Climate Change Policy and US Electric Utility Regulation

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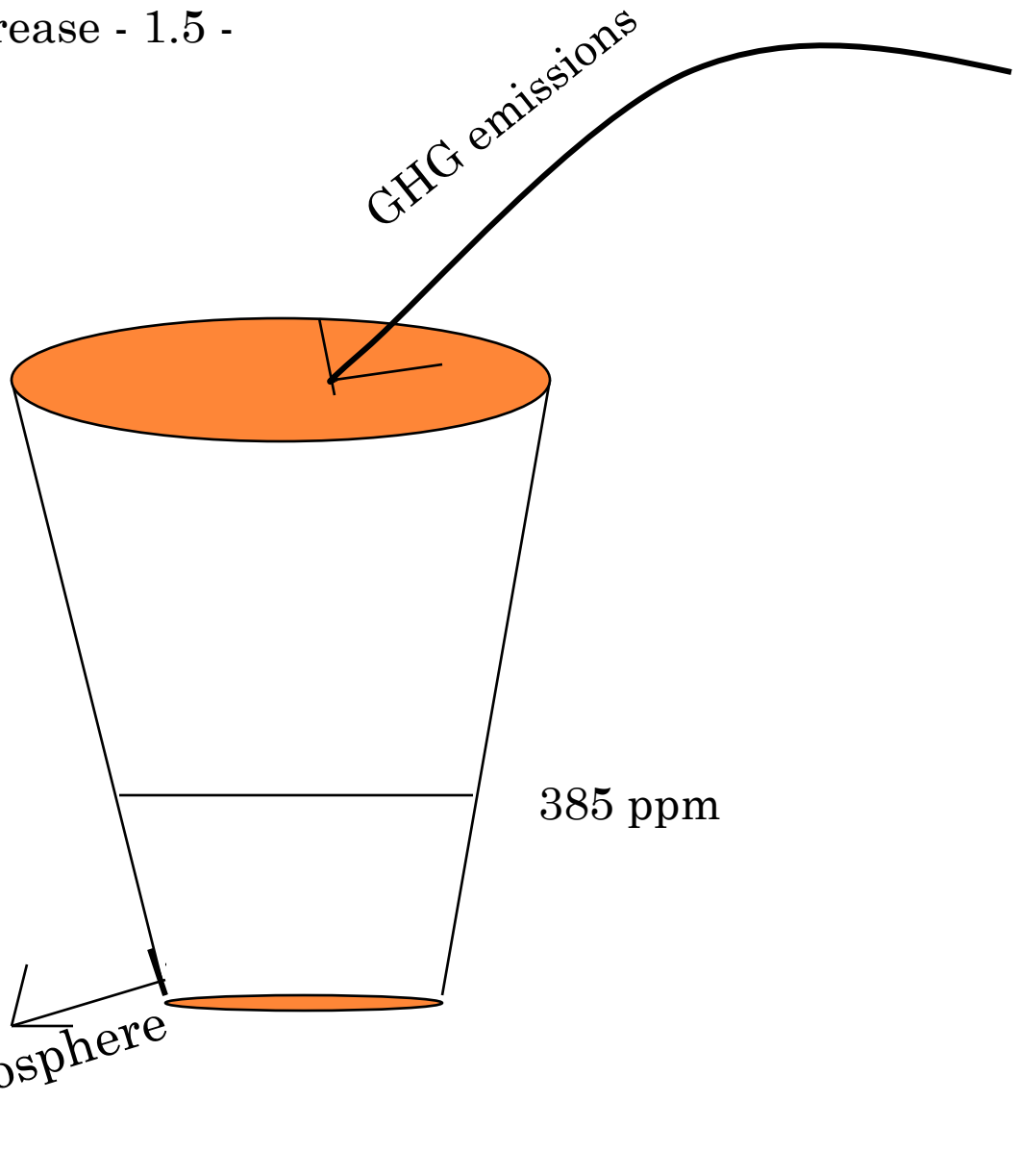
Outline

- Climate Policy 101
- Pricing Carbon Emissions
- Electricity Regulation and GHG emissions
- Regulation and the Public Interest

Bare Essentials - Science

- Make policy based on the probability distribution of peer-reviewed climate science
  - High probability of human-induced climate change
  - Changing at an increasing rate
  - Significant expected damages that are an increasing function of
    - Atmospheric concentration
    - Rate of Change

Current net increase - 1.5 - 2 ppm /year



It's a Stock

- Location of Emissions Does Not Matter
- Timing of Emissions Matters, but very little within a decade or so
- **Stabilizing Concentrations is very difficult - freezing or cutting emissions by 50% won't do it**

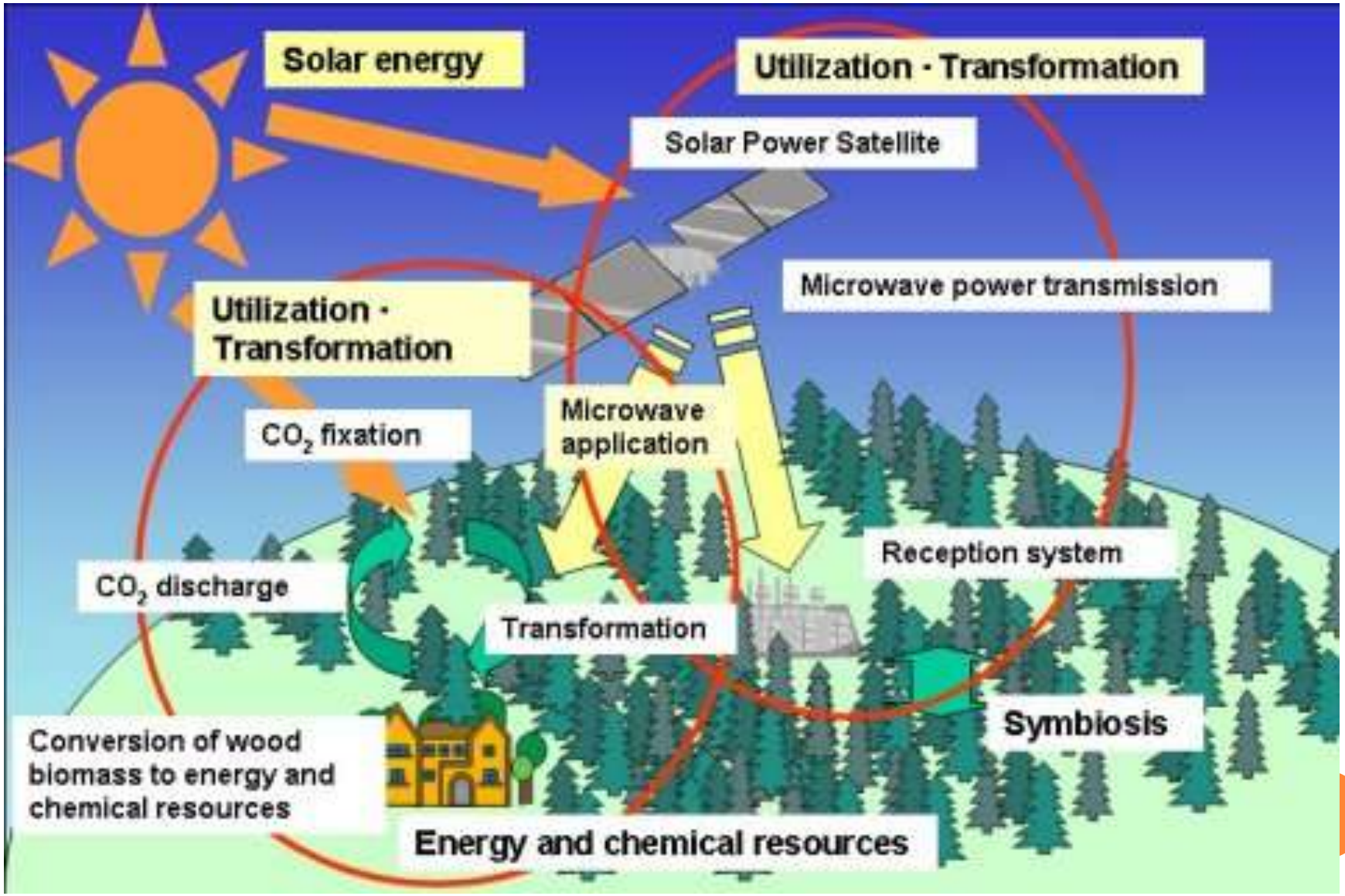
It's the Long Run That Matters

Energy systems take a long time to change

Mitigation Basics

- Risks are a function of atmospheric GHG concentrations and rate of change, so
  - Mitigation is not a 0/1 proposition – more mitigation means lower risks
  - Starting NOW makes sense
- Huge literature
- Enormous amount of public attention
- Clearly defined metrics (although their meaning is far from clear)

Solar Power Satellite



Putting a price on emissions

- GHG emissions are an *externality* – people do not take the risks of climate change into account when they decide to burn fossil fuels, emit methane, etc.
- If people have to pay when they emit, they will do less

GHG Taxes

- Some experience *for some sectors* in Europe
- Comprehensive tax in British Columbia, Canada
- Politically difficult to implement

Cap and Trade (Emissions Trading, Carbon trading)

- Set an overall limit on GHG Emissions
- Create a system of permits (allowances) consistent with this cap
- To emit a unit of GHGs, you must possess and surrender a permit
- Permits can be bought and sold for whatever price is agreed upon between buyers and sellers

Cap and Trade (Emissions Trading)

- Works by creating a price for CO2 emissions
- This price increases the cost of fossil energy use, both directly and in product markets
- “Making the market tell the truth”
- Program details determine what “truth” we put into practice

Cap and Trade (Emissions Trading)

- Allows cost-effective reductions and flexibility
- Gives clear incentives and price information
- Has been very successful in programs to limit sulfur dioxide and nitrogen oxides
- Central to the Kyoto Protocol and EU policy
- Has wide support among industry and environmentalists in Europe and the US

Emissions Trading is a tool - What it Accomplishes Depends on Its Design

- What is the Cap?
  - **How stringent** - determines how much GHGs will be reduced
  - Can be based on
    - Emissions History
    - Emissions Intensity
    - External criteria (international agreements)
- More stringent caps => higher permit prices => higher energy costs

Allowance Allocation – It's About the Money

- Allowances have cash value – the decision about how to allocate them is *exactly* like handing out money
  - Give to existing emitters
  - Rebate to consumers
  - Use as part of tax system
  - Earmark for energy conservation, R&D, etc.
- Allowances are being seen as a major (~$125 billion / year) source of off-budget spending

Coverage

- The more of the economy that is covered by the system
  - The more emissions are brought under the control of quantitative regulation
  - The lower the cost of any given level of emissions reductions
  - Key factor is coverage of transportation (something the EU has yet to do)

GHGs and Electricity

- The utility sector accounts for 40% of CO2 emissions and 1/3 of total GHG emissions in the US (2005)
- Share of electricity in total energy is likely to rise
- Electricity is likely to provide the bigger GHG reductions that transportation in the short run

Electricity is Not a Free Market

- Natural monopoly
  - Generation
  - Transmission
  - Distribution
- History of Commission Regulation
  - Ensure reasonable (low) rates
  - Ensure reliable service

Rates and GHG Reduction

- GHG reduction comes on the supply side through changes in generation mix
- GHG reduction comes on the demand side through conservation
  - Technology change
  - Behavioral change
- Demand side reductions are influenced by both electricity rates and public policy

Electricity Regulation in Flux

- Embedded cost regulation – generators receive costs plus a reasonable rate of return on investment
- Wholesale competition – generators compete in the market

How Does GHG Policy Affect Regulation and Electric Service?

- More aggressive policies => higher costs => higher electricity rates & more low-GHG sources
  - Traditional low GHG sources (nukes and hydro)
  - Alternatives (wind, solar, geothermal, etc.)
  - Carbon capture and storage

- Risk Management – unexpectedly high allowance prices can lead to very high prices
  -

Technology Choice

- New generation is needed, and investors are highly uncertain about policy
  - Low allowance prices – build coal
  - High allowance prices – build wind, etc
  - Very high allowance prices – think about nuclear and carbon capture and storage technologies

- How should regulators give guidance about prudent choice under these circumstances?

Allowance Allocation

- Wholesale competition
  - The price in the market **will** include the price of allowances
    - If no allowances are given to the industry, end users will pay higher rates
    - If generation owners get allowances, their profits will increase and end-users will pay higher rates
    - If Local Distribution Companies get allowances, then regulators will be able to dampen rate increases (but could also allow rates to rise and use revenue for conservation and other purposes

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Allowance Allocation

- If allowances are allocated to LDCs or not allocated at all to electricity, states are treated symmetrically
- If allowances are allocated to generation owners
  - Wholesale competition generators will get windfall profits
  - Embedded cost regulation customers *may* see smaller rates increases
    - Lower rates help users
    - Lower rates dampen conservation incentives

=>Allocation to generation owners will create asymmetry and inequity in generation

Commission choice – Low prices vs. Conservation incentives

- Commission regulation has historically have regulated to protect consumers from high prices
- Regulators will need to take account of the fact that higher prices have **two** GHG-reduction benefits
  - Increased conservation incentives
  - Resources that commissions can direct to energy reduction programs
    - Weatherization, energy efficient appliances and lighting
    - Smart meters, public funds for transmission improvements

Managing Conservation Programs

- Regulators have funded and partially managed conservation programs for many years
- GHG policy could plausibly dramatically increase the size and scope of these programs
- There is a significant public policy challenge in maintaining quality, efficiency, and accountability in a period of program expansion

Investing in the Energy System

- What role should electricity regulators play in designing and funding large-scale transmission and storage infrastructure?
- What role should electricity regulators play in investing in and choosing specific technologies (e.g. nuclear vs. wind)?
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Electricity Regulation and the Public Interest

- Traditional view of the public interest has been *low rates and reliable service*
  - "build pulverized coal plants now!"
- An ongoing criticism from the public policy community has been that the public interest requires emphasis on *overall efficiency*
  - "don't build pulverized coal plants if you think allowance prices will be high – even if you get free allowances"
- If you believe that climate change is one of the central public policy challenges we face, then the public interest can be defined in terms of *bringing about significant GHG reductions*

  "don't build pulverized coal plants!"

Conclusion

- Electric generation and consumption choices are a key part of GHG reduction strategies
- Federal policies will (likely) play a broad role in setting incentives
- State regulators will play an important role in the responses of generators and consumers through
  - Allowance use in ratemaking
  - Balancing consumer rates and reduction incentives
  - Funding and managing conservation programs
  - Public investment in transmission, storage, and new technology

Conclusion

The way that regulators act in response to these challenges will be fundamentally influenced by their view of the public interest

- Consumer advocacy
- Economic efficiency
- Environmental leadership