Annual Energy Outlook 2018

Modeling updates in the transportation sector

For
AEO2018 Transportation Working Group
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By
Nick Chase, Melissa Lynes, John Maples, Mark Schipper, and David Stone
Office of Energy Consumption and Efficiency Analysis
Updates to the *Annual Energy Outlook 2018*

- Transportation demand model highlights
  - Data updates
    - Bus and passenger rail transportation
    - Truck, rail, and marine travel demands
    - LDV and HDV stock history
    - Military fuel use
    - Recreational boating fuel use
  - Modeling updates
    - Expand macro drivers of freight sector
    - Add ZEV credit banking to LDV model
    - Addition of autonomous vehicles and ridesharing
Data updates
Bus and passenger rail data update

- Updating travel, fuel use, and efficiency data
  - Transit, Intercity, and School Buses
  - Transit, Commuter, and Intercity Rail
  - Adding history through 2015, from previous last history year of 2008
  - Estimating intercity and school bus passenger-mile travel and efficiency after 2000 based on population growth and bus travel from national highways
Change in transit bus energy consumption

Transit bus energy consumption
trillion Btu

Discussion purposes only - Do not cite or circulate
Change in intercity and school bus energy consumption

Intercity and school bus energy consumption

Discussion purposes only - Do not cite or circulate
Change in transit rail energy consumption

Transit rail energy consumption

trillion Btu

Discussion purposes only - Do not cite or circulate
Change in commuter rail energy consumption

Commuter rail energy consumption
trillion Btu

Update
Reference

Discussion purposes only - Do not cite or circulate
Other data updates

• Update LDV and HDV stock
  – Registration data are from 2016
  – Includes updates to the LDV fleet model

• Military fuel use
  – 2009 – 2015
  – From the Defense Logistics Agency

• Recreational boating fuel use
  – 2009 – 2015
  – From the Transportation Data Book

• Truck, rail, and domestic marine travel/demand (various DOT/DOE sources)

Discussion purposes only - Do not cite or circulate
Modeling updates
Freight driver expansion planned

- Goal is to analyze and then re-align commodity transport flows with industrial and service activities

- Prior AEOs projected freight travel based on gross output from 10 industrial groups

- AEO2018 proposes 17 industrial groups

- Secondary analysis goals
  - Isolate high value, high growth commodities
  - Include physical drivers
California zero-emission vehicle (ZEV) program modeling

• Adding credit banking and spending
  – Reflecting data collected and external model developed from EIA contracted report
  – Alternative compliance pathway highlighted by CARB midterm review to become primary pathway
    • 90% of large manufacturers have elected to use alternative pathway

• Potential for credit banking and spending scenario development
  – Projecting scenarios developed in contracted report
  – Potential scenarios
    • Early push to bank credits and spend later as requirements increase
    • No additional banking (spending existing credits and only selling for requirement in future)
    • Etc.
Autonomous vehicles and ridesharing

• Autonomous vehicles and ridesharing will be included in the Reference case and highlighted in two side cases

• Areas of focus for model development
  – LDV
    • Consumer owned
    • Ridesharing owned
    • Vehicle Design
    • Transit
  – HDV
    • Platooning
    • GPS
Autonomous vehicles and ridesharing - LDV

• Consumer owned
  – Travel
    • No occupancy trips (burrito effect)
    • Travel distances (work commute – does travel time play less of a role?)
    • Induced demand (non-licensed rider trips – handicapped, children, aged)
    • Implications for long distance travel
    • Shared use
  – Vehicle Ownership Rates
    • Impact of ridesharing services on ownership rates
    • Redesigned vehicles to improve service/efficiency
    • Technology evolution and vehicle replacement
    • Consumer preference/acceptance (age, income)
    • Shared use
Autonomous vehicles and ridesharing - LDV

• Ridesharing Owned
  – Travel
    • Growth in ridesharing
      – Geographic (urban, suburban, rural)
      – Demographics (age, income, employment status)
    • Percent of travel deadheading
    • Delivery services
    • Average annual vehicle travel and vehicle scrappage
    • Synergies with other modes/travel services
  – Vehicle Ownership Rates
    • Relationship between cost of service and capital investment (business model)
    • Shared use – privately owned
    • OEM relationships with ridesharing companies

Discussion purposes only - Do not cite or circulate
Autonomous vehicles and ridesharing - LDV

• Vehicle Design
  – Specialization to meet use (single occupant vehicle, simple box delivery vehicle)
  – Technology development (synergies with other advanced powertrain platforms)
  – Cost and performance
  – Infrastructure requirements

• Transit
  – 1st mile/last mile or substitute for transit trip
  • Metro bus, metro rail, commuter rail
Autonomous vehicles - HDV

- Platooning
- GPS guided efficient driving
Discussion/questions

<table>
<thead>
<tr>
<th>Nick Chase</th>
<th>phone: 202-586-1879</th>
<th>email: <a href="mailto:nicholas.chase@eia.gov">nicholas.chase@eia.gov</a></th>
</tr>
</thead>
<tbody>
<tr>
<td>Melissa Lynes</td>
<td>phone: 202-586-5192</td>
<td>email: <a href="mailto:melissa.lynes@eia.gov">melissa.lynes@eia.gov</a></td>
</tr>
<tr>
<td>John Maples (lead)</td>
<td>phone: 202-586-1757</td>
<td>email: <a href="mailto:john.maples@eia.gov">john.maples@eia.gov</a></td>
</tr>
<tr>
<td>Mark Schipper</td>
<td>phone: 202-586-1136</td>
<td>email: <a href="mailto:mark.schipper@eia.gov">mark.schipper@eia.gov</a></td>
</tr>
<tr>
<td>David Stone</td>
<td>phone: 202-586-8851</td>
<td>email: <a href="mailto:david.stone@eia.gov">david.stone@eia.gov</a></td>
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