

CGE–Regional Analysis of Climate Policy in Canada

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¹The work reported here is joint with Tracy Snoddon

- Intro Remarks
- Canadian Climate Policy
- MAC curve for carbon
- Data: CREAP
- Model: cmrt-f (overview and novel aspects)
- Selected Findings
- Refinements and Extensions

Introductory Remarks

- work in progress** intent was to use revised data and model²
revised model is running but emissions data is not
- regulatory elements** rather restricted, intent to extend and improve
calibration
- hypothetical alternative** a largely symbolic carbon tax (\$1/t)
introduced in 1992 and commitment to raise it by \$1/t
every year (about .03–04/l today)

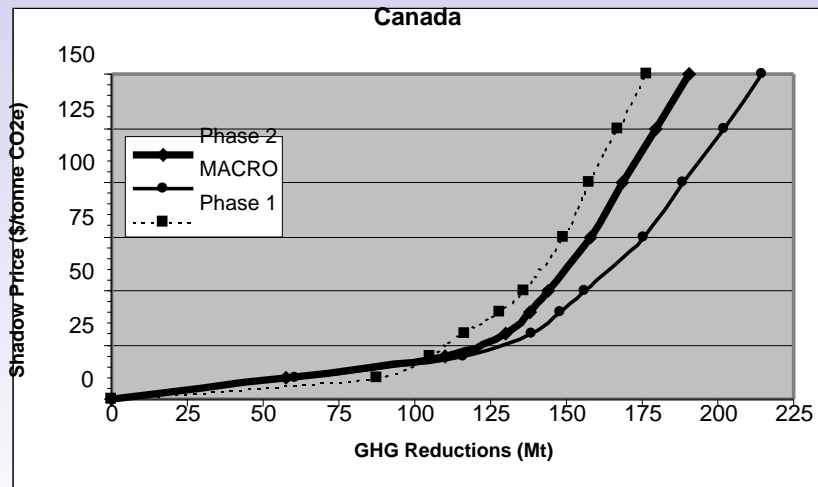
²Based on newer IO data and NRCan 2006 forecast

Federal Climate Policy

- Federal Climate Policy has been in a state of considerable flux.
- 2002 plan (and by implication Project Green) criticized for excessive reliance on voluntarism and virtual absence of user pays[JRH04]
- 18/50 mT reductions achieved 00-05³

³At an average cost of \$200/t

Figure 4.1 MJA Associates 2003



Clean Air Act targets much more modest; longer time frame

C-288 attempt to require Tories to meet Kyoto targets on Kyoto timeline (C-288 killer report)

provinces a number of provinces have announced plans and/or floated ideas about 'going ahead without the federal government' (versus going it alone)

Québec/BC plans

	British Columbia	Québec
overall target	10% below 1990 (2016)	1.5% below 1990 (2012)
transportation	vehicle emissions standards, alternative fuel incentives, hybrid subsidies	
electricity	100% carbon sequestration	
general ^a	Innovative Clean Energy Fund	Green Fund (from carbon royalties)
buildings	revised building code	revised building code; higher stds for gov't buildings

^aBoth funds focus on clean and renewable energy technologies

- **Canadian Regional Economic Analysis Project**
- microconsistent provincial data set⁴ includes:
 - tax detail
 - energy goods disaggregated
 - GHG emissions
- generic CRS/CES/CET CGE model† and documentation

⁴based on S-level IO data, 1998

- MCP formulation based closely on BMRT
- calibrated to be similar to CIMS for \$30 carbon tax
- Extensions/Refinements:
 - non-fossil electricity specify initial cost disadvantage
 - sinks and sequestration step functions from [Mar03]
 - vehicles constraint on fuel intensity of transportation and final demand
 - equal yield possibility to do equal yield type experiments (here use federal direct (income) or consumption (GST) taxes)

Federal Regulation federal government uses only regulatory (non-incentive based) instruments to reduce emissions

Federal Permits federal government uses only a tradeable permit scheme that causes all emitters to face \$30/t world price at the margin

Provinces Regulate (Federal Permits) BC and Québec invoke regulatory measures while the federal government uses permits

Provinces Regulate (Federal Regulation) BC, Québec and the federal government use regulatory measures only

In all cases assumed \$C30/t world price for CO_2 permits.

Federal Regulation

	Federal		Federal plus QC/BC	
	Welfare %	CO2 (%)	Welfare %	CO2 (%)
NF	-0.76	-2.93	-0.70	-2.80
PE	4.48	4.21	4.39	3.78
NS	0.49	-3.46	0.45	-3.34
NB	1.35	-0.78	1.43	-0.24
QC	-1.89	-1.82	-2.50	-3.60
ON	-1.76	-1.31	-1.61	-0.80
MB	-1.40	-5.54	-1.33	-3.01
SK	2.82	-0.03	2.72	0.07
AB	3.52	-1.60	3.60	-1.54
BC	-1.53	-1.47	-2.57	-4.76
Canada	-0.80	-1.47	-1.01	-1.58
Permit Purchases (Mt)		258.5		257.6

Regulatory Case

- qualifications (focus on key differences)
- small effect on emissions due to:
 - ① narrow range of regulations modeled
 - ② leakage via prices of energy to unregulated emitters
- provincial initiatives have very limited effect:
 - ① overlap with federal initiatives
 - ② leakage within and across provinces
- federal revenue falls mostly because of costs of subsidies (federal action only) but mostly because of reductions in direct and indirect tax revenues when BC and Québec also act

Federal Permits

	Federal Permits		Federal Permits + QC/BC	
	Welfare %	CO2 (%)	Welfare %	CO2 (%)
NF	-0.70	-11.36	-0.79	-11.37
PE	-1.77	-9.39	-1.86	-9.64
NS	-0.54	-29.42	-0.50	-29.25
NB	-1.01	-17.42	-1.00	-17.48
QC	-0.78	-11.21	-1.35	-12.36
ON	-0.73	-15.87	-0.65	-15.65
MB	-0.68	-17.10	-0.60	-16.96
SK	-0.77	-30.52	-0.78	-30.01
AB	-0.41	-31.05	-0.38	-30.71
BC	-0.65	-14.66	-1.69	-17.73
Canada	-0.70	-22.76	-0.92	-22.81
Permit Purchases (Mt)		71.3		70.9

Provincial Regulation in Permit Setting

- 1 permits work here because they reach all emitters
- 2 provincial regulatory effects have very limited impact because of:
 - 1 overlap with permit scheme
 - 2 leakage within and across provinces
- 3 most other provinces lose less whereas BC, QC lose more

Overview of Findings

- regulatory approach is not very effective (either level)
(modeling issue)
- adding provincial to federal regulation is ineffective for many reasons beyond limited scope of our modeling: i) within-province leakages via energy prices ii) overlap with federal programs latter gives federal government free ride
- all runs have federal government complying, whereas more reasonable approximation for 2008–2012 is no action

Concluding Remarks

- revised model/data distinguishes F/P/L governments, to permit tracking of provincial revenue changes and responses
- intent to add other regulatory measures and improve calibration of existing ones



Mark Jaccard, Nic Rivers, and Matt Horne.

The morning after: Optimal greenhouse gas policies for Canada's Kyoto obligations and beyond.

Technical report, C. D. Howe Institute, March 2004.

Commentary #197

http://www.cdhowe.org/pdf/commentary_197.pdf.



Mark Jaccard Associates.

Construction and analysis of sectoral, regional and national cost curves of GHG abatement in Canada.

Technical report, National Climate Change Implementation Process, 2003.

Final Report prepared for the Cost Curves Working Group, Analysis and Modelling Group.