October 4, 2022

MEMORANDUM FOR: Angelina LaRose
                       Assistant Administrator for Energy Analysis

FROM: Jim Diefenderfer
                       Director, Office of Long-Term Energy Modeling

SUBJECT: Summary of AEO2023 Transportation Working Group held on Thursday,
                       September 15, 2022

This memorandum summarizes our presentation and discussion at the *Annual Energy Outlook 2023*
(AEO2023) Transportation Working Group meeting. The Transportation Working Group presentation
summarized AEO2022 Reference case transportation projections. It also highlighted the planned
historical transportation data and modeling updates for the Transportation Demand Module (TDM) for
the AEO2023 Reference case, as configured in our National Energy Modeling System (NEMS). After the
presentation, meeting participants commented on additional model and data topics. The presentation
for this meeting is available in a separate document on our website.

Model updates (AEO2023)

We presented preliminary updates comparing projected values for AEO2023 to published AEO2022
values for different model topics:

- Impacts of non-transportation module updates—disposable income, employment, fuel price—
  on light-duty travel
- Light Duty—New Corporate Average Fuel Economy (CAFE) standards, zero-emission vehicle
  (ZEV) credit update, scrappage regionalization
- Diesel—overall transportation sector diesel consumption, ton-mile demand by mode for truck,
  rail, and waterborne freight, Freight Analysis Framework dataset update
- Public transit—passenger bus and passenger rail travel demand and energy consumption
- Air—re-regionalized model to align with 16 International Energy Outlook regions
- Other—primary transportation policies in NEMS

Discussion

During the discussion, participants primarily asked about electric vehicles, the ZEV credit mandate, and
recent policy changes.

Electric vehicles and policy discussion

Attendees noted that our projected levels of electric vehicle (EV) adoption are relatively low when
compared to California's ZEV requirements of 100% new vehicles by 2035, major automakers'
electrification statements regarding increased EV production and sales by 2030, and federal

WORKING GROUP PRESENTATION FOR DISCUSSION PURPOSES ONLY.
DO NOT QUOTE OR CITE BECAUSE RESULTS ARE SUBJECT TO CHANGE.

electrification goals of 50% EV sales share by 2030. We noted that California's 100% ZEV sales by 2035 requirement is not enforceable until the U.S. Environmental Protection Agency (EPA) grants a waiver, so we will not include the policy in NEMS for AEO2023. We explained that we do not model manufacturers' EV sales goals because those goals depend on a number of factors beyond the control of the manufacturers, such as comprehensive EV charging infrastructure deployment and broad consumer incentives for all EV purchases. Our projections of EV sales are closely tied to advancements in battery research and development, performance improvement, chemistries, design, and packaging, and we consider how those factors will affect cost. If manufacturers announce new future models, we make sure we have corresponding vehicles available in that size class.

A participant asked if we have a plan for a side case run or a separate policy-focused modeling run for the California internal combustion engine (ICE) vehicle ban, including all states adopting the ICE ban. In addition, attendees asked if we are doing a high EV penetration side case. We answered that we are not planning on additional side cases at this time, but we will consider the suggestions.

A participant asked what level of ZEV mandates are being assumed, or if the assumptions are the same as before the Safer Affordable Fuel-Efficient (SAFE) Vehicle rule. We clarified that we are using the original California Code of Regulations (CCR) Section 1962.2 ZEV requirements for model year 2018 and above,[1] including eight additional states that have signed on and an additional four states that will begin enforcing the mandate in the mid-2020s. A participant then asked if we are capturing the latest ZEV regulation finalized in August. We responded that EPA has to issue a waiver in order for the most recent ZEV regulation to go into effect. We presume that, if the ZEV mandate were to take effect, then we would likely see a larger share of EVs for manufacturers who met those mandates.

An attendee asked if we are including the production tax credit for light-duty vehicles (LDVs) in the Inflation Reduction Act of 2022 (IRA). We responded that we do not have the information to accurately estimate where batteries are currently produced or where they might be produced in the future. We are investigating internally how such projections might work across NEMS sectors. We noted that future battery prices are highly uncertain. The IRA vehicle and battery credits could apply downward pressure on prices, but significant supply chain constraints are likely to continue pushing prices up. A participant requested further clarification on the impact of the IRA Clean Vehicle Credit to which we responded that we plan to estimate the number of credit-eligible vehicles from the Congressional Budget Office's estimated Clean Vehicle Credit expenditures.[2] This estimate would result in between one million and two million total eligible EVs over the life of the regulation.

A participant asked if the assumptions on the IRA Clean Vehicle Credit will affect vehicle cost. We answered that we are implicitly modeling the credit based on Congressional Budget Office (CBO) information as discussed above. An attendee suggested separating utilization rates for different powertrains and allowing EV utilization to converge with ICE vehicles sometime in the future. We responded that we do not intend to hold EV travel schedules constant and that we are exploring different options to bring them in line with conventional vehicle travel schedules during the projection. We noted we are open to input and ideas on this topic.

---

[1] https://www.law.cornell.edu/regulations/california/13-CCR-1962.2
[2] https://www.cbo.gov/system/files/2022-08/hr5376_IR_Act_8-3-22.pdf

A participant asked if the scrappage inputs for LDVs are fixed over the projection period or if they are linked to other vehicle attributes such as fuel or price. We responded that the scrappage inputs are fixed and we do not plan on making them dynamic. The participant agreed with our response and further noted they had invested time in making scrappage inputs dynamic and the outcomes were not much different.

Finally, attendees asked, when viewing different side cases, if there is a way to estimate the ratio of oil imports to domestic production. We answered that typically all of the core side cases and tables are released at the same time. The results for the attendees' specific question are provided in Table 11 on our website. Table 11 contains petroleum indicators for each case, such as domestic production and exports.

Attendees

Guests (Webex/phone)

Samaneh Babaee	OnLocation, Inc.
Alicia Birky	National Renewable Energy Laboratory
Noel Crisostomo	U.S. Department of Energy
Naveen Dasari	Rhodium Group
Michael Freels	Oregon Department of Energy
Hao Deng	OnLocation, Inc.
Evan Elias	Oregon Department of Energy
Michael Gaffney	Rhodium Group
David Gohlke	Argonne National Laboratory
Aaron Hula	U.S. Environmental Protection Agency
Jim Kliesch	Honda
Hannah Kolus	Rhodium Group
Avi Mersky	American Council for an Energy-Efficient Economy
John Meyer	Leidos
Russell Owens	Energetics
Thomas Perrot	Energetics
Don Pickrell	U.S. Department of Transportation
Michael Shelby	U.S. Environmental Protection Agency
Daniel Tanner	U.S. Environmental Protection Agency
Wyatt Thompson	University of Missouri
Anna van Brummen	Rhodium Group
Jarrett Whistance	University of Missouri
Frances Wood	OnLocation, Inc.
Xinyi Wu	Argonne National Laboratory
Arthur Yip	National Renewable Energy Laboratory

EIA attendees (Webex/phone)

Erin Boedecker	John Maples
Caroline Campbell	Kevin Nakolan
Mike Cole	James Preciado
Jim Diefenderfer	Mark Schipper
Michael Dwyer	Sauleh Siddiqui
Mindi Farber-Deanda	Nicholas Skarzynski
Angelina LaRose	Josh Whitlinger