

CAPP Perspective on CCS

PTAC Vision to Value Forum

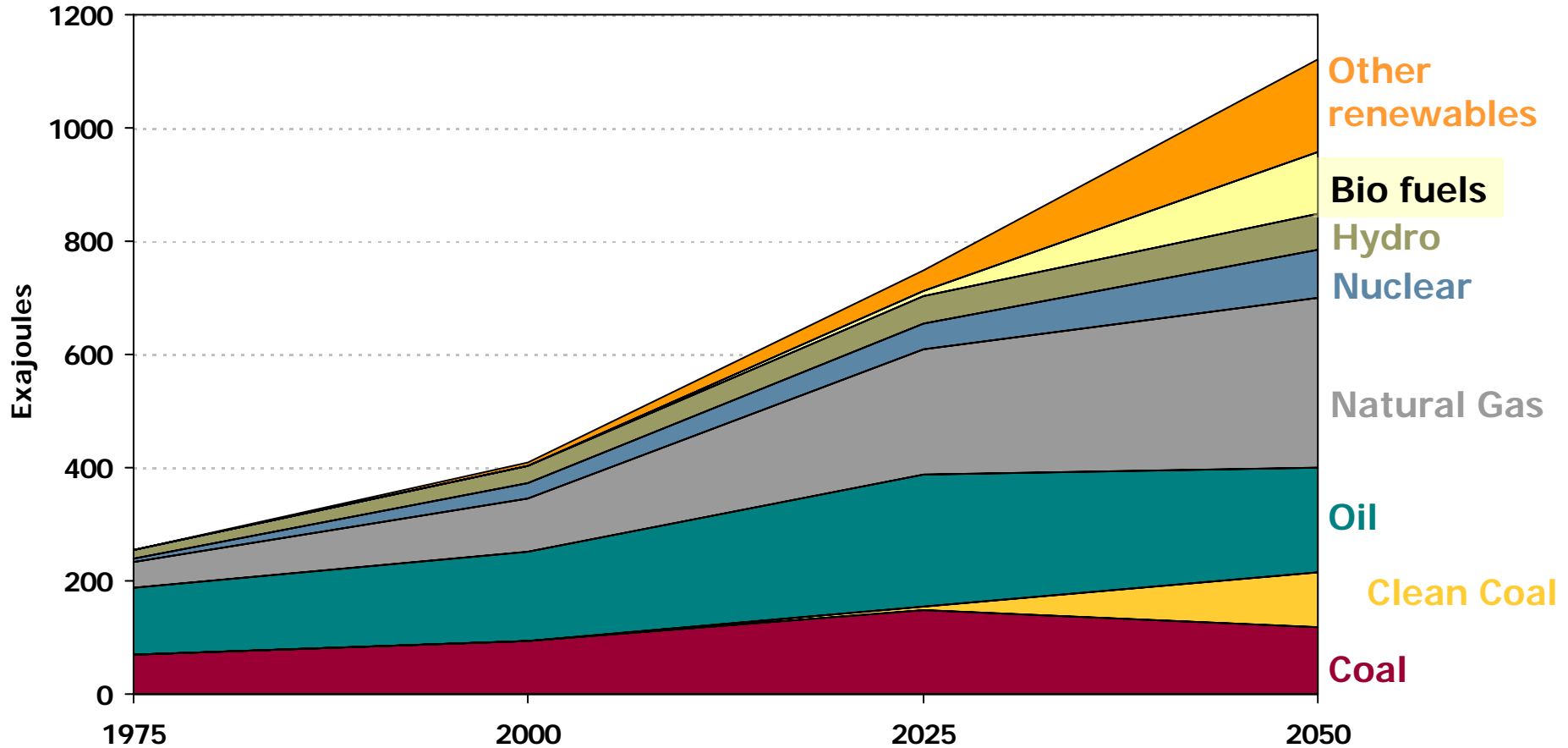
Rick Hyndman



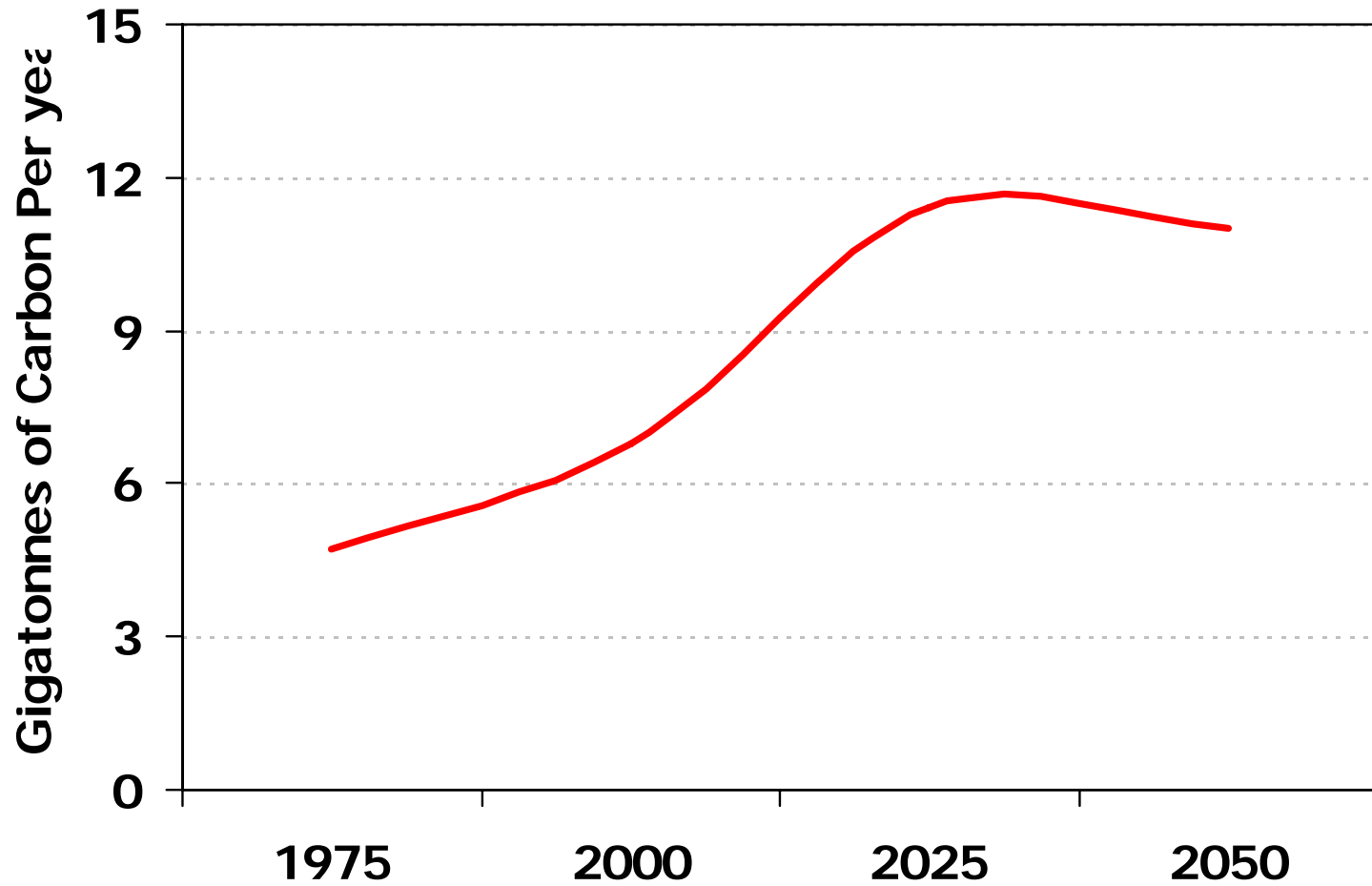
- **CCS essential to reconcile rising global and Canadian use of fossil fuels and reducing GHG emissions**
- **Canada's GHG emission objectives: the key role of technology**
- **Role of industry targets and Offset Program in promoting CCS**
- **Other elements of CCS strategy**

The Climate Change Challenge:

Energy use will continue to rise,
fossil fuels continue to dominate primary energy



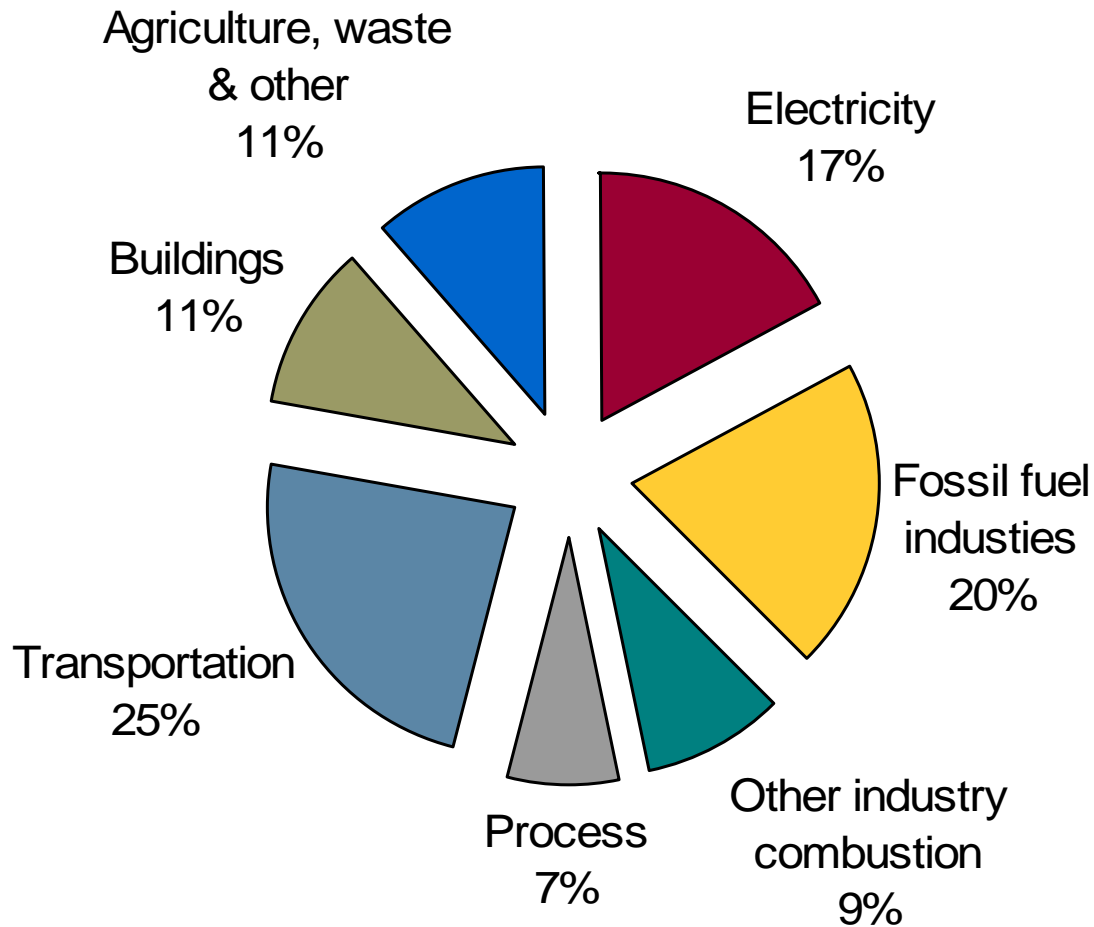
Shell Group 2001: Spirit of the Coming Age, Abundant Energy Supplies in a Fuel Cell World



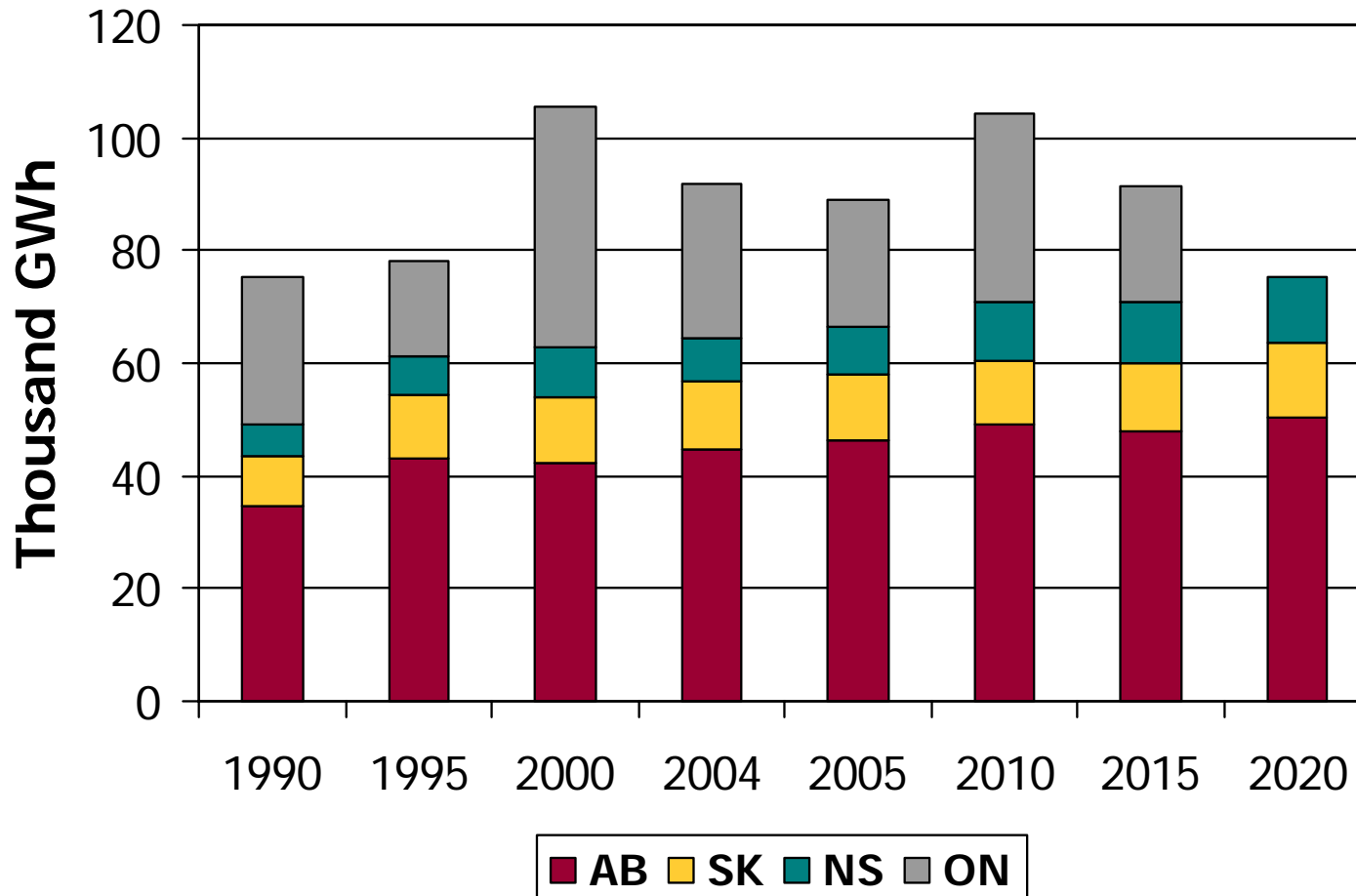
Approximation for Shell Scenario: Spirit of the Coming Age, Abundant Energy Supplies in a Fuel Cell World

Canada's GHG Emissions 2004

Total 758 mT CO₂e

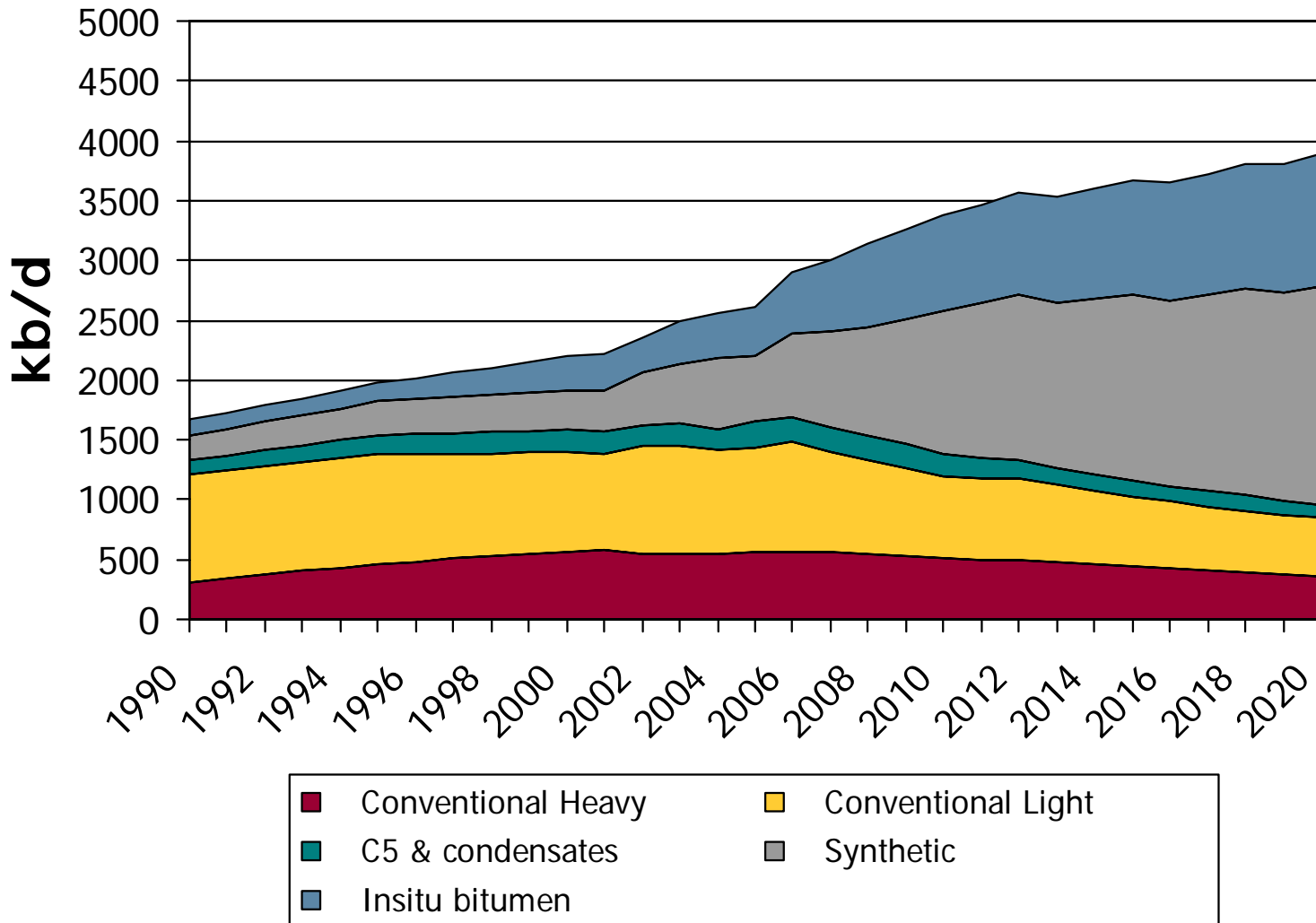


Coal Fired Electricity Generation



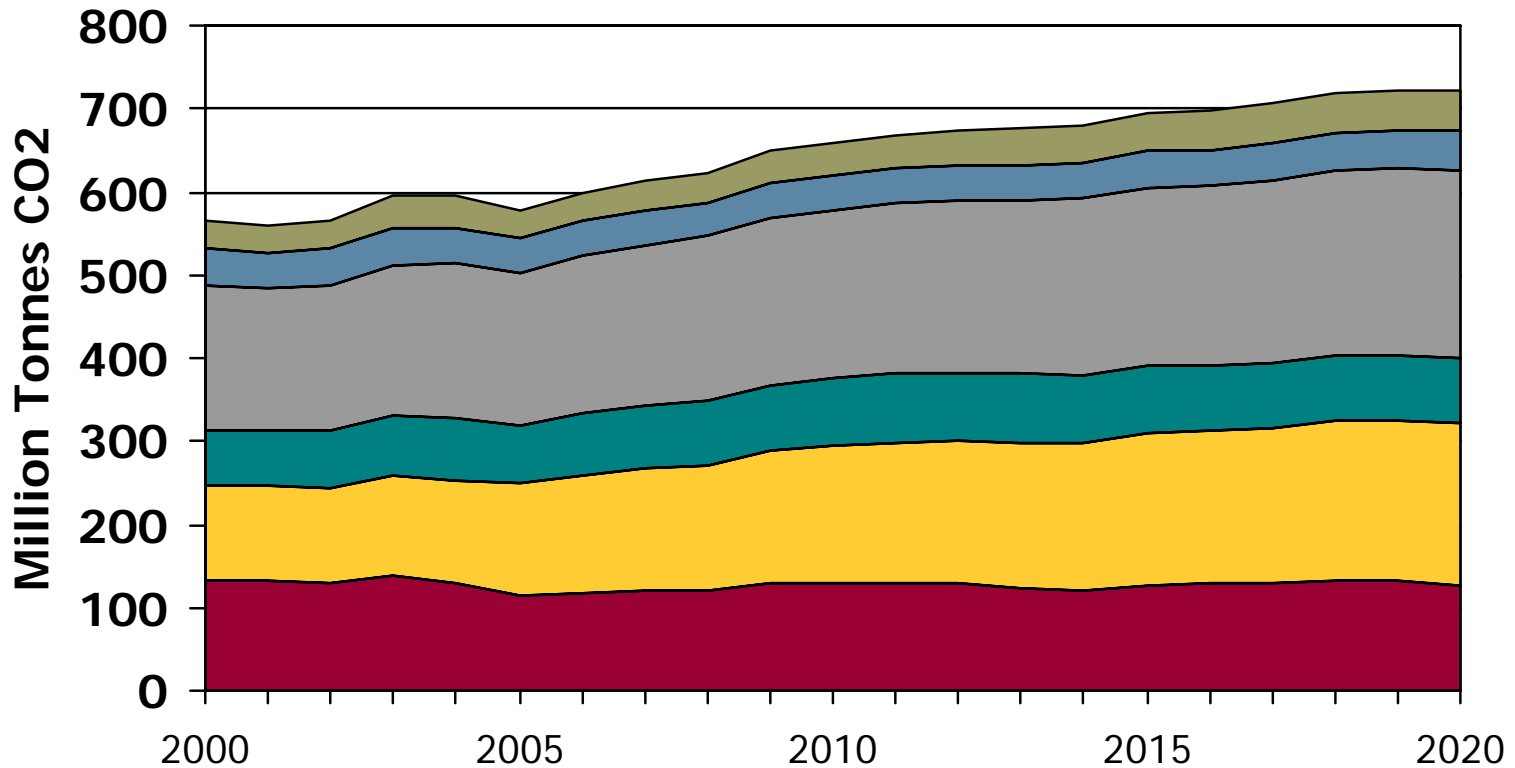
Source: NRCAN 2006 Reference Case

Canadian Oil Production: NRCan Reference Case

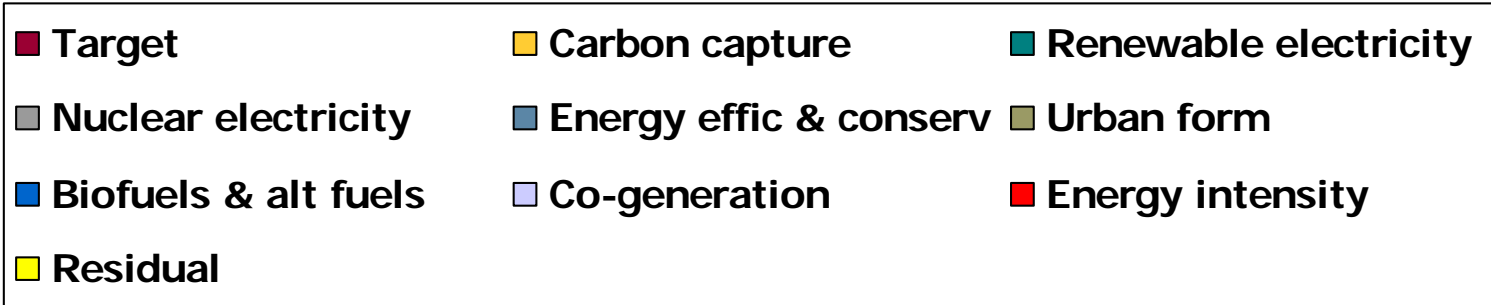
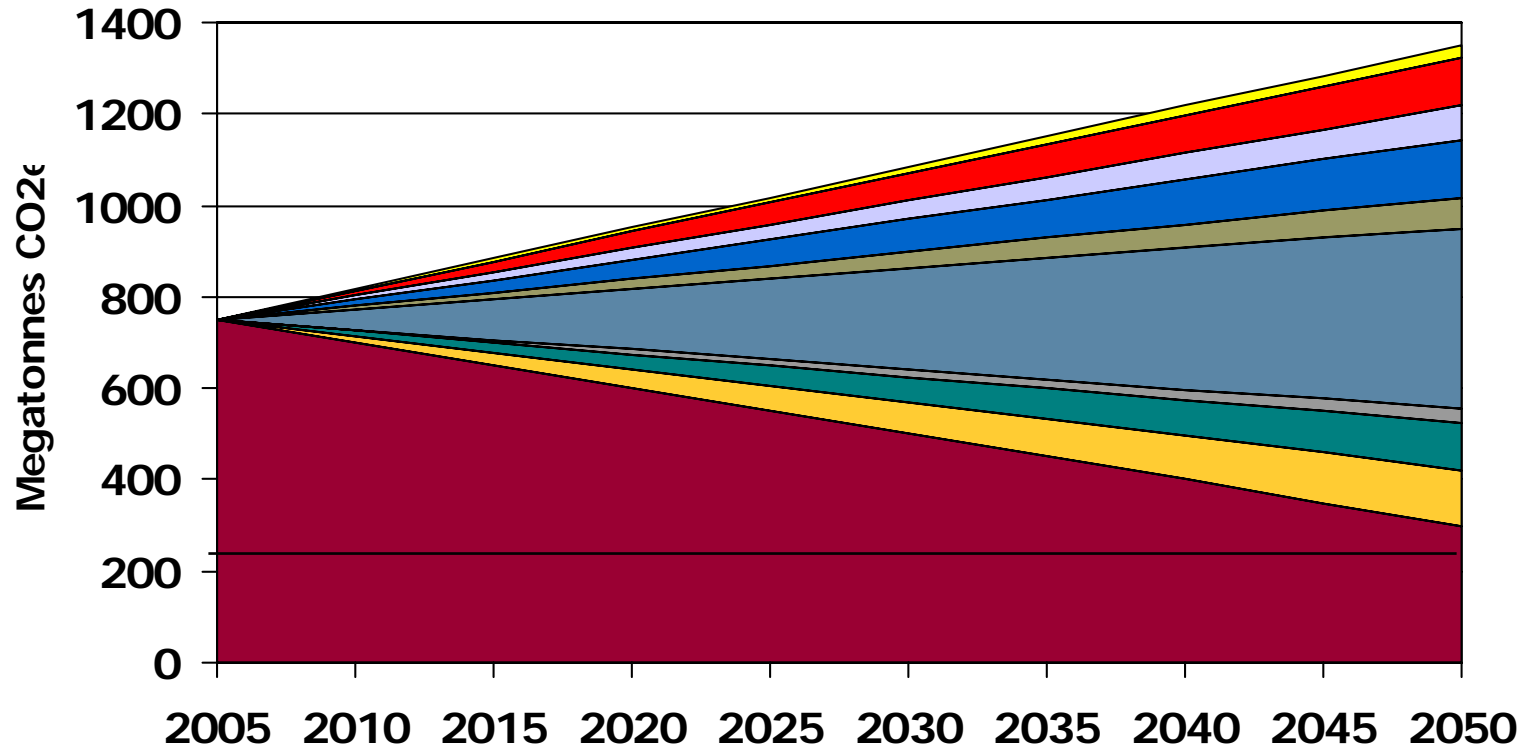


Source: NRCan 2006 Reference Case

CO₂ Emissions: NRCan 2006 Reference Case



NRTEE Action Wedges for a 60% reduction in GHGs by 2050



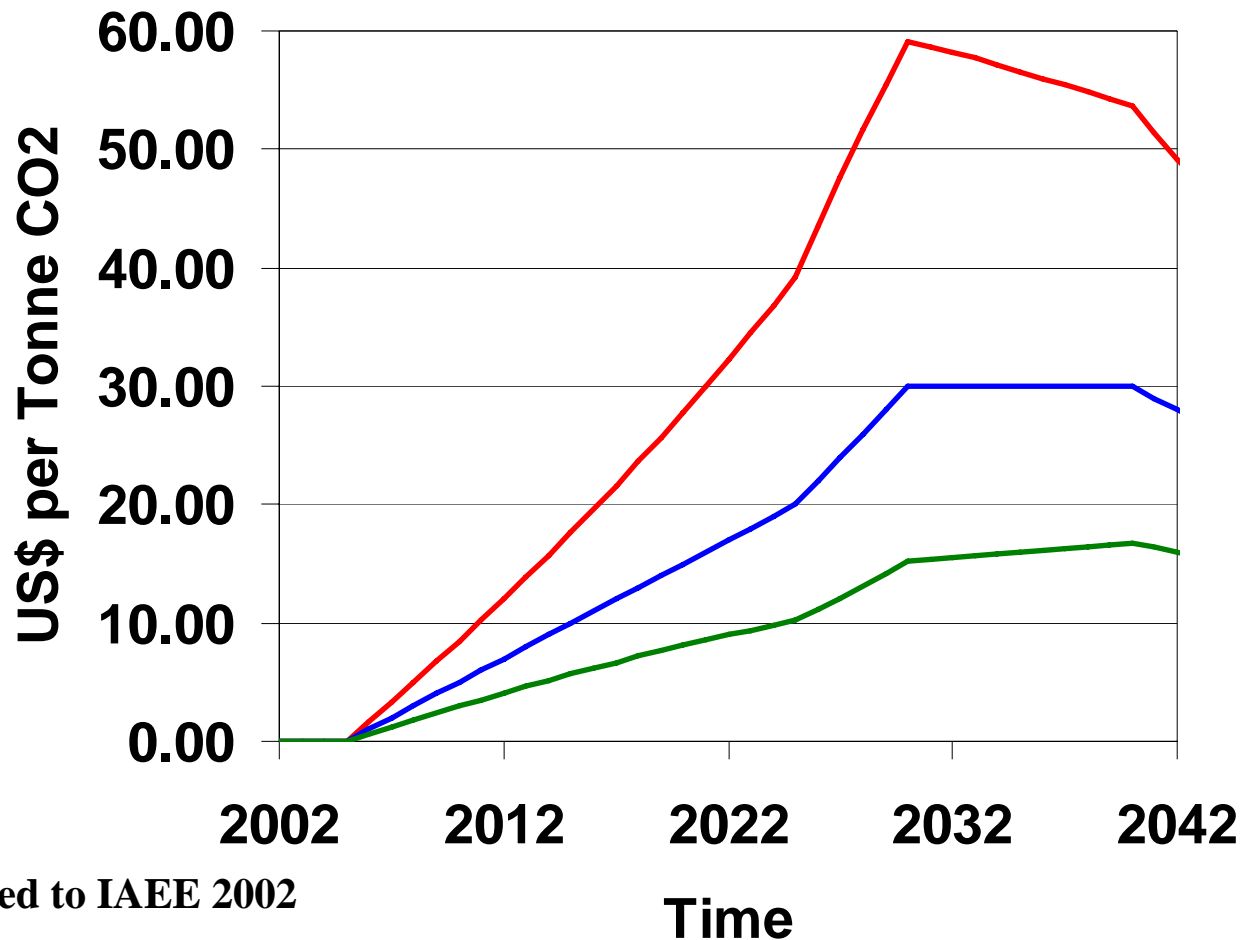
- **What Canada needs to do in the near term as its contribution to the initial international effort on climate change**
 - Defined in terms of effort not emission levels
 - improve efficiency to slow growth of GHG emissions
 - Invest in development of GHG-reducing technology for future reductions
- **The Federal Notice of Intent to regulate GHGs**
 - Near-term: 2010-2015
 - Medium term: 2020-25
 - Long-term: 2050

- **Large industry intensity targets for the near term**
 - Build on work done for LFE targets
 - Improve performance + increase investment in technology development
 - Compliance option of contribution to Technology Fund or directly to qualifying projects on the basis of a defined compliance price CO₂
- **Compliance price should increase over time, assuming the major emitting countries are on a similar path**
- **Manageable cost burden on industry from targeted intensity improvement and compliance price schedule**
 - Recognizes that trade competitors and partners have not yet imposed costs on their industry for GHG emissions

CO₂ price signal – proxy for the level of global effort to reduce GHG emissions

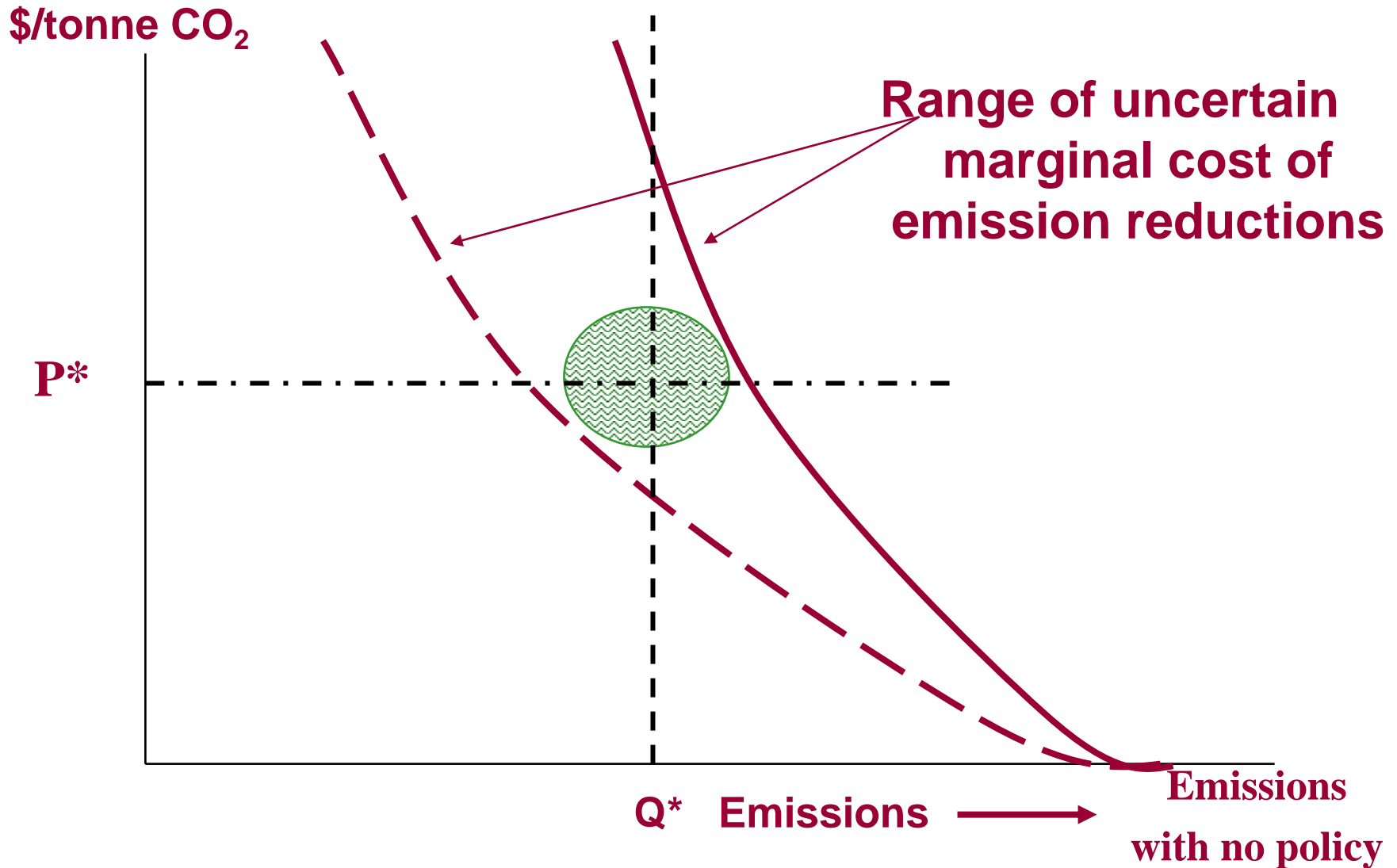


CO₂ Price Medians, 80% Intervals

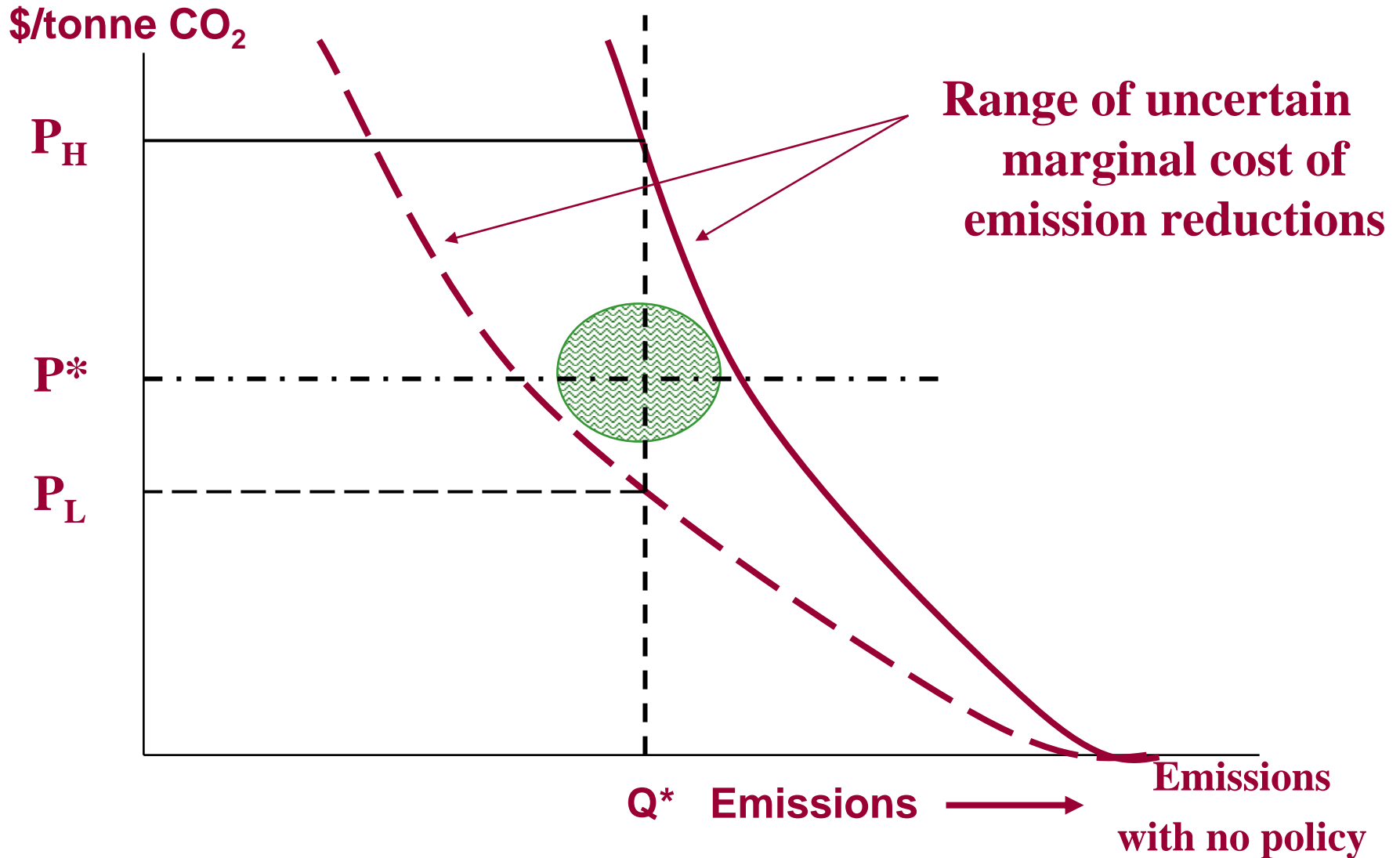


Forecast presented to IAEE 2002

Emission reduction cost uncertainty & price versus quantity approaches to policy

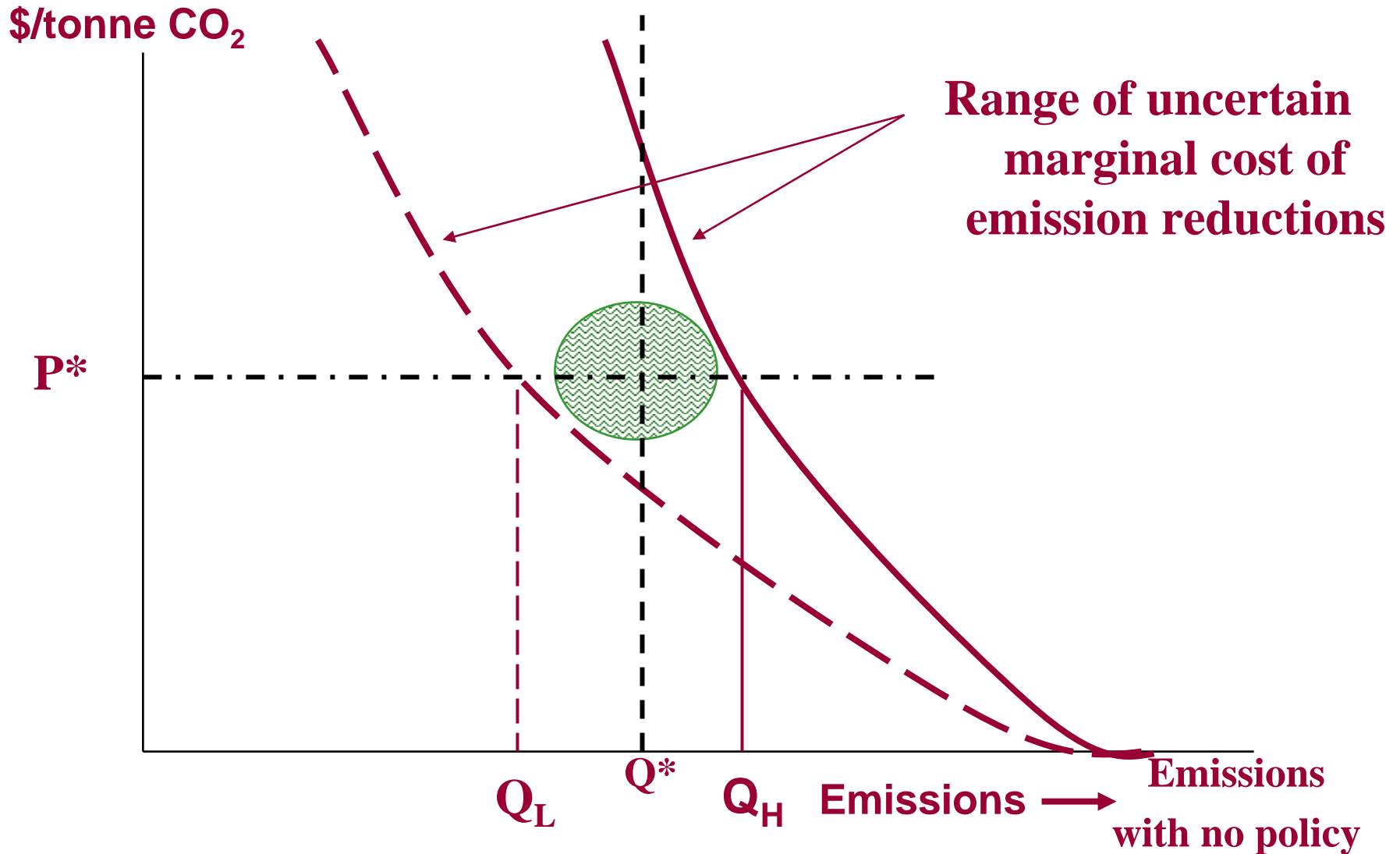


Emission reduction cost uncertainty & quantity cap



- **Regulation requiring permits to cover annual emissions**
- **Allocation of permits**
 - Auction: equivalent to a carbon tax with a market determined rate
 - Allocation to emitters on some basis so the cost to them is less than market price X total emissions
 - Grandfathering
 - Per unit of output
- **Market determined price of permits**
 - Total quantity of permits issued: annual emissions quantity target
 - Marginal cost of reductions
 - Fluctuations in economy, weather
 - Speculation by emitters and other market players

Emission reduction cost uncertainty & defined price signal



- **Regulation setting out intensity targets below business as usual**
- **Credits for reductions outside targets that qualify under the Offset Program**
 - notably storage of CO₂
- **CO₂ credits for performance better than targets**
- **Compliance obligation where emissions > targets**
 - Contributions to Technology Fund at defined compliance price (e.g. \$15/tonne CO₂)
 - Use of purchased CO₂ credits
- **The compliance price is the driver for the market mechanism to provide incentive for low cost emission reductions**

- **Pressure to improve performance of existing facilities + contribution to technology development**
- **Major reductions in emission intensity and the level of emissions in the medium-long term through new investment incorporates more efficient technology – capital stock turnover and technology transformation**
- **Escalating price over time**
 - Signal to market of intent to pursue more costly reductions over time, in line with efforts of major emitting countries

- **The industry intensity targets and Offset Program alone cannot drive CCS at this stage**
 - The general CO₂ price signal for emission reductions that is appropriate for the near-term is too low to incent CCS beyond the lowest cost capture opportunities near highest value EOR projects
 - Target compliance contribution to technology development can provide some support for CCS
- **Questions for other strategy elements to advance development and deployment of CCS**
 - How much benefit can there be from learning by doing?
 - What is the appropriate path for CCS deployment & how is it related to expected technology advances?
 - What roles should be played by provinces, federal government, industry and other GHG emitters?