Annual Energy Outlook 2022

Planned modeling and data updates in the transportation sector

For
AEO2022 Transportation Working Group
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Office of Long-Term Energy Modeling
AEO2022 and COVID-19

• **AEO2022** reflects updated macroeconomic projections from IHS Markit (including vehicle sales)

• The forecasts in the *Short-Term Energy Outlook* (STEO) reflect the near-term impacts of the pandemic and subsequent mitigation efforts.

• We released an *Annual Energy Outlook Trends and Expectations* report that discusses some of the early impacts of COVID-19 on different energy sectors: [https://www.eia.gov/outlooks/aeo/trends_expectations.php](https://www.eia.gov/outlooks/aeo/trends_expectations.php)
Outline

• Recap of *Annual Energy Outlook 2021* (AEO2021) Reference case

• Planned data and modeling updates for the AEO2022 Transportation Sector Demand Model
  - Light-duty vehicles (LDV)
  - Heavy-duty vehicles (HDV)
  - Air
  - Other

• Discussion
Transportation sector energy consumption remains lower than its 2019 level for entire projection period as a result of decreased travel in 2020.

**Transportation sector consumption by mode**

**AEO2021 Reference case**

<table>
<thead>
<tr>
<th>Fuel Type</th>
<th>2020 History</th>
<th>2020 Projections</th>
</tr>
</thead>
<tbody>
<tr>
<td>Light-duty vehicles</td>
<td></td>
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<tr>
<td>Medium- and heavy-duty</td>
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<tr>
<td>Vehicles</td>
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<tr>
<td>Air</td>
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<tr>
<td>Commercial light trucks</td>
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<td>Rail</td>
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<tr>
<td>Marine</td>
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<tr>
<td>Other</td>
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</tbody>
</table>

**Transportation sector consumption by fuel**

**AEO2021 Reference case**

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<tr>
<th>Fuel Type</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Motor gasoline</td>
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<tr>
<td>Distillate fuel oil</td>
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<tr>
<td>Jet fuel</td>
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<tr>
<td>Electricity</td>
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<tr>
<td>Other</td>
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</tr>
</tbody>
</table>
Passenger and freight travel by mode

Vehicle travel
AEO2021 Reference case
trillion vehicle-miles

Passenger travel
AEO2021 Reference case
trillion revenue passenger-miles

Rail and domestic shipping
AEO2021 Reference case
trillion ton-miles traveled

2020 projections
light-duty vehicles
heavy-duty trucks

2020 projections
air
bus
passenger rail

2020 projections
freight rail
domestic marine
Light-duty vehicle sales by technology or fuel type

Light-duty vehicle sales by technology or fuel
AEO2021 Reference case
millions of vehicles

history | projections

- other
- electric hybrid
- plug-in electric
- hybrid
- battery electric
- diesel
- flex fuel
- gasoline

New vehicle sales of battery-powered vehicles
AEO2021 Reference case
millions of vehicles

- total battery electric
  including 100-, 200-, 300-mile
  electric vehicles
- electric hybrid
- 300-mile electric
- 200-mile electric
- plug-in electric hybrid
- 100-mile electric

WORKING GROUP PRESENTATION FOR DISCUSSION PURPOSES. DO NOT QUOTE OR CITE BECAUSE RESULTS ARE SUBJECT TO CHANGE.
Light-duty vehicle
Light-duty vehicle updates

• Update stock data update to 2019 from 2018
  – Data based on vehicle registrations by region, vintage, and fuel type, including car and light truck split based on vehicle data from the U.S. Environmental Protection Agency

• Integrate new battery model
  – Battery size relationship to pack size and vehicle weight will be dynamic

• Revise regional LDV sales and stocks distribution

• Consider pending policy changes
  – Evaluate zero-emission vehicle (ZEV) mandate
  – Evaluate state internal combustion engine (ICE) bans
  – Update electric vehicle (EV) tax credit assumptions
Heavy-duty vehicle
Heavy-duty modeling updates

- Update stock data to 2019 from 2018
  - Update based on vehicle registrations by region, vintage, fleet type, and fuel type

- Update regional travel to 2019 values, including total travel, vehicle-miles traveled (VMT) by industrial sector, and stock fuel economy

- Integrate a new EV powertrain and battery model by vehicle size class and duty cycle
Public transit
Public transit modeling updates

• Update travel demands, fuel use, and efficiency data to 2020 from 2019
  – Transit, intercity, and school buses
  – Transit, commuter, and intercity rail
  – Potential COVID-19 impacts

• Re-estimate coefficients for travel demand (PMT) equations

• Update transit bus fuel choice to account for projected growth of electric- and natural gas-powered buses
Air
Air modeling updates

• Update last historical year to 2020
  – Aircraft fleet stocks (all regions): average of quarterly stock data to more accurately account for the average stock throughout the year (active versus parked, by region and body type)
  – Aircraft operations (U.S. Bureau of Transportation Statistics): revenue passenger miles, freight revenue ton miles, load factors, efficiencies

• Update assumptions defining the return to pre-COVID averages based on the International Air Transport Association, International Civil Aviation Organization, Airlines For America, and others

• Re-estimate recreational aircraft and aviation gasoline projections

• Re-estimate ticket yield projection
Other data updates
Other data updates

• Update freight rail and domestic marine shipping efficiencies and ton-miles by region and industrial sector
Discussion
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U.S. Energy Information Administration | www.eia.gov

Annual Energy Outlook | www.eia.gov/outlooks/aeo