

This document has been prepared as part of the implementation project of Legal Pathways to Deep Decarbonization (Michael B. Gerrard and John C. Dernbach, eds. Environmental Law Institute [2019]) (LPDD). For background information on the project, see <https://lpdd.org>

Memorandum to Accompany Model State Legislation Providing New AFV Tax Credits

There is a strong consensus in the scientific community that profound changes are occurring in the world's climate; that these changes are due in large measure to human activities; and that the consequences of unchecked climate change pose grave risks to the environment, human health and socioeconomic stability. See, e.g., "Climate Science Special Report, Fourth National Climate Assessment," (the "National Climate Assessment") which was released by the federal government on November 17, 2017 ("Earth's climate is now changing faster than at any time in the history of modern civilization, primarily as a result of human activities.")¹ The symptoms of climate change are now readily apparent: average global temperatures are increasing inexorably, sea levels are rising measurably, glaciers are retreating, arctic sea ice is disappearing, ocean waters are warming, permafrost is thawing, record droughts are occurring, wildfires are becoming more intense and storms are becoming more severe."²

The U.S. is not immune to such impacts. Recent years have seen record wildfires break out in the west, unprecedented flooding in the mid-west and devastating storms along our coasts. Over the longer term, reports published by NASA, Columbia University, and Cornell scientists in 2015³ and 2016⁴ predict that "megadroughts" (i.e., droughts of the depression-era "dust bowl" magnitude, but lasting for decades) "could become commonplace" in the southwest and U.S. plain states "if climate change goes unabated."⁵ It is predictions such as these that have led the 2019 report of the World Economic Forum to identify the "failure of climate change mitigation and adaptation" to be one of the top risks facing society – ahead of weapons of mass destruction, cyber-attacks, terrorism and the increasing scarcity of potable water.⁶

The December 12, 2015 Paris Agreement aims to avoid the worst impacts of climate change by holding the increase in average global temperatures to "well below 2°C above pre-industrial levels" with efforts "to limit the temperature increase to 1.5°C above pre-industrial

¹ U.S Global Change Research Program, *Fourth National Climate Assessment*, p.34. <https://www.globalchange.gov/browse/reports/climate-science-special-report-fourth-national-climate-assessment-nca4-volume-i>

² *Id.* at 37.

³ Benjamin I. Cook, Toby Ault, & Jason Smerdon, "Unprecedented 21st Century Drought Risk in the American Southwest and Central Plains States," *SCIENCE ADVANCES* (Feb. 12, 2015), <http://advances.sciencemag.org/content/1/1/e1400082>.

⁴ Toby Ault, Justin S. Mankin, Benjamin I. Cook & Jason E. Smerdon, "Relative Impacts of Mitigation, Temperature, and Precipitation on 21st-Century Megadrought Risk in the American Southwest," *SCIENCE ADVANCES* (Oct. 5, 2016), <http://advances.sciencemag.org/content/2/10/e1600873>.

⁵ *Id.* at 6.

⁶ *The Global Risks Report 2019*, Part I, WORLD ECON. FORUM, <https://www.weforum.org/reports/the-global-risks-report-2019>

levels.”⁷ Achieving these goals will be a daunting task, requiring that greenhouse gas emissions from industrial countries like the U.S. be reduced by about 80 percent by 2050. Reductions of this magnitude will take a colossal effort by virtually all levels of government in the U.S. and all sectors of the economy.

A book published by the Environmental Law Institute, entitled *Legal Pathways to Deep Decarbonization in the United States* (Michael Gerrard & John Dernbach, Eds., ELI 2019) (“LPDD”), has identified more than 1000 legal strategies that can be taken to achieve dramatic greenhouse gas emission reductions in the United States. Many of those pathways are focused on shifting transportation fuel sources in the U.S. away from fossil fuels, at a level that would result in the deployment of approximately 300 million alternative fuel vehicles (“AFVs”) – including hydrogen fuel cell vehicles (“HFCVs”), battery electric vehicles (“BEVs”) and plug-in hybrid vehicles (“PHEVs”). The goal is to shift 80%-95% of the miles driven from gasoline to lower carbon energy sources like electricity and hydrogen.”⁸

The importance of achieving this goal is readily apparent: in the United States the transportation sector accounts for 28% of the total energy consumed, 72% of petroleum usage and about a third of GHG emissions.⁹ Cars and trucks use about half the total energy consumed by the transportation sector, which also includes trains, subways, planes, ships and other water craft. States can play an important role in this effort by creating economic incentives for the purchase or lease of AFVs.

The proposed state income tax credit legislation accompanying this memorandum is designed to provide such an incentive. While beginning to fade, an initial barrier to the proliferation of AFVs is the cost. The cost of AFVs is impacted both by the new supply chain products required and the lithium ion batteries (the dominant battery for EVs) which comprise approximately one-third of the cost of EVs.¹⁰ Most consumers look to the immediate cost of vehicles and do not generally account for the long-term benefits associated with AFVs, which in some cases can make an AFV comparable in price to its internal combustion counterpart.¹¹ Additionally, some studies suggest that AFVs depreciate faster than internal combustion vehicles making the higher or equal purchase

⁷ *Id.* The NASA Study indicates that the risks of a megadrought occurring in the Western U.S. drop sharply – to a range from 30-60 percent in a 2°C warming scenario. *See, e.g.*, <https://www.ecowatch.com/megadroughts-2031955357.html>.

⁸ LPDD, Ch. 14, at 353; *see also*, Chris Gearhart, *Implications of Sustainability for United States Light-Duty Transportation Sector*, 3 MRS Energy & Sustainability 1, 7, note 6 (2016)

⁹ U.S. Energy Information Agency: Annual Energy Review: 2011 (2012), available at: <http://www.eia.gov/totalenergy/data/annual/>; *see also*, <http://www.eia.gov/todayinenergy/detail.php?id=29612>.

¹⁰ Michael Gerrard and John Dernbach, *Legal Pathways to Deep Decarbonization in the United States* (Environmental Law Institute, 2018), Ch. 14, at 361. *See also*, Andreas Poullikkas, *Sustainable Options for Electric Vehicle Technologies*, 41 Renewable & Sustainable Energy Revs. 1272, 1282 (2015).

¹¹ Eric Loveday, *Electric Cars to Cost Same as, or Less than ICE Within a Decade*, Inside EVs, <http://insideevs.com/electric-cars-to-cost-same-as-or-less-than-ice-within-a-decade/> (last visited Sept. 24, 2019); Jens Hagman et. al., *Total Cost of Ownership and Its Potential Implications for Battery Electric Vehicle Diffusion*, 18 RES. Transp. Bus. & Mgmt. 11 (2016).

price harder to be accepted by consumers.¹² The model statute would address such problems by allowing tax credits for the purchase or lease of AFVs.

The proposed legislation provides for options to the enacting state, so that it could elect to provide the tax credits: (i) only for BEVs and HFCVs; (ii) for BEVs, HFCVs and PHEVs; or (iii) for BEVs, HFCVs, PHEVs and simple hybrid electric vehicles ("HEVs") that recharge predominantly through regenerative braking. For HEVs to qualify for the income tax credit, the vehicles would have to meet a minimum EPA mpg rating for combined city and highway driving, which would be determined on a year-to-year basis by—at the state's option—the transportation or environmental agency, and would be keyed to the third highest-performing HEV on the market. Initially, the HEV EPA rating qualification would be set at 50 mpg combined city/hwy. This threshold seems appropriate for at least two reasons. First, as of the 2019 model year, several small HEVs meet 50 mpg, thus this threshold offers car-buyers a number of options, at different prices. Second, no current model achieves an EPA rating of 60 mpg combined city/hwy, and only two achieve a rating of 55 mpg or more.

Because the expenditures involved in purchasing and leasing an AFV differ, the model statute includes different tax credit schedules for each of these scenarios. (It should be noted that the amounts set forth in the model statute are merely suggestions, which are provided with the understanding that the enacting state will determine the amount of the incentives to be provided, in its discretion.) The model statute calls for the reduction of the credits over time, so that following December 31, 2022 and December 31, 2026, respectively, the tax credits would be adjusted to lesser amounts specified by the legislature. These reductions are suggested due to the fact that the obstacles to the development of a robust electric vehicle market are likely to diminish over time. It appears that there is limited reason to offer the tax credits beyond December 31, 2028 as the cost of AFVs will likely continue to decrease, limiting the effectiveness of these incentives. Accordingly, under the proposed statute the incentive would terminate on that date. The enacting state could revisit this sunset provision in the event the circumstances currently expected were not to materialize.

¹² Bernd Propfe et al., Cost Analysis of Plug-In Hybrid Electric Vehicles Including Maintenance & Repair Costs and Resale Values, Presentation at EVS26 International Battery, Hybrid, and Fuel Cell Electric Vehicle Symposium (May 6-9, 2012), at 4, http://elib.dir.de/756971/1/EVS26_propfe_final.pdf.