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# Memorandum

To: TCI  
FROM: JASON FROST AND PAT KNIGHT  
DATE: MAY 29, 2019  
RE: TCI REFERENCE CASE ASSUMPTIONS COMMENTS

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## Synapse Energy Economics Comments

Thank you for the opportunity to submit comments on the TCI Reference Case input assumptions. We think that TCI can be an important policy tool for reducing greenhouse gas emissions from the transportation sector. At Synapse, we regularly assist our clients with analysis and modeling of transportation sector energy consumption, greenhouse gas emissions, and decarbonization strategies. The following comments are based on our research and modeling experience.

### Battery Costs

- Slide 13 suggest that states are leaning towards using assumptions utilized in a recent NYSERDA study. However, this battery price trajectory was itself based on a 2016 forecast from Bloomberg NEF. This forecast is now outdated—it has been regularly updated by BNEF each year since 2016.
  - The most recent BNEF forecast is available at <https://about.bnef.com/blog/behind-scenes-take-lithium-ion-battery-prices/>. This trajectory reaches a cost of \$62/kWh (in 2018 dollars) by 2030. We expect this projection to appear in BNEF's next New Energy Outlook, which will likely be released this summer.
  - Alternatively, last year's 2018 New Energy Outlook forecast could be used. It is available here: <https://about.bnef.com/new-energy-outlook/#toc-download>.
- Electric sector storage impacts:
  - The storage costs in the 2018 NREL ATB are based on older and substantially higher battery cost projections. More recent sources include Lazard LCOS 4.0 and a recent Brattle literature review available here: <http://energy.nv.gov/uploadedFiles/energynvgov/content/Home/Features/2018.10.15%20Nevada%20Energy%20Storage%20Presentation.pdf>.
  - In addition, a new ATB study will be available in July 2019.
  - That said, we would not expect electric sector storage costs to have a large impact on the transportation sector.

## Vehicle Introduction Years

- We recommend that no electric vehicle introduction years should be set to 2051.
  - Since manufacturer decisions to offer vehicles are based on consumer demand and policy, all vehicle types should be offered to NEMS at the expected costs and NEMS should be allowed to determine the level of demand.
  - Vehicles that will not be offered should only be selected in very small numbers by NEMS and therefore would be unlikely to substantially impact the results of the modeling. There is little risk to offering too many EV types to the model.
  - We recommend introducing the remaining electric light trucks in the early 2020s, in line with recent announcements by OEMs.

## Fuel Economy Standards

- The impact of EV sales on fleet average fuel economy, and the average fuel efficiency of gasoline-powered vehicles required to comply with standards, should be captured in the modeling. Increased EV sales will increase average fuel efficiency so that gasoline-powered vehicles may not need to become more efficient, even in a future in which current CAFE standards are kept in place.
- We recommend that fuel economy standards should be held constant after 2025 in the reference case to reflect the policies currently in effect.

## ZEV Mandates

- To clarify the explanation of the ZEV mandates, the numbers listed in the webinar slides are the number of credits that need to be submitted, not the number of EVs that need to be sold.
  - EVs can earn up to four credits each based on the size of their batteries, and California has estimated that its ZEV mandate will require eight percent of new vehicle sales to be electric in 2025.
  - Recent modeling in Colorado (<https://coloradosun.com/2019/05/13/colorado-electric-vehicle-state-rules/>) suggests the 2025 ZEV mandates could be met with a sales percentage of around six percent.
- We agree that both state ZEV mandates and existing state incentive programs should be included in the modeling.

