Policies to Stimulate Automotive Environmental Excellence

Ministry of the Environment

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Ministry Goals

- To reduce the environmental impact of automobiles
- To encourage innovation in automobile manufacturing
- To foster cooperation among all stakeholders
Methods of Analysis

• Total Private cost
  – manufacturing, consumer use, disposal
• Life cycle assessment
  – EPS, XLCA
• Policy options
Focus: Use Phase

- Use phase dominates private and environmental cost
- Greenhouse gases dominate total environmental costs (all analyses)
  - XLCA: 50%-75% of total environmental cost
- Focus: reducing emissions from the use phase of automobiles
Methods to Reduce Use Phase Emissions

- Vehicle weight reduction
- Increased fuel efficiency (other than weight)
- Fewer miles driven per vehicle
Recommended Designs

• Mostly aluminum BIW

• Reduced weight leads to:
  – reduced private cost
  – reduced emissions (all-Al 40% below all-steel baseline)
Sensitivity Analyses

• Private cost
  – insensitive to: production volume, discount rate, aluminum cost, fuel price

• EPS
  – design choice insensitive to recycling rate
XLCA Sensitivity Studies

• Total lifetime cost by varying CO₂ cost (5%-95% percentile)
  – Steel: $114-$232
  – Aluminum: $73-$143

• For all-steel to match all-Al design:
  – Increase fuel efficiency to 43 mpg, or
  – Reduce miles driven per vehicle by 40%

  For all-steel:
  – $114-$232 (5%-95% percentile)

Total lifetime cost by varying CO₂ cost

XLCA Sensitivity Studies
Policy Recommendations

- Consumer labeling
- CAFE-like regulations
- Revenue-neutral gas tax
- Subsidies for aluminum capital investments
- Funding for R&D
Consumer Labeling

- EcoCar Label Mandate
- Includes lifetime fuel cost, fuel economy, and an environmental impact rating.
- Consumer education
- Combined with other policies, this can promote lightweight vehicles
- Opportunity for auto manufacturers to display their environmental commitment
CAFE Regulations and Gas Tax

• CAFÉ raises the bar of fuel efficiency for all manufacturers
• Allows flexibility for manufacturers
• CAFE alone gives perverse incentive: people drive more miles
• Couple with gas tax for correct incentive
• Use revenue from gas tax to reduce labor income tax or subsidize aluminum capital
Subsidy for Al Capital and Research Funding

• Use subsidies from gas tax revenues to spur the development of aluminum processing industry
• Increase government funding for fuel efficiency research and development
Conclusions

• Mostly aluminum BIW reduces weight and increases fuel efficiency
• A comprehensive set of policies:
  – insures the success of aluminum industry
  – discourages an increase of miles driven per vehicle