



Climate Policy as a One-Way Ratchet with Complementary and Subnational Policies

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and Sectoral Complementary Policies
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My Manifesto for Economic Research on Climate Policy

Two directions for economic research are somewhat lacking today:

1. How to infuse regulation and subsidiary (subnational) actions with incentives generally and prices in particular.
 2. Contribution of price collars in trading programs and quantity collars in tax programs to rationalized complementary policies.
- This research could help reconcile the inefficiency of policy as it actually is taking shape, keep economics relevant in climate policy, and give people a chance for long run success in managing the global climate

Ambitious, Efficient, Comprehensive

- Influence of carbon prices have fallen short of expectations.
- Political opposition. Partial coverage of price-based instruments would invite leakage and convey disadvantage from tax interaction effect.
- The public **consistently expresses a preference** for regulatory approaches and complementary policies over emissions pricing.
- Subsidiary/subnational policies proliferate.
- Economic concerns about this are many:
 - Complementary policies:
 - Select emissions reductions away from efficient frontier.
 - May not be additional at all. If they are...
 - They subsidize emissions reductions and push down allowance prices, interfering with market signals to investors.
 - Regulatory policies:
 - May not encourage innovation or truthful revelation of costs.
 - Subsidiary (subnational) policies:
 - May not interact well with incentive based policies at a different level of government.

What was the Road to Paris?

- Through Brussels
- And Through Beijing
 - Clean Power Plan (US Electricity Sector)
 - ❑ Adequately Demonstrated Best System of Emissions Reductions
 - Natural Gas Markets
 - Subnational (State and Local) Efforts
 - ❖ Renewables / Energy Efficiency
 - 29 states with renewable targets
 - 25 states with funded EE programs
 - ❖ Cap and Trade
 - Regional Greenhouse Gas Initiative
 - California/Quebec

Background on the US Clean Power Plan

➤ Policy is implemented by the States

- EPA's technical findings determine state requirements based on adequately demonstrated... best system of emissions reductions. Those demonstrations are largely based on “complementary policies.”
- Timeline: state declaration in 2016; final plans due in 2018
- Compliance in 2022

➤ Multiple pathways for States

- States choose rate-based, mass-based policies or other
- State plans must show environmental equivalence to BSER
- Coordination and strategic issues are challenging

➤ States encouraged to work together

- EPA proposed “trade ready” model plans for rate and mass which enables states to pursue cost-effective outcomes.



Role of States (& Provinces)

Indeed,... the national-level emission mitigation regulations in the US are due to the initiative of states: *Mass. v. EPA*, 2007.

If it were not for the states...
we would not be having the same conversation in 2016.

Theory perspective is (understandably) frequently that complementary policies are an obstacle to comprehensive, ambitious, efficient climate policy.



But complementary policies are how we got this far.

How do commitments be made credible? How do policies come into existence?

Consider Mental Models for Implementation of a Carbon Price/Tax

Unitary
Government
Actor

Conducts
Benefit-Cost
for Climate

Enacts
Optimal
Carbon Tax

Affects All
Relevant
Margins

Dynamic
Updating
w/New Info

Or is it...

Bicameral Congress
w/ Complex
Committee Structure;
Federal Institutions

Tax Enabled
to Raise
Revenue

Behavioral/
Subnational
Margins May Be
Mute

No Dynamic
Adjustment

Credibility of (US, other) Commitments?

- It is not possible to bind future governments. How do we trust the commitments of the US and others? What aspects of policy make it more durable?
- Constituencies, institutions and complementary and subnational policies appear to be ratchets that instigate and support commitments

US News Since Paris

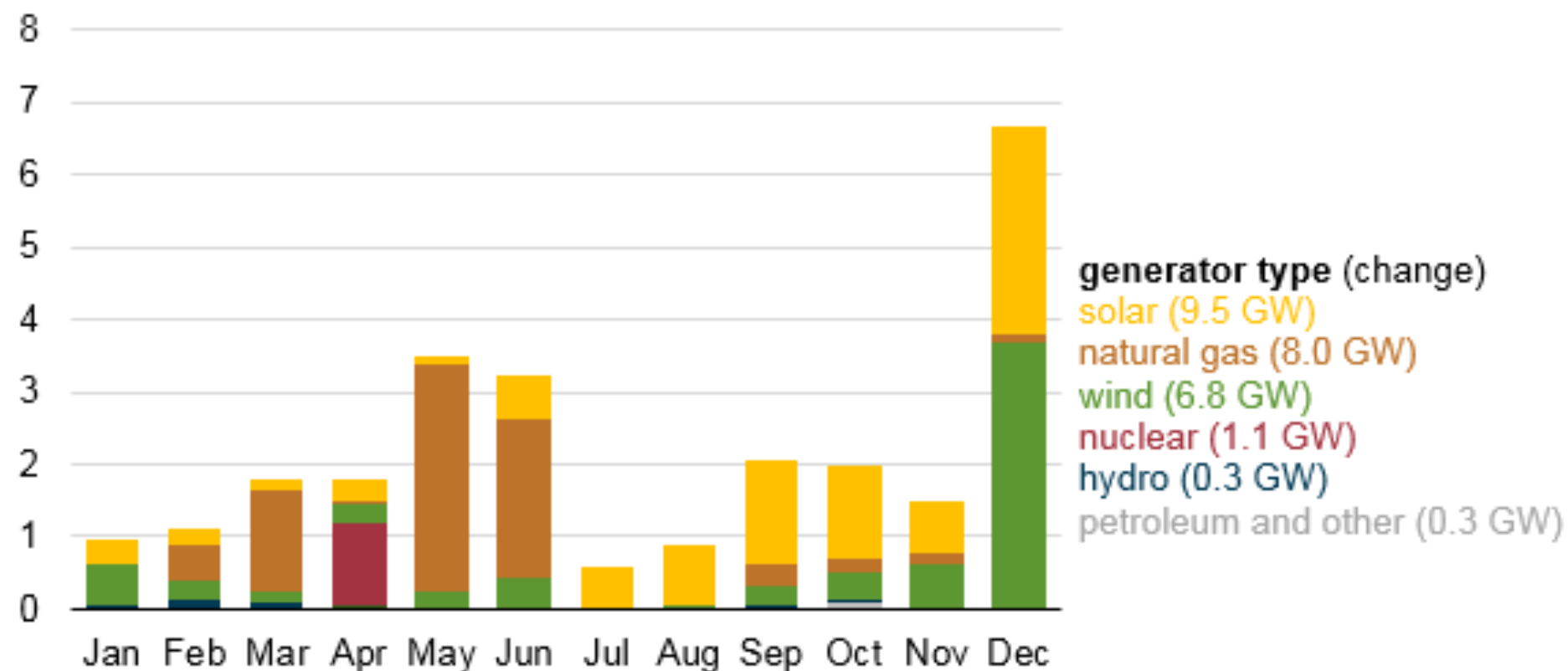
- Supreme Court “Stay” of Clean Power Plan until review
- “Opening” on the Supreme Court leads to a likely more favorable makeup for the Clean Power Plan
- Persistent low natural gas prices
- Extension of production/investment tax credits for wind/solar
 - Modeling indicates this is more important than the influence of the Clean Power Plan on renewable investment
 - 53 GW by 2020
- This year EIA is expected to reduce modeling representation of capital cost for solar by 20%



New Constituencies in US Power Sector

Scheduled electric generating capacity additions in 2016

gigawatts

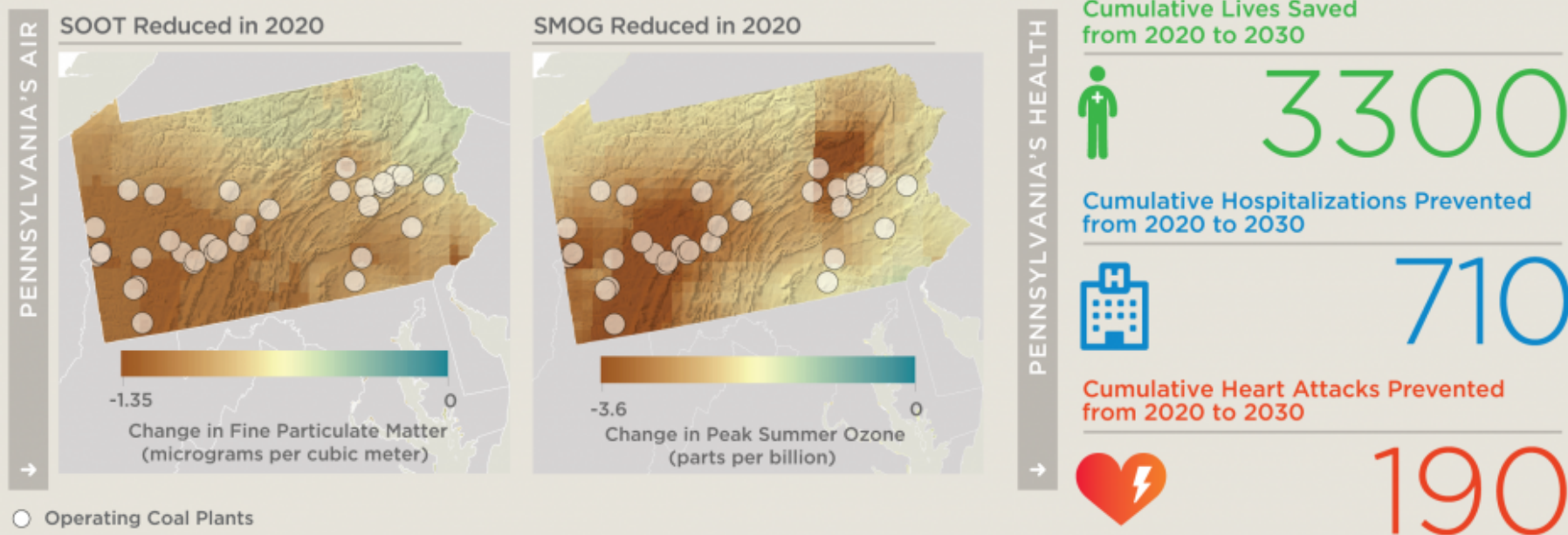


Utility scale solar only; does not include rapidly growing rooftop solar

Constituencies in Public Health Co-Benefits

PENNSYLVANIA: A Health Benefits Hotspot

AIR QUALITY AND HEALTH BENEFITS OF A POWER PLANT CARBON STANDARD



THESE MAPS SHOW: Reductions in fine particulate matter and peak summer ozone, and the resulting health benefits under Policy Scenario 2 compared to the 2020 reference case. For soot and smog, negative values = lower pollution. The health benefits assume a linear increase from the 2020 annual estimate. By comparison, Scenario 1 resulted in 10 lives saved, and Scenario 3 resulted in 2600 lives saved. Source: *Health Co-benefits of Carbon Standards for Existing Power Plants*. www.chgeharvard.org/health-co-benefits.

Can we create institutions that are flexible and *durable*?

- Prices
 - Political support can be fickle.
 - Uses of funding (dividends in BC, California) may provide support.
- Cap and trade
 - Free allocation, banking creates vested constituencies.
 - Over-allocation erodes program relevance.
- Regulation
 - The US Clean Air Act is a venerable institution.
 - Formal process of fact finding, notice and comment, citizen suits and judicial review.
 - Fact finding is based on adequately demonstrated technologies often propagated by complementary and subnational policies.
 - Reversal of final rules is time consuming; requires formal process.
 - Final rules survive lack of funding for enforcement and parties remain subject to retroactive enforcement; rules remain an influence on behavior.



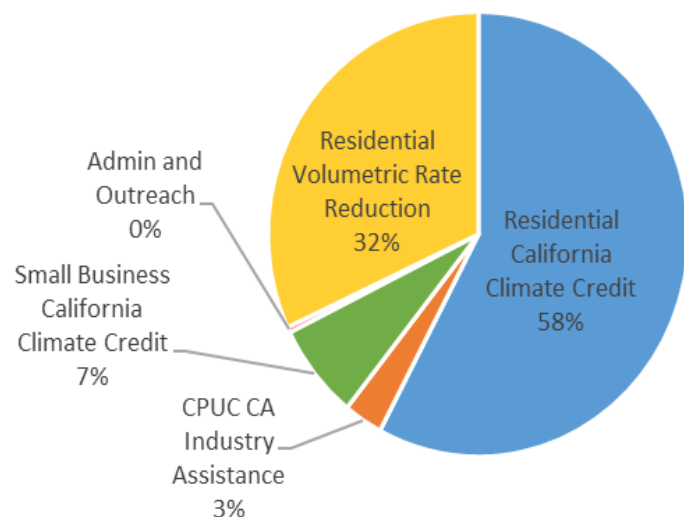
Allocation Can Build Constituency

SO₂ Trading

- Grandfathering (with consignment)

California CO₂ (IOUs) 2013-2014

- Free with consignment auction
 - Energy intensive firms (3%)
 - Small business (7%)
 - Residential customers through per-customer-account dividends (58%) and volumetric rate reduction (32%)

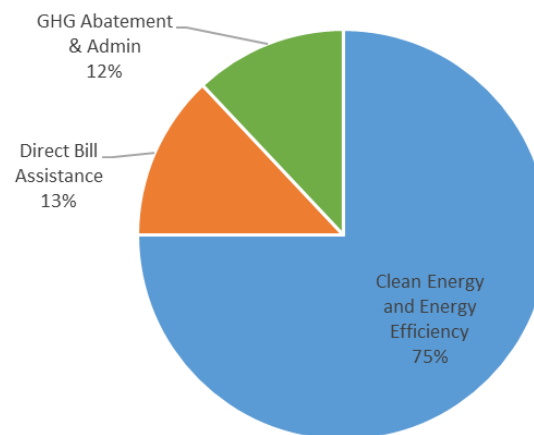


NO_x Budget Trading

- Grandfathering, Updating OBA & Auction

RGGI 2012-2014

- Auction
 - RE, EE (75%)
 - Residential customers (13%)
 - GHG abatement and admin (12%)



EU CO₂ Trading (Phase 3)

- Auction
 - >50% climate and energy
 - Industry assistance

State & Local Roles in U.S. Environmental Policy

- Relevant state & local activities are extensive (transportation planning, permitting, standards, land use, etc.).
- These functions are excluded from virtually all economic models.
- The usual assumption of harmonization *as if* in a unitary model of government.
- Under cooperative federalism, cost effective federal policy requires support and cooperation from the states. How to elicit that?
 - Three ways: command (sanctions), subsidies and markets.



Subsidiarity & Federalism in Economic Research

- We have understanding of prices as a cost effective policy tool.
- “Emissions cap/floor and trade” is also effective in preemption of subnational efforts to reduce emissions.
(Goulder and Stavins; Burtraw and Shobe)
- Economic models rely on the price signal to be passed through to various functions of government. Will it?...
 - Consider the activities of government planners and developers
- If the price signal is muted, that creates a role for supplementary, subnational policies
 - How can national policy encourage those policies to be cost effective?
- Two conflicting views frame the debate:
 - “Meet or exceed” versus “Preemption”



Complementary Policies?

- Consider the breadth of complementary policies where there is carbon pricing
 - EU ETS: “... variations in economic activity and the growth of wind and solar electricity production are robustly explaining EUA price dynamics...” (Koch et al. 2015)
 - California: The Scoping Plan identifies standards and measures that account for 83% of the state’s emissions reduction goals.
 - RGGI: The trading program accounts “for about half of the region’s emissions reductions” since 2009. Other factors include economic activity, RPS policies and natural gas prices (Murray and Maniloff 2015). Note also the role of auction-derived investments in energy efficiency (Analysis Group 2015).
- There is no carbon pricing in most of the 195 national INDCs
- Is pricing actually the *complementary* policy?

Refinement of Theory to be Relevant for Policy

I encourage research that expands our theory to serve the *complex* of constituencies, institutions and policies. Two strategies:

1. Infuse regulation, subsidiary actions with **incentives** generally and prices in particular.
2. Insist on price **collars** in trading programs; quantity collars in tax programs. (Maybe a formal process of program review is sufficient, but not best.)

I feel that policies that lack these features lack fundamental integrity and durability.

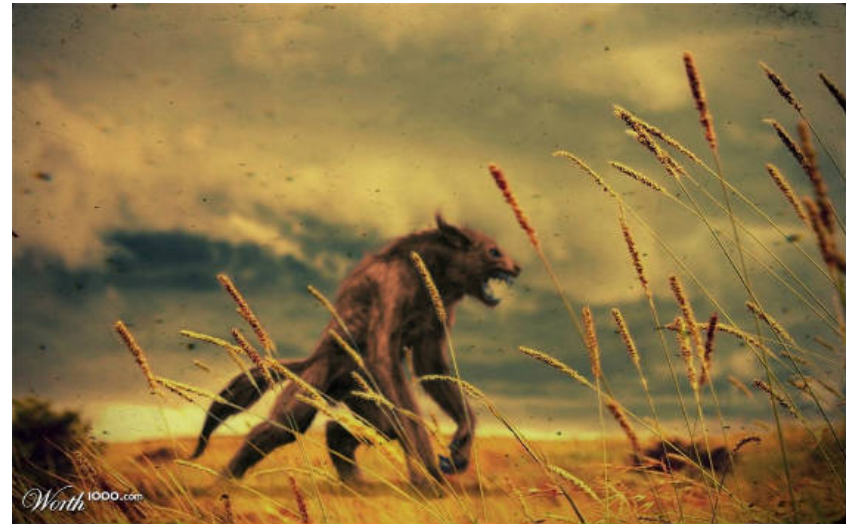


Incentive-Based Regulation

- Improved R&D policies
- Performance standards > technology mandates
 - Technology based policies are not necessarily as static as described by economists, especially in a federal system
- Reverse auctions for subsidies
- Prizes
- Emissions rate trading and emissions cap and trade
 - In the US, lead phase out, various air pollution policies, and the Clean Power Plan

Cost Management in Trading Programs

Price Spikes are like **Rougarou** – the seldom seen mythical creature from the French Alps



Price Declines are the commonly observed phenomenon. Why?

- Political pressure leads to over-allocation
- Incentive based regulation (carbon price) leads to innovation
- Program spending may complement goals (EU, RGGI, Alberta)
- In general, “complementary” policies are common *worldwide*!

In Trading Programs, Price Floors are Crucial to Credibility

- Observing outcomes in the EU, RGGI's innovation – a price floor (like on eBay!)
 - Widely considered a good feature of auction design
- Appeared in Waxman-Markey
- Adopted in CA & Quebec
- In all three North American programs the price floor has been triggered at least once. Subsequently, prices rose off the floor and the program continued.
- ❑ Price floors are an **essential feature of market design** and to **demonstration of “additionality”** given complementary policies.
- Note a price floor can enable *alignment* across price and quantity based programs.



The EU Market Stability Reserve *may* act like a price floor. But the French proposal has reignited EU discussion of a price floor.

Conclusion

- Complementary policies are the primary driver of emissions reductions and global cooperation on climate policy today
- An economic assault on “complementary policies” is unhelpful
- There are opportunities for efficiency gains by infusing complementary policies/regulatory policies with incentives
- Meanwhile trading programs require cost management to be meaningful in an environment with complementary policies

