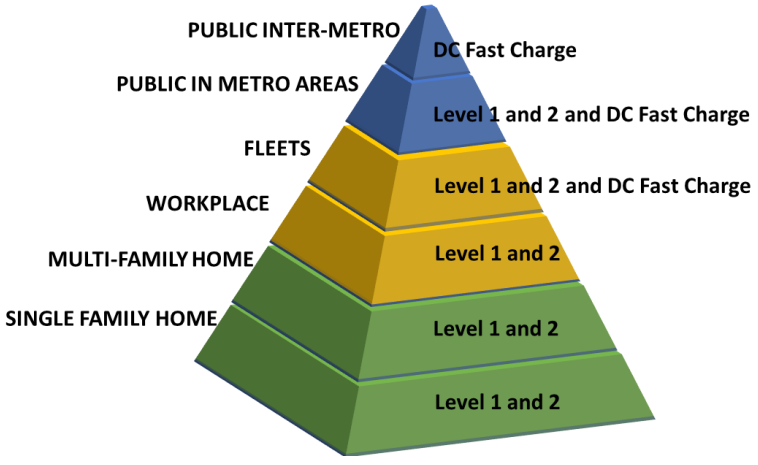
Best Practices for DC Fast Charger Pricing

The future of transportation is widely seen to be electric. Plug-in electric vehicles (PEVs) can provide significant benefits to ratepayers in utility service territories, the electric grid and to each state. Given the number of benefits, it's no surprise that states and utilities around the country are preparing for the accelerated growth of this market through supportive state level PEV policies and utility PEV programs. The American driver simply wants more of these convenient, clean vehicles that save consumers money today.

Most PEV charging happens at home, on a Level 1 or Level 2 charging station. In fact, surveys put the amount of charging that occurs at home at around 80% of all charging. Workplace charging is the next place where PEV drivers choose to drive, with 10-15% of all charging occurring at the workplace. This can also be either Level 1 or Level 2 charging.

DC fast charging (DCFC) represents a small but essential component of PEV charging infrastructure. These DCFC stations enable PEV drivers to travel further than the battery range allows; even with the majority of battery electric vehicles (BEVs) on the market today offering 200-300 miles of range per charge, there will still be some trips that require recharging along the way. In addition, those PEV drivers that do not have a garage or a dedicated parking space, such as those who live in multi-unit dwellings or apartment buildings, will rely on DCFC to charge. Shared mobility services and transportation network companies (TNCs) like Uber and Lyft also require DCFC stations to charge quickly in between offering rides.

For these use cases mentioned above, the driver must be able to charge, and charge quickly. For this reason, open access is even more important for DC fast chargers than it is for public Level 2 chargers. Drivers should be able to use any public DC fast charger at a reasonable cost. In most cases, the electricity from a DC fast charger will cost more than electricity from a home outlet, due to the capital cost of the system as well as other expenses such as demand charges.



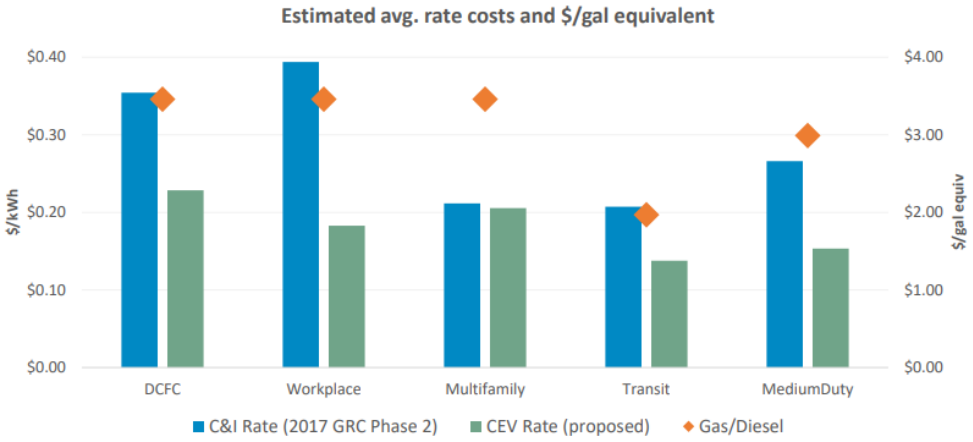
Consumer Pricing on DCFC

Demand charges are built into most industrial and large commercial utility rate structures. They are based on the maximum instantaneous power draw (kW) by a customer. The timing of the peak

for an individual load may or may not line up with the overall system peak. Demand charges are particularly difficult for DCFC, which can have high peak power but low utilization over a billing period. Typical demand charges begin once a peak usage threshold is exceeded; the higher rate remains until the end of the billing cycle, after which it resets. Numerous states have implemented rate relief for DCFC, shifting the stations on to tariffs with a higher cost per kWh but no demand charges, for a period of several years. Pilot programs in Hawaii and Connecticut have removed demand charges for DCFC five years. Pacific Power in Oregon removed the demand charges completely for now and installed a ten-year ramp to phase demand charges back in. **Plug In America strongly supports moving DCFC stations off of demand charge tariffs while system utilization is low.**

Switching DCFC stations to non-demand-metered tariffs will maintain the viability of the stations while the PEV market grows. The current utilization rates of DCFC make demand charges excessively disadvantageous. Even when the market grows and utilization increases, returning to demand charges as the primary tool of recouping system costs may not be appropriate. **Rather, Plug In America suggests that time-varying rates may be a better means of addressing system impacts than kW-based demand charges.**[1] The peak demand of an individual load may not align with the system peak; non-coincident peak demand does not impose as many costs on the grid.

[2] Pacific Gas & Electric in California has proposed a subscription plan for public DCFC that would result in lower demand charges. Since this is a time-of-use plan, the rates are more suitable for fleets than for DCFC along travel corridors, where drivers have less discretion in their time of charging. PG&E estimates DCFC station owners might pay approximately $0.23/kWh under this plan once all costs are considered. Of course, the capital cost of the station would be in addition to this.



[1] For further discussion of this topic, see the May 15, 2018 post by Jim Lazar of RAP at https://www.raponline.org/knowledge-center/demand-charges-less-equitable-less-effective-rate-design-tou-energy-rates/.
[2] Source: PG&E

As a general guideline, where possible, electricity from a DCFC should cost less than the equivalent amount of gasoline. Considering the efficiency of PEVs, ten kilowatt-hours of electricity is similar in vehicle range to one gallon of gasoline. Either one will move a vehicle *roughly* 30 miles. So, as a rule of thumb, one can multiply the electricity price by ten find the approximate "gasoline-equivalent" price. An electricity cost of $0.25/kWh corresponds to about $2.50/gallon gasoline. If gasoline costs $2.50/gallon, a DCFC that charges more than $0.25/kWh will result in the drivers not seeing fuel cost savings, which are one of the major motivating factors behind purchasing a PEV.

For a DCFC system with low utilization, the station owner may feel the need to charge a higher amount to recoup its costs. This will lead to slower PEV adoption, continued low utilization and continued higher rates. Discounting the rate in the near term will lead to higher PEV adoption, higher utilization and eventually greater revenue for recouping the capital costs. It would be a mistake to attempt to recoup the costs in the near term while utilization is low. Rather, the station owner should plan to recoup costs over the lifetime of the system with recognition of the speed at which the PEV market is growing.

For example: suppose a utility constructs a $30,000 DCFC system (50 kW) that has utilization of two hours per day. The system is expected to last for five years, at a minimum. Using simple payback, the utility needs $6,000 per year in revenue and therefore must charge approximately $0.16/kWh above and beyond the cost of electricity to recoup the capital cost of the system. This could bring the total price per kWh to well above the price of gasoline and delay PEV adoption. But suppose the utility considered that with increasing PEV adoption the station's utilization would increase 50% per year over the next five years (the PEV market grew 80% in 2018). Then the system would be utilized an average of 5.2 hours per day over that timeframe and would only need an additional $0.06/kWh to cover capital costs. Taking the long view can improve the economics of DCFC for drivers.

Some utilities do own and operate DCFC systems, typically at 50 kW. Often, these are municipal utilities. Selected utilities are shown in the following table:

Utility	DCFC Price per kWh	Notes
Green Mountain Power	$4.95+$0.20/min (~$0.33/kWh for 60 minutes)	Given rate is with EVgo membership and is same as other EVgo stations
SMUD	$0.25/kWh	Numerous free ChaDeMo stations through Drive the ARC program
Burlington Electric Department	$0.17/kWh	
Hawaiian Electric	$0.49-$0.57/kWh	Rate varies by time of day
Duke Energy (proposed)	$0.236/kWh	Based on third-party DCFC rates Not expected to fully cover capital cost of stations

Utility-Owned DCFC Development

Some utilities own and operate DCFC. Due to their longer time horizons and lower cost of capital, utilities may be able to provide DCFC services at reasonable rates while still recouping their capital costs.

A number of New York utilities have proposed an alternative plan to support DCFC development, giving DCFC station owners a per-plug incentive that declines over time from 2019 through 2025. This would have a similar effect to reducing and then gradually increasing demand charges. There would be higher incentives for stations that can supply 75 kW or more, to encourage deployment of faster DCFC.

Plug In America Recommendations

The PEV market is currently about 2% of the light-duty vehicle market, with cumulative U.S. sales since 2010 over 1,000,000 vehicles, [3] with sales increasing more than 80% from 2017 to 2018. States party to the Zero Emission Vehicles Memorandum of Understanding are targeting an on-road fleet of 3.3 million EVs by 2025, and these states make up only about 25% of the U.S. population. Proper DCFC charging rates and rate design will not only be to the benefit of the PEV driver, but also the ratepayer and the electric grid. **Plug In America highly encourages utilities and regulators to adopt best practice policies for DCFC as follows:**

- We support shifting DCFC systems onto energy (kWh) based rate tariffs and removing demand charges;

[3] https://insideevs.com/monthly-plug-in-sales-scorecard/; cumulative U.S. EV sales of 1,126,070 through December 2018.

- For DCFC and industrial or commercial accounts with PEV chargers, we support time-varying rates over kW-based demand charges as a means of system cost recovery;
- We support innovative plans such as with California's PG&E DCFC rates and the New York joint utilities' proposal to alleviate the burden of demand charges on third-party DCFC;
- We support prudent investments by utilities in DCFC, particularly in areas where the stations are needed for travel corridors but the economics are not favorable for third-party investment;
- Where possible, we encourage DCFC owners to take the long view when setting prices, as low prices now will lead to increasing utilization and ultimately greater revenue.

About Plug In America

Plug In America is the nation's leading independent consumer voice for accelerating the use of plug-in electric vehicles in the United States. Formed as a non-profit in 2008, Plug In America provides practical, objective information collected from our coalition of plug-in vehicle drivers, through public outreach and education, policy work and a range of technical advisory services. Our expertise represents the world's deepest pool of experience of driving and living with plug-in vehicles. We drive electric. You can too.
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