly to taxpayers.
- | Laws aren't always perfect and those subject to the rules may find “loopholes” to get around them.

2. Market-Based Approaches & Other Incentives

- I Incentive – a carrot to entice you to do something
 - EX – tax credit for buying a hybrid car
- I Market-based approach - a structure is created that better enables parties to determine how best to reach a solution. Unlike “command and control” which is a one-size-fits-all approach.
- I 3 main types of market-based approaches:
 1. Taxes
 2. Tradable permit systems
 3. Other incentive - a benefit that can entice you to do something, such as driving hybrid in HOV lane

Understanding Polluter Pays Taxes - Externalities

- I Costs or benefits produced as side effects of someone's activities that are not reflected in prices.
 - EX – costs of using plastic shopping bag
 - Driving car – pollution, CO2 emissions, wear and tear on roads, etc.
- I Externalities can also be positive.
 - EX – purchase of fax machine, increases value of other owners of fax machines because there are more opportunities to use the machine when there are more owners. This positive externality is not reflected in the price of the fax machine.

Polluter-pays tax

- | Person causing the pollution or problem pays.
- | Intended to cause polluter to pay for negative *externalities* of the activity that generates the pollution.
- | EX - a tax could be imposed annually on cars that get less than 18 miles per gallon based on the number of miles driven each year. The tax would be set at a rate to approximate the “cost” of the pollution caused by fuel-inefficient cars.

Environmental or Green Taxes

Examples:

- | Tax on gas (not our current one though)
- | Energy tax
 - Problem – what are you taxing?
 - | Heat value?
 - | Emissions?
 - | Materials used to generate the energy?
 - Need to phase such a tax in to give people chance to change and adapt to cost

Environmental taxes

- I Could use the revenues to reduce income taxes (“tax shift”)
- I Widely used in EU
 - Tax on plastic bags in Ireland
 - Landfill tax in UK
 - Tax on wooden disposable chopsticks in China
 - Others – tax on batteries, plastic tableware

Existing tax rules that hurt the environment

- | Tax breaks for oil producers
- | Deducting interest and property taxes on second home (often a vacation home at coast or mountains)
- | Not taxing value of free parking given to employees
- | Tax breaks for 3-ton+ “cars”

Taxes as Incentives

- | Tax credits on purchase of hybrid vehicles
- | Other credits:
 - Ck state websites
 - Kansas – 4/07 – enacted incentives for income and property tax breaks on property that captures CO2
 - Sierra Club - <http://zoomer.sierraclub.org/>
- | Not available to all people though (taxes are complicated!)

Tradable permits

- | Gov't decides how much of an emission or pollutant is permissible and then allocates among the polluters via tradable permits
- | 1990 – US created air emission allowance program
 - Trade on national exchanges
 - Tax issues addressed by IRS in 1992
- | EU – CO2 trading began 1/05
 - Started as trial
 - Designed to help EU meet Kyoto obligations
 - Only covers about 40% of CO2 emission sources
 - | Transportation to be added in 2011

Benefits of tradable permits

- | Lets business determine if more cost efficient to buy permits from others or take steps to reduce its emissions to reach the target or to even go below so it can sell its extra permits.
- | After allocation system created, market primarily controls system rather than gov't

Downsides of tradable permits

- | Technological improvements can lower the value of the allowances – so would need to readjust the quantity
- | Large firms may get too much control of the market

Advantages of market-based/incentives 1

- | Attract attention - people usually interested in “carrots.”
- | Might help people to see or do something they would otherwise not have done (such as buying a hybrid car).
- | Might work well in reaching large numbers of individuals.

Advantages of market-based/incentives 2

- I Enables businesses to determine their best approach to reach desired target rather than being told there is a single way (such as manufacture a car with a specific MPG).
- I Taxes, such as a tax on each plastic shopping bag used, can help consumers see the true cost of the item and factor that into their decision-making as to whether to use the plastic bag or a reusable cloth bag.
- I Can be created in ways that are relatively cost-effective to the government since they do not need to be complicated to work.

Disadvantages of market-based/incentives 1

- I Costs of incentives – no such thing as a “free lunch” – someone pays
- I Difficult to estimate impact of incentive so the provider needs to be ready for too many people seeking it beyond what they can handle or letting people know of limit which can hurt usage though.

Disadvantages of market-based/incentives 2

- | Costs of setting up a tradable permit system or collecting a polluter-pays tax.
- | Challenges of determining the proper tax rate given that the costs of pollution or GHG emissions are hard to quantify. (a measurement problem)
- | Deciding what to do with the revenue generated.

3. Education and Information

- I *Advantages of education and information:*
 - Generally low cost relative to “command and control” techniques.
 - May have more significant or longer-lasting effects if information helps individuals and businesses know why certain actions (or inactions) are beneficial to the environment.
- I *Disadvantages of education and information:*
 - May not work.
 - Information may not be accurate or complete.

Examples 1

- I Environmental Impact Statements required by National Environmental Policy Act of 1969.
- I Al Gore's 2006 documentary film – *An Inconvenient Truth*.
- I Toxic Release Inventory created by Emergency Planning and Community Right-to-Know Act of 1986 and later expanded by the Pollution Prevention Act of 1990. The inventory is maintained by the EPA and provides information on toxic chemical releases that are reported by specified industry groups and federal facilities so that people can know about this information.
- I Energy stickers that appear on some household appliances to let consumers know how much energy they use.

Examples 2

- I Pollution or climate change “calculators” that request information from user on miles driven per year, diet, city where you live, and other info to determine how much pollution you cause. Or, some use a “footprint” approach to let you determine how much space you need compared to how much is allocated to you as one of 6 billion people on the planet. Examples of these calculators can be found at:
 - Redefining Progress - <http://www.myfootprint.org/>
 - Cool-It - <http://www.cool-it.us/>
 - Flight emissions - <http://www.roughguides.com/climatechange/>
 - British Airways – enables passengers to calculate climate change impact of their flight and make a donation to an organization to help offset that impact, such as by purchasing energy efficient light bulbs for a community.
http://www.britishairways.com/travel/climateimpact/public/en_us
- I K-12 curriculum to teach about global warming

4. Personal and Corporate Values

- I Doing something for the benefit to self and society.
- I EX - “Goldman Sachs believes that a healthy environment is necessary for the well-being of society, our people and our business, and is the foundation for a sustainable and strong economy.

Ex – “Environmental Auditing”

- § To gain understanding of harm a company may be causing to the environment.
- § Such audits may also prevent firms from violating environmental laws and find low-cost ways to comply with laws.
- § May also identify new practices, such as recycling or paperless offices, that can reduce overall company costs.
- § Some jurisdictions provide immunity from prosecution or fines if a company engages in an audit and finds environmental problems that it needs to correct. For example, Michigan has a law called the Environmental Audit Privilege and Immunity Law.

Ex – personal values

- | Individuals taking actions to protect environment, such as driving less, buying hybrid car, recycling, installing solar panels in their home, and using reusable shopping bags.
- | Donate money to organizations such as TerraPass or DriveNeutral that use the money to invest in renewable energy or to buy pollution credits in marketplace so they can't be used by businesses to pollute.
 - Both of these companies were started by college students.
 - | TerraPass – <http://www.terrapass.com/>
 - | DriveNeutral – <http://www.driveneutral.org/>

Ex – Global warming

- I In June 2006, Bank of America announced program where employees living within 90 miles of Charlotte, Boston and LA could obtain up to a \$3,000 check from B of A for buying a new hybrid car. Per B of A:
 - ““Given the size of our commuting associate base, the hybrid program expands our commitment to the environment and helps our associates to participate in making a difference while cutting down on their commuting costs.” “We are pleased to be one of the first corporations offering this benefit and strengthening our long-standing leadership on environmental issues.””
[http://newsroom.bankofamerica.com/index.php?s=press_releases&item=7446]
- I The press release also notes that B of A has a voluntary commitment to reduce GHG emission by 9% by 2009.

EX – Global warming

- I Hewlett Packard includes hybrids in its fleets of employee cars as a way for HP to reduce GHG emissions (and use less gasoline).

EX – Hewlett Packard and WWF

Nov 2006 announcement

- | HP and World Wildlife Fund to work together to reduce HP's GHG emissions worldwide by 15% from 2006 levels and to “educate and inspire others to adopt best practices, and use HP technology in conservation efforts around the world.”
- | “HP will report and verify CO2 emissions from its facilities, based on Greenhouse Gas Protocol and World Economic Forum's Global Greenhouse Gas Registry.”
- | “HP will develop energy efficiency measurements for its product categories. HP will work with WWF to develop goals for improved product performance and report publicly on progress toward those goals.”

And government values

- | Many states and cities have taken some type of action – some are laws, some are suggestions.
- | EX – CA Governor Schwarzenegger’s Executive Order S-3-05
 - “That the following greenhouse gas emission reduction targets are hereby established for California: by 2010, reduce GHG emissions to 2000 levels; by 2020, reduce GHG emissions to 1990 levels; by 2050, reduce GHG emissions to 80 percent below 1990 levels”
 - + West Coast Governors’ Initiative on Climate Change
 - <http://www.climatechange.ca.gov/>

And higher education values

- | Some universities have signed the American College & University Presidents Climate Commitment
 - To reduce GGH emissions on campus
- | <http://www.presidentsclimatecommitment.org/>
 - Has both facilities and curriculum components

And religious group values

- I Per WSJ 9/14/07 – “In 2002, religious groups submitted a shareholder proposal asking GE to count its emissions of global-warming gases. GE opposed the resolution, which won a surprisingly strong 20% of shareholder votes.”

[GE's Environment Push Hits Business Realities, by Kranhold, pg A1]

Advantages of Values Technique

- I Voluntary actions may be better accepted by individuals and businesses relative to government mandates.
- I Many of the efforts involve deliberations by many different individuals and organizations which can lead to better understanding of the issues and possible solutions, and some form of peer pressure may exist to increase compliance with the values.

Disadvantages of Values Technique

- | No sanctions for not properly following the established principles and practices.
- | Some issues may be overlooked either in whole or geographically.

5. Development and Use of New Technologies

- I Examples:
 - changes in engine design have resulted in less air pollutants over past decade
 - improvements in solar energy have made it a more realistic alternative to other energy sources
- I Businesses motivated to explore new technologies both to meet laws and to make a profit.
- I As more and more governments and businesses throughout the world agree to reduce GHG emissions, they will be looking for new technologies that don't produce such emissions. There will be a strong market for such technologies.

Ex – climate change

- | Electric and hybrid fuel cars that use less gasoline than traditional cars; so - less GHG emissions
- | Development of hydrogen fuel cells to power cars.
- | Use of lighter materials in manufacturing cars (a lighter car uses less fuel).
- | Biofuels as alternatives to oil. Ethanol, a commonly used biofuel = about 1.2% of world's gasoline supply. However, it does not produce as much energy as oil-based gasoline. Corn and sugar cane are important sources for producing ethanol.

Ex – airline industry

WSJ 4-24-07 –

I Boeing's Dreamliner 787

- Engines are 20% more efficient than regular jet engines
- Will likely use 10% less fuel than today's engines
- Plus “technologies that will make them burn cleaner and create less noise.”

“Virgin Atlantic Orders Up to 23 Boeing 787s,” by J. LYNN LUNSFORD and ROD STONE; April 24, 2007

New Technologies - Advantages

- | Provides a benefit to businesses.
- | Can enable businesses and households to function in highly functional ways while also reducing the use of natural resources and/or reducing levels of pollutants.
- | Some may generate tax credits or other tax advantages for business.

New Technologies - Disadvantages

- | Can be costly to develop and produce with resulting low adoption rates.**
- | May require government subsidies to enable them to be developed and produced.**

Combination of techniques and motivations

WSJ 4-24-07 – “The aviation industry, hit hard by soaring oil prices and the prospect of dwindling supplies, has been scrambling to develop alternative fuels. Most recently, the Pentagon has been experimenting with a B-52 bomber that has been flying on a fuel derived from coal oil.”

- I Rationale: Increase profits, help environment, stave off more gov't regulation, avoid pending increases in oil prices as world demand grows

The slide features a large green shape on the left side, which has a white semi-circular cutout. The text is centered within this white area. A dark blue horizontal bar with rounded ends extends from the bottom of the green shape towards the right edge of the slide.

How to evaluate proposed solutions

To design appropriate solution

I Consider:

- *Cause and severity*
- *Understanding the people whose behavior you want to change*
- *Linkage between the problem and solution (must be a connection for the solution to work)*
- *Secondary effects or unintended consequences*
- *Mandatory versus voluntary measures*

Also consider

- | Cost effectiveness
- | Dissimilar impact on different groups (such as based on geographic area, economic group, etc.)
- | Safety and health
- | Differing effect on different levels of gov't
- | Impact on business competition

Consider Principles of Good Tax Policy

Including:

- | Equity and fairness
- | Simplicity
- | Transparency and visibility
- | Economic growth and efficiency
- | Minimum tax gap

Slides are at
http://www.cob.sjsu.edu/nellen_a/

Questions?

