Niagara Mohawk Power Corporation
d/b/a National Grid

New York State Electric Vehicle
DCFC Per Plug Incentive and
Infrastructure Make-Ready Program

2021 Annual Report

Case 18-E-0138

PREPARED FOR:
NEW YORK PUBLIC SERVICE COMMISSION
3 EMPIRE STATE PLAZA
ALBANY, NY 12223

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nationalgrid

Contents

New York State Electric Vehicle DCFC Per Plug Incentive and Infrastructure Make-Ready Program 2021 Annual Report

I. Executive Summary / Background

In accordance with the New York Public Service Commission's ("Commission's") February 7, 2019 Order Establishing Framework for Direct Current (DC) Fast Charging Infrastructure Program,[1] and July 16, 2020 Order Establishing Electric Vehicle Infrastructure Make-Ready Program and Other Programs,[2] Niagara Mohawk Power Corporation d/b/a National Grid ("National Grid" or the "Company") provides this report covering the annual period ending December 31, 2021.

The DC Fast Charger Order established a per-plug incentive program to encourage development of electric vehicle ("EV") DC Fast Charger stations in a cost-effective manner. To evaluate the success of the incentive program, the Commission directed the state's utilities to file detailed annual reports regarding DC Fast Charger station activity. Similarly, the Make-Ready Order established a program of incentives to encourage development of EV Level 2 and DC Fast Chargers throughout the state. The Make-Ready Program provides incentives to offset utility and customer capital costs of eligible EV charging infrastructure.

To enable the Commission and Department of Public Service Staff ("Staff") to evaluate the performance of the Make-Ready Program, the Commission directed the utilities to file detailed annual reports on these programs, and directed the utilities to combine their Make-Ready Program reports with their DC Fast Charger reports.[3] Consistent with the Make-Ready Order, the Joint Utilities[4] engaged Atlas Public Policy ("Atlas") to serve as their common third-party contractor to assist the Joint Utilities in gathering and preparing the information to be presented in the annual reports, and to ensure the appropriate data anonymization and aggregation for the public portions of the annual report.

By Ruling dated February 28, 2022, the Commission Secretary granted the Joint Utilities an extension until April 15, 2022 to file their annual reports.[5] The Joint Utilities sought the extension to enable Atlas and the Joint Utilities additional time to obtain and compile information needed for the reports from Make-Ready Program participants and EV supply

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[1] Case 18-E-0138, *Proceeding on Motion of the Commission Regarding Electric Vehicle Supply Equipment and Infrastructure ("EVSE Proceeding")*, Order Establishing Framework for Direct Current Fast Charging Infrastructure Program (issued and effective Feb. 7, 2019) ("DC Fast Charger Order").
[2] Case 18-E-0138, *EVSE Proceeding*, Order Establishing Electric Vehicle Infrastructure Make-Ready Program and Other Programs (issued and effective July 16, 2020) ("Make Ready Order").
[3] Make Ready Order, p. 107.
[4] The Joint Utilities are Central Hudson Gas & Electric Corporation, Consolidated Edison Company of New York, Inc., National Grid, New York State Electric & Gas Corporation, Orange & Rockland Utilities, Inc., and Rochester Gas & Electric Corporation.
[5] Case 18-E-0138, *EVSE Proceeding,* Letter from Sec. Michelle L. Phillips to Carlos A. Gavilondo (Feb. 28, 2022).

equipment vendors and network providers. The Company's 2021 annual report presented here, therefore, includes information gathered and compiled by the Company as well as information gathered and compiled by Atlas. Because of concerns regarding privacy or commercially sensitive information, the public version of the annual report has been redacted, and a complete, confidential version of the report is being submitted separately to the Records Access Officer.

This annual report first describes common elements, such as definitions used and methodological information, then presents information on the 2021 DC Fast Charger Per Plug Incentive program and the 2021 Make-Ready Program separately, below.

II. Definitions

The following terms are used throughout the annual report:

- **Active Plug:** A Plug at which at least one valid charging Session occurred.
- **Active Site:** A Site at which at least one valid charging session occurred.
- **All or Some Data Received and Validated:** Status that indicates data was received and validated for a Site or Sites but does not guarantee that the Site(s) recorded utilization.
- **Charging duration**: The timeframe within a charging Session over which energy is delivered from the charger to the vehicle.
- **DCFC:** Direct Current Fast Charger.
- **Eligible plugs:** The number of plugs capable of charging simultaneously at an Operational Site.[6]
- **L2:** Level 2 Charger.
- **No Valid Data Received:** Data was not received for a Site due to no response, or data provided was not provided in a valid format and therefore unusable.
- **Operational site:** EV charger installations which were operational and approved for incentives from the Company as of December 31, 2021.
- **Participant**[7]: An entity that applies for and receives incentives available through the Company's Make-Ready or Per-Plug Incentive Program.
- **Plug:** The piece or subdivision of the charging equipment that physically interfaces with a single vehicle in a one-to-one connection.
- **Session**: A single charging event which is initiated when a vehicle connects to a Plug and concludes when the vehicle disconnects from the Plug.
- **Session data**: Data collected about a single Session, including start time, stop time, total energy dispensed, and peak demand recorded in a Session.

[6] At many charging stations there are multiple plugs. In both the Make-Ready and DCFC Per Plug Incentive Programs the number of eligible Plugs at a given Station is the number of Plugs that are able to deliver energy simultaneously. In some cases, a charging station may have two Plugs that are not able to deliver energy at the same time, so together those Plugs are considered one Eligible Plug. In these cases, this report provides the charging data for both Plugs where Plug-level data are reported.

[7] For the Make-Ready Program, the Participant may be (1) a Company electric account holder or customer, (2) a developer, (3) an approved contractor, (4) an equipment owner, or (5) the owner or operator of a site. The Participant receives the incentive and takes on the reporting responsibilities of the program. For the Per Plug Incentive Program, the Participant must be the account holder or customer.

- **Session interval data**: Charger power output recorded over the course of a Session.[8]
- **Session duration**: The duration of a charging Session.
- **Site**: The physical location where one or more Stations are installed.[9]
- **Station**: The single piece of charging equipment (e.g., kiosk) that administers charge to a vehicle.
- **Unmatched Utility ID**: The unique identifier for Operating Costs and Fee Structure data could not be matched sufficiently because submissions were completed manually by program participants using an Atlas ID and not Utility ID numbers.

III. Methodology

As part of the data collection for the EV Make-Ready and DCFC Per-Plug Incentive programs, National Grid provided Atlas with a list of the projects considered complete and paid out. Atlas worked directly with program participants to request the required charging session data, operating costs and fee structure information, while also establishing direct relationships with EV charging networks to collect the data.[10] Thus, Atlas received data from program participants as well as directly from select EV charging networks. Atlas excluded data submitted by program participants when that data was duplicative of data provided by a program participant's EV charging network. After the data were collected, Atlas normalized, reviewed, and validated the charging session, 15-minute session interval, and load curve data, along with operating costs and fee structure data.

To determine what aggregated information to present for the public report, Atlas applied the "15/15" standard adopted by the Commission, which provides: "that an aggregated data set may be shared only if it contains at least 15 customers, with no single customer representing more than 15 percent of the total load for the group."[11] For the purposes of the EV Make-Ready and Per-Plug Incentive program, the 15/15 rule is applied at the project (charging site) level. Thus, where there are fewer than 15 sites or a single customer is more than 15 percent of the relevant information, no data is provided in the public report.

The steps used by Atlas to review and validate the data are described briefly below, with additional information provided in Appendix A.

Once data was normalized, there were three batches of data Atlas validated and identified using automated errors or flags: (1) station registrations; (2) session and interval data; and (3)

[8] Charging stations typically report session interval data in 15-minute intervals.
[9] One Site could have multiple Participants and/or configurations. A Participant is counted for each unique site that they develop.
[10] According to Atlas, the following EV charging networks submitted charging session data on behalf of the EV Make-Ready and Per-Plug Incentive Program participants: AmpUp, ChargePoint, EV Connect, Evoke, Livingston EV Network, SKYCHARGER, and Volta Charging; and the following EV charging networks submitted 15-min interval data on behalf of the EV Make-Ready and Per-Plug Incentive Program participants: EV Connect, Volta Charging, Livingston EV Network, and ChargePoint.
[11] Cases 14-M-0101 and 16-M-0411, Order on Distributed System Implementation Plan Filings (Mar. 9, 2017), pp. 25-26; available at: https://documents.dps.ny.gov/public/MatterManagement/CaseMaster.aspx?MatterCaseNo=16-M-0411.

operating costs and fee structure. Atlas defined e*rrors* as problems with the session/EV supply equipment ("EVSE") data itself or a failure to follow required reporting standards, and excluded data found to be erroneous. Atlas defined *flags* as items for evaluation that could represent a problem with the session/EVSE data or simply an unusual session; flagged data was considered on a case-by-case basis. For this report, validated data (considered complete and without errors) and flagged data are included. Once data tables and reports were produced, at least two Atlas staff members reviewed the information to ensure data were associated with the right utility and relevant reporting measure before considering the data final.

Data Collection Limitations

Enumerated below are the limitations and hindrances that arose while attempting to collect, manage, and process data for the EV Make-Ready and Per-Plug Incentive programs:

1. **Participant non-response and non-compliance.**
   To gather data from non-responsive program participants, at least two outreach attempts were made by Atlas and two attempts from the utility's program management team. Program participants were instructed to work with their EV charging network to produce a session data report, and to fill out a template on their site's operating costs and fee structure and then upload each report through a web link provided by Atlas. Atlas has notified each utility of program participants that failed to submit session data and/or operating costs and fee structure.
2. **Incomplete and missing data.**
   Among those who submitted data, many did not include required fields, which necessitated inference and estimation; or, in acute cases, rejection of the data as submitted. Inferred fields are substantially less reliable than reported data.
3. **Poorly formatted data.**
   Although poor data formatting (unexpected data types, non-standard) can be mitigated via the validation process, large scale poorly formatted data required either normalization—which carries the risk of data loss or misunderstanding the original intent—or exclusion from an already limited dataset.
4. **EV charging network technical issues.**
   EV charging networks have different technical capabilities or software in place to provide site, session, or interval data in a timely manner. For interval data in particular, many EV charging networks were not able to report on active interval session data from the past year, resulting in a large set of missing data.

IV. DC Fast Charger Per Plug Incentive (DCFC PPI) Program Information

National Grid recently determined that not all DCFC data for 2021 was reported to Atlas in time for this annual report filing. As a result, the information presented below does not reflect data for the entire year. **National Grid will be filing a supplemental annual report** that includes the omitted DCFC data as soon as practicable following receipt of the processed data from Atlas. National Grid's responses to the data requested in the DC Fast Charger Order based on the partial information available at this time are as follows:

1) **The cumulative number of plugs for which the utility has received applications**

   The Company has received applications for thirteen (13) plugs. The Company paid incentive payments on four (4) plugs in 2021.

2) **The number of plugs in service and their geographic siting**

   There are four (4) plugs in service in Jefferson County. Incentive payments have been paid for these four (4) plugs.
   There are four (4) plugs in service in Essex County.
   There is one (1) plug in service in Franklin County.

3) **The number of plugs under construction and their estimated in-service date**

   There are four (4) plugs under construction associated with the DCFC PPI and their estimated in-service date is June 1, 2022.

4) **Station equipment type**

County	Application Complete	Incentive Paid	Number of Plugs in Service as of 12/31/2021	Max Power Output	Plug Type
Jefferson	Yes	Yes	4	350	CCS/CHAdeMO
Essex	Yes	No	4	350	CCS/CHAdeMO
Franklin	Yes	No	1	50	CCS/CHAdeMO

5) **Installation costs**

   All-in installation costs for the four (4) plugs in Jefferson County was [redacted]

6) **Energy usage data including**
   - kWh dispensed
   - Start/stop times
   - Peak kW per charging station
   - Amount of time each vehicle is plugged in
   - Amount of time each vehicle is actually charging
   - Load curves

Energy usage data are presented in Attachment 1. Load curve information is not available at this time and will be submitted with the Company's supplemental filing. Based on information available at the time of this report, DCFC average charging session durations and actual average charging durations for the third and fourth quarters (Q3 and Q4) are shown in Table 1, below:

Table 1 – DCFC Average Session and Charging Durations

DCFC Stations	Q3 2021	Q4 2021
Average Session Duration (mins.)	[redacted]	
Average Charging Duration (mins.)		

Total energy dispensed was [redacted] kWh; approximately [redacted] kWh in Q3 2021 and [redacted] kWh in Q4 2021.

7) Comparisons of peak DCFC station demand with local peak demand and system peak demand

NYCA system peak day and hour for calendar year 2021 occurred at 6PM on June 29, 2021. The substation peak day and hour for calendar year 2021 where DCFC EV supply equipment is installed occurred at 3PM on August 10, 2021. [redacted]

8) Usage fees

Usage fee data was not available at the time this annual report was prepared.

9) Technologies used to manage demand

The participants did not use any technologies to manage demand from DCFC stations in 2021.

V. Make-Ready Program Information

Table 2, below, shows the total National Grid stations, sites, and plugs activated as part of the EV Make-Ready program, and summarizes charging sites and plugs where data were received or not received from program participants or EV charging networks. The table also indicates whether site and plug data showed usage or no usage (no usage could mean the data were considered invalid or the station did not have usage data). Table 3 provides additional details on the data submitted by program participants or EV charging networks.

Table 2. National Grid Summary

Station Type	Program	Total Stations	Total Sites	Sites with Use	Sites with No Use	Sites Not Received	Total Plugs	Plugs with Use	Plugs with No Use	Plugs Not Received
DCFC	Make Ready	3	2	1	1	0	4	2	2	0
L2	Make Ready	407	107	88	4	15	581	438	59	84
Total		**410**	**108**	**88**	**5**	**15**	**585**	**440**	**61**	**84**

Table 3. Receipt of Data by Site(s)

Item		Fee Structure		Interval Data		Operation Costs		Session Data		Total	
Station Type	Status	Total Sites	Total Plugs	Total Sites	Total Plugs	Total Sites	Total Plugs	Total Sites	Total Plugs	**Total Sites**	**Total Plugs**
DCFC	**Total**	**2**	**4**	**2**	**4**	**2**	**4**	**2**	**4**	**2**	**4**
	All or Some Data Received and Validated			1	2			2	4	**2**	**4**
	No Valid Data Received	2	4	1	2	2	4			**2**	**4**
L2	**Total**	**107**	**581**	**107**	**581**	**107**	**581**	**107**	**581**	**107**	**581**
	All or Some Data Received and Validated	20	94	56	309	20	94	92	497	**97**	**509**
	No Valid Data Received	87	487	51	272	87	487	15	84	**101**	**545**
Total		**108**	**585**	**108**	**585**	**108**	**585**	**108**	**585**	**108**	**585**

The Company's responses to the data requested in the Make Ready Order are as follows:

1) **Reporting period Make-Ready program participation information (as of Dec. 31, 2021)**
   Program participation information is summarized in Attachment 4.

   a) **The percent of service applications that have matured into operating stations**
      The Company received 431 applications, of which 108 (25%) matured into operating stations, or paid projects, in 2021.

b) The number of station owners participating

The Company had 87 unique Participants in 2021.

c) The number of sites for which incentives were issued

The Company issued incentives to 108 sites.

d) The number of plugs installed

The Company installed a total of 585 plugs in 2021.

Additionally, the Joint Utilities provide DPS Staff on a semi-annual basis a program summary and plug tracker, showing sites in Disadvantaged Communities. See Attachment 4 for more information.

e) Infrastructure costs incurred

Infrastructure costs are to be differentiated by equipment and installation costs for customer-owned assets as well as equipment and installation costs for Company-owned assets. The cost details for Company-owned assets are broken out into costs considered make-ready and those considered new business.

Customer cost information is provided in Attachments 5. Company cost information is provided in Attachments 6 and 7.

f) Additional site information requested by DPS Staff

In addition to the Make Ready Order reporting provisions, DPS Staff requested site information, including Premise Address, Premise County, Premise Type, Project Completion Date, Approved Contractor Company, Approved Contractor Name, Approved Contractor Email, Charger Level, Plug Type, Total Number of Plugs, and Output per Plug (kW). This information is provided in Attachment 8.

2) Utility system and billing information for each station

a. 15-minute interval data

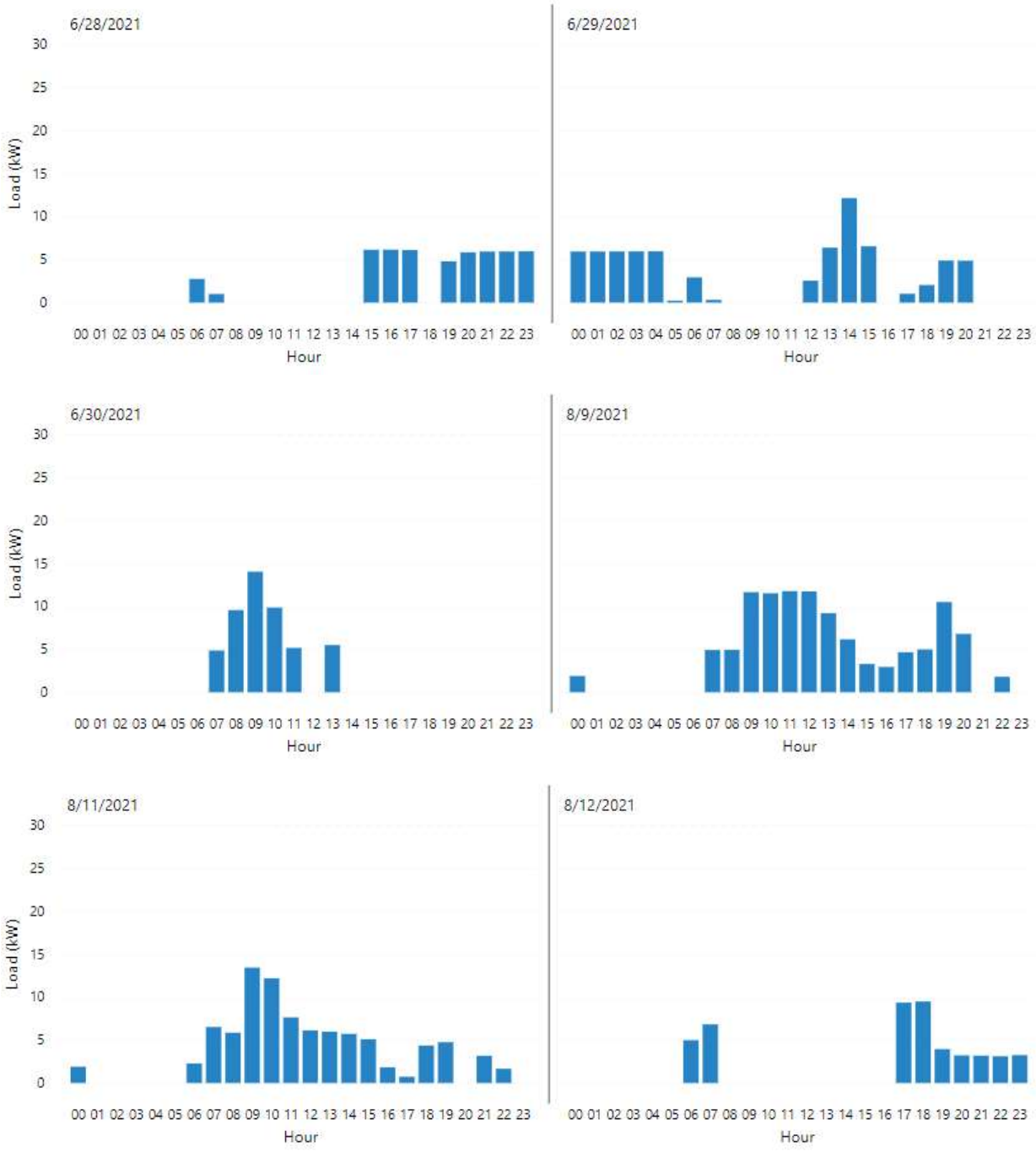
Existing metering configurations and capabilities do not enable the Company to provide 15-minute interval data for the participating stations. As such, Atlas Public Policy derived 15-minute interval data based on available charging data. See Attachment 9.

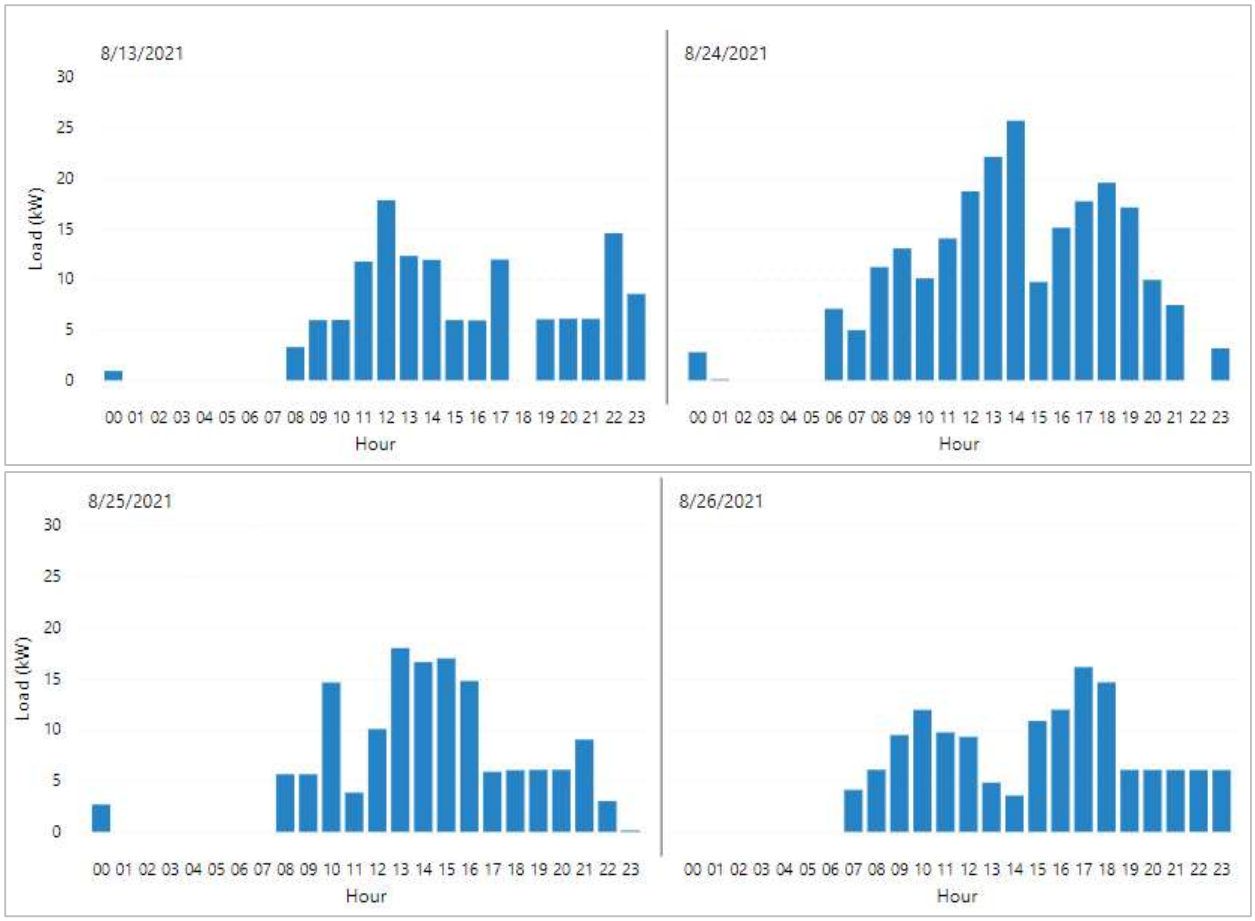
b. Load profiles for the stations for the top ten demand days of each year

The Company's top system demand days for 2021, ranked in order, were as follows: 6/29, 6/28, 8/26, 8/11, 8/25, 8/9, 8/24, 8/13, 8/12, and 6/30. Aggregate station load profiles (based on data from 205 active plugs at 33

active sites) for the foregoing dates are presented in chronological order in Figure 1, below. Source data are provided in Attachment 10.

Figure 1 – EV Station Load Profiles for 2021 Top Ten Demand Days





c. Utility bills, to be differentiated by delivery service-related costs and energy-related costs

Utility bills for the customer accounts are available in Attachment 11.

3) Plug and charging session data

a. The number of sessions daily

In 2021, there was a total of 5,156 charging sessions. Table 4 provides the number of charging sessions per quarter throughout the year.

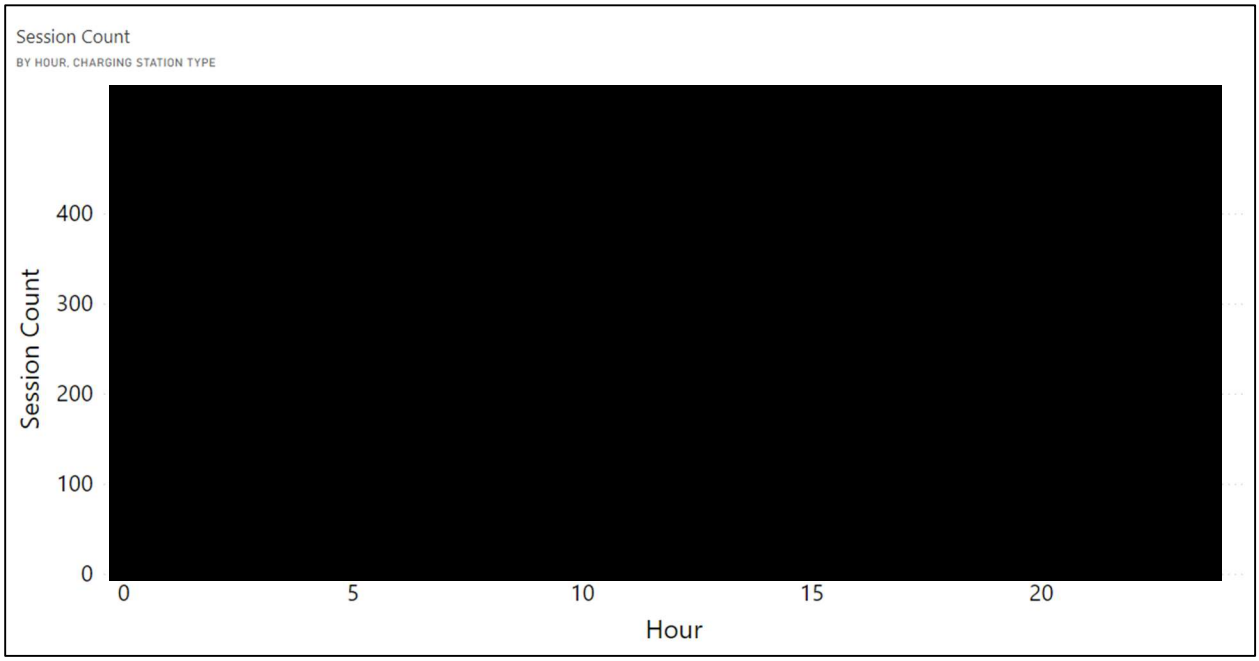
Table 4

Charging Sessions by Quarter	Q1	Q2	Q3	Q4
L2	[redacted]			
DCFC				

Based on data from 277 plugs at 66 sites. See Attachment 12 for data on all sessions and Attachment 13 for daily station summary.

b. Start and stop times of each charge

Figure 2 –Charging Sessions by Time of Day (Hour)



Based on data from 277 plugs at 66 sites. See Attachment 12 for data on all sessions and Attachment 13 for daily station summary.

c. The amount of time each vehicle is plugged in per session

Figure 3 – Average Session Duration in Minutes

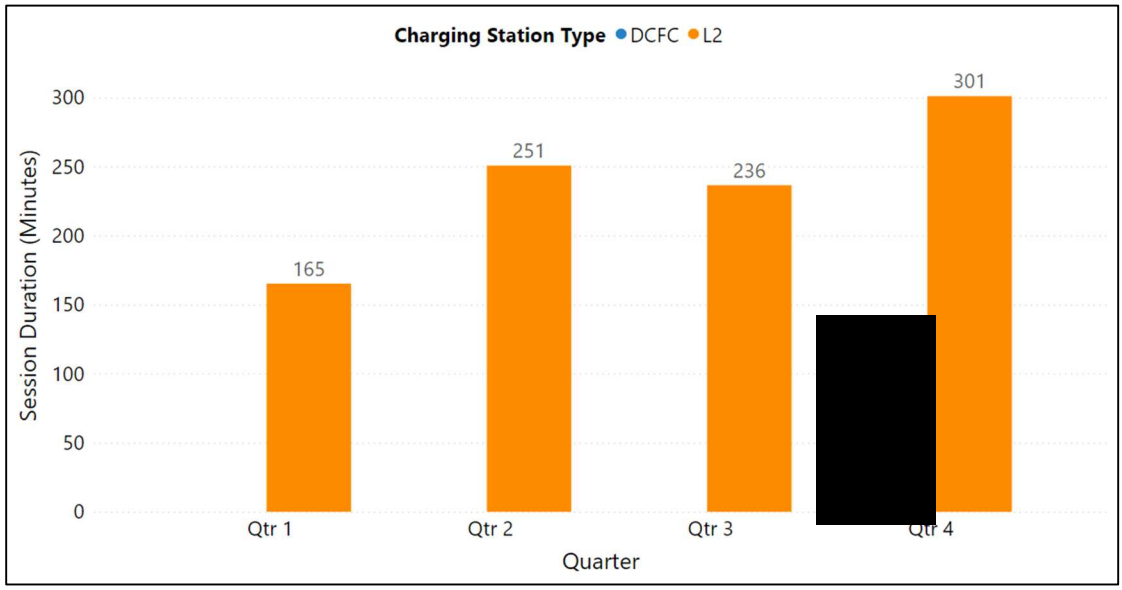
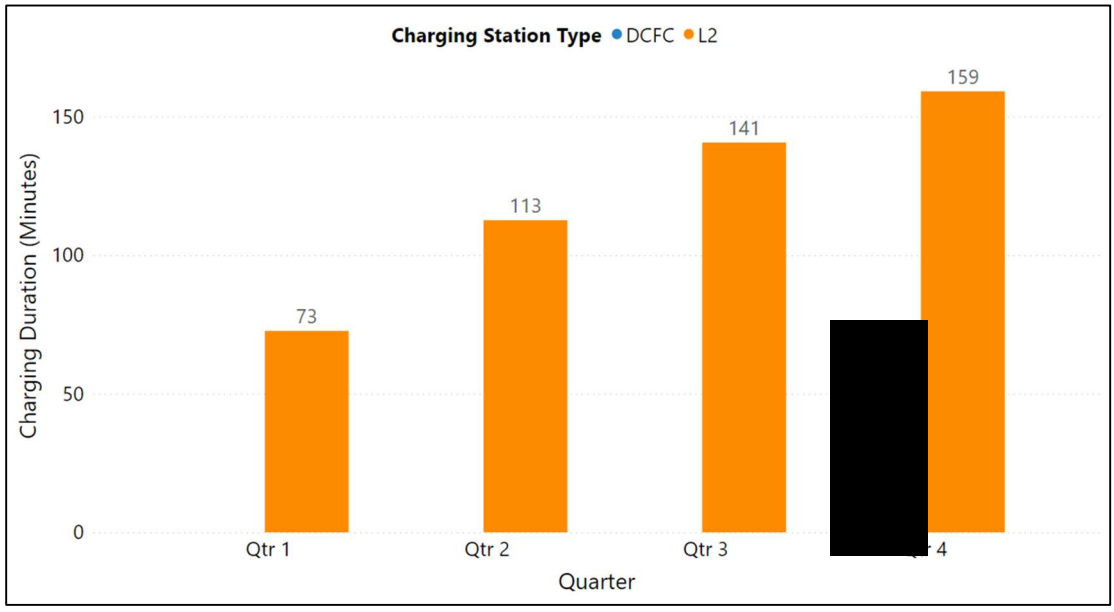


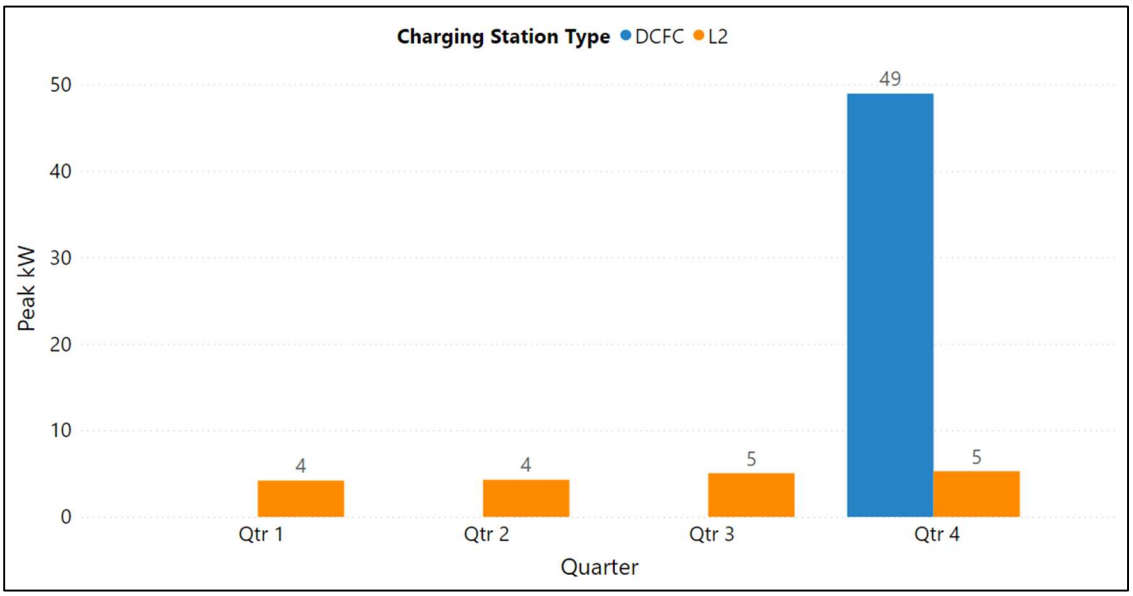
Figure 4 – Average Charging Duration in Minutes



Based on 5,156 charging sessions from 277 plugs at 66 sites. See Attachment 12 for data on all sessions and Attachment 13 for daily station summary.

d. Peak kW per charging session

Figure 5 – Average Peak kW per Session by Quarter

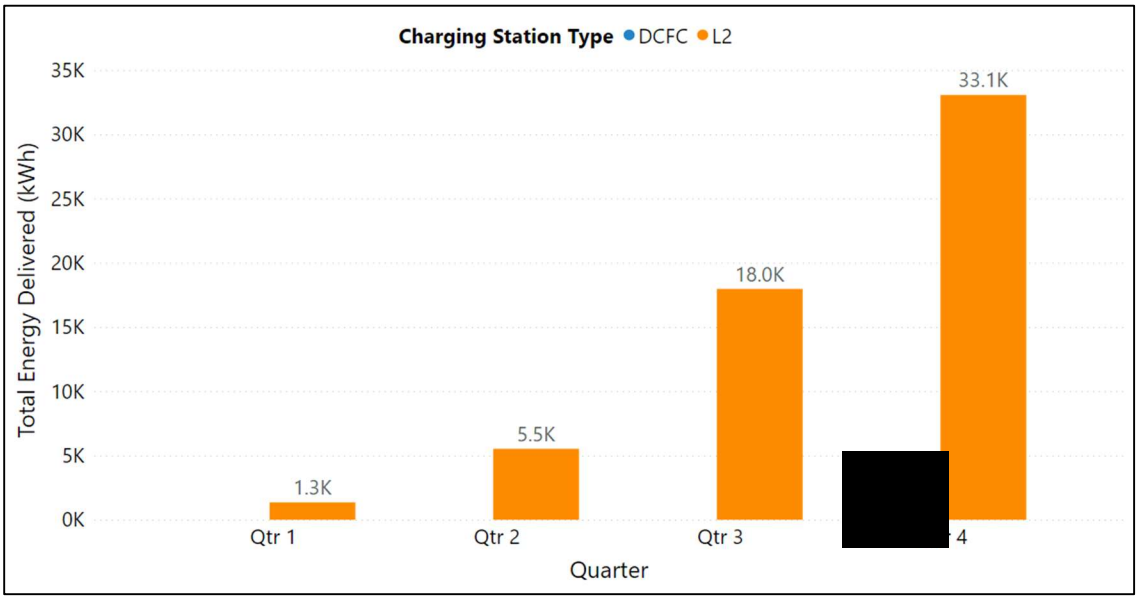


155 plugs provided peak kW. See Attachment 12 for data on all sessions.

e. kWh per charging session

From January 1, 2021 through December 31, 2021, a total of 58,481 kWh was delivered, with 57,904 kWh from 66 active L2 stations, and 576 kWh from 1 DCFC active site (this DCFC site is co-located with an L2 site).

Figure 6 – Total kWh Delivered per Quarter by Station Type



See Attachment 12 for All Session Data and Attachment 13 for Daily Station Summary data.

f. Plug outage information. Plug outage information is to include the number and duration of outages and is to be differentiated by expected outages (for maintenance) and unexpected outages

Atlas indicated it was unable to obtain reportable data on plug outages and this data was not submitted nor captured for this reporting period.

4) Financial information

a. Fee structure (structure of fee to the end-use customer, i.e., cost per minute, cost per kWh, cost per session and whether the station owner is providing charging for free)

Based on 32 stations reporting, from January 1, 2021 through December 31, 2021, nine (9) (28%) stations used Energy-Based fees (*e.g.* per kWh), nine (9) (28%) used a time-based fee, 13 (41%) were free, and one (3%) was unknown. See Attachment 15 for fee structure data.

b. Charging revenues derived

Based on 8 stations reporting revenues, from January 1, 2021 through December 31, 2021, a total of [redacted] revenue was reported from (1) station using a time-based fee structure. See Attachment 15 for data.

c. Operating costs, which should include energy-related costs and non-energy-related costs separately identified

See Attachment 16 for operating cost data.

VI. APPENDIX A

Individual charging sessions are evaluated against two sets of criteria—potential errors and potential flags. *Errors* are generally problems with the session/EVSE itself or a failure to follow required reporting standards. *Flags* are items for evaluation that could represent a problem with the session/EVSE or simply be an unusual session. Errors were excluded from reporting, while flagged data were included.

Registration Validations

ERRORS

Validation Name	Description
Site – No Duplicate Site Ids	No sites share a duplicate ID
Site – No Duplicate Site Address	No sites share an address
Station – No Duplicate Station Ids	No stations share a duplicate ID (usually, the serial number)

Session Data Validations

ERRORS

Validation Name	Description
Session Date — Null	The plug start or plug end date-times for this session are missing
Session Date — Out of Bounds	The plug start or plug end date-times are outside the reporting period (the session begins or ends prior to the start of the year OR the session begins or ends after the end of the year)
Session Duration — Null, Zero, or Negative	The total duration of the session (plug end time – plug start time) or charging duration (when applicable) is either missing, equal to zero, or a negative number
Session Energy Delivered — Null, Zero, or Negative	The total energy delivered during the session (in kWh) is either missing, equal to zero, or a negative number

FLAGS

Validation Name	Description
Session Duration — Less Than 1 minute	The session duration (plug end time – plug start time) or charging duration (when applicable) is less than 1 minute long
Session Energy Delivered — More Than 250 kWh	The total energy delivered during the session (in kWh) is greater than 250 kWh. For reference, the largest available consumer battery (in the 2022

	GMC Hummer EV Pickup) is estimated to hold 200 kWh
Session Energy Delivered — More Than 0.5 kWh	The total energy delivered during the session (in kWh) is less than 0.5 kWh
Session Duration — Multiple Days	The charging duration (plug end time – plug start time) is greater than 1,440 minutes (1 day) or idle duration (session duration – charging duration, when applicable) is greater than 2,880 minutes (2 days)
Session — Power Above Rating	For L2 stations, average power, defined as Energy (kWh)/Charging Duration, does not exceed 25 kW. For DCFC stations, average power, defined as Energy (kWh)/Charging Duration, does not exceed 400 kW.

Session Interval Data Validations

ERRORS

Validation Name	Description
Interval – Negative Energy Delivered	The total energy delivered during this interval (in kWh) is less than 0 kWh
Interval Date — Out of Bounds	The Interval start or Interval end date-times are outside the reporting period (the Interval begins or ends prior to the start of the year OR the Interval begins or ends after the end of the year)
Interval – Negative Power Delivered	The Peak kW or Average kW delivered during this interval (in kWh) is less than 0 kWh
Interval - Start Time after End Time	The reported start time of the interval occurs after the reported end time of the interval.

FLAGS

Validation Name	Description
Interval — Power Above Rating	For L2 stations, Peak kW or Average kW (*defined by Energy (kWh)/Charging Duration*) does not exceed 25 kW. For DCFC stations, Peak kW or Average kW (defined *by Energy (kWh)/Charging Duration)* does not exceed 400 kW.

Operating Cost and Fee Structure Validations

ERRORS

Validation Name	Description
Costs – Empty Entry	This operating cost entry is blank for all cost-related fields

FLAGS

Validation Name	Description
Costs – Missing/Incorrect ZIP Code	The ZIP code for this operating cost entry is either missing or greater than 5 characters
Costs – Low Costs	The total costs for this entry are less than $10
Costs – High Costs	The total costs for this entry are greater than $100,000