

Carbon Taxes

Nic Rivers

BC Sustainable Energy Association

Vancouver, May 2008

Outline

1. Understanding the economic response to carbon taxes
2. Why economists like carbon taxes
3. Stringency

1. Understanding economic response to carbon taxation

Response to a Carbon Tax

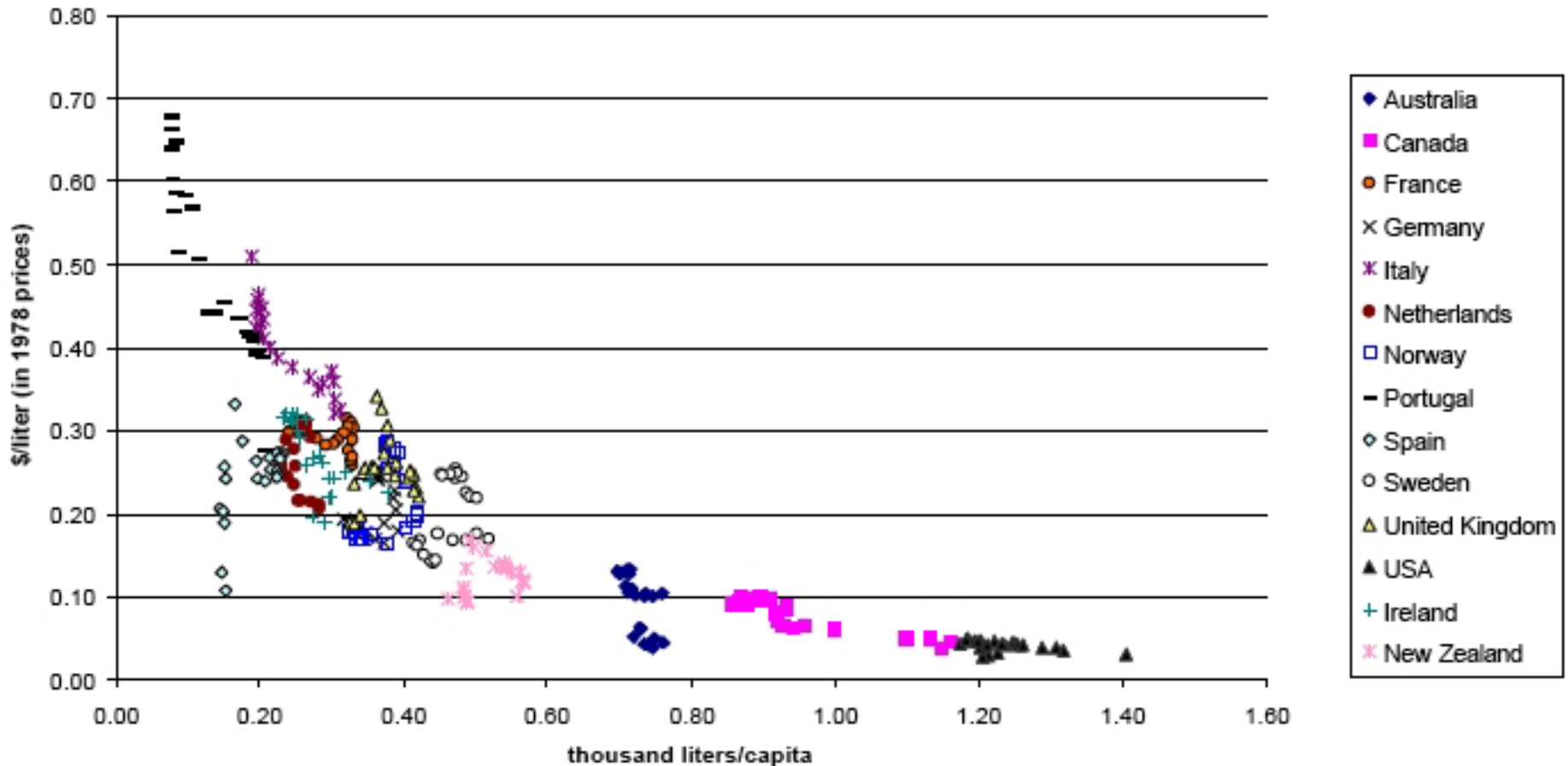
- “I’m not going to stop driving...”
- Response increases over time:
 - Small immediate behaviour change (when technology/capital is inflexible)
 - Larger change when capital is flexible
 - Larger change when firms have time to develop new technologies
- Overall long-term response to a price change is larger than most people imagine

Personal Transportation Elasticities

- Personal transportation generally considered least price responsive sector
- Price elasticity is percent change in demand associated with a 1 percent increase in price
- Short run gasoline price elasticity:
 - 350+ international studies surveyed: $\sigma = -0.25$
- Long-run gasoline price elasticity:
 - 200+ international studies surveyed: $\sigma = -0.77$
 - Recent Canadian data: $\sigma = -0.9$

Source: Graham, D. and Glaister, S. 2005
“Decomposing the determinants of road traffic
Demand”. *Applied Economics*.
Yatchew, A. and No. J. 2001. “Household gasoline
Demand in Canada” *Econometrica*.

Cross-country Gasoline Demand



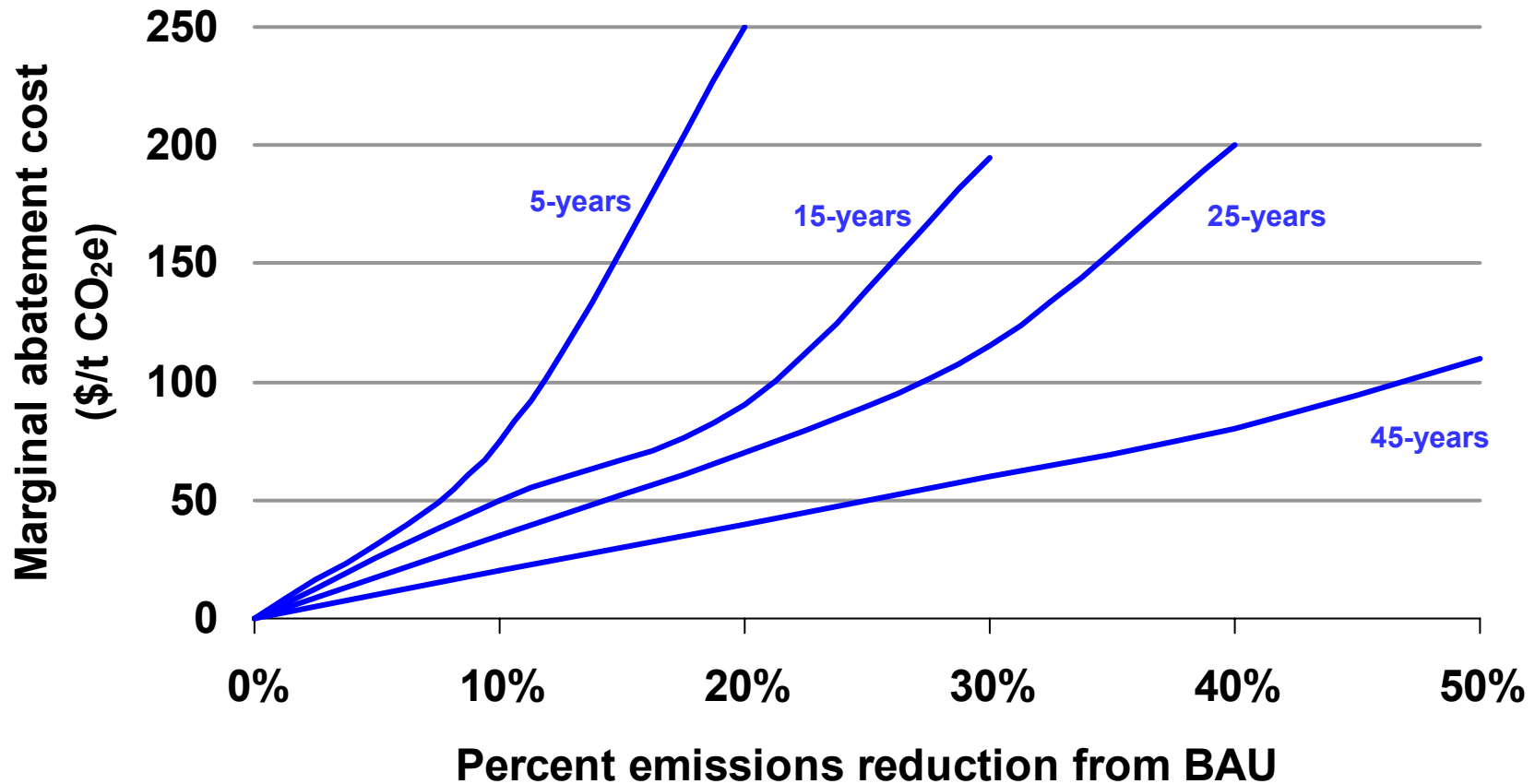
Source: Hammar, H., Lofgren, A., Sterner, T.2004
 "Political Economy Obstacles to Fuel Taxation"
The Energy Journal.

Note: This study implies a long-run price elasticity of -1

Interpretation of Elasticities

- BCs \$30/t CO₂ tax will increase the price of gasoline by about 5 percent
 - Short run response: 1-2 percent reduction in gasoline demand
 - Long run response: 4-5 percent reduction in gasoline demand
- Other sectors are likely to be more price responsive than transportation

Modeled Response to Carbon Taxes

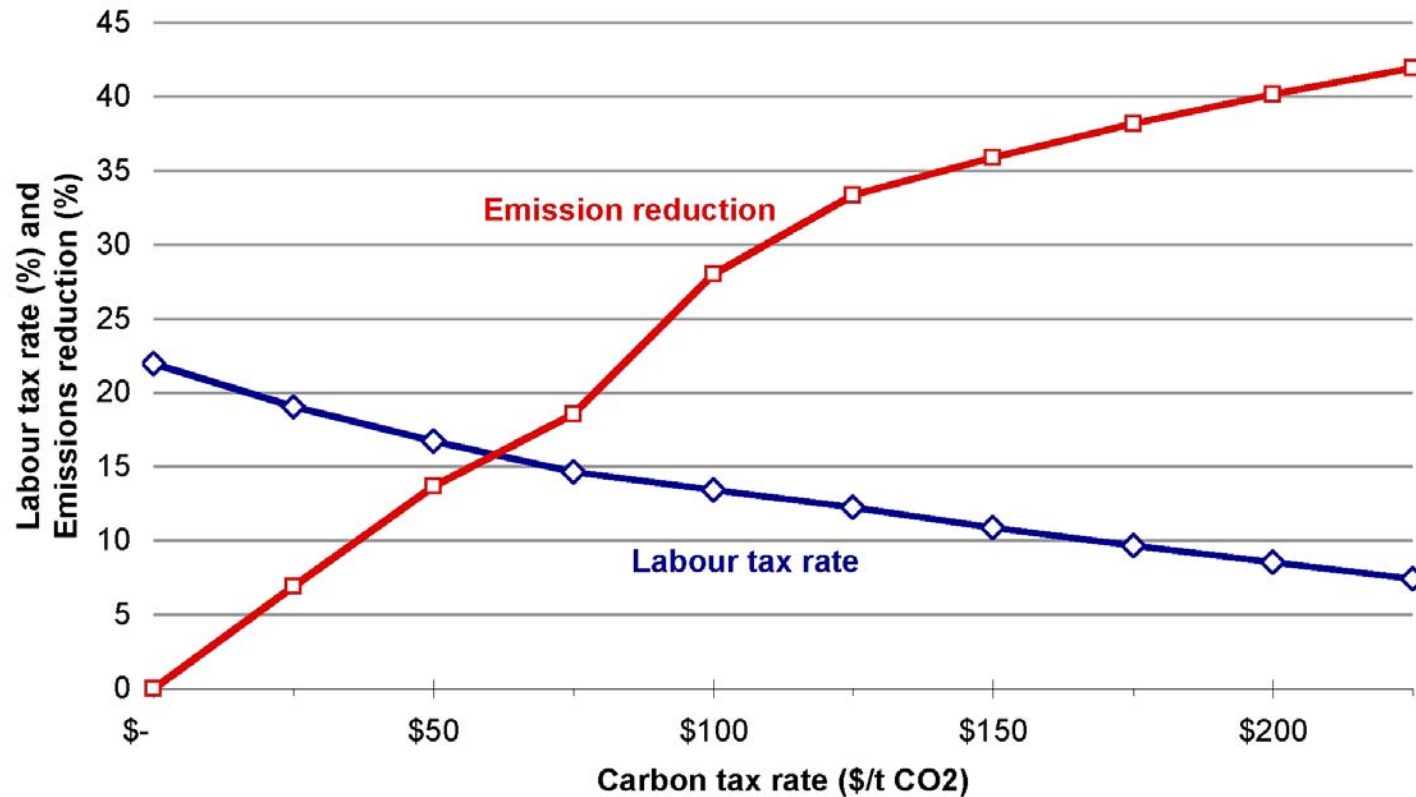


2. Why economists like carbon taxes

Attributes of carbon taxes

- Flexible and efficient
 - Firms and individuals can choose between continuing current behaviour (while paying the tax) vs. reducing emissions
- Low administrative burden
 - Current tax collection structure can be used
- Effective
 - Induce reductions in carbon emissions
- Raises revenue
 - Can be used to reduce other taxes which hinder economic growth
- **Using carbon taxes to reduce emissions will cost less than using other policies**

Analysis of Canadian carbon tax



*Note: Study conducted using GEEM model applied nationally;
Assumes all carbon tax revenue is recycled to reduce personal income tax.
Results are for year 2020.*

Source: Rivers, N. and Sawyer, D. 2008.
"Carbon-centred tax reform in Canada".
Report prepared for David Suzuki
Foundation.

3. Stringency

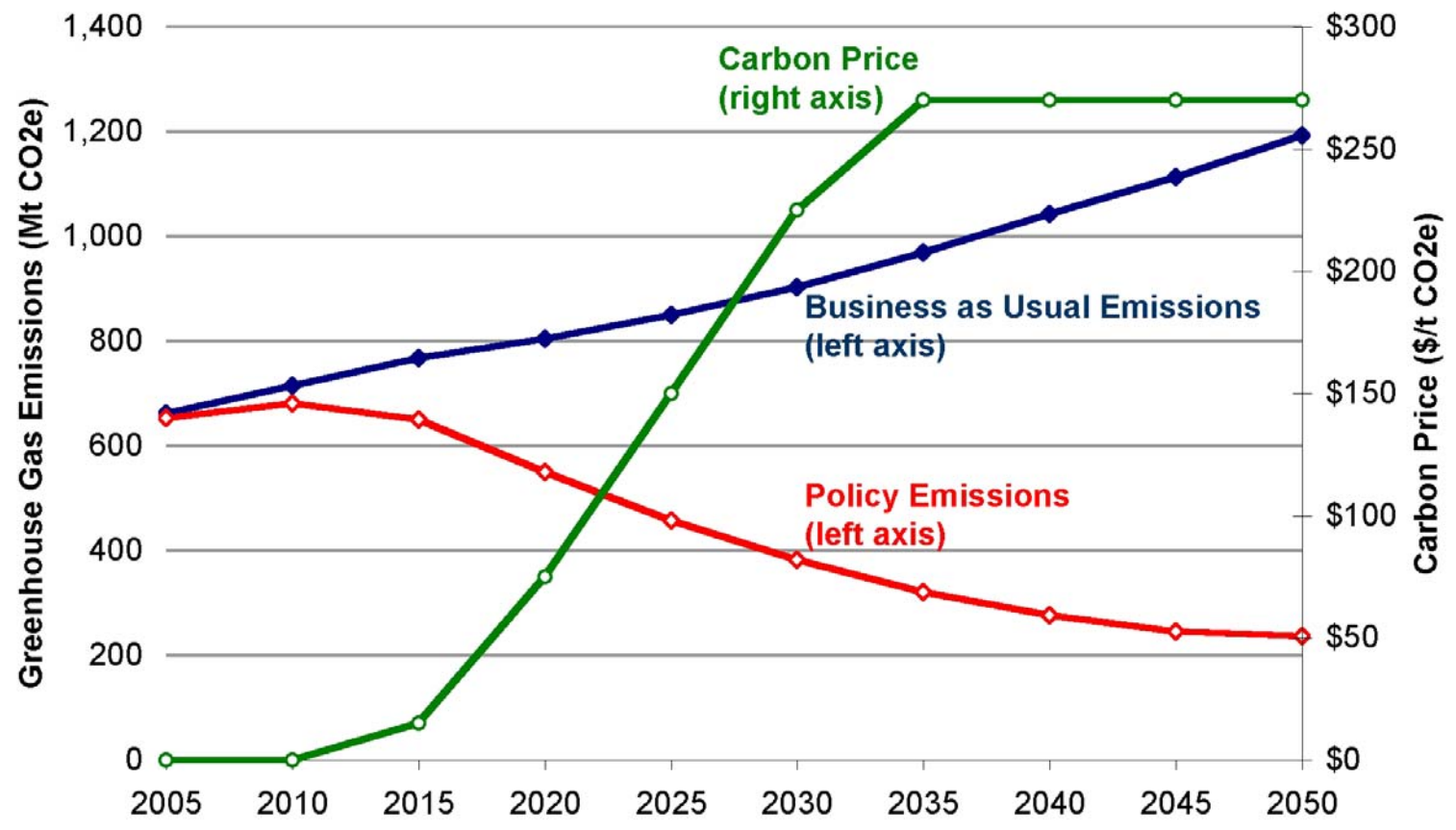
Large reduction in GHG emissions desired

- International community is focused on capping emissions at 450-550 ppmv CO₂
 - Entails 60-90% reduction in GHG emissions from current levels by developed countries by 2050
- Current federal target: 65% reduction from current levels by 2050
- Current British Columbia target: 80% reduction from current levels by 2050

Stringent policies are required

- Various models (MIT-EPPA, CIMS) estimate that a tax would have to reach \$200 to \$300/t CO₂ to reduce emissions by 60-80% from current levels by 2050
- BC's carbon tax is an excellent start, but well below stringency required for deep reductions
- Delay in implementing policy implies that larger policies will be required in the future, or that goals will not be met

Modeling policy stringency



Note: Study conducted using CIMS applied nationally. Agricultural and waste emissions are excluded.

Source: Bataille, C., Rivers, N., Peters, J. 2007. "Pathways for deep GHG emissions reductions". Report for NRTEE.