

Electricity and Climate Change: Some Institutional Context

Dr. William M. Shobe
University of Virginia

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The Physical Context

- # A global, uniformly-mixed pollutant
 - Ultimately, *everyone* must agree on a limit
 - # Emissions take place in sovereign nations
 - # Costs and benefits vary from place to place
 - Depends on: physical geography, economic development, stock of fossil fuel reserves
 - # Knowledge subject to great uncertainty
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The Political Context: The United (but federal) States of America

The Constitutional hedge

- Federal power over the states is limited
- State powers are limited
- The ability of states to cooperate is limited
- The powers of both levels of government over individual actions are limited

The limits are intentionally vague and hence mutable with the times

Taken Together...

- # We have a serious global problem on our hands, and

- # No one has the power to fix it

- # But cities, states, countries, and regions are trying

- # Global climate policy is being built from the locality up

Economics and Federalism

- # Policy initiatives have very different effects depending on the level at which they are implemented
 - Many resources are mobile: capital, labor, air
 - The smaller the encompassing jurisdiction the more likely resources are to move in response to a given economic incentive
 - # And local policies *must* reflect local interests!
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General Equilibrium

- # For small economic changes, we look only at the immediate sector affected: partial equilibrium
 - # Large change require us to look at secondary affects in other sectors: general equilibrium
 - # Secondary does not mean small
 - # These GE changes may not be ‘politically’ relevant because they are diffuse and hard to pinpoint
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Now, On To Electricity

- # Why do states have an “electricity” policy?
 - Why not have a shampoo policy or a policy on sump pumps? It may seem obvious to you, but it is not obvious to me.
 - Does getting electricity into homes *really* depend on state regulatory machinery? I doubt it.
 - It is possible that there are ‘network externalities’ that justify some state involvement in the distribution system, but probably not at the power plant level (no one really knows).
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One Problem with State Electricity Policies

- # One thing we are pretty sure about is that prices for electricity are too low and production is too high.
 - Prices are well below the true social marginal cost of production
 - So some electricity is being produced for people who value it at less than the cost of producing it
 - In a warming world, this is a serious problem
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Warmer Temperatures and the Grid: modest engineering problem

- # How will a warming climate affect demand and supply for electricity?
 - Not too much
 - Increased cooling demand will more than offset the reduced heating
 - We're not sure about much else, but it's not that big a deal
 - # Infrastructure will need to be hardened
 - # Grid services shifted some
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‘Decarbonizing’ the Economy: the interesting question

- # Economists generally agree now that we need immediately to begin investing in decarbonizing the economy
 - While few feel that we could meet Al Gore’s recent challenge, more and more believe that it is worth deep cuts in CO₂ by 2050.
 - # This is one of the greatest public policy challenges of recent times
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Framing the Problem

- # The atmospheric carbon dioxide concentration has enormous social value
 - # In the past, we have given this value away for free to anyone who wanted to use it
 - No matter how trivial the value of the use
 - # As a result, producers have come to depend on the free input and it has become depleted
 - Goods produced using this resource are too cheap
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Atmosphere as Economic Asset

- # To solve the problem, we need to make sure that the use of this asset reflects its scarcity
 - This can be done with regulations, but at a cost that is much higher than it needs to be
 - The better way is to use a price signal that allows all users of the resource to make their own best response to the scarcity of the resource
 - # The economic value of this asset is HUGE
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Generating Scarcity

- # Economists have developed two mechanisms for signaling the scarcity of environmental goods through price:
 - Charging for the goods directly: often referred to as a Pigouvian tax (after A. C. Pigou)
 - Capping use and letting trading by users establish the price
 - Actually it's just deciding not to give away the public's property interest in the atmosphere
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Scarcity and Value

- # Creating assets in CO₂ via a cap has far-reaching consequences for policy
 - # The wider the coverage the better, because increased flexibility means lower costs
 - # The value of the resource will now be part of the economy: current bills before the Senate create assets worth \$130 - \$370 billion/year
 - Does this belong to the states or the federal government
 - *All state expenditures in FY07 were about \$500 billion*
 - # Plus, the asset now becomes embedded in economic activity
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This is Big!

- # It is an almost unprecedented shift of wealth around the economy
 - # 'Rent-seeking' will be intense at all levels of government
 - # General equilibrium effects are very important in determining the economic consequences of a given policy choice.
 - # A great deal of work needs to be done.
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“Ownership” of the Environment

- # Thinking about ownership of the environment
 - Who owns it? The firm generating the emissions or the farmer suffering the damage to his crops?
 - How is the air different from public lands?
 - Or spectrum, or standing timber, etc.
 - Which ‘public’ owns it? Local? State? Federal?
 - # Probably the assets should be auctioned
 - Then every user faces the full scarcity value
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Claims for compensation

- # Grandfathering implies emitter ‘ownership’
 - # How about early reducers or nuclear plants?
 - # How about those with below average emission rates?
 - # How about coal companies or regions?
 - # How about consumers paying higher prices?
 - # Honoring these claims is hard to resist
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Using the Proceeds

- # Economic theory and modeling supports using most of the proceeds to lower tax rates on mobile capital and labor
 - # Some should be used to support R&D in conservation and renewables
 - # Compensation with allowances or auction proceeds should be transitory
 - # There may be a gain from states doing some of the compensation
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The Renewables Challenge

- # If generation from renewables increases dramatically, there will be challenges to maintaining electricity grid reliability.
 - # There is considerable need for research in this area.
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Other State CO₂ Policies

- # Many are redundant under a federal cap
 - RPS policies raise costs but don't reduce CO₂
 - State policies are subject to leakage
 - Policies are hard to get rid of
 - # Decoupling: make-believe incentives?
 - Electricity companies should concentrate on generating electricity at low cost
 - Firms are left with diffuse and ineffective incentives. Why use electricity companies?
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Other State Policies (cont.)

- # Energy independence
 - # Green research
 - # Policy innovation
 - Are states laboratories of democracy?
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Better Pricing Policies

- # States could affect consumer behavior by developing rate and metering techniques that present consumers with the marginal costs of their current activities.
 - # Giving consumers better pricing information lowers costs.
 - # I never conserved more than when I had to put coins in my little room heater!
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Questions?

