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China-Australia Carbon Market Design Expert Workshop on Allocation

Beijing October 12th 2013

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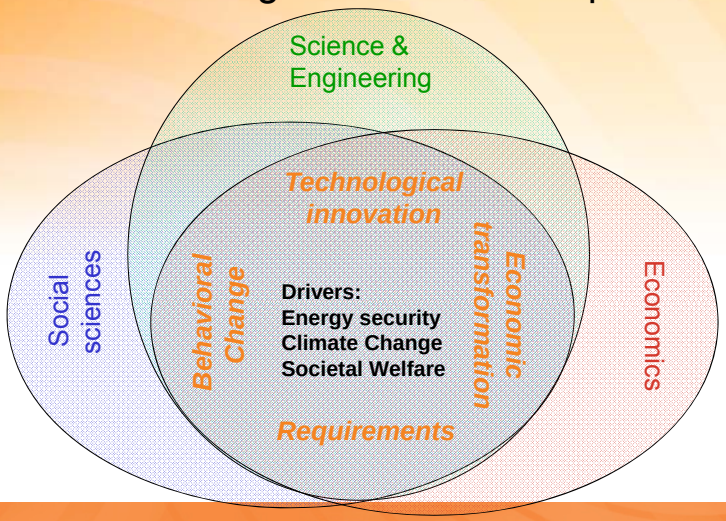
Key interdisciplinary perspectives & tools required to address challenges – CEEM's unique strength



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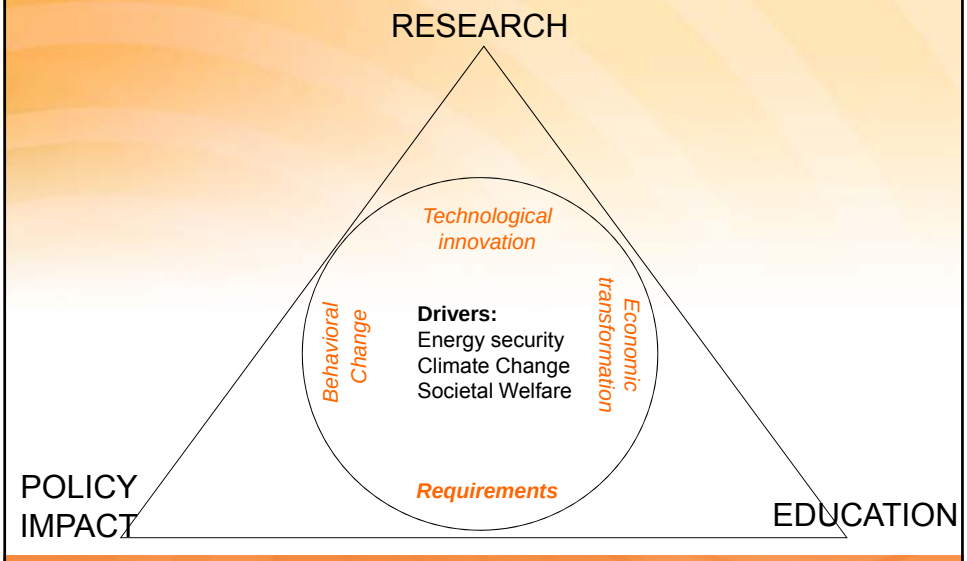
CEEM's core tasks



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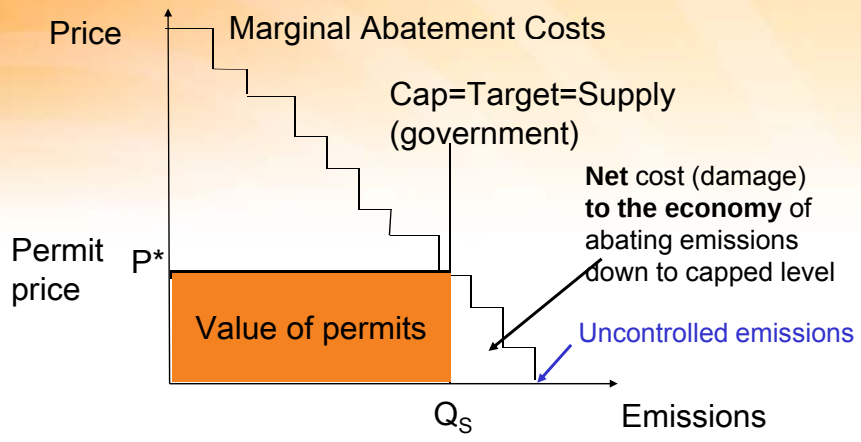
Allocation and distributional effects



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Allocation effects

Table 1. Effect of allocation methods to existing installations in the power sector

Allowance allocation method		Impacts: More expenditure on extending plant life (and potential minimum-run) relative to new build		Increase operation of (higher) emitting plants	Less efficiency improvements
		Distortions: Discourage plant closure	Discourage closure of higher emitting plants	CO_2-inefficient fuel choice and plant operation	Reduce incentives for efficiency improvements
	Auction				
Uniform benchmark	Installed capacity	X			
	Output projection	X	X		
	Historic output	X	X	(X)[a]	
Technology/fuel-specific benchmark	Installed capacity	X	X		
	Output projection	X	X		
	Historic output	X	X	X	
Emissions-based	Emissions projection	X	X		X
	Historic emissions	X	X	X	X

[a] To avoid distortions between generation technologies, non-fossil-fuel stations would also have to receive free allowances. This would avoid internalization of CO_2 costs in the electricity price, and thus distort choices of input factors and consumption for electricity consumers.

Source: Neuhoff et al. 2006

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Australian Carbon Pricing Mechanism Auction Design

Dr. Regina Betz

Beijing October 12th 2013

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Auction Classification (I)

- Sell auctions vs. purchase auctions
- Single sided auctions vs. double auctions
  - Single sided: e. g. auction for primary allocation of CO_2-permits
  - Double auction: e. g. secondary market for permits
- Single unit vs. multi unit vs. multi item auctions
  - Single unit: one indivisible item
  - Multi unit: several homogeneous items
  - Multi item: several heterogeneous items

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Emissions Permits characteristics

- Mixture of multi unit and multi item
  - ➡ Become perfect substitutes over time (after validation date)
- Decreasing marginal value
- Existence of secondary markets
  - ➡ no exposure problem
  - ➡ no need for package bidding / combinatorial auctions

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Auction schedule

Table 1 – Indicative Auction Schedule

	Compliance Year – Auction Schedule									
Vintage	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22
2015-16		15m*	1/8 + (2/8 – 15m)**	4/8	1/8					
2016-17		15m*	1/8 + (1/8 – 15m)***	1/8	4/8	1/8				
2017-18			1/8	1/8	1/8	4/8	1/8			
2018-19				1/8	1/8	1/8	4/8	1/8		
2019-20					1/8	1/8	1/8	4/8	1/8	
2020-21						1/8	1/8	1/8	4/8	1/8
2021-22							1/8	1/8	1/8	4/8

* 15m refers to the 15 million unit limit, as discussed in 3.5 Auctions without a pollution cap in place.

** The number of 2015-16 vintage units available for auction in 2014-15 will be 1/8 of the total vintage allocation plus the excess units that were unable to be auctioned in 2013-14 due to the 15 million unit limit.

*** The number of 2016-17 vintage units available for auction in 2014-15 will be 1/8 of the total vintage allocation plus the excess of units that were unable to be auctioned in 2013-14 due the 15 million unit limit.

Source: Australian Government 2012 - Auctions - Position paper on the legislative instrument for auctioning carbon units in Australia's carbon pricing mechanism

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Auction Classification (II)

- Static or dynamic auctions
  - Static: one round
  - Dynamic: more than one round (e.g. ascending clock)
- Sealed bid or open bid auctions
  - Sealed bid: no information is available on price and quantities
  - Open bid: Different options on transparency
    - Price
    - Total (excess) demand
    - Individual demand
    - Who is bidding
- Uniform- or pay-your-bid (discriminatory)
  - Uniform pricing: each winner pays the clearing price
  - Pay-your-bid prices: winners pays price of its bids

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Australian Government Auction Objectives

- Promote an efficient allocation of permits... with a minimum of risk and transaction costs = allocate permits to those who value them the most
  - Simple auction rules will attract more (smaller) bidders
- Promote efficient price discovery
  - Reveal market prices of permits particularly at early stages (advance auctions)
- Raise auction revenue (consistent with other objectives)
  - Not a primary goal

Source: Australian Government's White Paper (2008)

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Recommendations for Auction Design

- Clock auction with intra-round bidding with aggregate demand revealed in each round,
- Simultaneous auctions of different vintages whenever applicable
- Allowing trade-exposed industries and other recipients of free permits to sell these permits in the auction (double auction extension)
- Proxy bids to accommodate small participants

To tested experimentally:

- Sealed bid vs. Clock auction (no intra-round bidding)
- Sequential vs. Simultaneous
- Clock with information of aggregate demand vs. without info

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Results

- Hypotheses
  - Higher social surplus with simultaneous clock auctions (allocative efficiency).
  - Better price discovery with open clock (information efficiency). Prices are closer to the Walrasian equilibrium and less volatile.
  - Lower prices with open clock (public revenue).

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Conclusions

- No significant differences in multi-unit auction formats
  - Sealed bid and clock formats perform equally well
  - No evidence for increased collusion under clock
- But sequential auctioning of multiple (multi-unit) items yields higher efficiency and higher revenues than simultaneous auction
  - Bidders bid more aggressively on first item of sequential auction
- Recommendations for Australian ETS Auction
  - Use open clock auctions with proxy-bidding (reveal aggregate demand after each round)
  - Auction multiple vintages sequentially (with earliest vintage first)

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Thank you.

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