On carbon prices and volumes in the evolving 'Kyoto market'

OECD / CATEP Global Forum on Emissions Trading,
Paris, 17-18 March 2003

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- Implications for market structure
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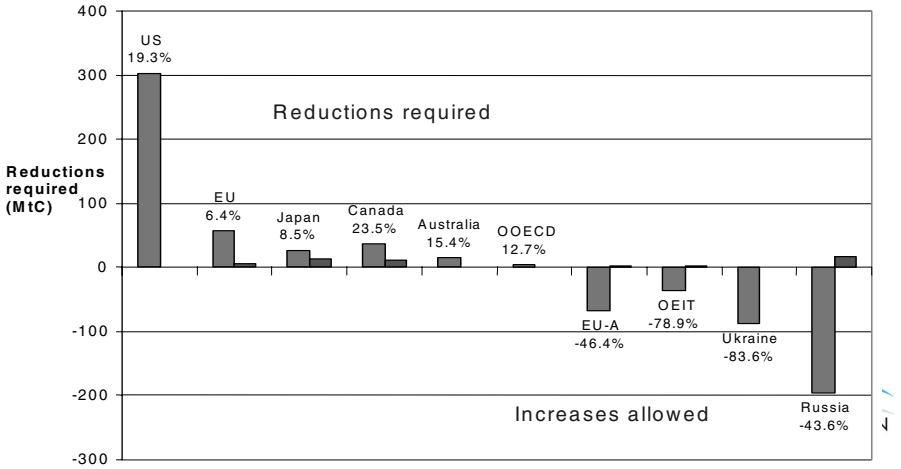
Kyoto commitments and trading potential

Gap between present (yr 2000) emissions and Kyoto target, and managed forest allowances (MtC/yr)



Carbon prices and impact of US withdrawal: modeling studies

Model / study	Equilibrium Carbon Price under Kyoto, $/tCO2e		Price impact of US withdrawal (% decline)
	With US	Without US	
Hagem and Holtsmark (2001)	15	5	66%
Kemfert (2001)	52	8	84%
Eymans et al. (2001)	22	10	55%
Den Elzen and Manders (2001)	37	13.6	63%
Bohringer (2001)	-	'Close to zero'	
Babiker et al (2002)	10	Negligible	

Note: Most of these models do not include non-CO2 gases or full range of carbon sinks.

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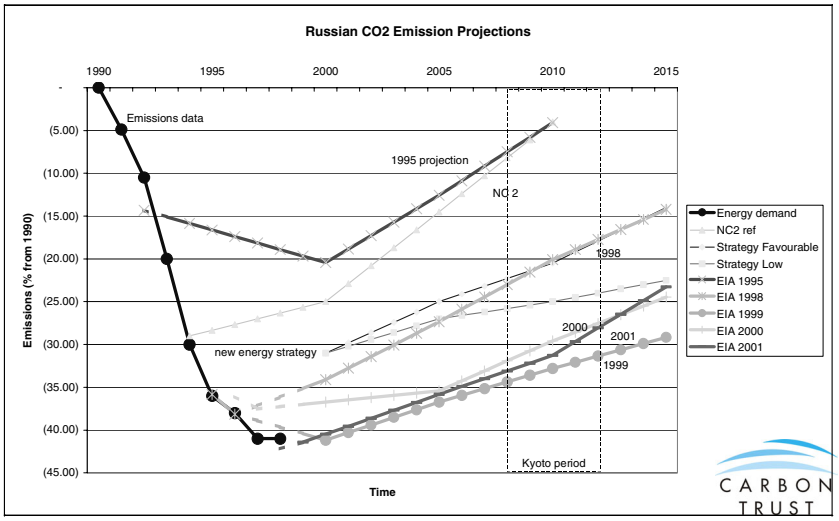
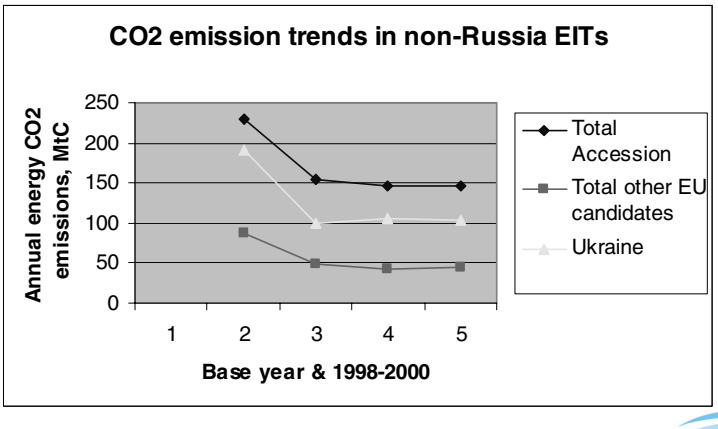
The evolution of Russian energy-CO2 projections



Will EIT emissions 'bounce back'?

Trends in non-Russian EITs by group, [1990] and 1998–2000



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- No emissions growth yet in more advanced EITs
- EU expansion will incorporate considerable surplus allowances

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The political and institutional realities of state behaviour in international trading

'All politics is local'

- Domestic prioritisation
  - Legislation developed & developing - real price facing industry in domestic markets may differ radically from 'international price', governments will protect existing achievements from being undercut by 'junk trades'
- Highly imperfect supply market
  - Transaction costs, market power, will raise costs of international access
- Buyer sovereignty
  - The decisive 'market actors' are sovereign states; complex political and strategic interests will determine what allowances they will accept (for compliance), on what terms

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National interests: the sellers

- Russia and Ukraine
  - Internal actors want real investment into reforming energy sector
  - Reduced revenue expectations after US withdrawal increases need to leverage private sector investment
  - Proposals emerging including 'green investment scheme'
- EU Accession Countries
  - Trading will be part of negotiations on Accession
  - State Aids rules will impede inflated allocations
  - Accession governments looking to sell internationally (and have already started)
- Developing countries
  - Complex political history of the CDM, viewed as a political question (eg. Thai rejection)
  - Dual objectives (crediting, and sustainable development)
  - Emphasis on distributional equity (notably, Africa)

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National interests: the buyers

- EU
  - Historical emphasis on domestic action (eg. supplementarity proposals)
  - Prioritisation of Accession countries and post-colonial relationships
  - Protection of existing domestic legislation
- Japan
  - Force of national commitment
  - Hesitance regarding market mechanisms
  - Distrust of Russia, much closer relationships with Asian neighbors
- Canada
  - Most market-oriented
  - Domestic opposition to unlinked transfers
  - Corporate interest in 'returns'

All these countries will exercise 'buyer sovereignty' to determine what allowances will be acceptable (for compliance), on what terms, reflecting domestic debates

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Analogies with the oil markets?

The oil market:

- International traded price far greater than marginal cost
- Major 'swing' suppliers have big influence but not monopoly power
- Price instability has forced restructuring of markets and relationships
- International collaboration to maintain oil price at 'reasonable' levels
- Strong government-industry interrelationships

Kyoto CP1 carbon market could have all these features
(Russia as the Saudi Arabia; EITs as the OPEC; DCs as non-OPEC)

But important differences:

- Constructed commodity, depends upon institutional credibility (compliance, etc)
- Heirarchy of 'environmental and political legitimacy'
- Sequentially negotiated allocations
- CP1 massive supply-demand imbalance created by US pullout

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Implications for the Kyoto mechanisms - projects

Heirarchy of value led by project mechanisms:

- CDM, small projects
  - renewable energy may be highest value
  - Potential for early start (Delhi, COP8)
- Other CDM
- JI – 'track two' dependent upon Supervisory Cttee
- JI – mainstream, forward trading contingent on meeting eligibility, probably looser project governance

- Removal Units (Annex I sink projects): variable domestic price, low international price
- Total volume from international project credits limited

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Implications for the Kyoto mechanisms – emissions trading

Heirarchy within AAU trading:

- 'Greened' trading: revenues linked to environmental reinvestment (Russian Green Investment Scheme)
- OECD countries that exceed their targets due to domestic action (eg. UK?)
- EIT exports governed through non-GIS-type routes (eg. through domestic trading with 'acceptable' allocation).
- wholesale transfers of AAUs without any linkages or constraints (will this happen at all?)

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Approaches to price estimation

- Likely to be strong price differentiation between project credits and AAUs
- Three approaches to price prediction in context of supply overhang:
  - *Extrapolation:* projection or expert survey based on existing markets (confirms the hypothesis of wide price differentiation between projects and mechanisms)
  - *Sufficiency:* prices required to significantly affect investment behaviour; implies prices around $/Euros 10-20/tCO2 to be relevant in project economics;
  - *Political constraints:* arising from the desire to protect existing domestic policies on the one hand, but to constrain international financial transfers on the other.

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Possible price implications
(i) Project credits

Credits from projects may evolve towards three kinds:

- Linked to European legislation: 'Good quality' (in European eyes), price $15-30 / tCO2eq
  - to be fungible with European emissions trading system and European national legislations
  - sufficient to induce investment in non-marginal projects of perceived high value (eg. renewables, 'political' JI)
- Linked to legislation in other Kyoto countries: Kyoto rules sufficient, price $5 - $20 / tCO2eq
- Non-compliance verified reductions, price $3-10/tCO2eq

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Possible price implications
(ii) AAUs

AAUs will be differentiated according to channel

- 'EU Accession' - may be amenable to modeling of 'Accession bubble', no results found but price below c. Euro 10/tCO2e may be unacceptable
- 'Greened' (GIS)
  - In EU, may be made fungible with Accession AAUs (same price)
  - In Japan, price up to c. $10/tCO2e may be acceptable
  - In Canada, price significantly lower - up to $5/tCO2e
- Price range for AAUs channeled through corporate allocation in CEE, Russia & Ukraine may be similar, subject to scrutiny
- Larger, lower priced transfers may be made on state-to-state, case-by-case basis, not accessible to private sector

- Price floor may be influenced by 'shadow price' that would be consequent upon US re-entry, c. $5-10/tCO2e ?

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Kyoto supply-demand balance scenarios

	Low surplus scenario		High surplus scenario	
MtC/yr avg	Emissions change % 2000-2010		Emissions change % 2000-2010	
Demand		**220**		**53**
EU-15 C	7%	120	-3%	30
Japan C	10%	58	-3%	17
Canada C	15%	61	0%	37
Other GHGs		12		-2
Managed forests		-30		-30
Supply		**331**		**587**
Russia	20%	106	0%	196
Ukraine	20%	67	0%	87
Accession 10	25%	45	5%	75
Other EIT	25%	24	0%	36
Other GHGs		24		79
Managed forests		40		40
CDM (equiv. annual)		15		50
Surplus		**110**		**530**

Conclusions on the 'state economics' of the Kyoto-Marrakech System

- No uniform international carbon price: strong differentiation
- Carbon price facing companies will vary according to location and nature of project
- Many international transactions will be at higher price than competitive models predict
- Oil markets demonstrate this is not such an unusual situation: various analogies can be drawn
- This could only change if something is done to restore supply-demand balance in the system
- Supply demand imbalance / carry over potentially in range 100 to 550MtCeq/yr, most likely 200-400 ?

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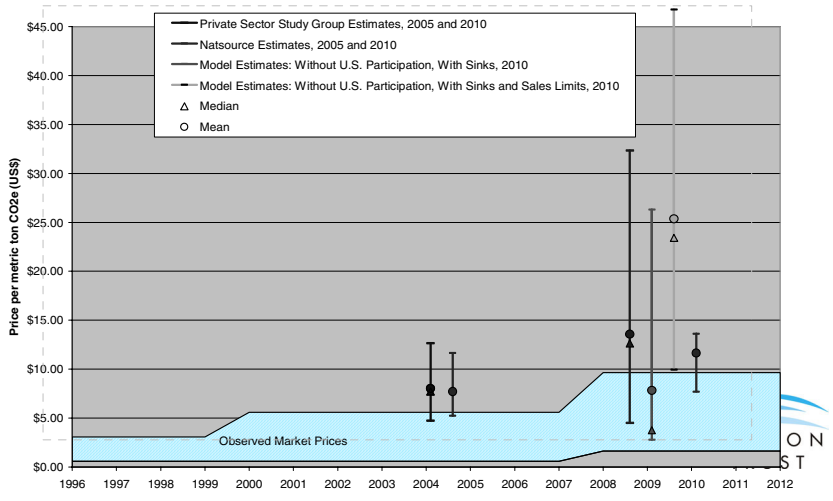
Price projections:
results of Natsource survey



Fuel prices in carbon terms

		Unit	Price, $/unit Min	Price, $/unit Max	Price, $/tCO2e Min	Price, $/tCO2e Max
Coal	Steam	Tonne	40	50	13.6	17.0
	Industry	Tonne	30	70	10.2	23.9
Oil	Crude	Barrel	15	30	40.9	81.8
	Auto Europe	Litre	0.55	0.95	239.7	414.0
	Auto N.Am	Litre	0.33	0.4	143.8	174.3

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International revenue flows

- implicit constraints upon prices

	Current ODA expenditure (1998 data)		Likely volume of imports, (MtCO2e/yr)		Price required for allowance trade to equal x% of ODA ($/MtCO2e)	
	US $bn/yr	% GNP	Low	High	20%	5%
Japan	10640	0.28	100	200	21.28	2.66
Canada	1691	0.29	50	100	6.76	0.85

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