

Carbon Markets in the United States

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**Bilateral Cooperation between China and the United States:
Facilitating Progress on Climate-Change Policy**

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Policy Analysts Favor *Carbon-Pricing*. Why?

- No other feasible approach can provide meaningful emissions reductions (such as U.S. target of 83% cut in national CO₂ emissions below 2005 by 2050)
- Least costly approach in short term (heterogeneous abatement costs)
- Least costly approach in long term (incentive for carbon-friendly technological change)
- For *political reasons*, most carbon-pricing policies have featured cap-and-trade, rather than carbon taxes ...

Cap-and-Trade

- Provides *cost-effective* means of achieving *meaningful* emissions reductions
- Offers *easy means of compensating* for *unequal burdens* imposed by climate policy
- Has a *history of successful adoption and implementation* over two decades
 - U.S. EPA Leaded Gasoline Phasedown (1982-1987)
 - U.S. SO₂ Allowance Trading, CAAA of 1990 (1995-2010)
 - European Union Emissions Trading System (2008-2020)
 - *U.S. Regional Greenhouse Gas Initiative, RGGI (2009-2019)*
 - *California's AB-32 GHG Cap-and-Trade System (2013-2020)*
- Provides *simple means to link* with other countries' climate policies

But climate politics is now difficult in Washington

- **Carbon-pricing is controversial**
 - It makes the costs transparent (unlike conventional policy instruments, which *hide the costs*)
 - In Washington, cap-and-trade was *demonized* as “cap-and-tax”
 - *Opposition by conservatives to cap-and-trade is ironic*, given experience
 - *President Reagan*: leaded gasoline phase-out with cap-and-trade
 - *President George H.W. Bush*: acid rain cut by half with cap-and-trade
 - *President George W. Bush*: Clean Air Interstate Rule (cap-and-trade)
 - Cap-and-trade was *collateral damage* in battle against climate action, which itself was a consequence of political polarization.
 - So, a meaningful federal, nationwide carbon-pricing policy is *unlikely* in the foreseeable future.
 - But there is significant action at the *sub-national level* ...

Major Sub-National Climate Policies in the USA

- **Regional, state, & even local climate policies continue to emerge**
 - More than half of 50 states are contemplating, developing, or implementing climate policies
- **Most important:**
 - Regional Greenhouse Gas Initiative (RGGI)
 - California's Global Warming Solutions Act (AB 32)

Regional Greenhouse Gas Initiative – Structure & Performance

- Downstream CO₂ cap-and-trade system for electricity sector in 9 states
 - States must auction 25% of allowances, but trending towards 100% auction
 - Trigger price allowed use of offsets (in principle)
 - Limited emissions to average of 2002-04 level during period 2009-2014
- Was non-binding due to modest targets, *low natural gas prices*, recession, and energy conservation
 - In response, cap lowered by 45% in 2015, then 2.5%/year until 10% cut by 2019 (13% below 1990, 35% below BAU)
 - With barely binding cap, little direct emissions impact; allowance price now at \$5.40/ton CO₂
 - But auctions raise considerable revenue for states (> \$1 billion)

Regional Greenhouse Gas Initiative – Lessons

- Numerical & geographic offset-use *constraints* rendered offsets *ineffective*
- Changing economy can render a cap *non-binding* or drive prices *too high* → role for price floor & ceiling, i.e., *price collar*
- Downstream system meant *limited economic scope*; also, limited geographic scope and threat of 50% *leakage* (due to interconnected electricity market) →
 - *Modest targets* to keep allowance price down
 - Addressing leakage threat with modest targets *limits leakage*, but *also limits emissions reductions*
 - Free allocation would *not* reduce leakage threat (later)
- *Best way* to address a non-binding cap for the long term is to *reduce the cap*

California's Global Warming Solutions Act of 2006 (AB 32)

- Broad and ambitious policy to cut GHG emissions to 1990 level by 2020
 - Cap-and-trade system
 - Energy efficiency standards for vehicles, buildings, & appliances
 - Renewable portfolio standard (increases from 20% to 33%)
 - Low carbon fuel standard
- Cap-and-trade system
 - Cap, covering 85% of economy, declines from 2012 through 2020
 - Increasing use of auctions over time
 - Protection for trade-sensitive industries (later)
 - Up to 49% of reductions can be from offsets (in theory)
 - Link with Quebec system; others pending

Lessons from California's AB 32 Cap-and-Trade System

- Carbon pricing is necessary, but *not* sufficient, due to other market failures
 - Examples include principal-agent problem (renter-occupied buildings)
 - So, specific non-pricing policies *can be* complementary
- But some “complementary policies” *conflict* rather than complement!
 - *California example* – Low Carbon Fuel Standard
 - *Consequences* of policy for sources *under the cap* of a cap-and-trade system
 - *Achieves no incremental CO₂ emission reductions* –relocates emissions
 - *Drives up abatement costs* (marginal costs not equated)
 - *Suppresses allowance price* (by reducing overall demand for allowances)
 - Many so-called “complementary policies” are *nothing of the kind!* (Also a major problem with European Union policies)

More Lessons from California's Cap-and-Trade System

- Initial free allocation *fostered political support*
- Economy-wide system *feasible*, and *much more effective* than sectoral system
- Free allocation *per se* does *not* address leakage/competitiveness (inframarginal)
 - So, *attempts* at competitiveness protection under EU ETS are *ineffective*
 - But *output-based updating* system makes allocations *marginal*
 - So, in California system, this *reduces competitiveness and leakage risks* for trade-sensitive sectors
 - But, ultimately, *only way to eliminate* leakage/competitiveness risk is through broader (national & international) coalition of action

Sub-National Climate Policies in Absence of Federal Action

- In the *absence* of meaningful Federal action, sub-national climate policies could become the *core* of *national action*
- Problems
 - Legal obstacles: possible preemption for Federal legislation
 - Not national in scope
 - Not cost-effective (if there are different carbon shadow-prices)
- Is there a (*partial*) solution?
 - Yes, state & regional carbon markets can be linked
 - Linkage reduces costs, leakage, price volatility, and market power
 - A possible future for U.S. climate policy: linkage of state & regional cap-and-trade becomes the *de facto* national climate policy
- But there *is* action in Washington ...

U.S. Supreme Court, EPA, & Clean Air Act

- **Cascade of policy from Massachusetts v. EPA (Supreme Court, 2007)**
 - This led to ...
 - Rule for existing power plants proposed *June 2, 2014*: 30% reduction in CO₂ emissions below 2005 level by 2030
 - Rule provides incentives for use of cap-and-trade by states and by multi-state plans , so potentially cost-effective
 - But is the policy efficient? Does it maximize welfare?
 - What about weaker criterion: *does it enhance welfare (B > C ?)* ...

Economic Analysis of “Clean Power Plan” Rule

- **Fundamental economic arithmetic of a global commons problem**
 - Benefits spread globally, cost incurred locally
 - It would be surprising – to say the least – if EPA were to find that the expected benefits of the proposed rule would exceed its expected costs
 - But this is what EPA found.
 - Its central estimate is positive net benefits (benefits minus costs) ...
 - of **\$67 billion annually in the year 2030!**
 - *How can this be?*

Estimated Benefits and Costs of Proposed Clean Power Plan Rule in 2030

(EPA's Regulatory Impact Analysis, Mid-Point Estimates, Billions of Dollars)

	Climate Change Impacts	
	Domestic	Global
Benefits		
Climate Change	\$3	\$ 31
Total Benefits	\$3	\$ 31
Total Compliance Costs	\$9	\$ 9
<i>Net Benefits (Benefits – Costs)</i>	- \$6	\$ 22

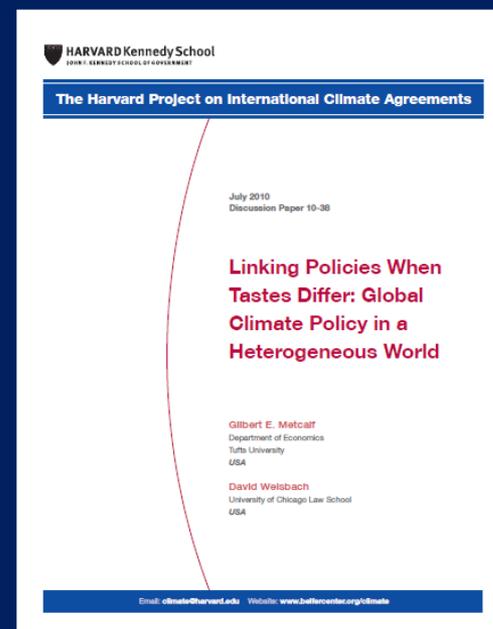
94% of estimated domestic benefits are health impacts of correlated local air pollutants

Key Challenge for COP-21 in Paris, December 2015

- **Central Question for Emerging Hybrid Policy Architecture under the Durban Platform for Enhanced Action**
 - Can an agreement that is *anchored* in domestic political realities, ...
 - ... *adequately* address emissions with sufficient ambition?
 - Are there ways to enable and facilitate *increased ambition* over time?
 - *Linkage* of regional, national, and sub-national policies can be part of the answer – connections among policy systems that allow emission reduction efforts to be redistributed across systems
- **Cap-and-trade emerging as instrument of *choice* in many countries**
 - Regional, national, and sub-national levels
 - European Union, New Zealand, Northeast USA, California, Quebec, Ontario, China, Korea, etc.
- **But, national (& sub-national) policies will be *heterogeneous* ...**

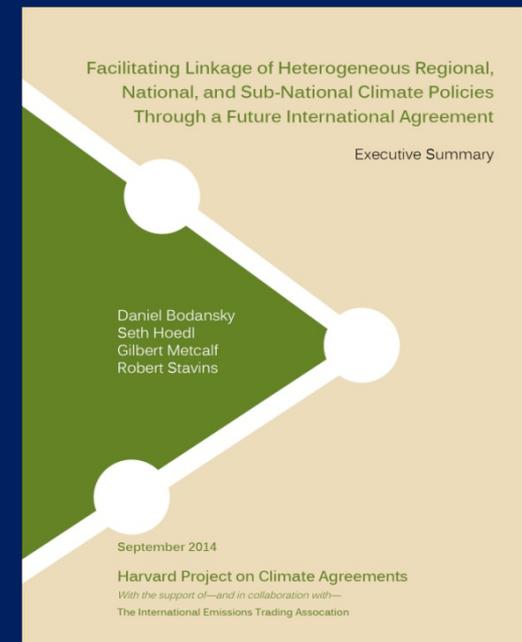
Policy Linkage in a Heterogeneous World

- Global agreement should accommodate this *heterogeneity* – *locus of regulation* (super-national to sub-national), and *policy instrument*:
 - Cap-and-trade systems
 - Carbon tax systems
 - Emission reduction credit systems
 - Command-and-Control regulations
- Linkage among heterogeneous policies ranges from straightforward to infeasible
- Benefits of linkage
 - Cost savings
 - Reduce market power
 - Reduce total price volatility
 - Allow for distributional equity (UNFCCC's “common but differentiated responsibilities”) *without* sacrificing cost-effectiveness



What needs to be in the 2015 Paris Agreement to facilitate effective linkage?

- “Facilitating Linkage of Heterogeneous Regional, National, and Sub-National Climate Policies through a Future International Agreement”
- First principal: *Do No Harm ...*
 - If poorly designed, the 2015 agreement could actually inhibit effective linkage
 - Example: “supplementarity requirements,” as were discussed in Kyoto (and included in KP)
- What *should* the 2015 agreement *include*? ...



What should the 2015 Paris Agreement include?

- **Design elements** for inclusion in the Paris agreement, *either* directly or by establishing a process for subsequent international elaboration:
 - Effective linkage requires *common definition of key terms* (in particular, units used for compliance purposes)
 - *Registries and tracking* are necessary – key role for top-down part of hybrid architecture will be *tracking, reporting, and recording* of unit transactions *across jurisdictions*
- **Inclusion of detailed rules in core agreement is *not* desirable**
 - It could make it difficult for rules to evolve in light of experience
 - Standards to ensure environmental integrity should be elaborated in *subsequent COP decisions*
- **Core agreement:** articulate general principles regarding linkage, and authorize the COP to develop more detailed rules later
 - Less can be more on the road to Paris and beyond!

Conclusions

- Carbon markets are a favored approach to reducing CO₂ emissions in diverse countries of the world, including in the United States
 - But primary action in USA is at the sub-national level
 - This will be further stimulated by new Federal regulation – the Clean Power Plan
- In years to come, major locus of international cooperation:
 - May continue to be UNFCCC
 - Or it may be other existing venues (G20, China-USA bilateral?)
 - Or it may be “climate clubs” – groups of jurisdictions that harmonize policies and provide exclusive benefits to members
- Under any of these venues, importance of carbon-pricing and linkage remain!

For More Information

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