

Feebates in Canada and the U.S.

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Outline of Presentation

- ◆ Canadian government interest in incentives and disincentive options
- ◆ Overview of feebates
 - Feebate characteristics
 - North American Feebate Analysis Model
- ◆ Major findings/Insights
 - Market overview
 - Policy options
- ◆ Conclusion
 - Canadian situation
 - Further Analytical Plan/Concluding Remarks



Disclaimer

- ◆ The following presentation is intended to describe the work that was conducted by Transport Canada to develop a new North American Feebate Analysis Model.
- ◆ The scenarios presented are not representative of actual policies, but rather are used to illustrate the results coming from the model.
- ◆ Please note that the views expressed are those of the authors, and not of the Government of Canada.



Fuel Efficiency Initiatives in Canada

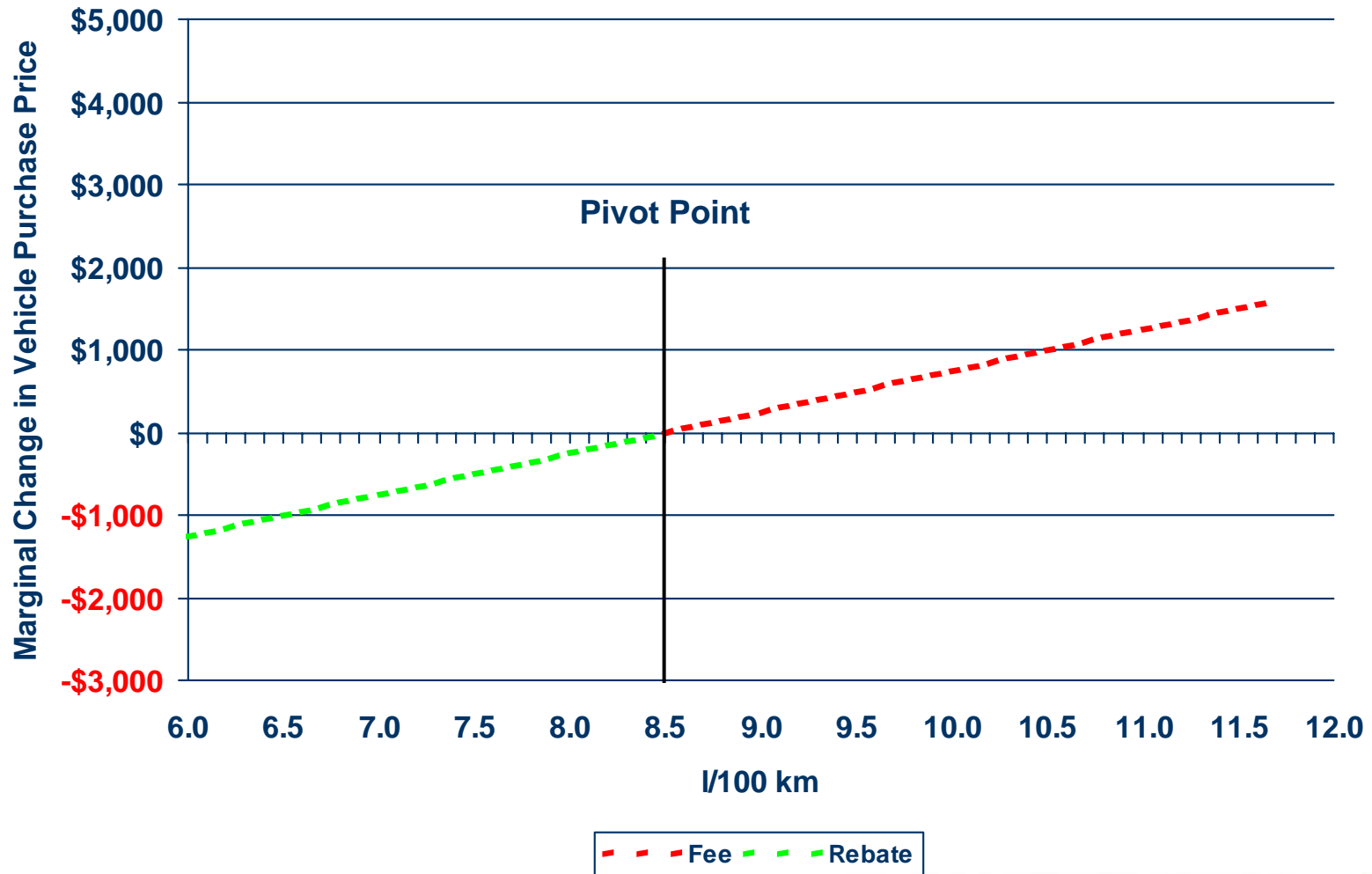
- ◆ In 2004, a federal government working group was mandated to identify, evaluate and recommend, from a range of economic instruments, cost-effective options to reduce GHG emissions from passenger transportation.
 - The preliminary conclusions of the WG assessment provided the impetus for a further review of feebate options.
- ◆ In Budget 2005, the National Round Table on the Environment and the Economy (NRTEE) was requested to conduct a third-party review of the feasibility, cost and impact of the implementation of feebates in Canada.
 - NRTEE will present its recommendations in the fall for considerations for the next Budget.



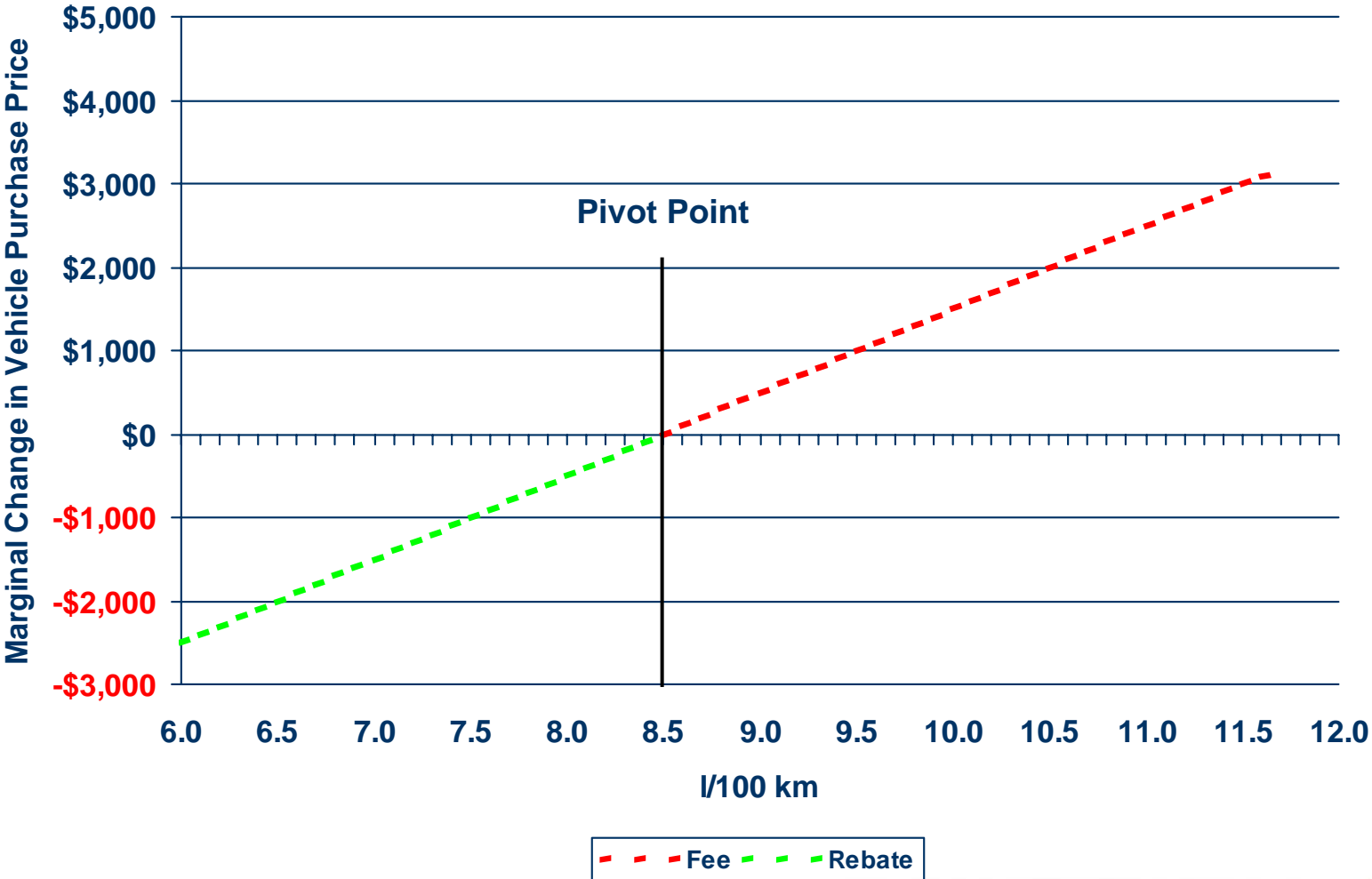
Overview of Feebates



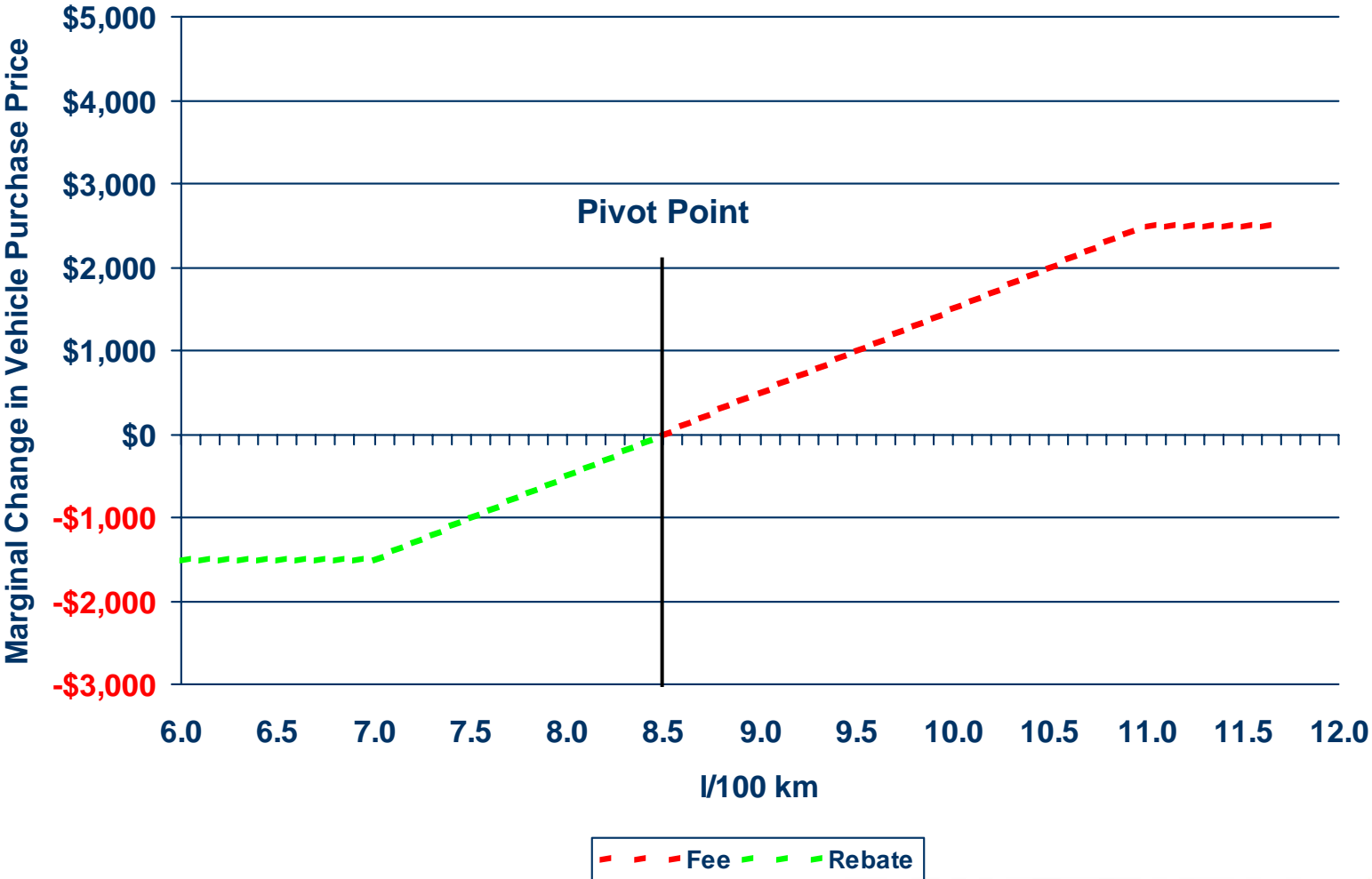
Illustrating a Feebate



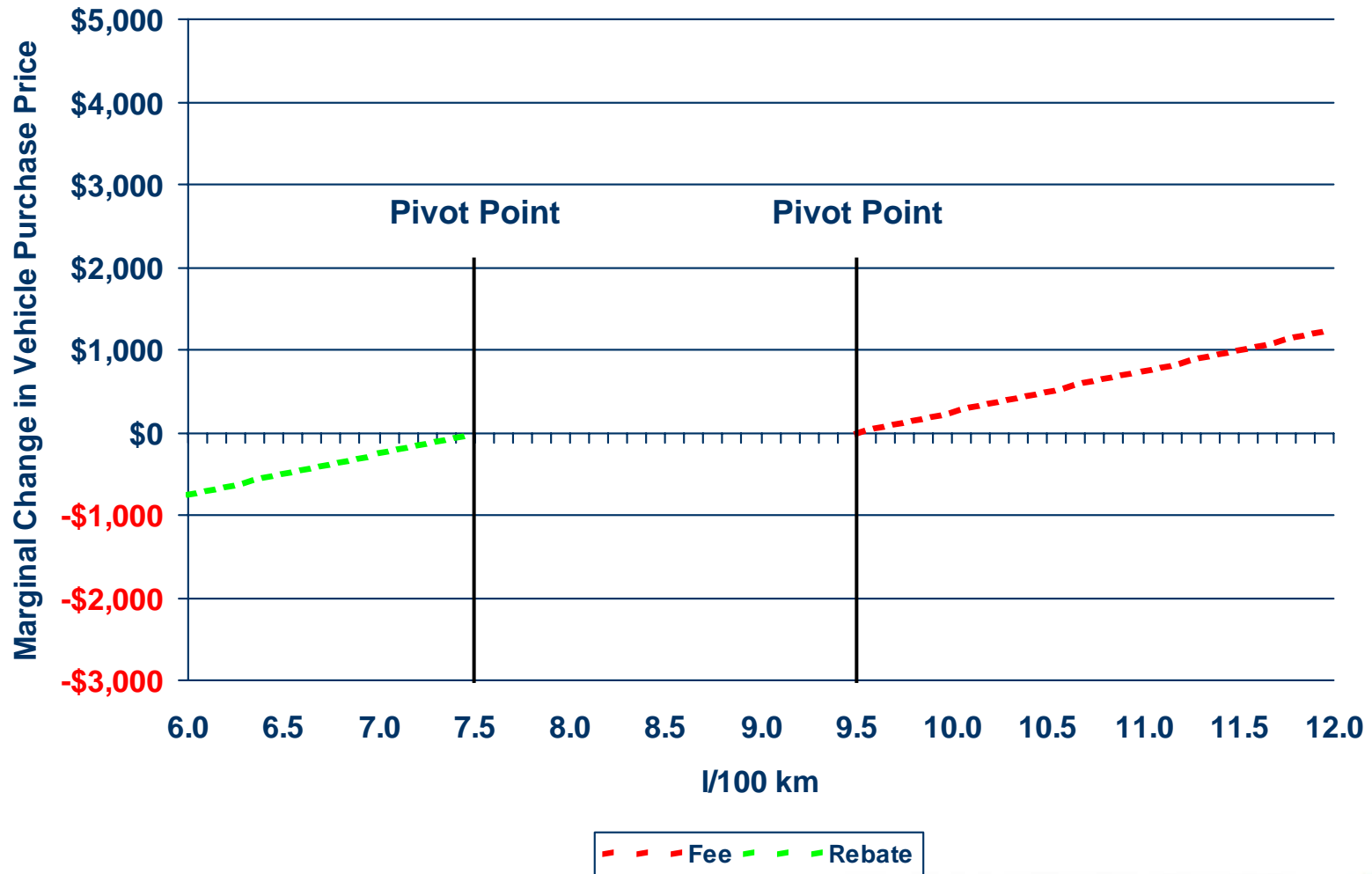
Illustrating a Feebate



Illustrating a Feebate



Illustrating a Feebate



Factors Affecting the Design of a Feebate Regime

- ◆ Fuel saving valuation
- ◆ Consumer and manufacturers' reaction (price elasticities)
- ◆ Cost of technologies
- ◆ Feebate rate:
 - Flat, proportional/uniform or exponential (with possible cap)
 - Performance or technology based
- ◆ Pivot points and market coverage
- ◆ Mechanism for program delivery
- ◆ Quality and availability of fuel economy data



North American Feebate Analysis Model – Model Structure

- ◆ NAFAM assumes that manufacturers will implement fuel economy technology on vehicles so as to maximize the satisfaction of their customers.
 - This can be shown to be the profit-maximizing strategy for manufacturers in a competitive market. Customer satisfaction is represented by consumer's surplus, the economist's monetary measure of well being.
- ◆ The manufacturers' decision variables are the fractional changes in fuel economy for every light-duty vehicle sold in North America.
- ◆ Choosing a change in fuel economy affects consumer satisfaction in three ways:
 - It provides fuel savings
 - It increases vehicle purchase price
 - It reduces the fee or increases the rebate applicable to the vehicle in question.



North American Feebate Analysis Model

- ◆ Major Modifications to Greene and al. Modelling Framework
 - Aggregated North American market
 - The user can specify a threshold under which vehicles will not be modified/redesigned to meet new demand for fuel economy
 - **Imported cars:** 2,000 vehicles in Canada OR a total of 20,000 in North America
 - **Domestic cars:** at least 20,000 vehicles in Canada OR a total of 20,000 in North America
 - Demand is country-specific (even region-specific)
 - Updated fuel economy cost curves
 - Updated to model-year 2003 sales data



North American Feebate Analysis Model

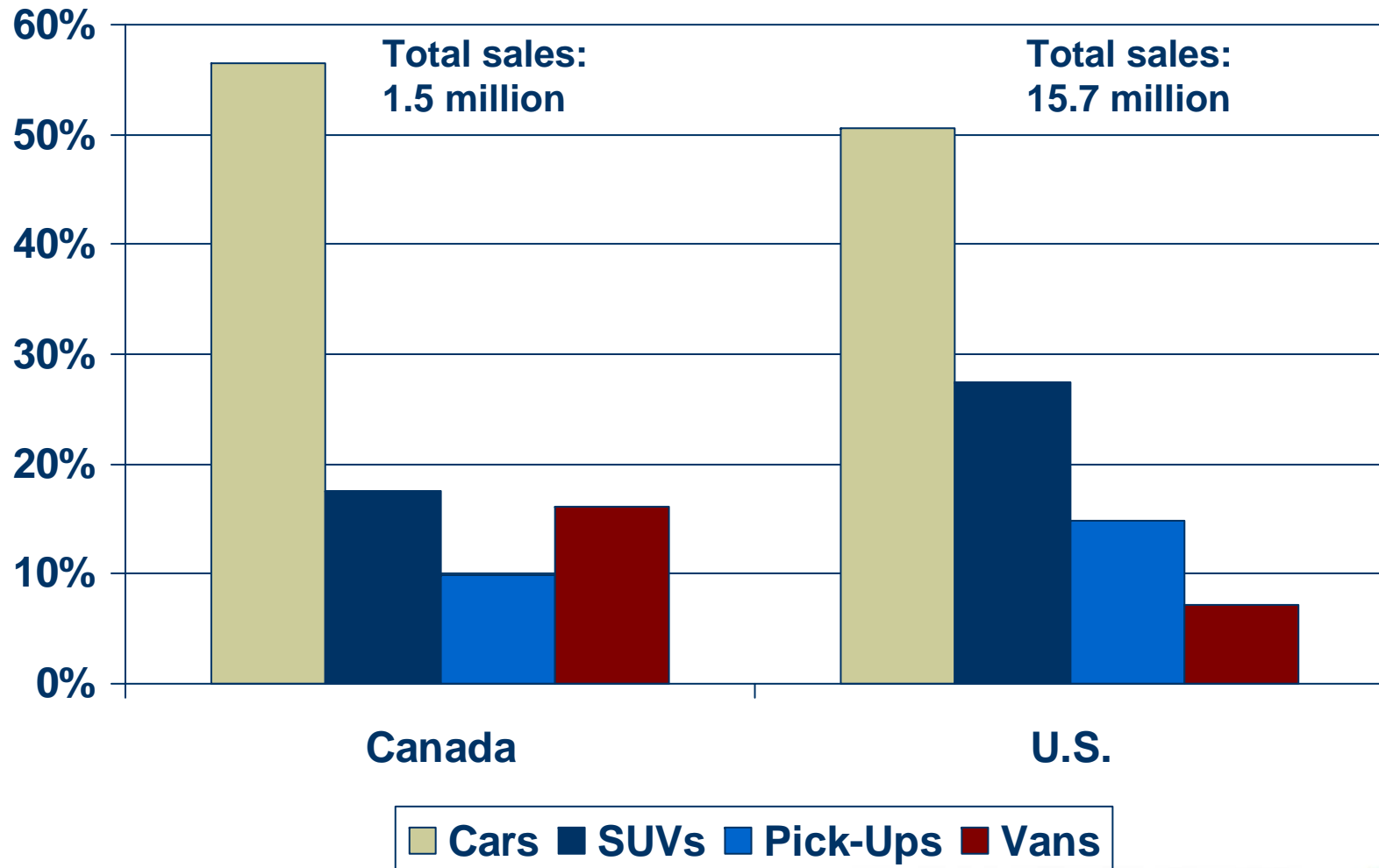
- ◆ Outputs:
 - Effect on key variables
 - Manufacturers net benefit
 - Consumer net benefits
 - Impacts on government revenues
 - Societal fuel saving Value
 - Relative impact on automobile manufacturers
- ◆ Key assumptions
 - Vehicle attributes and price remain unchanged
 - No technological progress nor introduction/retirement of makes and models over the analysis period
 - Market failure – inefficient market for energy efficiency
 - Country-specific market assumptions



Market Overview/Results Summary



Vehicle Sales by Type in 2003



Results Summary

- ◆ No policy case:
 - Modest improvements in fuel economy, vehicle sales and manufacturers revenues
 - If full valuation of fuel savings is used, fuel economy improves much more
- ◆ Feebates:
 - As expected, increasing the rate has a positive impact on fuel economy but a negative impact on consumers and manufacturers
 - The spill-over effect on Canadian policies on the U.S. are very small. On the contrary, the spill-over effect of U.S.-only policies in Canada are quite significant.



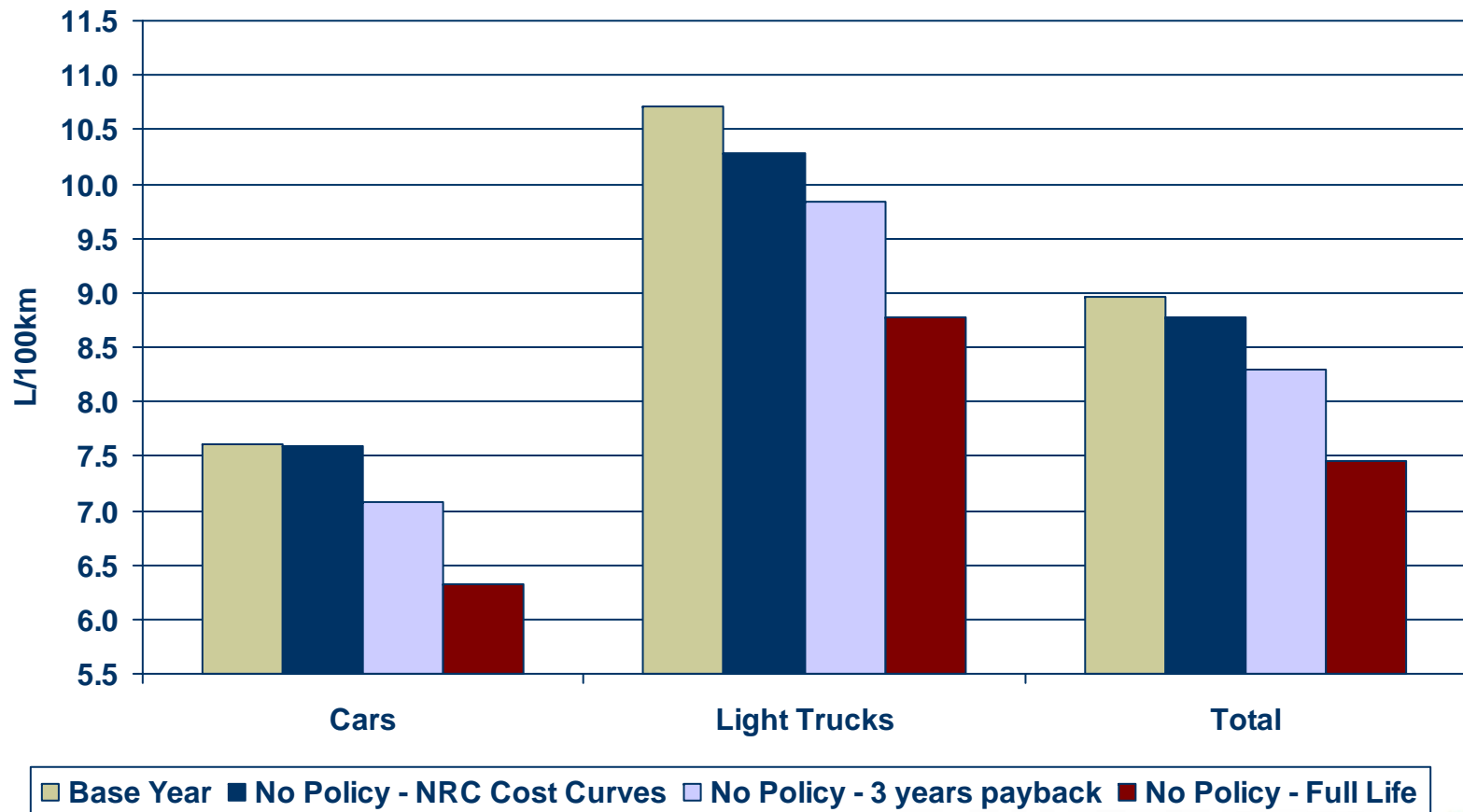
Results Summary

- ◆ Rebates and fees:
 - Can produce significant changes in fuel consumption, but at large costs to consumers or the government
- ◆ Elasticities:
 - Reducing elasticities has only a small impact on fuel consumption, but reduces the impact on consumers and manufacturers
- ◆ New Cost Curves:
 - Using the new EEA cost curves results in significantly larger fuel economy improvements than with the NRC cost curves



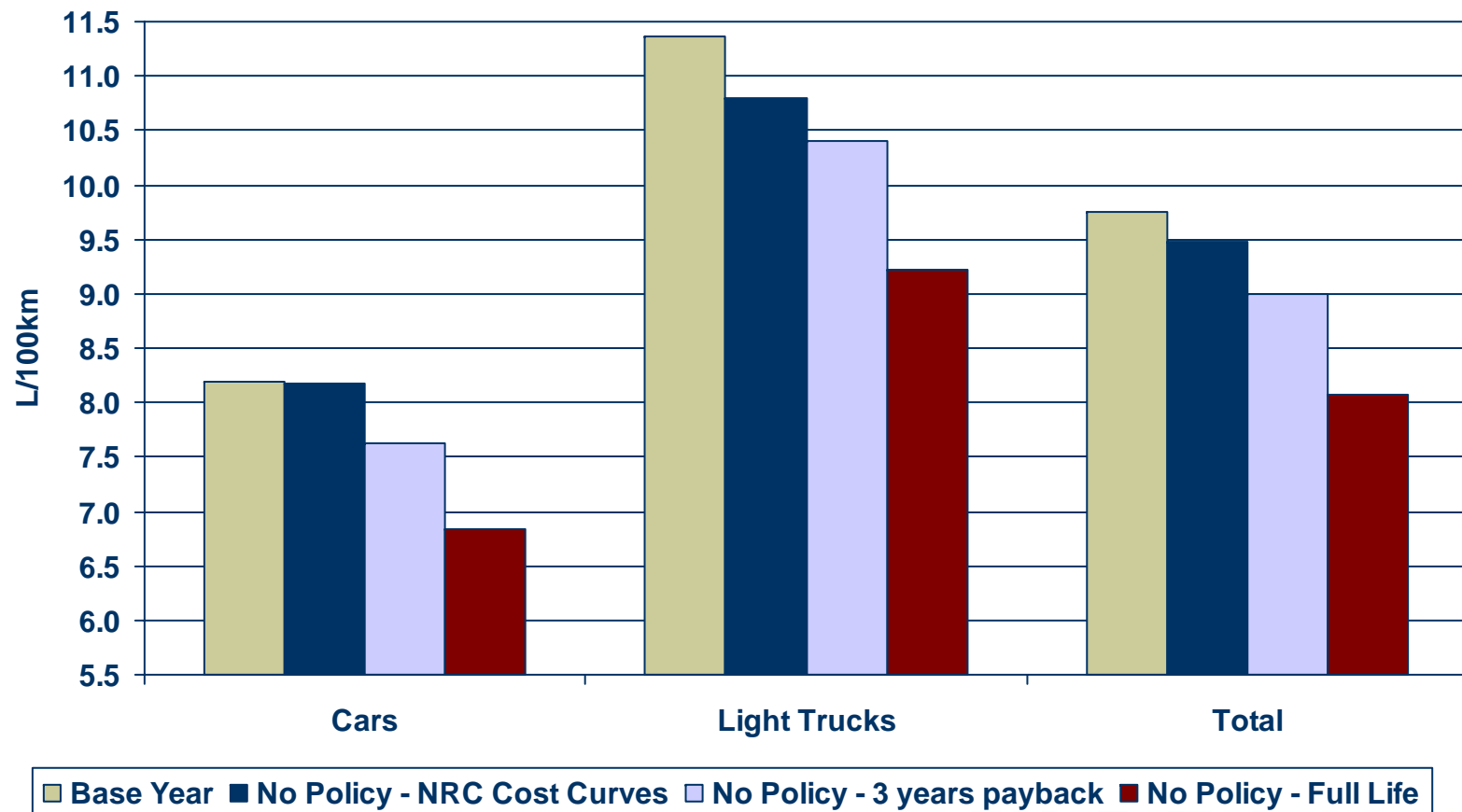
Results Summary – Cost Curves

Effects on Canadian Fleet



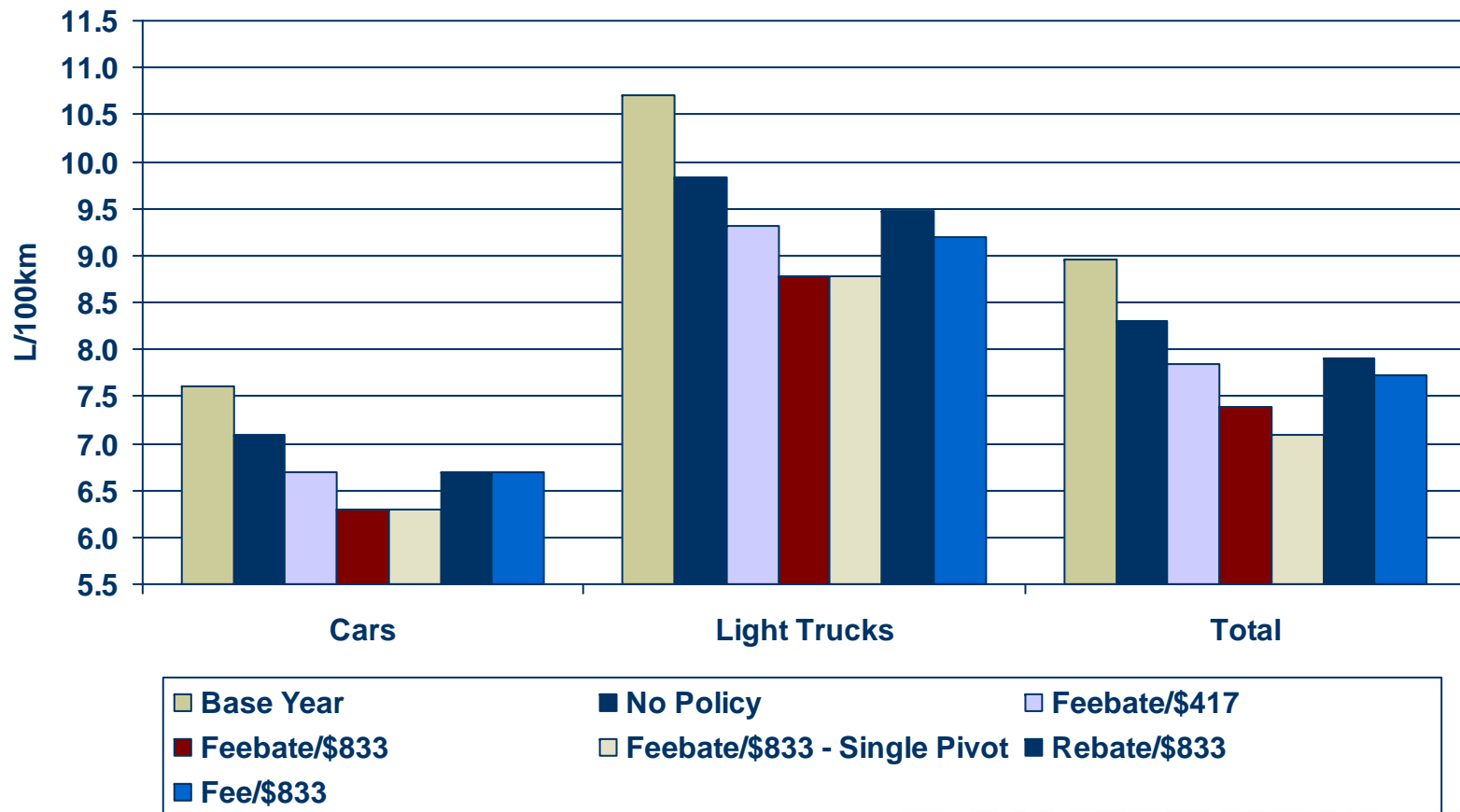
Results Summary – Cost Curves

Effects on U.S. Fleet



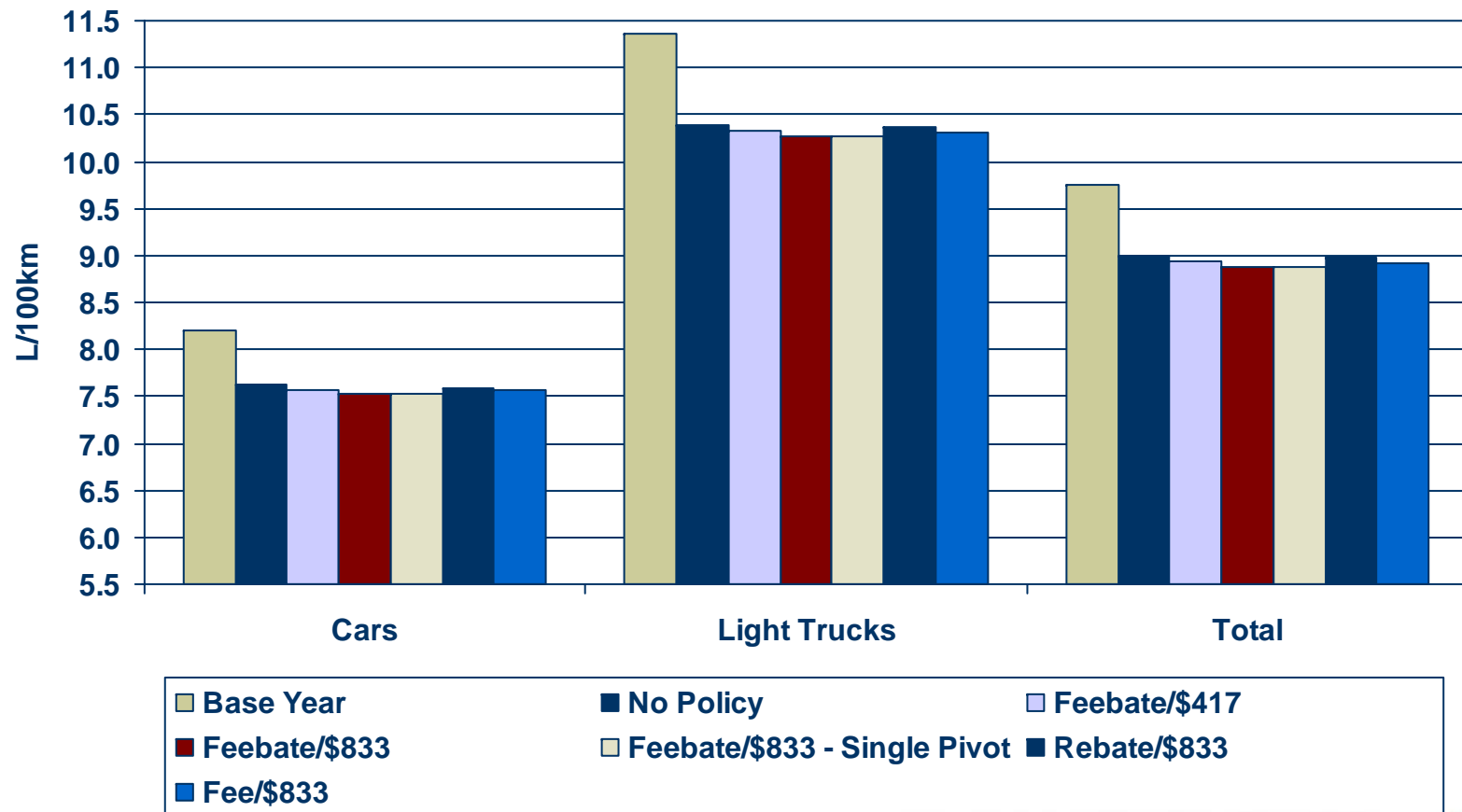
Results Summary – Canada-only Cases

Effects of Policy on Canadian Fleet



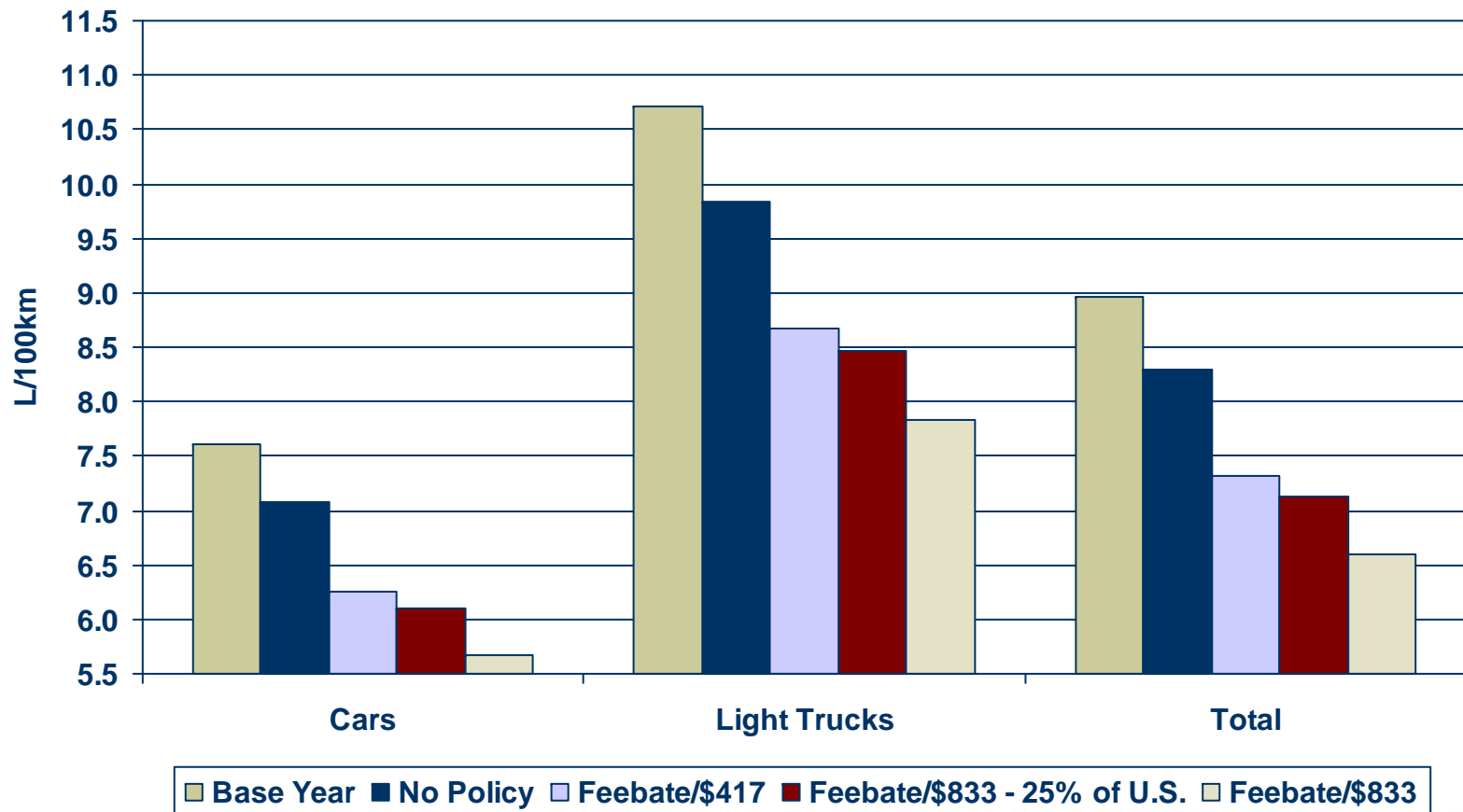
Results Summary – Canada-only Cases

Effects of Policy on U.S. Fleet



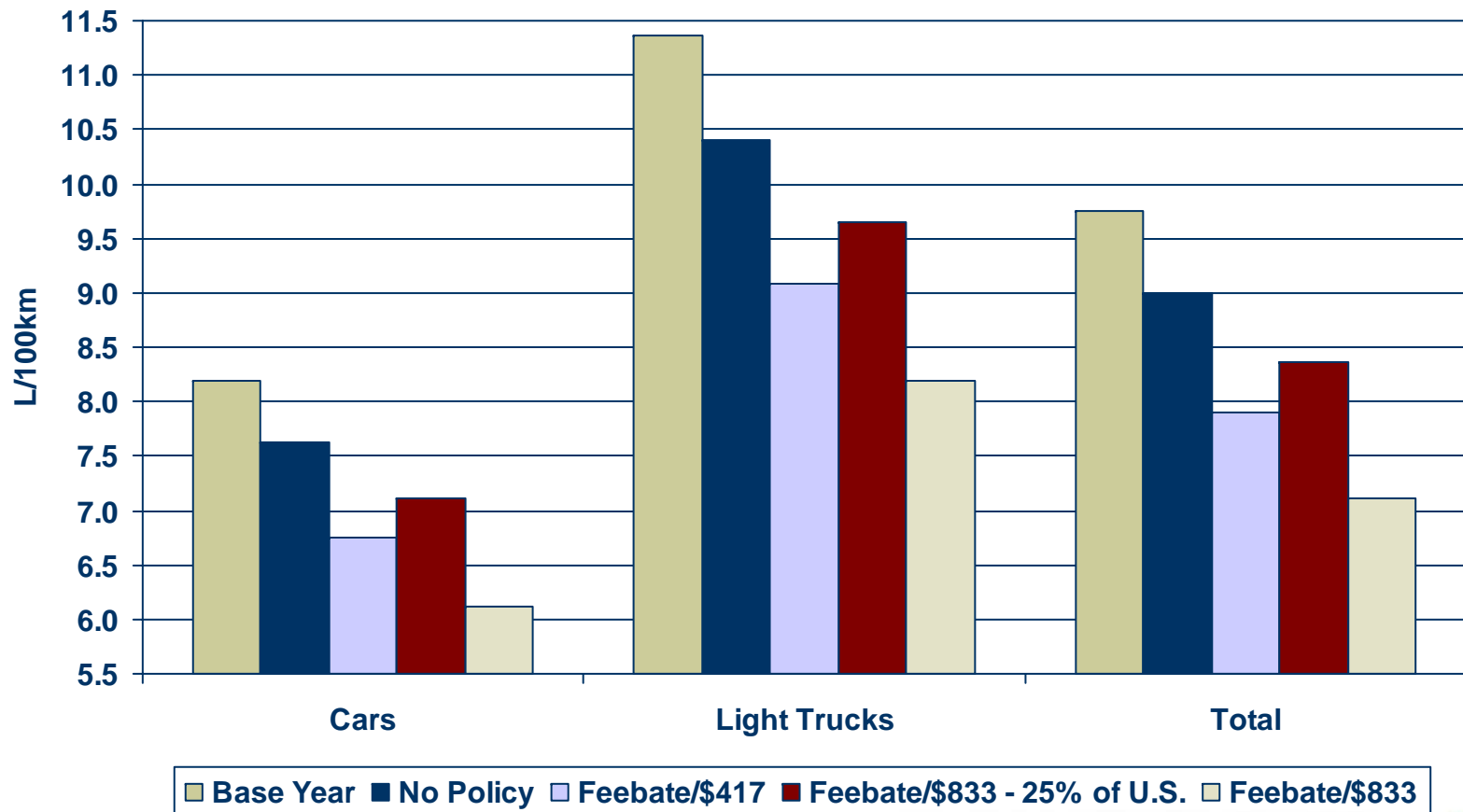
Results Summary – North American Cases

Effects of Policy on Canadian Fleet



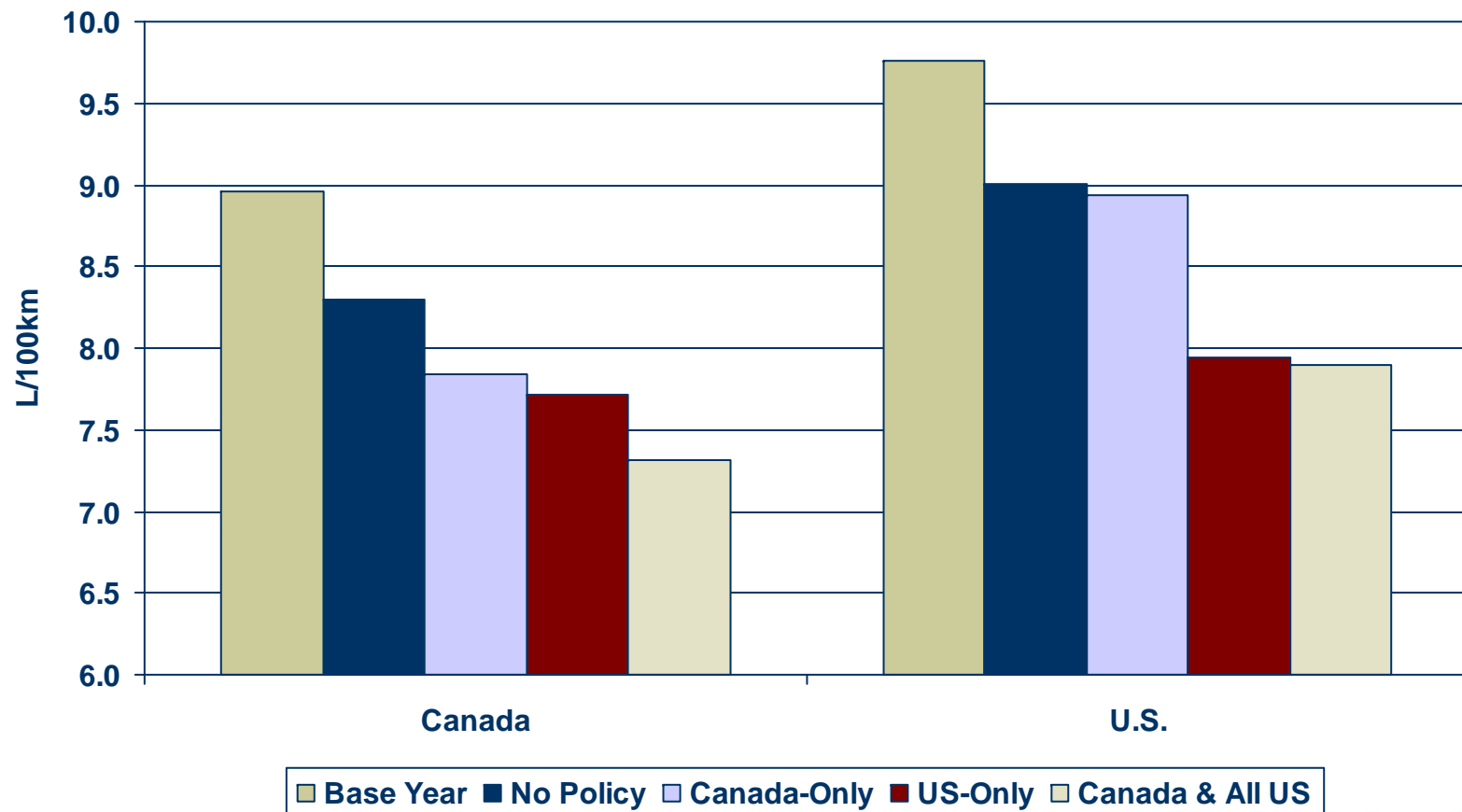
Results Summary – North American Cases

Effects of Policy on U.S. Fleet



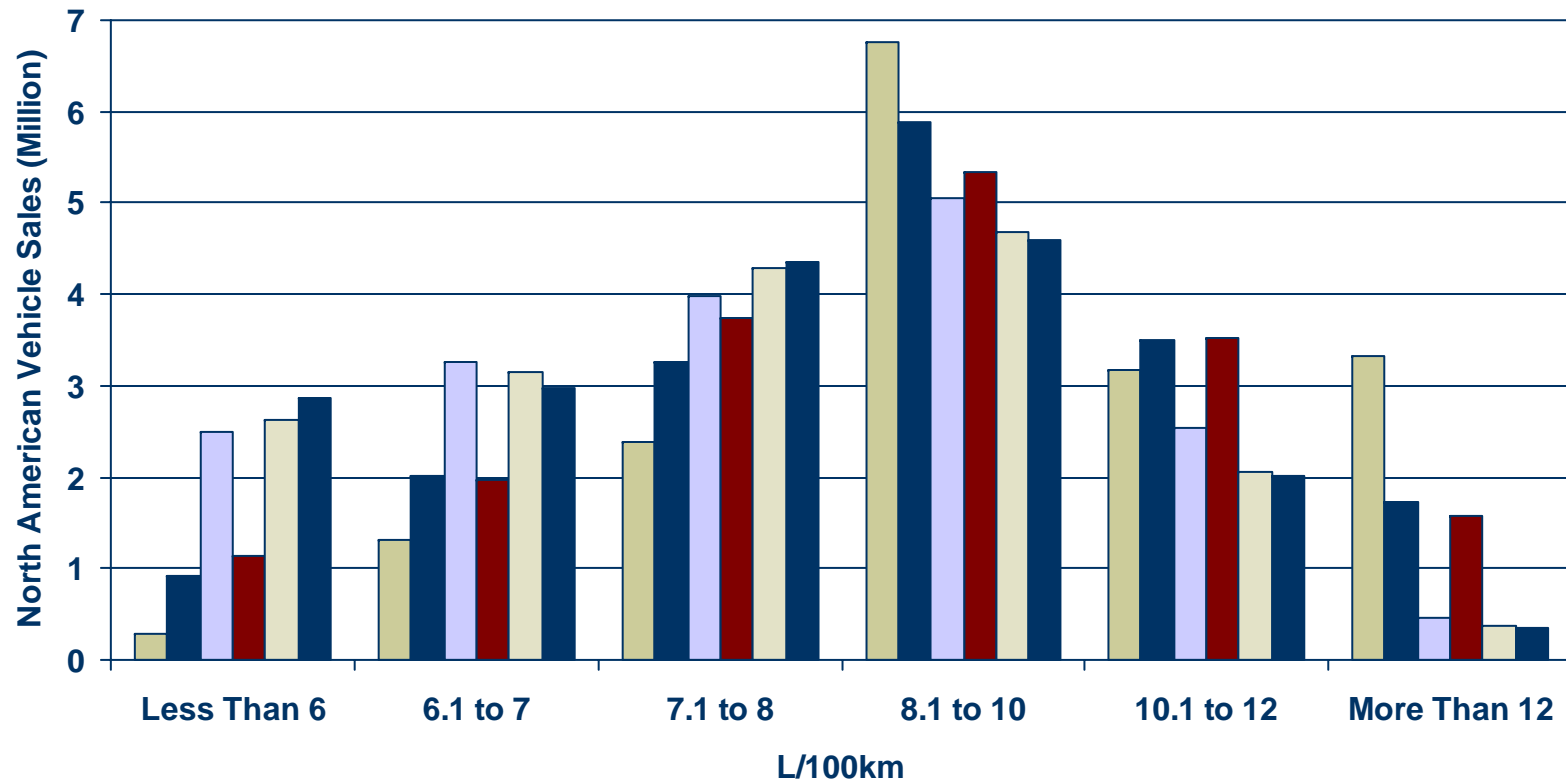
Results Summary – \$417 Feebate

Total Fleet Average Fuel Economy



Results Summary – Fuel Consumption Distribution

\$417 Feebate



■ Base Year
 ■ No Policy-3 years
 ■ No Policy-Full Life
 ■ Canada-Only
 ■ US-Only
 ■ North America



Findings/Insights

- ◆ Canada being a small market, consumer decisions to shift vehicle class or size represents a larger proportion of the fuel economy improvements than what would be observed in a larger market.
 - Analysis found that the impact of technology on fuel improvements of an US feebate could be as high as 90%.
 - In Canada, the impact of new technologies is always lower than what is observed in the U.S.
- ◆ We confirm the impacts of an increased number of pivot points by vehicle classes (i.e. many mid-points)
 - Reduces pressure on consumers to shift vehicles class
 - Reduces cost to manufacturers
 - Reduces fuel economy benefit
 - Adds design complexity and possible perverse effects



Findings/Insights

- ◆ Canada-only policies can actually move the market, but at much higher costs to Canadians than North American harmonized policies
 - The negative impact on manufacturers in Canada is reduced by increased revenues in the U.S.
- ◆ For Canada, the best scenario would be a feebate harmonized with the U.S.
 - Same goal can be achieved with much lower feebate rate
 - A Canada and some U.S. states scenario would also reduce costs to Canada
 - U.S. market so large that if it were to act alone (although this is unlikely), Canada would see very noticeable benefits
- ◆ Rebates and fees can have an impact on fuel economy, but at a great cost either to government or vehicle buyers



Current Canadian situation

- ◆ NRTEE will make its assessment of feebates public in the fall
 - Will provide its recommendations to the Finance Department
- ◆ Before implementing a feebate, it is likely that further testing/study will be required
 - There are no example of the large-scale application of a feebate in the world
 - A “partial feebate” where only outliers are subject to the feebate could be a promising complement to or replace either a voluntary or regulatory approach



Current Canadian situation

- ◆ Further impacts of feebates that should be studied before considered for implementation include:
 - Distributional effects on households (by revenue, size, location)
 - Possible modal shifts
 - Environmental impacts on air pollution
 - Impact on used vehicles sales
- ◆ The feebate would need to be:
 - Environmentally effective
 - Administratively simple to implement and flexible
 - Economically fair and efficient (revenue neutrality)



Areas for Further Work

- ◆ Cost Curves
 - Further research to include hybrid and diesel technologies
 - Do cost curves vary under a Canada-only scenario?
- ◆ Elasticities
 - Do they properly reflect Canadian market?
- ◆ GHG reductions estimates
 - Annualized model
 - “Annual path” needed to analyze cost per tonne of measures
 - Stock Turnover Model
 - In order to estimate the impact of feebates on the whole fleet



Questions?

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