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 Law Addressing Demand Charges

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 2015[3] and 2016[4] 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." 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.[5]

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

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

levels."[6] 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")[7], 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") – particularly electric vehicles ("EVs"), plug-in hybrid electric vehicles ("PHEVs") and hydrogen fuel cell vehicles (HFCVs"). "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 watercraft.

Although most EV charging takes place at home or work, consumers expect to be able to use the vehicles they purchase for extended trips. For that reason, the limited range of EVs, combined with the lack of adequate charging infrastructure along longer distance travel corridors stands as a major impediment to the widespread adoption of this technology. According to experts, "[c]onsumer reluctance towards EVs . . . arises from the limited range of the battery pack. The nearest charging station may be prohibitively far, or its wait time far too long. With no charging nearby. . . EV drivers could become stranded."[10]

Thus, the proliferation of publicly accessible electric vehicle charging stations -- capable of providing direct current ("DC") fast charging service[11] -- is essential to addressing these "range anxiety" issues and promoting the expanded consumer acceptance of electric vehicles.

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[6] *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.

[7] Michael Gerrard and John Dernbach, *Legal Pathways to Deep Decarbonization in the United States* ("LPDD")(Environmental Law Institute, 2019).

[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] Clint Cohen, *Blowing Smoke: Why the Current Government Incentive Regime Makes EVs and PHEVs A Distant Prospect-and How to Fix It* (2013) 38 Colum. J. Envtl. L. 375, 384.

[11] "Level 3" chargers – commonly called "DC Fast Chargers" -- provide DC service that can recharge a car battery to 80% capacity in less than an hour. See SAE J 1772. There are two other levels of electric vehicle charging,

In many jurisdictions, the current rate structure for electrical service discourages the development of high-performing DC fast chargers. Electricity bills in those jurisdictions include charges for the total amount of electricity consumed in the monthly billing cycle, but also impose an additional charge – called a "demand charge" – keyed to the maximum amount of electricity used in any given 15 minute (or one hour) period during the billing cycle. There is a valid reason for such charges, since electric companies must size their facilities to handle the maximum load on the system at any moment at time. It follows, therefore, that those who put stress on the grid should shoulder some portion of the costs involved in providing the infrastructure needed to meet that demand. Well-designed coincident peak demand charges can be a fair and reasonable means of recovering such costs from commercial and industrial customers.[12]

However, problems arise with the application of this concept to DC fast charging stations. At this early stage in development of the EV market such stations may sit idle for most of the day, only to draw significant power for short periods while electric vehicles are recharged. As a result, demand charges imposing significant costs dominate the bills paid by operators of such stations -- even though they may not sell significant amounts of overall power over the course of a billing cycle.[13] As a result, high performing DC fast charging generally tends not to be a profitable business.[14]

The model law that accompanies this memorandum would address this issue. Under the model law, each regulated electric company would be required to submit to the PUC a proposed tariff designed to facilitate DC fast charging for EVs. The submission would be required to evaluate the costs and benefits of alternative rate designs under multiple scenarios of EV adoption. The PUC would be required to provide notice and the opportunity for public comment, and thereafter approve, modify or reject the proposal. In the event of rejection, the electric company would be required to submit a modified proposal addressing the reasons for rejection. Within thirty days of PUC approval the tariff would be made available to consumers. Thereafter, the electric company would be permitted to seek modifications to the approved tariff, but only once in any three year period.

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provided by "Level 1"and "Level 2 chargers, respectively. "Level 1" charging is serviced by a standard wall outlet providing AC 120 volts/20 amps of power, and can fully recharge a car battery in 8-12 hours; Level 2 chargers connect to outlets providing AC 208/240 volts/40 amps service (about the same required for a dryer plug) and can recharge a car battery in 4-8 hours. While Level 1 and Level 2 chargers are adequate for home or office charging, they are not suited for charging along a travel corridor. https://www.boston.gov/sites/default/files/file/2020/06/How%20To%20Install%20an%20EVSE%20.pdf.

12 *Understanding Electricity Demand Charges*, Energy Watch, available at https://energywatch-inc.com/electricity-demand-charges/

13 Dane McFarland et al, *Analytical White Paper: Overcoming Barriers to Expanding Fast Charging Infrastructure in the Midcontinent Region*, (Great Plains Institute, 2019), available at: https://scripts.betterenergy.org/reports/GPI_DCFC_Analysis_July_2019.pdf

14 *Id.* at 6

A number of jurisdictions are focusing on the difficulties posed by the application of demand charges to direct current fast chargers. The model law draws heavily from the language of bills addressing this problem that either are pending or have been recently enacted by legislatures around the country.[15]

[15] *See, e.g.*, Illinois HB 3243 (currently pending); Maine H.P. 245 (currently pending); New York A 3876, S 3929 (recently enacted, not yet signed.)