

May 29, 2019

To: Transportation and Climate Initiative Technical Analysis Workgroup  
Christine Kirby and Chris Hoagland, Co-Chairs

<https://www.transportationandclimate.org/main-menu/tci-regional-policy-design-stakeholder-input-form>

Thank you for the opportunity to provide comments on the Transportation and Climate Initiative (TCI) states' Reference Case modeling assumptions. As noted in the May 23<sup>rd</sup> TCI webinar on the states' planned Reference Case assumptions, developing and modeling the Reference Case is a critical step in understanding the region's current and projected transportation sector emissions, and will be used as a comparison point for future policy scenarios as the states design a regional low-carbon transportation policy by the end of 2019.<sup>1</sup>

We offer the following comments and suggested improvements to the Reference Case assumptions presented in the webinar. As the states move ahead with technical analyses to inform the design of a regional policy, we also look forward to—and encourage the states to provide—additional, iterative opportunities for stakeholders to propose specific policy scenarios and comment on the full suite of modeling and analyses outlined during the April 30<sup>th</sup> TCI workshop in Boston.<sup>2</sup>

While developing the Reference Case is an important first step, the other analyses the states are planning will be critical to understanding the potential benefits, including to specific communities, of different policy scenarios and decisions and the eventual policy design. Accordingly, we encourage the states to involve stakeholders in discussions around the full suite of analyses to the maximum extent feasible and to communicate clearly, and as early as possible, the anticipated timing of next steps and the opportunities that will be provided for stakeholders to comment on and review these analyses.

## 1) Electricity Sector Assumptions

We strongly support the states' proposal to include up-to-date information on the region's power sector and anticipated deployment of clean energy under state policies, including by updating the 2018 Annual Energy Outlook (AEO 2018) data to reflect the most recent available data on the following factors identified in the May 23<sup>rd</sup> webinar:

- Power plant firm builds and retirements: update to be consistent with NJDEP's RGGI modeling and any firm builds and retirements announced subsequent to that modeling;
- State offshore wind goals and procurements: update to be consistent with current offshore wind commitments by TCI states, which total 17.2 GW and could increase to 21.6 GW pending final passage of 2019 legislation or favorable outcomes from pending studies;

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<sup>1</sup> Transportation & Climate Initiative, *Webinar: Reference Case Assumptions Design*, May 23, 2019, <https://www.transportationandclimate.org/webinar-reference-case-assumptions-policy-program-design>.

<sup>2</sup> This should include opportunities to comment on different transportation strategies, investment opportunities, and analyses of health implications and household distributional and equity impacts. We provided some initial thoughts on policy scenario modeling in comments submitted on May 14, 2019, and anticipate providing more detailed comments as this process continues. See [https://www.transportationandclimate.org/sites/default/files/webform/tci\\_2019\\_input\\_form/Advocate%20Group%20Comments%20on%204\\_30%20TCI%20Workshop.pdf](https://www.transportationandclimate.org/sites/default/files/webform/tci_2019_input_form/Advocate%20Group%20Comments%20on%204_30%20TCI%20Workshop.pdf).

- State renewable and clean energy programs: update to be consistent with NJDEP’s RGGI modeling and recent commitments such as DC’s 100% by 2032 requirement and Maryland’s recent adoption of a 50% by 2030 renewable portfolio standard;
- State load forecasts and energy efficiency programs: update to be consistent with NJDEP’s RGGI modeling or more recent load forecasts where available, such as ISO New England 2019 CELT forecast, released May 1, 2019;<sup>3</sup> and
- National Renewable Energy Laboratory (NREL) renewable energy cost projections: update to use NREL’s most recent Annual Technology Baseline.

We further urge the states to ensure the Reference Case incorporates:

- Energy storage targets: fully include individual states’ targets and mandates for on-grid battery storage, in addition to state renewable energy and energy efficiency mandates;
- On-grid battery costs: utilize up-to-date forecasts of on-grid battery costs, such as from individual TCI states, if available, or from sources such as Bloomberg New Energy Finance (BNEF); and
- State clean energy commitments: reflect specific gubernatorial commitments to achieve 100% clean energy, including in Connecticut (by 2050), Maine (by 2050), Maryland (by 2040), New Jersey (by 2050), and New York (by 2040). Region-wide, consistent with states’ climate targets, climate pollution from electricity in the Reference Case should be at or near zero by 2050.

With respect to Virginia, we encourage the states to assume Virginia’s power sector CO<sub>2</sub> Budget Trading Program will enter into force in 2021 and enable the state to link with the Regional Greenhouse Gas Initiative (RGGI), consistent with the recent rule approved by the state’s Air Pollution Control Board.<sup>4</sup>

## **2) Technology Costs: EVs and Batteries**

We support the states’ proposal to update the default AEO 2018 estimates of per-kWh battery costs in the Reference Case to reflect better projections of these costs, consistent with recent price trends and reasonable expectations of continued price declines in future years. While the states’ proposal to use the NYSERDA-sponsored study is an improvement over the AEO numbers, we encourage the states instead to use alternative, regularly updated battery cost projections that have a proven track record of success, such as projections from BNEF,<sup>5</sup> rather than a static study such as the one conducted for NYSERDA.

## **3) Vehicle Introduction Years**

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<sup>3</sup> ISO New England, *CELT Report: 2019-2028 Forecast Report of Capacity, Energy, Loads, and Transmission* (May 1, 2019), [https://www.iso-ne.com/static-assets/documents/2019/04/2019\\_celt\\_report.xls](https://www.iso-ne.com/static-assets/documents/2019/04/2019_celt_report.xls).

<sup>4</sup> Virginia Regulatory Town Hall, *CO<sub>2</sub> Budget Trading Program (Final Text)*, <http://www.townhall.virginia.gov/L/ViewXML.cfm?textid=13287>.

<sup>5</sup> Bloomberg New Energy Finance, *Electric Vehicle Outlook 2019*, <https://about.bnef.com/electric-vehicle-outlook/>.

Given the recent and rapid progress we have seen in the market, the Reference Case should assume electric vehicle (EV) and plug-in hybrid electric vehicle (PHEV) models are available in every size class by 2030. In most cases, the Reference Case should assume these models are available well before 2030.

Light-duty vehicles

Light-duty PHEV and EV models are already available in many class sizes and will soon be available in others. To reflect current technologies and trends, we recommend that the Reference Case assume that light-duty PHEV and EV technologies will be available across most segments by 2025 (and in most cases earlier), as shown in the tables below, based on manufacturers’ announcements and vehicle roadmaps.<sup>6</sup> Given the rapid pace of PHEV and EV technology development and new model announcements, it is possible that some vehicle types will be available earlier than the dates shown below; thus, it may also be appropriate to assume earlier introduction dates in the Reference Case than shown below.

**Recommended Vehicle Introduction Year Assumptions for Light-duty Vehicles**  
 (Recommended changes to the May 23<sup>rd</sup> webinar assumptions are shaded in red)

	2 Seater Cars	Mini Cars	Subcom Cars	Compact Cars	Midsize Cars	Large Cars
Plug-In Hybrid (10 mile)	2014	2015	1995	2011	2011	2014
Plug-In Hybrid (40 mile)	2014	2015	1995	2011	2011	2015
Electric Vehicle - 100 mile	2014	2015	1995	2011	2011	2019
Electric Vehicle - 200 mile	1995	2024	2020	2018	2018	2013
Electric Vehicle - 300 mile	2020	2025	2020	2020	2015	2012

	Compact Pickups	Std Pickups	Compact Vans	Std Vans	Compact SUVs	Std SUVs
Plug-In Hybrid (10 mile)	2021	2025	2018	2022	2016	2023
Plug-In Hybrid (40 mile)	2019	2025	2018	2022	2018	2020
Electric Vehicle - 100 mile	2021	2025	2018	2022	2018	2023
Electric Vehicle - 200 mile	2019	2024	2020	2022	2016	2020
Electric Vehicle - 300 mile	2021	2030	2025	2024	2016	2016

Heavy-duty vehicles

Similar to light-duty technology availability, the state of technology for electrified heavy-duty vehicles is progressing rapidly with battery cost decreases. With respect to heavy-duty vehicles, the Reference Case’s entries up through Class 8 should be unconstrained post-2020 for the various technologies including battery-electric vehicles and hydrogen fuel cell vehicles.

**4) Federal Fuel Economy and GHG Emission Standards**

<sup>6</sup> See, e.g., Lukas Cardignhan, “10 Electric Cars That Will Arrive On The Market In 2020,” HotCars (May 7, 2019), <https://www.hotcars.com/10-electric-cars-that-will-arrive-on-the-market-in-2020/>.

We support the states' proposed approach of including federal average fuel economy standards and adopted greenhouse gas emission standards for light- and heavy-duty vehicles in the Reference Case through model year 2025. To the extent the states evaluate the negative effects on transportation emissions, public health, and consumer costs of the Trump Administration's proposed rollback of federal light-duty vehicle standards, we support the states' proposal to do so in a sensitivity analysis. A sensitivity analysis should also include evaluation of more stringent federal standards (at least consistent with the rate of improvements required over the last five years) through 2030 or beyond.

### **5) Federal EV Tax Credit**

We support using OnLocation's estimates for the federal EV tax credit in the Reference Case. We also recommend including a sensitivity to the Reference Case that extends the federal EV tax credit, consistent with introduced bipartisan legislation, to an additional 400,000 purchasers per manufacturer at \$7,000.<sup>7</sup>

### **6) State Clean Vehicle Policies**

The states should assume that Section 177 States maintain and enforce their existing Low Emission Vehicle (LEV) and Zero Emission Vehicle (ZEV) programs. The list of states adopting the programs should include Colorado, since it has adopted LEV and is in the process of adopting ZEV. Beyond 2025, the Reference Case should assume that these state programs continue at a rate at least consistent with the last five years of regulation through at least 2030. During this period, the analysis should assume existing state incentives, including rebates and tax credits, are available.

### **7) Fuel Prices**

We recommend that the states update the Reference Case to include the most recent projections of fuel supply and prices from AEO 2019, rather than relying on the AEO 2018 forecast. Fuel prices, and the underlying fuel supply curves used to derive these prices in NEMS, are one of the most important and influential assumptions in energy modeling. Fuel prices are substantially lower in AEO 2019 than in AEO 2018, with real Henry Hub gas prices 17 percent lower and Brent crude oil prices 5 percent lower in the 2020 - 2030 timeframe. Between 2020 and 2050, natural gas and crude oil prices average 11 and 4 percent lower, respectively in AEO 2019, as compared to AEO 2018. Domestic production, especially of crude oil, has also changed significantly between the two cases: between 2020 and 2030, the domestic production of Crude Oil and Lease Condensate average 24 percent higher in AEO 2019 than in AEO 2018. Given the significant changes in fuel supply (and resulting market prices) between the two forecasts, and the likely weight of fuel projections in the states' modeling, it is appropriate to update these particular assumptions to AEO 2019.

### **8) VMT Growth**

We support the states' proposal to use current state projections of VMT growth in the Reference Case.

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<sup>7</sup> "Stabenow, Alexander, Peters, Collins, Kildee Introduce Bipartisan Bill to Expand Electric Vehicle and Hydrogen Fuel Cell Tax Credits" (press release), April 10, 2019, <https://www.stabenow.senate.gov/news/stabenow-alexander-peters-collins-kildee-introduce-bipartisan-bill-to-expand-electric-vehicle-and-hydrogen-fuel-cell-tax-credits>.

Thank you for the opportunity to provide these comments.

Acadia Center  
Clean Air Council  
Climate XChange  
Climate Law & Policy Project  
Connecticut Fund for the Environment  
Conservation Law Foundation  
Electric Vehicle Club of Connecticut  
Energize Maryland  
E2 (Environmental Entrepreneurs)  
Environmental League of Massachusetts  
Green Energy Consumers Alliance  
Health Care Without Harm  
Natural Resources Defense Council  
Sierra Club  
Transportation for Massachusetts  
Union of Concerned Scientists