

# Addressing Greenhouse Gas Emissions from the Personal Transport Sector: Identification and Evaluation on Policy Options and Tradeoffs

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Emission Trading

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# Overview of Presentation

- Purpose of Study
- The Need to Address Personal Transport
  - Major contributor to CO<sub>2</sub> emissions in 2003
  - Emissions up significantly since 1990 and growth will likely continue
  - Achieving compensating reductions has equity and economic implications
- Existing Policies to Address Transport Emissions
  - Policies not developed to address GHG emissions
- Shortcomings of Efficiency Standards to Address Transport Emissions
- Policy Objectives and Options for Addressing Transport Emissions
- Evaluation Criteria
- General Evaluation of Options and Tradeoffs
- Conclusions

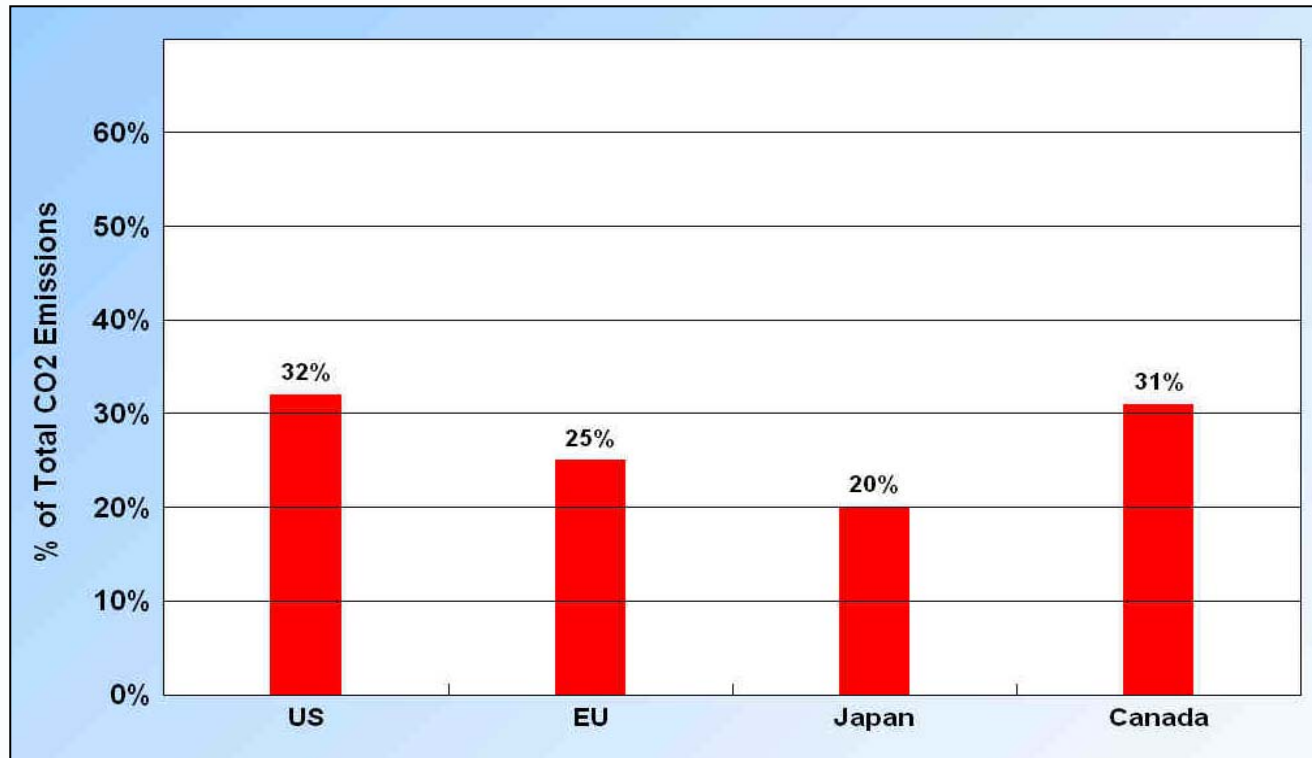


# Purpose of Study

- Review existing transport policies and their limitations in addressing GHG emissions
- Describe alternatives, with an emphasis on emissions trading programs
- Evaluate alternatives against economic and environmental criteria
- Identify tradeoffs



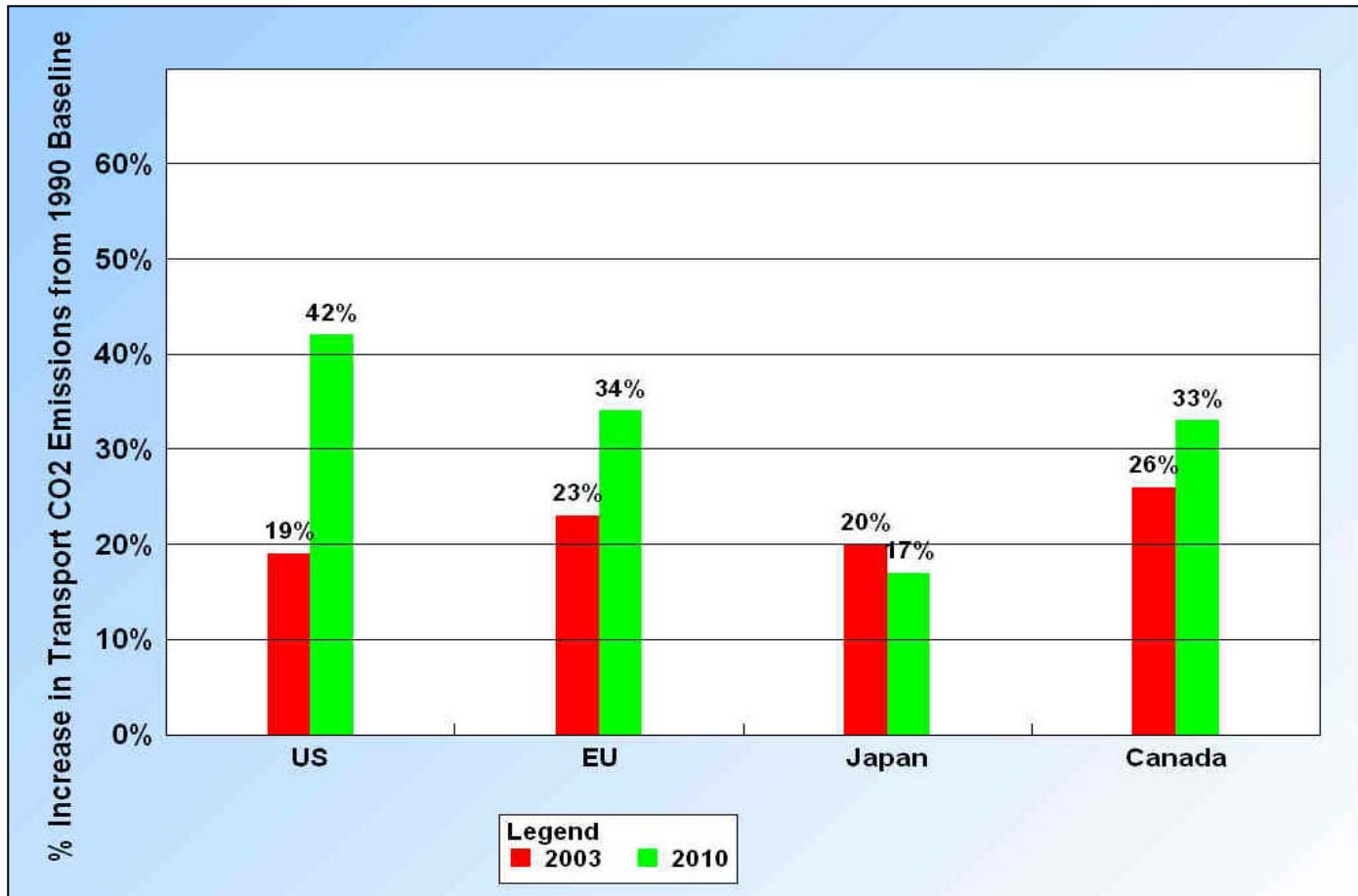
# The Need to Address Personal Transport\*: Major Contributor to CO<sub>2</sub> Emissions in 2003



\* Personal GHG transport emissions comprise the overwhelming majority of all transport emissions. Some policy options considered here are applicable to all transport emissions.



# The Need to Address Personal Transport: Emissions Up Significantly Since 1990 And Growth Will Likely Continue



Some new thinking from Natsource.  
More growth. Less pollution.



# The Need to Address Personal Transport: Achieving Compensating Reductions Elsewhere Has Equity and Economic Implications

- Only ways to offset increasing emissions are further reductions in other sectors or additional government purchases (e.g. CERs)
  - Industry has already made significant progress in reducing emissions since 1990 and may decrease further (U.S. -1%, EU -9%, Japan +1%, Canada -11%)
  - Electric power must offset its own significant emissions increases since 1990 (U.S. +27%, EU +6%, Japan +16%, Canada +40%)
    - EU emissions up modestly and are covered by EU ETS
    - Although power emissions growing in Canada, growth will be limited by coverage under LFE program
  - Difficult to address emissions in other sectors (residential, commercial, waste, land use/sinks)
  - Governments are already planning large purchases; additional purchases increase burden on taxpayers



# Existing Policies to Address Transport Emissions

- Existing policies developed to address energy security and improve environmental performance
  - Traditional regulatory programs or voluntary agreements designed to increase fuel efficiency
  - Taxes to send price signal
  - Research and development to push lower emitting vehicles and fuels into the market
  - Deployment incentives to pull such technologies and fuels into the market



# Existing Policies Not Developed to Address GHG Emissions

- Fuel efficiency standards are still the baseline approach for addressing transport GHG emissions
- Still utilized to reduce transport emissions given significant experience and familiarity
- Not originally developed to address climate change





# Shortcomings of Efficiency Standards to Address Transport Emissions

- Do not provide incentives to reduce vehicle miles traveled (VMT) for new or existing vehicles - the primary contributor to increasing transport emissions
- Economically inefficient due to automakers' high marginal costs of abatement
- No flexibility to achieve standards more cost-effectively
- No incentive to abate beyond requirements
- Environmental gains can be reduced due to the “rebound effect” (VMT increases as a result of fuel cost savings created by higher fuel efficiency)
- Also can be reduced due to the “junker effect” (more stringent standards provide disincentive for fleet turnover)



# Policy Objectives and Options for Addressing Transport Emissions

- Efficiency improvements, and reduction in VMT growth are needed today, and lower emitting vehicles are required to address emissions in longer term
- Non-tradable vehicle fuel efficiency standards plus downstream trading program covering stationary sources (base case)
- Downstream\* trading programs plus standards with greater flexibility
  - Fuel efficiency standards that are tradable among manufacturers plus downstream trading
  - Fuel efficiency standards in which manufacturers that exceed target can sell into downstream system (included in U.S. legislative proposals)
  - Fully tradable standards in which manufacturers that exceed target can sell into the system, or buy permits for compliance
- Upstream\*\* program covering transport sector emissions
- Upstream coverage of transport emissions plus downstream trading system plus vehicle fuel efficiency standards (tradable or nontradable)

\* Downstream programs cover large stationary emissions sources, which typically account for 40-50% of national CO<sub>2</sub> emissions. Examples include EU ETS, Canada's Large Final Emitter program, U.S. SO<sub>2</sub> and NO<sub>x</sub> trading programs.

\*\* Upstream programs require upstream sources (entities involved in fuel production, preparation, delivery and sales) to hold allowances for emissions embedded in the fuels they sell. No such program has yet been implemented.

# Evaluation Criteria

- Economic efficiency (reducing total costs to the economy)
- Effectiveness in reducing VMT
- Impact on fuel efficiency and availability of and demand for lower emitting vehicles
- Transport sector's contribution to emission reductions, via:
  - More stringent fuel efficiency standards
  - Investments in research and development (R&D) into new technologies (reductions not guaranteed)
  - Deploy less carbon-intensive vehicles
  - Purchase reductions from other domestic sectors, or internationally
- Impact on GHG trading program permit prices



# General Evaluation of Options and Tradeoffs\*

## Base Case With Different Levels of Flexibility

- Standards plus downstream (base case) with variations for flexibility\*\*
  - *Economic efficiency*: Standards are expensive due to high MC; full trading flexibility with downstream would improve this
  - *VMT*: Standards do not provide incentives to reduce VMT (regardless of tradability), and increase via rebound effect
  - *Fuel efficiency/technology availability*: Standards ensure availability of vehicles that meet standards, except under full trading flexibility
  - *Contribution to reductions*: Emissions increasing under current standards because VMT growth not addressed; under full flexibility, manufacturers would buy and stimulate reductions in other sectors
  - *Permit prices*: No impact, unless full trading flexibility

\* For consistency, evaluation assumes same level of standards in different options. In practice, an increase in standards may accompany a change in policy, and this could have different impacts when compared to base case.

\*\* Tradable standards have been discussed in U.S. legislative proposals for an upstream/downstream program



# General Evaluation of Options and Tradeoffs: Upstream Program

- Upstream program covering transport sector emissions
  - *Economic efficiency*: Some analysis concludes upstream without standards is much more efficient than base case
    - Particularly relevant for EU and Japan – other analysis concludes that interaction between existing fuel taxes and upstream could significantly reduce efficiency
  - *VMT*: Upstream increases fuel prices and should provide incentives to reduce VMT
    - However, VMT continues to increase in EU, despite high fuel prices
  - *Fuel efficiency/technology availability*: Could increase demand for low emitting vehicles, but dependent upon consumer consideration of life cycle costs; technology changes require long lead times to be introduced into automakers' product lines
  - *Contribution to reductions*: Likely will contribute to transport reductions, but cap may be met through permit purchases given high MC; can stimulate reductions in other sectors
  - *Permit prices*: Increase due to demand from upstream sources



# General Evaluation of Options and Tradeoffs: Upstream + Downstream + Standards

- Upstream coverage of transport emissions + downstream + standards
  - *Economic efficiency*: Unless tradable, standards reduce efficiency relative to pure upstream due to high MC
  - *VMT*: Fuel price increase under upstream coverage should provide incentives to reduce VMT (but EU VMT is still increasing)
  - *Fuel efficiency/technology availability*: Standards ensure availability, if fully tradable would allow manufacturers to rely on permit purchases to meet standards
  - *Contribution to reductions*: Upstream emissions caps + standards likely will contribute to transport reductions; caps (and standards, if tradable) likely will be met through permit purchases given high MC; can stimulate reductions in other sectors
  - *Permit prices*: Increase due to demand from upstream sources



# Conclusions

- Transport emissions need to be addressed given growth since 1990 and continued forecasted growth
- Achieving reductions from other sectors or additional government GHG purchases will be difficult
- Existing transport policies developed to address other objectives
- Standards are costly and are unlikely to slow emissions growth
- Alternatives should achieve several objectives
- All options involve tradeoffs that need to be considered



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