

Duquesne EV-TOU Rate Analysis for C&I Class

Results

August 26, 2020

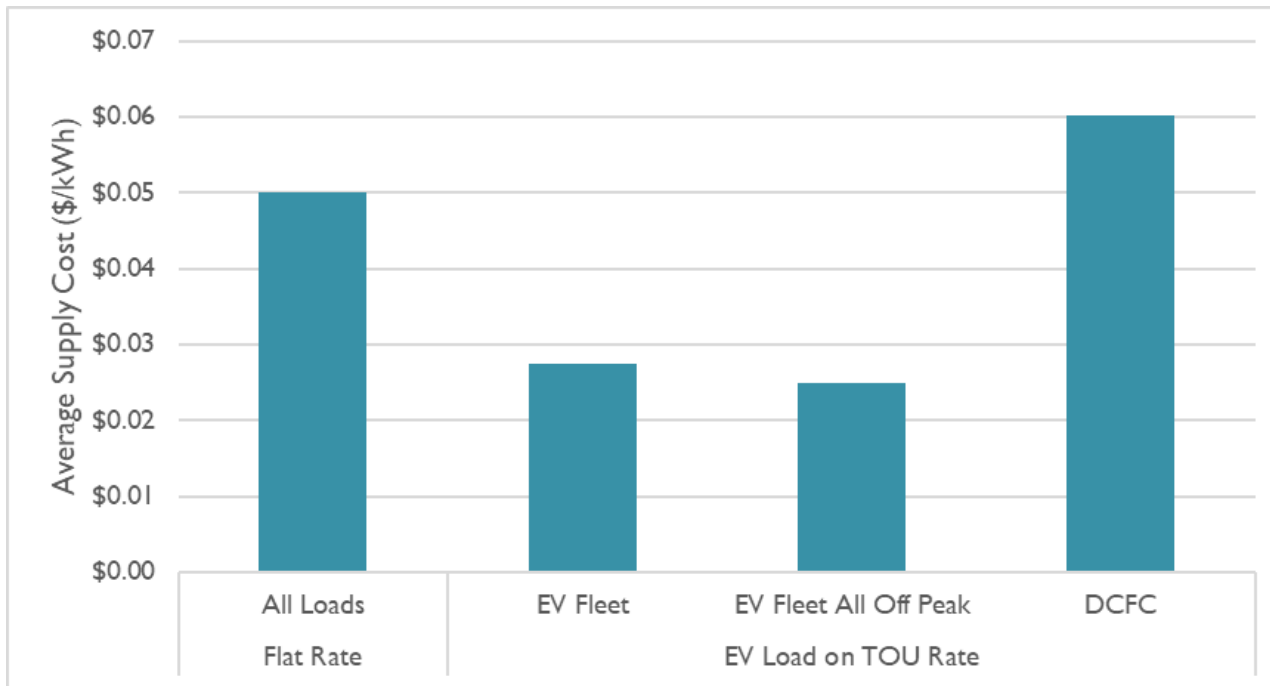
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Synapse Model Overview

- This model estimates bill impacts for a typical small to medium C&I customer, aiming to understand how charging non-EV load on the EV-TOU rate impacts C&I customers
 - We compare electric bills for a C&I customer on DLC's EV-TOU rate for the entire premise's use of electricity to a C&I customer on DLC's EV-TOU rate for EV load only
- Additionally, we compare the impact of the TOU rate on EV charging cost per mile relative to the cost of gasoline per mile for a comparable internal combustion engine vehicle (ICE)
- Assumptions
 - EV fleets are charged between 9pm and 5am to avoid peak pricing
 - The flat supply rate is \$0.05/kWh, based on DLC's illustrative assumptions
 - Annual C&I load profiles for an office building, a warehouse, and a hotel were modeled to represent load from non-EV end uses, in addition to data from DLC

Preliminary Results

- C&I EV fleet load on the EV-TOU rate is cheaper than on the flat rate
 - Overnight charging provides the greatest opportunity for savings
- DCFC could face higher prices, as it is primarily used on peak
 - TOU may still be appropriate for DCFC relative to other options such as demand charges

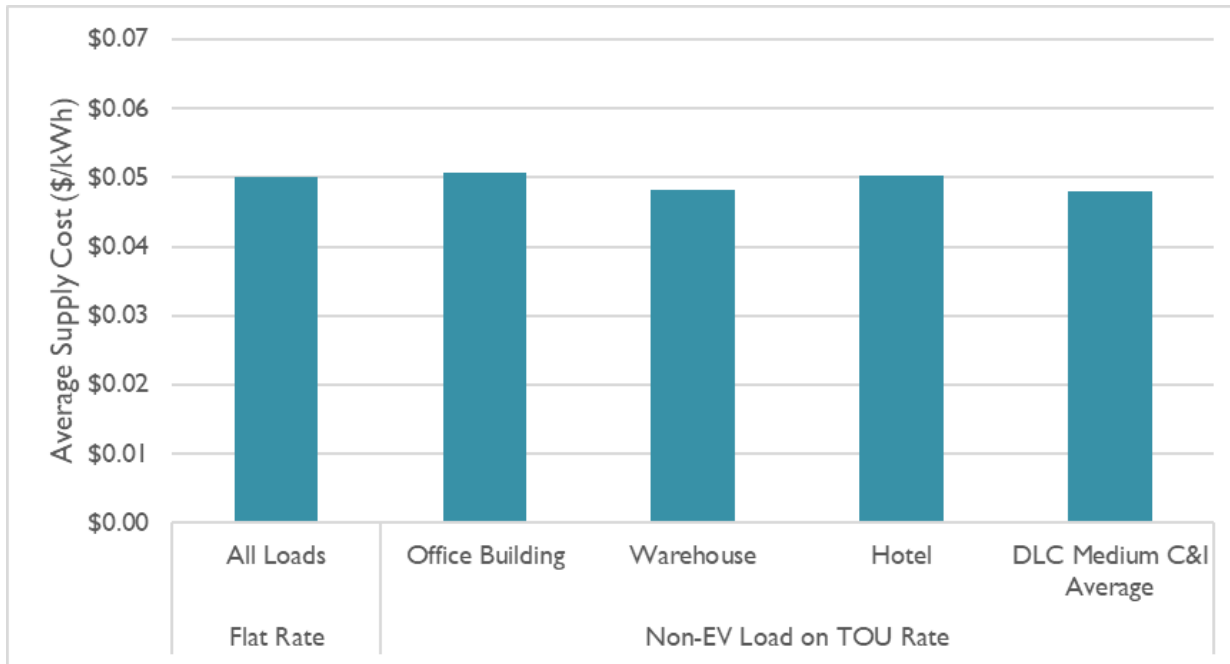


Average Supply Cost (\$/kWh)

Flat Rate	All Loads	\$0.050
	EV Fleet	\$0.028
TOU Rate	EV Fleet All Off Peak	\$0.025
	DC Fast Charging	\$0.060

Preliminary Results, cont.

- Office buildings, warehouses, and hotels face similar average TOU supply costs
 - Average rates are close to the flat rate
- C&I customers may see limited benefit and unnecessary risk in the TOU rate
- Note that DLC Medium C&I Average represents DLC data from March 2020



Average Supply Cost (\$/kWh)

Flat Rate	All Loads	\$0.050
TOU Rate	Office Building	\$0.051
	Warehouse	\$0.048
	Hotel	\$0.050
	DLC Medium C&I Average	\$0.048

Bill Analysis Takeaways

- EV load can respond to price signals more effectively than other C&I loads
 - The greatest benefit of a TOU rate is associated specifically with EV load
 - The EV-TOU rate may reduce C&I EV load bills by up to 50%
- Other loads can also benefit from TOU rates
 - But in cases where existing loads are less flexible, customers may perceive a whole-premises TOU rate as risky
 - On the EV-TOU rate, there may be more perceived risk for C&I customers whose load is primarily non-EV and not flexible
 - This could be a barrier to EV-TOU rate acceptance and EV adoption
- Though separating EV load requires an additional meter, we recommend giving the customer the choice – “optionality is best”
 - Larger customers in particular may be willing to pay additional metering costs to benefit from TOU rates for EV charging

Fuel Cost Savings

- For EVs charging overnight, the proposed TOU rate reduces supply costs by \$0.0225/kWh
 - The cost of driving 100 miles is reduced by \$0.64
 - This is equivalent to a reduction in the price of gasoline of \$0.27/gallon for an ICE vehicle
- In 2021, the EIA Annual Energy Outlook projects gasoline costs of \$2.64/gallon
 - The savings associated with the EV TOU rate is about 10% of the fuel cost per mile for an ICE vehicle
- If EV fleets charge entirely during off peak hours, supply costs would be reduced by \$0.025/kWh
 - This equates to a reduction in the price of gasoline of \$0.30/gallon
 - This is about 11% of the fuel cost per mile for an ICE vehicle

Discussion of Peak to Off-peak Ratios

- DLC has proposed a peak to off-peak ratio of about 3.5 (see table below) based on a combination of:
 - Historical PJM LMPs (2016-2019) and
 - 2021-2022 cleared capacity prices
- All capacity costs are associated with the on-peak period, which increases the peak to off peak ratio
- The peak, shoulder, and off-peak periods do not depend on the day of the week or on the season
 - Emphasis on simplicity over maximization of the peak to off peak ratio (tradeoff)
 - Synapse could examine hourly LMPs to design a rate that has more variation (less simple) but a higher peak to off-peak ratio (better price signal)

Rate Factor

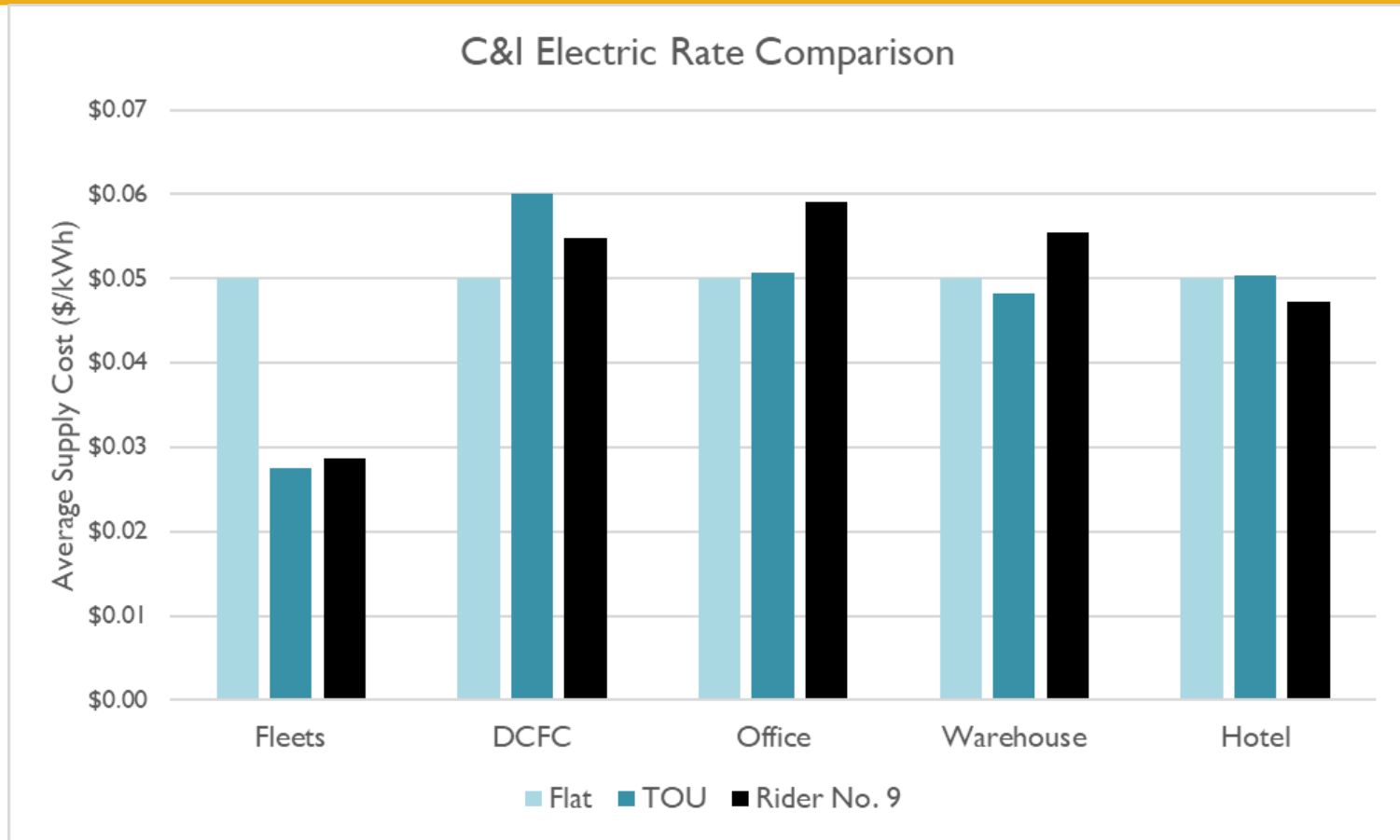
	<u>On Peak</u>	<u>Shoulder</u>	<u>Off Peak</u>
2021/2022 Rate Factor			
2016	1.66	0.64	0.45
2017	1.66	0.64	0.48
2018	1.59	0.71	0.48
2019	1.70	0.61	0.46
Average	1.65	0.65	0.47

Source: DLC filing Exhibit DBO-4, lines 22-26

Discussion of 200 kW cap

- The 200 kW cap is related to the specific class of C&I customers, as larger C&I customers already have the option of a time-varying rate
- Without separating the EV and non-EV load, there is a risk that the additional EV load would “tip” the C&I customer over the 200 kW limit
 - This could create additional risk for the customer
 - A separate meter and rate would allow small to medium C&I customers to stay on their existing rates and reduce risk
- The tariff for C&I customers with a peak load greater than 200kW (Rider No. 9) is based on day-ahead hourly pricing, plus administrative charges, taxes, and capacity charges.
- Were a large C&I customer to exceed the 200 kW peak demand limit and be moved to Rider No. 9 from the TOU rate, offices and warehouses would see an increase in their average supply cost (see next slide).

Discussion of 200 kW cap (cont.)



	Flat	TOU	Rider No. 9
Fleets	\$0.05	\$0.03	\$0.03
DCFC	\$0.05	\$0.06	\$0.05
Office	\$0.05	\$0.05	\$0.06
Warehouse	\$0.05	\$0.05	\$0.06
Hotel	\$0.05	\$0.05	\$0.05

Discussion of FPFR Contract

- Page 16 of DLC’s filing states that “[t]he Company will obtain default service supply for EV-TOU customers through the same FPFR products that provide default service supply for the respective customer classes.”
 - FPFR = Fixed-price full requirements
- Residential and Small C&I rates are recalculated twice per year. Medium C&I are recalculated quarterly.
 - In principle, this seems often enough for load shifting to flow through to downward pressure on customer rates in a timely manner.
 - However, if DLC begins with a pilot TOU program, not many customers will be able participate at first. Downward pressure on rates likely won’t be noticeable to suppliers until it’s a broader program with more customers.
- Rates would be recalculated for the entire customer class—whether it’s Residential/Lighting, Small C&I, or Med C&I. This means that all members of a customer class would benefit from the load shifting of the customers on the EV-TOU rate, instead of just the TOU customers. We believe that the rate benefits of load shifting should be provided exclusively to those customers who are on the TOU rate and shifting their load. This helps to further incentivize adoption of EVs and shifting of load to off-peak hours.