RATE DESIGN CONSIDERATIONS FOR EV CHARGING

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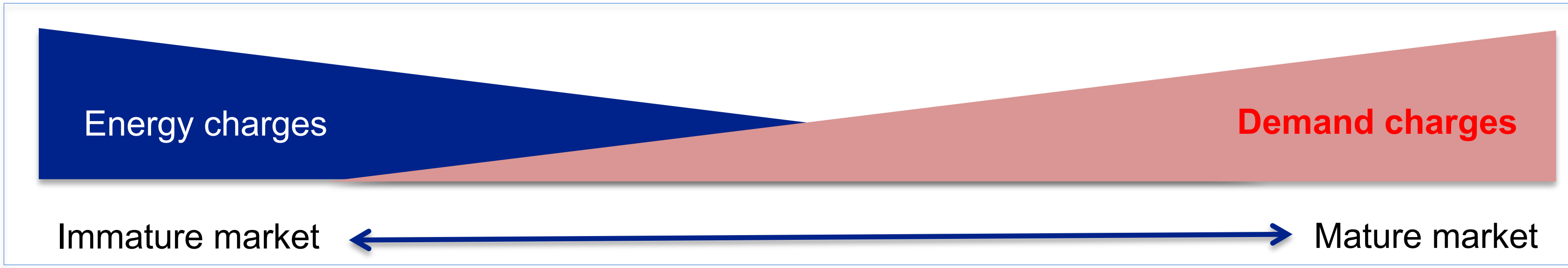
RATE DESIGN GOALS

- Charging should be **profitable** so that it is sustainable. But **demand charges make this impossible** when utilization rates are low.
- Charging should always be **cheaper than gasoline** (typically $0.29/kWh, or ~$0.09/mile, or less).
- Level 2 charging should be considerably **cheaper than DC fast charging.**
- EV chargers should be on **dedicated tariffs** and on **separate meters**, preferably the meter built into the charging station.
- Tariffs should offer an opportunity to **earn credit for providing grid services** through managed charging.
- Ideally, utilities could leverage distributed energy resource management systems (DERMS) to **promote a more efficient use** of existing grid infrastructure by offering varying rates, or interconnection costs, or levels of cost sharing for make-ready by location.

RATE DESIGN PRINCIPLES FOR EV CHARGING

- Tariffs should be **time-varying**, and preferably dynamic, while recovering most utility costs.
- Tariffs should have **low fixed charges** which primarily reflect routine costs for things like maintenance and billing.
- Tariffs should reflect the actual cost of providing service, and should charge more for **coincident peak demand.**
- Tariffs for DCFC should de-emphasize demand charges and **shift more cost to volumetric charges until market matures** and utilization rates climb, then scale up demand charges and scale down volumetric charges.
- If needed at all, **demand charges should scale with utilization rates**, and only recover location-specific costs of connection to the grid, not upstream costs.

ADDRESSING THE DEMAND CHARGE PROBLEM
RMI'S PROPOSAL

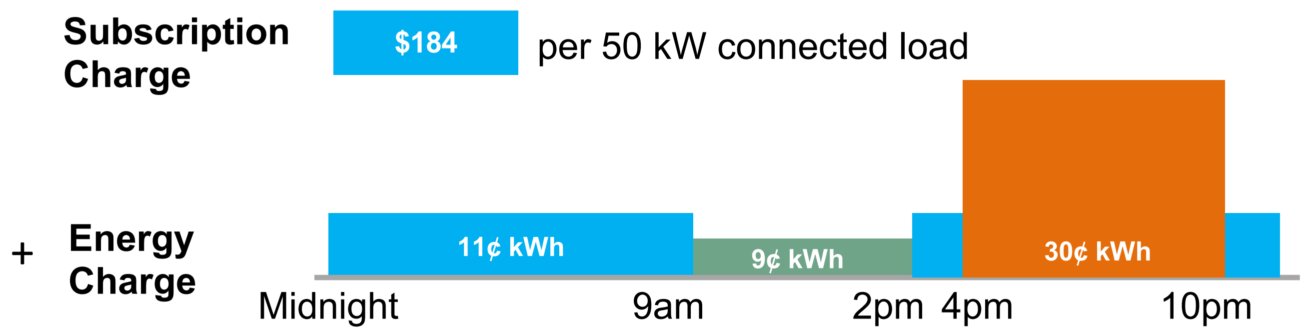


- While the market is young, there are no demand charges. More cost is shifted to volumetric charges until the market matures.
- As the market matures and utilization rates climb, demand charges scale up and volumetric charges scale down.
- Can be done as a function of utilization rates. Example: (indicative pricing)

Utilization rate	Volumetric rate (kWh)	Demand charge (kW)
<=10%	$0.20	$0
15%	$0.18	$1
20%	$0.16	$2
30%	$0.15	$3
40%	$0.14	$4
50%+	$0.11	$5

ADDRESSING THE DEMAND CHARGE PROBLEM
PG&E'S PROPOSAL

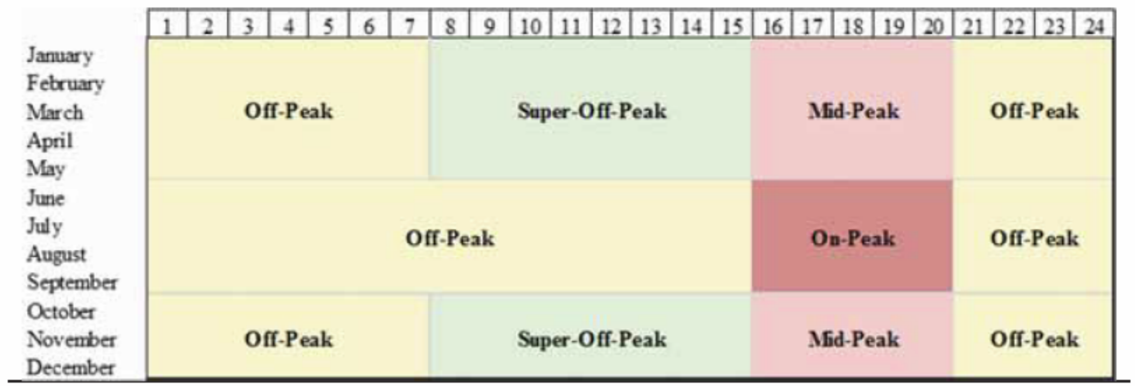
Proposed "EV-Large S" (over 100 kW) rate



- No demand charges
- Time of Use rate is matched to system peaks for appropriate cost recovery
- Rates are stable year-round, sending charging networks and drivers reliable and appropriate price signals
- Allows profitable DCFC operation across a wide variety of load shapes and charging scenarios

ADDRESSING THE DEMAND CHARGE PROBLEM
SCE'S DEMAND CHARGE HOLIDAY PROPOSAL

Figure III-7
Proposed TOU Weekday Periods for New V Rates (Hour Beginning)



- SCE has proposed four new rates for EVs
- No demand charges for first 5 years, then demand charges phase in over next 5 years. By Year 11, back to regular rates.
- Time of Use rate is matched to system peaks for appropriate cost recovery
- Rates vary by winter/summer, reflecting system costs and sending charging networks and drivers reliable and appropriate price signals
- Should allow profitable DCFC operation
- Other utilities are proposing similar "demand charge holiday" approaches

ADDRESSING THE DEMAND CHARGE PROBLEM
XCEL'S "RULE OF 100" APPROACH

Demand calculation

y **kW demand * .9 power factor * .9 = adjusted demand**
(= > current demand or 50% of largest adjusted demand over previous 11 months)

If demand charges are = < ***x*** **kWh / 100 hours/mo**

- Xcel's "A14" tariff in Minnesota
- Effectively calculates demand charges as a function of utilization.
- For example, a 50 kW DCFC used once per day would result in a bill that is 70% lower.
- By the time the same charger is used five times per day, the provision no longer has any effect upon the bill