EPA’s Economic Research Needs for Reducing Vehicle GHG Emissions

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We use academic research

OP and OAR

- **Office of Policy** (which includes the National Center for Environmental Economics) provides overall guidance and review for regulatory analysis
  - E.g., *Guidelines for Preparing Economic Analyses*

- **Program offices**, such as the Office of Air and Radiation (which includes the Office of Transportation and Air Quality), draft the standards and do the detailed analyses

- We have a lot of interaction and collaboration
GHG Regulations

- EPA regulates GHGs under the Clean Air Act
  - We collaborate with Dept. of Transportation, which regulates fuel economy, for vehicle rules
- The Clean Air Act authorizes emissions standards, not carbon taxes
  - We don’t have a full toolkit of environmental policy instruments available
  - We commonly build program flexibilities into the rules, such as averaging, banking, trading
- EPA (in collaboration with NHTSA, coordination with CARB) has issued standards for
  - Light-duty vehicles for model years (MYs) 2012–25
  - Medium- and heavy-duty vehicles for MYs 2014–18
OTAQ Research Needs for Vehicle GHG Standards: we’re not done yet

- Upcoming:
  - Midterm evaluation of light-duty vehicle standards for MYs 2022–25
    - Final due April 2018
  - Expected new medium- and heavy-duty standards
    - Time line still being assessed

- See the most recent AERE Newsletter!
Some areas EPA has identified for more work (both LD & HD)

- Impacts of GHG Standards on Vehicle Demand
  - Higher up-front costs, lower operating costs: which dominates?
- Energy Paradox
  - $100 bills on the street, or hidden costs?
- Willingness to pay for vehicle attributes
  - What are tradeoffs associated with performance, range, etc.?
- Rebound effect
  - Is the response to fuel economy the same as the response to fuel price or fuel cost/mile?
- Energy security
  - Especially but not only impacts on military
- Impacts on “affordability”
  - Distributional impacts, access to credit
Conclusion

- Thanks for all the work that has been/is being done
- We look forward to seeing new work
- Especially medium- and heavy-duty!

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Appendix
Vehicle Demand

- GHG/fuel economy standards create a tradeoff:
  - higher up-front cost
  - lower operating costs
  - How do people evaluate the tradeoffs?
- Light duty:
  - Lots of models, little assessment
  - How well do the models predict?
- Heavy duty:
  - Even less is known or modeled
  - Lots of diversity of vehicles
Engineering estimates find many technologies with short estimated payback periods that have not been in common use in vehicles. $100 bills lying on the streets, or hidden costs?

For LD vehicles, we have an experiment going on right now: standards are in place.
- But we don’t have an obvious control
- And the Great Recession is a great confounder
- Anyone have an idea for how to estimate the effects of the standards?
WTP for vehicle attributes

- EPA and DOT include in their costs for meeting the standards the costs of holding performance, size, etc. constant.
- But it could be cheaper to meet the standards by not holding other things equal: e.g.,
  - Reducing performance
  - Reducing gas tank size
  - Reducing range on an EV
- Fuel savings are monetary, but the value of most other characteristics is hedonic.
- How valuable are these other characteristics relative to fuel economy?
Rebound effect for vehicle miles traveled

- When fuel economy improves, it becomes cheaper to drive a mile
  - Therefore, more driving is expected
  - But how much?
- Most existing studies rely on driver response to fuel cost/price changes rather than fuel economy changes
- It’s unclear whether drivers respond the same way to fuel economy as to fuel price
- And it’s likely to be different for light–duty vs. heavy–duty
  - And possibly even different segments of medium– and heavy–duty
Energy Security

- Oil shocks were an original motivation for fuel economy standards
- 3 ways that fuel economy standards might affect energy security:
  - Reducing macroeconomic disruptions
  - Reducing world price of oil
  - Reducing military expenditures
- Currently, the agencies include estimates of the impacts of macroeconomic disruptions
- Are there appropriate ways to estimate and include these other effects?
Affordability

- What are appropriate estimates of the distributional impacts of the standards?
- Some possibilities for the light–duty market:
  - Low–income households
    - They don’t account for many new–vehicle purchases
  - Used vehicle markets
    - More common vehicles for low–income households
  - Consumer access to loans
    - Will lenders consider only price increases and not reduced fuel costs?
  - Low–priced new vehicles
    - An entry–level segment for first–time new vehicle buyers
- For medium– and heavy–duty, access to credit for more expensive vehicles is potentially an issue