Transportation: substantial emissions, smaller reductions

- Transportation sector is responsible for:
  - 31% of U.S. emissions of CO₂
    - ⅔ of that is from passenger vehicles (cars, light trucks)

- Pricing carbon would achieve relatively little in emissions reductions from transportation
  - Reductions in other sectors would be several times greater in proportion to total emissions in those sectors
### Comparative effects of a price on carbon emissions: an illustrative example

- Pricing carbon is cost-minimizing, inducing reductions in emissions where they are easiest, cheapest
  - Small response in transport sector implies that it is relatively costly to reduce GHG emissions there

- Illustration: Suppose $17 \text{CO}_2\text{e} \text{ allowance price}$
  - Expected response to a 15¢/gallon carbon price
    (a 5% increase if gasoline price is $3 per gallon)
    added to transportation fuels:
      - By current estimates, that would induce
        - Short Run: ~0.25% decrease in gasoline consumption, emissions
        - Long Run: ~1.25% decrease in gasoline consumption, emissions

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### The transportation response to a carbon price: why its emissions reductions are relatively costly

- **Short Run: Adapt driving behaviors**
  - Drive less, Drive more slowly, Shift some driving off-peak
    - Observable (but small) response to $4 \text{gasoline prices}$
      Limiting factor: value of time

- **Long Run: Increase vehicle fuel economy**
  - If $17 \text{allowance price} \\text{maintained, small permanent increase in average fuel economy}$
    - 15+ years to achieve full response, as older vehicles retired
    - Consumers appear to value fuel economy less than other vehicle characteristics.
    - If so, a carbon price will be ineffectual here
Transportation adaptations are relatively costly (II)

– **Long Run: Reduce commute distance**
  - Relocate home or work location, as opportunity arises
    - *Existing land-use patterns will be long-lived*
      - These arose partly in response to past (low) gasoline prices

– **(Medium Run: Mode choice for freight hauling)**
  - Shift toward less carbon-intensive modes, e.g. RR
    - *Effect would likely be small unless carbon price substantial*
      - Limiting factors:
        - value of time (inventory costs)
        - quality of service (flexibility, reliability)

Although a carbon price would have a limited effect on transport emissions:

- Announced CAFE standards should reduce GHG emissions by about 25% per vehicle-mile, on average, by 2030
  - *(holding gasoline prices, incomes, congestion, fleet mix constant)*
    - But long-run trends suggest VMT could be \(\frac{2}{3}\) greater by then

- At current gasoline prices and planned CAFE standards, $17 carbon price would have no add’l effect on average fuel economy, but:
  - Would stimulate demand for fuel-efficient vehicles
    - *easing automakers’ vehicle-pricing constraints, costs of compliance*
  - Would encourage efficient decisions about driving
    - *A counterbalance to CAFE effect of encouraging driving*

- If gasoline prices were much higher, this carbon price:
  - Would begin to encourage greater fuel economy
    - *Europe in 2006: ~$6/gallon, ~38 MPG fleet average fuel economy*
See these CBO Publications for more on CAFE, Gasoline Taxes, Driving Responses

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