

Preparing Corridors for Long-Range EVs (Assumptions)

A Case Study for the “Accelerating Alternative Fuel Vehicle and Infrastructure Deployment with Innovative Finance Mechanisms Workshop”

The tables below define the assumptions used in the financial analysis that was included in the case study. Assumptions denoted as “Internal” are from the 2015 report, [Strategic Planning to Implement Publicly Available EV Charging Stations: A Guide for Businesses and Policymakers](#). The analysis was completed using the [EV Charging Financial Analysis Tool](#), a free Microsoft Excel-based tool available for download.

TABLE 1: MARKET ASSUMPTIONS

Parameter	Assumption	Source
Annual compounded growth rate in number of charging sessions	5% (Challenging), 10% (Neutral), 15% (Favorable)	Internal assumption
DC Fast Charging Station initial average utilization [# of charging sessions per station per year]	600 (Challenging), 900 (Neutral), 1,200 (Favorable)	Favorable scenario is 3.3 sessions per day, in use 4% of a 24-hour day based on charging use data along West Coast Electric Highway from Washington Department of Transportation (WSDOT)

TABLE 2: OWNER-OPERATOR ASSUMPTIONS

Parameter	Assumption	Source
DC Fast Charging Site Assumptions		
Total number of stations [#]	24 (Challenging), 50 (Neutral), 100 (Favorable)	Internal assumption (at least 2 stations per site)
Total number of sites [#]	12 (Challenging), 25 (Neutral), 25 (Favorable)	Internal assumption (stations either 25 or 50 miles apart)
Charging station equipment cost (per station) [\$]	\$35,000	Plug-In America and ABB Ltd.
Construction and equipment installation cost (per station) [\$]	\$26,000	Washington State Department of Transportation (WSDOT)
Electric utility upgrades and grid interconnection cost (per site) [\$]	\$20,000	WSDOT
Lease and property transaction costs (per site – one-time fee) [\$]	\$6,000	WSDOT
Host site identification and screening (per site) [\$]	\$5,000	WSDOT
Maximum number of charging sessions per station [sessions/year/station]	3,650 (10 sessions per day, in use 13% of a 24-hour day)	Internal assumption
Average charging energy per session [kWh/session]	15 kWh	Internal assumption

Parameter	Assumption	Source
Maximum power draw [kW/session]	50 kW	Internal assumption
Average time of charging session (minutes)	30 minutes	Internal assumption
Per-energy user fee [\$/kWh]	\$0.518 per kWh	Based on energy-equivalent price of gasoline in New York in 2014
Electricity retail price in first year [\$/kWh]	\$0.152 per kWh	Average Commercial Electricity Price New York (2012)
Annual compounded growth rate in electricity price [%]	0.25%	Internal assumption
Demand charge [\$/kW/month]	\$8.32 per kW	National Grid average demand charge for New York
Annual maintenance cost as percentage of equipment value [%]	3%	Internal assumption
Host site lease or access cost (average per site/year) [\$]	\$1,200 per year	Internal assumption
Additional Cost Assumptions		
General & Administrative costs as percent of revenues	5%	Internal assumption
Initial Capitalization Assumptions		
Percent Equity Funded [%]	40%	Internal assumption
Owner Operator Cost of Equity	10.25%	Internal assumption
Owner Operator Cost of Debt (Long Term)	8%	Internal assumption
Maximum Debt Term [years]	10 years	Internal assumption
Expected equipment lifespan [years] - All equipment types	10 years	ABB Ltd.
Income Statement Assumptions		
Interest Expense Rate [%] (Revolving Line of Credit)	4.3%	Internal assumption
Income Tax Rate [%]	31.6%	Internal assumption
Projected Shares Outstanding (Millions)	1	Internal assumption
Balance Sheet Assumptions		
Accounts Receivable [% of Revenue]	5%	Internal assumption
Accounts Payable [% of Revenue]	0%	Internal assumption
Prepaid Expenses [% of Revenue]	0%	Internal assumption
Maximum Debt Term [years]	10 years	Internal assumption
Expected equipment lifespan [years] - All equipment types	10 years	ABB Ltd.

TABLE 3: PRIVATE SECTOR PARTNER ASSUMPTIONS

Parameter	Assumption	Source
Private Sector Weighted Average Cost of Capital (WACC)	10.3%	Internal assumption
Private Sector Cost of Goods Sold [% of Revenue]	80%	Internal assumption
Private Sector Marginal Tax Rate	31.6%	Internal assumption
Retailer Assumptions		
Average expected revenue per customer per minute (\$)	\$1 per minute	Internal assumption
Maximum retail revenue per customer per session (\$)	\$25	Internal assumption
Annual customer revenue sharing agreement (from sales) [% of revenue]	5%	Internal assumption
Automaker Assumptions		
Per Station Subsidy – DC Fast Charging Station [\$]	\$10,000 (Challenging), \$15,000 (Neutral), \$20,000 (Favorable)	The Challenging scenario is based on a 2013 program by Nissan to encourage DC fast charging stations . The Neutral and Favorable scenarios assume more than one automaker participates in the project.
Estimated NPV of lifetime after-tax profit per station – DC Fast Charging Station [\$]	\$17,500 (Challenging), \$26,250 (Neutral), \$35,000 (Favorable)	The value of the stations to the automaker must be greater than the subsidy the automaker provides to the station owner-operator. This value was determined by multiplying the subsidy provided to the owner-operator by 1.75.