



Cost Analysis of Workplace Charging for Electric Vehicles

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Workplace Charging Considerations

- Charging rate required for employees
- First cost of equipment
- Fee or non-fee based
- Impact on building energy/demand

EV Chargers

Electrical Ratings

- AC Level 1 : 120 VAC, 1.9 kW



Typically 1.3 kW

- AC Level 2 : 240 VAC, 19.2 kW



Typically 6 kW

EV Chargers

Electrical Ratings

- DC Level 1 : 500 VDC, 40 kW
- DC Level 2 : 500 VDC, 100 kW

CHAdeMO



**Kia, Nissan, Mitsubishi,
Subaru, Toyota**

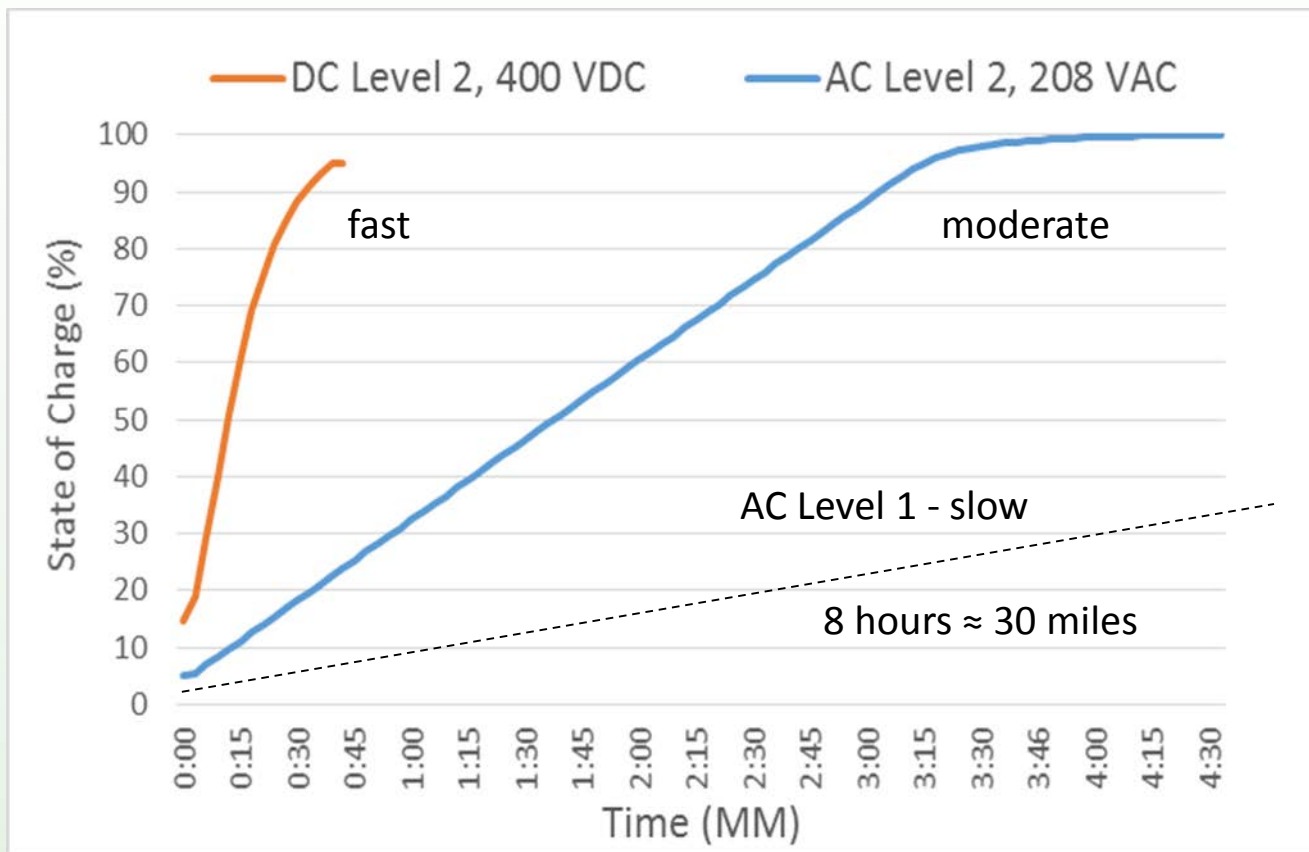
SAE Combo



**Audi, BMW, Chrysler, Daimler, Ford,
GM, Porsche, Volkswagen**

Charger Selection

What type of charger is appropriate for workplace charging?



Equipment Costs

Charger	Average Capital Cost ¹			Recurring Annual Cost	
	Payment Type	Equipment (transformer)	Installation ²	Networking	Maintenance
AC Level 1	No-fee	\$150	\$225	\$0	\$20
AC Level 2	No-fee	\$725	\$375	\$0	\$250
	Fee-based	\$2,125	\$4,875	\$400	\$250
DC Level 2	Fee-based	\$23,500 (\$17,500) ³	\$13,125	\$400	\$1,500

Notes: ¹ Agenbroad, J., Holland, B., "[Pulling Back the Veil on EV Charging Station Cost](#)", Rocky Mountain Institute, April 2014.

² Includes permitting

³ added transformer equipment and installation cost when existing electric service requires additional capacity

Workplace Charger Utilization

Vehicles
per day



Multiple EV/day: Annual Electricity Costs

Charger (10 kWh's/day)	Recurring Costs			
	Sessions	Energy	Demand ¹	\$/EV/Year
AC Level 1 (home)	250 (1/day)	\$320 ²	\$0	\$320
AC Level 1 (work)	250 (1/day)	\$150	\$172	\$322
AC Level 2 (work)	1000 (4/day)	\$600 ³	\$792	\$348
DC Level 2 (work)	4000 (16/day)	\$2400 ⁴	\$2,640	\$315

¹ AC Level 1: 1.3 kW, AC Level 2: 6 kW, DC Level 2: 20 kW avg., \$11/kW, 12 months/year

² 35 mi, 3.5 mi/kWh, \$0.128/kWh, \$0/kW (residential)

³ 1.67 hours @ 6 kW, 4 times per day, 5 days/week, 50 weeks, \$0.06/kWh (commercial electric rate)

⁴ 0.25 hours @ 20 kW avg., 16 times per day, 5 days/week, 50 weeks, \$0.06/kWh (commercial)

1 EV/day: Annual Electricity Costs

Charger (10 kWh's/day)	Recurring Costs			
	Sessions	Energy	Demand ¹	\$/EV/Year
AC Level 1 (home)	250 (1/day)	\$320 ²	\$0	\$320
AC Level 1 (work)	250 (1/day)	\$150	\$172	\$322
AC Level 2 (work)	250 (1/day)	\$150 ³	\$792	\$942
DC Level 2 (work)	250 (1/day)	\$150 ⁴	\$2,640	\$2,790

¹ AC Level 1: 1.3 kW, AC Level 2: 6 kW, DC Level 2: 20 kW avg., \$11/kW, 12 months/year

² 35 mi, 3.5 mi/kWh, \$0.128/kWh, \$0/kW (residential)

³ 1.67 hours @ 6 kW, 1 time per day, 5 days/week, 50 weeks, \$0.06/kWh (commercial electric rate)

⁴ 0.25 hours @ 20 kW avg., 1 time per day, 5 days/week, 50 weeks, \$0.06/kWh (commercial)

10-Year LCC Assessment of PEV Chargers

Station Type (10 kWh's/day per vehicle) (35 mi/day = 8750 mi/yr)	10-Year Per Session Life-Cycle Costs			
	Fully Utilized		One Vehicle/Day	
	Life-Cycle	Electric Cost	Life-Cycle	Electric Cost
AC Level 1 – R	\$1.79	\$1.28	\$1.79	\$1.28
AC Level 1 - C	\$1.53	\$1.00	\$1.53	\$1.00
AC Level 1 - D	\$1.79	\$1.29	\$1.79	\$1.29
AC Level 2 – C – No Fee	\$1.32	\$1.00	\$2.60	\$1.00
AC Level 2 – C – Fee	\$2.24		\$6.28	
AC Level 2 – D – No Fee	\$1.67	\$1.39	\$5.07	\$3.77
AC Level 2 – D – Fee	\$2.59		\$8.75	
DC Level 2 – D	\$2.39	\$1.26	\$30.15	\$11.16
DC Level 2 - T	\$2.75		\$35.93	

R – residential, C – commercial non-demand, D – commercial demand, T – commercial demand with transformer

No fee – no annual or per payment processing fee, Fee – annual or per payment processing fee

Fully utilized: AC Level 1 – 1 vehicle per day, AC Level 2 – 4 vehicles per day, DC Level 2 – 16 vehicles per day

Thank You

For more information:

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