Q. Schedule D – Electric Vehicle Overview

Figure 1 on page 2 of 5 indicates that the rate of charge for Level 3 chargers is "up to 140 km of range per hour of charging", and on page 3 of 5 it notes that Level 3 chargers provide the fastest rate of charge reaching 80% of a vehicle range in 30 minutes. Please explain the difference between these two statements when the average range an EV can travel in a single charge has grown to 386 km in 2019 (referenced on page 4 of 5).

A. Charging times at Direct Current Fast Chargers ("fast chargers") can vary. This is primarily due to the charging output of the fast charger.[1] Most fast chargers installed today have a charger output of 25 kW to 50 kW.[2] Each of Newfoundland Power's proposed charging sites will include a 50 kW fast charger.

Table 1 provides indicative charging times for an electric vehicle ("EV") to charge to 80% of its range using a 50 kW fast charger.[3]

Table 1:
50 kW Fast Charger
Indicative Charging Times to 80% of Range

Vehicle range (in kilometres)[4]	200	300	400
Charging time to 80% (in minutes)[5]	30	45	60

An EV with a range of 200 kilometres could reach a charge of 80% in 30 minutes using a 50 kW fast charger. An EV with a range of the 2019 average of approximately 400 kilometres would take closer to an hour to charge to 80%.

An hourly charging rate of 140 kilometres included in Figure 1 of Schedule D reflects the charging time associated with a 25 kW fast charger.[6]

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1 Charging times will also vary based on a number of factors beyond the fast charger output, including the EV's battery size and charge rate, the battery's current state of charge and the range of the vehicle.

2 See, for example, https://calevip.org/electric-vehicle-charging-101.

3 A charging reference of 80% is typically used in the industry as charging speeds slow around 80% to prolong battery life. See, for example, https://chargehub.com/en/electric-car-charging-guide.html.

4 The majority of EVs travel 200 to 400 kilometres on a single charge. See, for example, https://www.plugndrive.ca/electric-vehicle-range.

5 Indicative charging times are based on the time to charge for 200 miles (322 kilometres) in 60 minutes per Table 1 of the *U.S. Department of Energy's Enabling Fast Charging: A Technology Gap Assessment October 2017* report (the "*U.S. Department of Energy Report*"). For example, for a vehicle with 200 kilometres of range, the calculation is: (200 x 80%) ÷ (322 ÷ 60) = 29.8, or approximately 30 minutes.

6 For the purposes of the 25 kW fast charger, the range per minute of charging of 2.92 miles/minute noted in the *U.S. Department of Energy Report* for a 50 kW fast charger was used as a proxy. 2.92 x 60 minutes = 175 miles (281.6 kilometres). 281.6 x 50% = 140.8, or approximately 140 kilometres.