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April 29, 2019

Mark L. Johnson
Executive Director and Secretary
Washington Utilities & Transportation Commission
1300 S. Evergreen Park Drive S. W.
P.O. Box 47250
Olympia, Washington 98504-7250

Re: Docket No. UE-160082 – Avista Utilities Semi-Annual Report on Electric Vehicle Supply Equipment Pilot Program

Dear Mr. Johnson,

On April 28, 2016 the Commission issued Order 01 in Docket UE-160882 approving Avista Corporation's, dba Avista Utilities (Avista or Company) tariff Schedule 77 for its Electric Vehicle Supply Equipment (EVSE) Pilot Program (program). Within the Order the Commission required Avista to submit quarterly reports on the status of the program beginning on August 1, 2016 and ending on August 1, 2018. As described in Order 01, the effective date of tariff Schedule 77 was May 2, 2016. The term of the program began with the first residential EVSE installation on July 20, 2016. On February 8, 2018 the Commission issued Order 02 in Docket UE-160882 approving Avista's proposed revisions to tariff Schedule 77. This included extending the installation period of the Program with additional port installations through June 30, 2019, and a revised reporting schedule of semi-annual reports, with interim quarterly updates.

The semi-annual reports must include the following:

1. For DC Fast Charging stations, Avista shall report the locations and utilization of stations, review and revise the DC fast charging rate, and assess the amount of overall fixed and variable costs recovered through user payments.

2. For all other services offered under the EVSE Pilot Program, Avista shall report participation levels, expenditures, and revenues for each service offered for the duration of the program on a semi-annual basis. Avista will also provide informal quarterly updates to Staff and other interested parties. A final report must be provided no later than December 31, 2019, with enough information to accurately evaluate the program's success.

Report Topics:

1. Residential and Commercial AC Level 2 EVSE
2. DC Fast Charger (DCFC) EVSE
3. Customer Surveys
4. Data Analysis
5. Demand Response (Load Management)
6. Community Programs
7. Revenues and Expenditures

As of April 23, 2019, the number of installations for the various EVSE categories are as follows:

Table 1

	3-Year Allowed Port Installations	**# Ports Installed**	**# Ports Scheduled for Installation**	**# Ports Remaining**
Residential SFH[1]	240	188	4	48
Workplace\Fleet\MUD[2]	175	114	32	29
Public	60	41	3	16
DC Fast Chargers (DCFC)	7	6	1	0

[1] Single Family Home
[2] Multi-Unit Dwelling

Other general statistics are shown in Table 2 below, based on data obtained from on-line networked EVSE.

Table 2

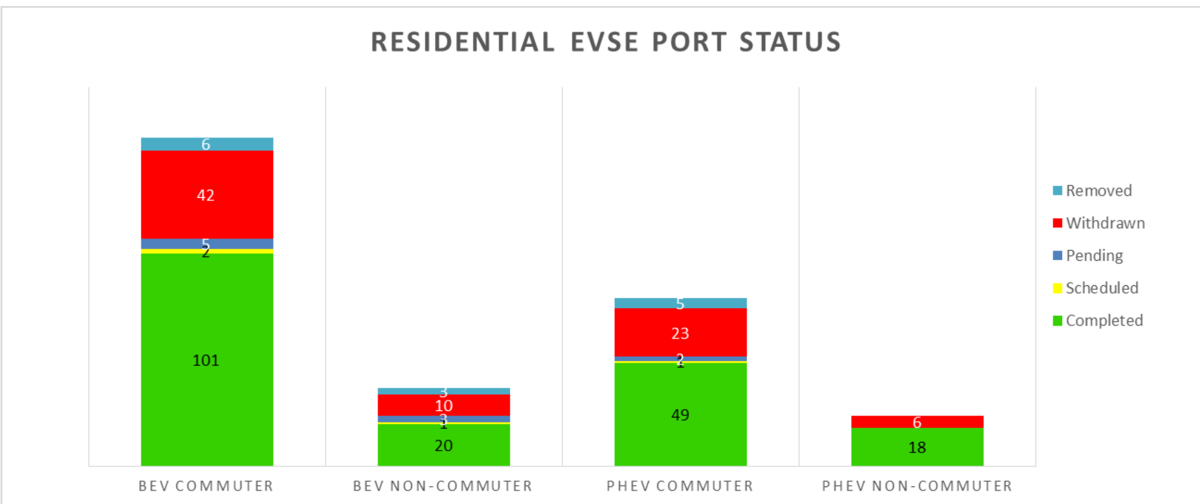
Daily Avg. No. of Charge Sessions	83
Daily Avg. kWh Consumed	594
Sessions Charged to Date	52,440
kWh Consumed to Date	432,869
Lbs. of CO_2 Saved to Date	952,312
Gallons of Gasoline Saved to Date	54,941

Residential AC Level 2 EVSE

Residential EVSE installations continue to meet customer needs, with EVSE reliably providing power for electric vehicle ("EV") charging on demand. Installation costs and contractor performance also continue to meet expectations. Uptime reliability for non-networked units has been perfect at 100%, and for networked units relatively high at 98%. However, on-line connectivity issues remain unsatisfactory at 52% for networked EVSE. When a networked EVSE is offline, it generally does not prevent power delivery to the EV in residential locations, however without connectivity the EVSE does not transmit or receive information, and therefore reduces the volume of data collection and demand response (DR) experimentation. Software and hardware updates from the EVSE manufacturer and on-site technician visits initially showed some success, but over time have not sustainably improved online connectivity. These problems have been confirmed and isolated to issues with the EVSE, separate from any intermittent problems that may be experienced with the customer's WiFi network which is used for EVSE connectivity to the internet. Even with residential connectivity rates well below expectations for EVSE deployed thus far, sufficient data has been gathered to successfully meet the pilot's learning objectives in terms of quantifying EV load profiles for various types of vehicles and drivers, which allows for detailed analysis and modeling of grid impacts. However, the Company will continue to pursue improved connectivity rates for deployed EVSE, under warranty with the EVSE manufacturer and the EVSE Network Service Provider (EVSP). As the market develops, new EVSE from other manufacturers may also become available and utilized. Lab testing and field trials of new or improved hardware and software must demonstrate satisfactory performance over a minimum of several weeks prior to any widespread deployment, in order to maintain a high level of customer experience and satisfaction.

The following chart shows the status of residential applications and installations by categories of Battery Electric Vehicle (BEV) Commuter, BEV Non-Commuter, Plug-In Hybrid Electric Vehicle (PHEV) Commuter, and PHEV Non-Commuter.

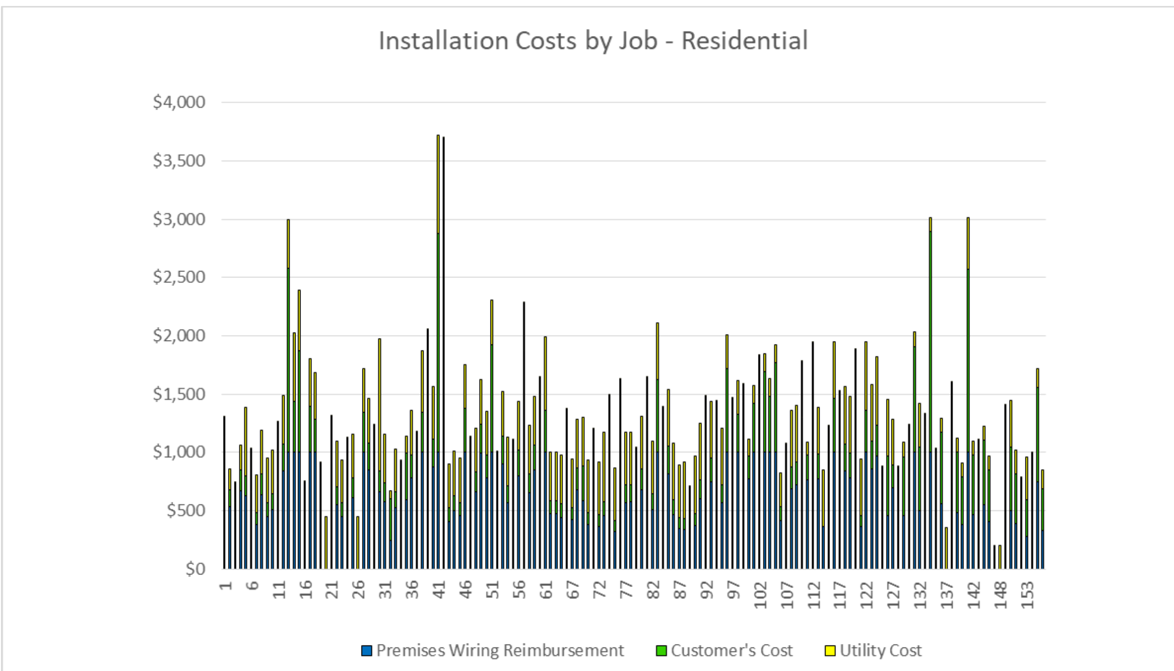
<u>Chart 1</u>



EVSE from two different manufacturers have been utilized to date for AC Level 2 residential installations, one networked and the other non-networked. Different models, hardware and firmware updates to the EVSE have demonstrated varying degrees of cost and communications reliability, as noted. This experience has reinforced the importance of utilizing open communications protocols such as the Open Charge Point Protocol (OCPP) industry standard, to avoid reliance on proprietary systems and encourage competition in the marketplace. It has also reinforced the need to conduct extensive performance testing. To date, the market has been slow to offer EVSE for residential applications that are cost-competitive and utilize open communications capable of demand response.

The chart below shows the residential installation cost components by job, ranging from a total of $200 to $3,990, not including the EVSE cost. Lowest cost installations correspond to rare cases where an adequate 240V AC circuit is already installed. Higher costs generally corresponding to a greater number of wall and floor penetrations, total circuit distance, subpanel installs, and especially main panel capacity upgrades. Outdoor earth trenching occurs occasionally and also adds costs; concrete trench work is more expensive but rare for residential installations. To date, no information indicates that transformers or secondary wire from the transformer to the residential customer have required replacement due to EVSE installation.

<u>Chart 2</u>



Residential installation cost breakdowns continue to meet expectations as shown by the average costs in the tables below. These costs compare favorably with other studies as detailed in previous reports. Prior to 2018, the Company was allowed to reimburse residential customers 80% of premises wiring costs between the meter and the EVSE, up to a maximum of $1,000. This was then reduced to a rate of 50%, up to the same maximum of $1,000.

Table 3 – Networked Residential Installations (115 ports installed)

Premises Wiring Reimbursement	Customer's Cost	Utility Hardware & Installation Cost	Total Installation Cost	EVSE Cost	Total Costs Installation + EVSE
$657	$268	$435	$1,359	$1,061	$2,420

Table 4 – Non-networked Residential Installations (86 ports installed)

Premises Wiring Reimbursement	Customer's Cost	Utility Hardware & Installation Cost	Total Installation Cost	EVSE Cost	Total Costs Installation + EVSE
$539	$529	$208	$1,276	$515	$1,791

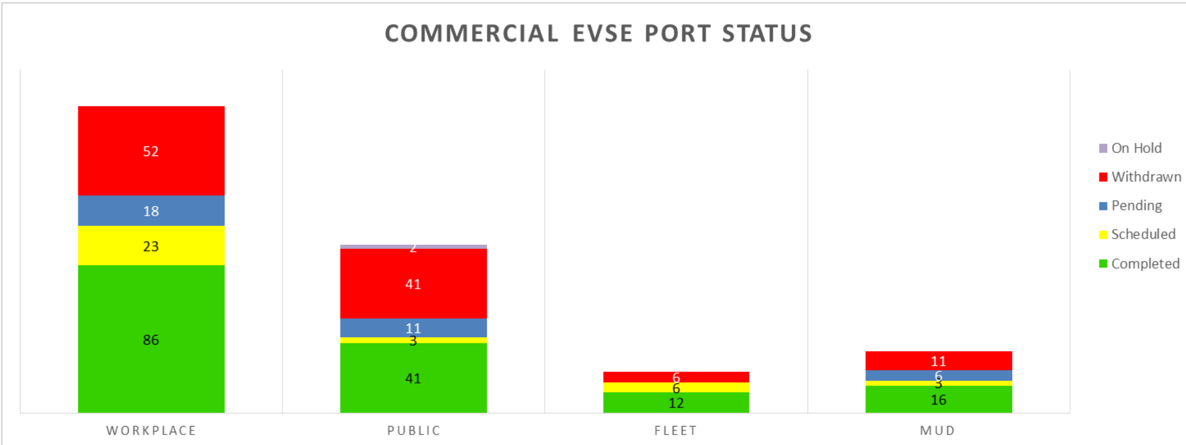
In addition to providing empirical data necessary for quantifying load profiles, networked EVSE in residential locations have the potential to provide net system benefits with remote demand response capability, as a result of shifting EV loads from on-peak to off-peak times. However, they also require greater upfront and ongoing operations and maintenance costs, and cause customer inconvenience when problem troubleshooting is required, compared to non-networked EVSE. The Company will continue to evaluate various costs and benefits, in order to provide important insights and effective program proposals.

Commercial AC Level 2 Charging EVSE

EVSE from five different manufacturers have been utilized for commercial AC Level 2 installations. These EVSE have demonstrated varying degrees of cost, reliability, and user satisfaction over time. Similar to residential EVSE installations, this experience has reinforced the importance of utilizing open communications protocols such as the OCPP 1.6 industry standard, to avoid reliance on proprietary systems and encourage competition in the marketplace.

The following chart shows the status of commercial applications and installations by category.

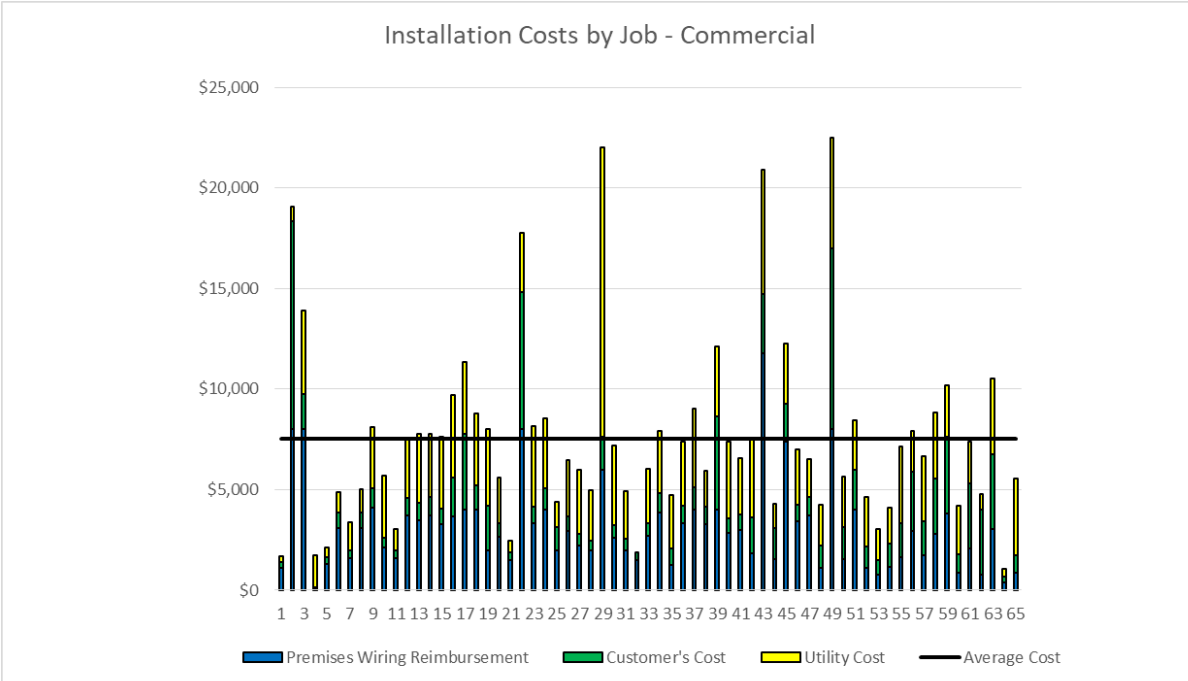
Chart 3



Typically, significant outreach and consulting work is required to inform and assist commercial customers to install an AC Level 2 EVSE on their property. Some of the concerns include the projected cost of electricity, liability risks, and potentially adverse impacts on parking areas that are highly utilized.

Costs for commercial installations continue to meet expectations, with an understanding that larger variations in cost are expected depending on unique site conditions, compared to residential installations. A greater number of withdrawals occur for commercial installations compared to residential, for a variety of reasons. This includes a larger customer cost share for premises wiring, as well as the other common concerns previously mentioned. The cost components of commercial installations documented to date are shown below. The majority of these EVSE locations are used as workplace charging for employees.

Chart 4



Lower costs correspond to simpler installations avoiding service upgrades and trench work, lower cost EVSE, and/or a smaller number of port connections. Conversely, higher costs are associated with multiple installed EVSE ports, required upgrades to transformers, supply panels, and/or trench work, especially concrete and asphalt trenching. Wall mounted EVSE often require no trench work and reduce the length of both above-ground and underground conduit, while pedestal mounted EVSE typically require trench work and relatively longer conduit lengths.

Average cost breakdowns for commercial EVSE sites are listed in the table below. These costs compare favorably with other pilot programs and studies as detailed in previous reports. Prior to 2018, the Company was allowed to reimburse commercial customers 80% of premises wiring costs between the meter and the EVSE, up to a maximum of $2,000 per port connection. This was then reduced to a rate of 50%, up to the same maximum of $2,000 per port.

Table 5 – Networked Installation Costs (51 job sites, 114 ports installed)

Premises Wiring Reimburse-ment	Customer Cost	Utility Hardware & Install Cost	Total Install Cost	EVSE Cost	Total Cost EVSE + Installation	Avg. # Ports	Total Cost per Port
$3,386	$1,679	$2,886	$7,952	$5,269	$13,221	2.24	$5,915

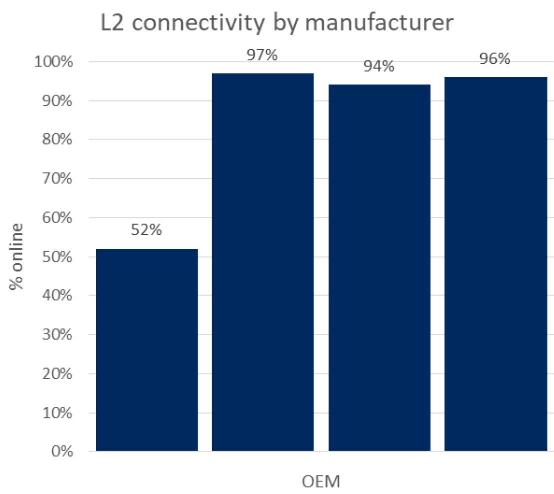
Table 6 – Non-networked Installation Costs (16 job sites, 33 ports installed)

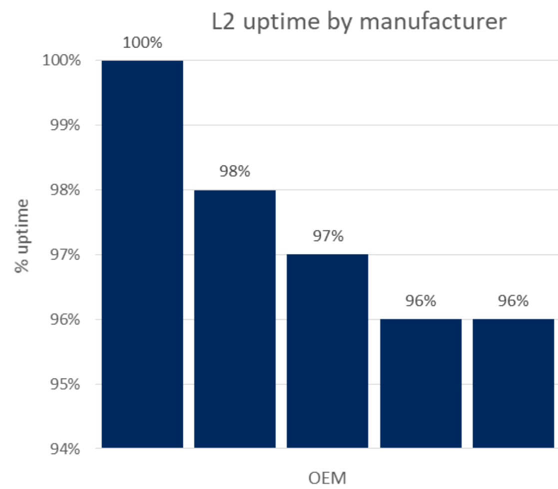
Premises Wiring Reimburse-ment	Customer Cost	Utility Hardware & Install Cost	Total Install Cost	EVSE Cost	Total Cost EVSE + Installation	Avg. # Ports	Total Cost per Port
$1,846	$1,465	$2,515	$5,826	$2,280	$8,107	2.06	$3,930

In order to minimize costs, where practical the Company advises customers to utilize wall mounted EVSE and to minimize trenching and conduit lengths by locating the EVSE as close as possible to the nearest power source. Other factors such as desired location, accessibility, communication signal strength, and safety concerns are also of high importance when consulting with commercial customers on EVSE siting and configuration determinations.

Note that similar to residential installations, networked EVSE in commercial locations add substantially to upfront costs compared to non-networked EVSE. Ongoing maintenance and operations costs are also higher for networked EVSE. However, networked EVSE are necessary for data transmission, payment transactions that in some cases may be required by the site host, and demand response capability that may be possible in cases other than public charging. Recently, uptime and connectivity performance have declined for certain EVSE, but not all. The chart below shows the overall connectivity and uptime performance across the network from December 2018 through March 2019, for the various EVSE deployed in commercial locations.

Chart 5





While industry standards have not been well established for uptime performance of AC Level 2 EVSE, a level of 99% or higher per site location is deemed necessary to maintain acceptable customer satisfaction, with very short corrective lead times when downtime does occur. Most problems thus far are the result of faulty EVSE hardware and firmware, and coordination and support from the network provider. The Company is making progress working with various EVSE manufacturers and the network provider in making corrective actions, uncovering root causes to problems and implementing systematic improvements.

DC Fast Charger (DCFC) EVSE

Standardized DCFC site design has an operational 50kW DCFC with both CCS and CHAdeMO connectors, and a dual-port AC Level 2 EVSE as a backup. The installations include adequate property easements and/or site agreements for future expansion, with transformer capacity and conduit installed to allow for low-cost expansion of an additional 150kW DCFC, and where practicable up to two downstream units supplied by and sharing power with the 150kW DCFC.

The first DCFC station in Rosalia, Washington was commissioned for public use on January 18, 2017. Another five DCFC stations have been installed since that time, utilizing EVSE from two different manufacturers. Site acquisition and installation design is nearing completion for the final site in the Spokane U-District downtown, scheduled for installation and commissioning in June, 2019.

Remote monitoring and customer feedback demonstrated very satisfactory status and availability of all DCFC in the network prior to December, 2018. Since that time, DCFC from one of the two manufacturers began exhibiting a number of problems related to a combination of hardware, firmware and network coordination and support issues, which until only recently have been corrected. DCFC uptime suffered as a result, falling to 86% for the period of December, 2018 through March, 2019. As DCFC are relied upon by EV drivers for quick turnarounds and longer distance trips, their uptime performance is of even greater importance than AC Level 2 EVSE. Anything less than 100% availability for a given DCFC site location could result in significant delays for the EV driver, possibly even a vehicle tow, to proceed to their final destination. This highlights the need for EVSE redundancy at DCFC sites, preferably additional DCFC but at minimum an AC Level 2 EVSE as per the standard site designs deployed in the pilot program.

Total labor, material and overhead costs have averaged $126,928 for the six DCFC sites installed to date. More information on the DCFC sites as well as public AC Level 2 is posted online at www.plugshare.com, including customer feedback. Charging session characteristics are as indicated in the table below:

Table 7

Session Dates	01/18/2017 - 10/23/2018	01/18/2017 - 03/31/2018
No. of Charging Sessions	386	741
Avg. Charging Time	28.2 minutes	38.2 minutes
Avg. Power Delivery	30.3 kW	27.8 kW
Avg. Consumption	13.8 kWh	13.7 kWh

The number of total DCFC charging sessions and average charging time has increased significantly since the last report. The following table shows the number of charging sessions by month for each of the DCFC stations commissioned. Kendall Yards remains the most utilized site, due to its location in the urban core of Spokane and along main travel corridors. Charging there in March, 2019 has tripled in volume from one year previous in March, 2018. Other sites such as Rosalia are very valuable, placed in strategic locations along inter-city travel corridors and thus enabling driver confidence and longer distance travel, but are not as heavily utilized as they are isolated from major population centers and the market remains in its early stages of adoption.

Table 8

Month	**Rosalia**	**Kendall Yards**	**Pullman**	**Liberty Lake**	**Wander-mere**	**West Plains**
Commissioned	01/18/2017	09/14/2017	12/15/2017	01/12/2018	9/14/2018	09/18/2018
Jan-Dec 2017	63	36	0	-	-	-
Jan-2018	2	5	1	0	-	-
Feb	5	7	3	3	-	-
Mar	6	11	10	10	-	-
Apr	2	4	8	3	-	-
May	4	9	4	1	-	-
Jun	2	10	5	2	-	-
Jul	7	14	4	24	-	-
Aug	2	20	2	19	-	-
Sep	7	25	14	20	8	4
Oct	6	20	10	7	14	3
Nov	4	24	15	11	21	4
Dec	5	21	10	7	15	2
Jan-2019	3	22	9	7	22	0
Feb	8	12	3	12	6	1
Mar	4	34	1	6	1	5
Total	**130**	**274**	**99**	**132**	**87**	**19**

Note that for the West Plains and Pullman sites, and especially the Wandermere site, the more recent number of reported charging sessions are very low, due in large part to downtime issues.

Customer Surveys

During the course of the pilot program, two different online surveys have been utilized, tailored separately for residential and commercial customers – the first to gauge experience with the installation process and EV purchase decisions immediately following EVSE installation, and the second to solicit periodic feedback at semi-annual intervals, primarily related to EV and EVSE use and satisfaction. A final set of surveys will be completed in July, 2019, following conclusion of the pilot program's EVSE installations. Results below reflect the last set of online surveys conducted in the fall of 2018.

Given the number of responses to date, the margin of error at the 95% statistical confidence level is 6% for residential customers, and 29% for commercial customers. Completion rates as of October 15, 2018 are as follows:

Table 9

Customer	Post-installation	Semi-Annual
Residential	58% (92 of 158)	56% (252 of 454)
Commercial	19% (10 of 53)	30% (30 of 99)

Customer satisfaction remains high, with 94% of residential respondents and 90% of commercial respondents indicating they were satisfied or very satisfied with the program. A very high satisfaction rate of 98% was reported for their EV. Suggestions for program improvement centered on minimizing the frequency of troubleshooting requests when network connectivity issues arise. Additional comments included the need for more public and workplace charging, as well as informing and educating the public about EVs and EVSE locations. When contacted by phone, 11 of 21 commercial customers indicated they would be interested in installing more stations at the same or different facility locations. Multiple respondents also indicated that they would like to see more charging locations in the Spokane Valley and DC fast chargers in the downtown Spokane area.

Chart 6

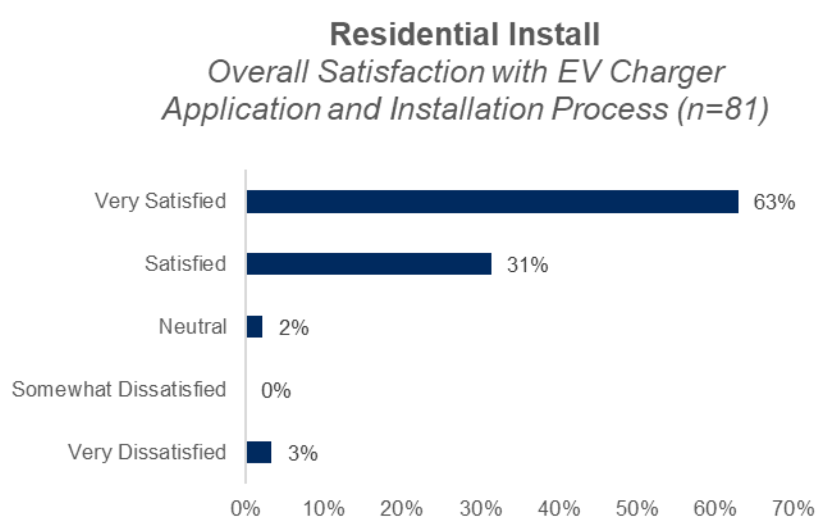


Chart 7

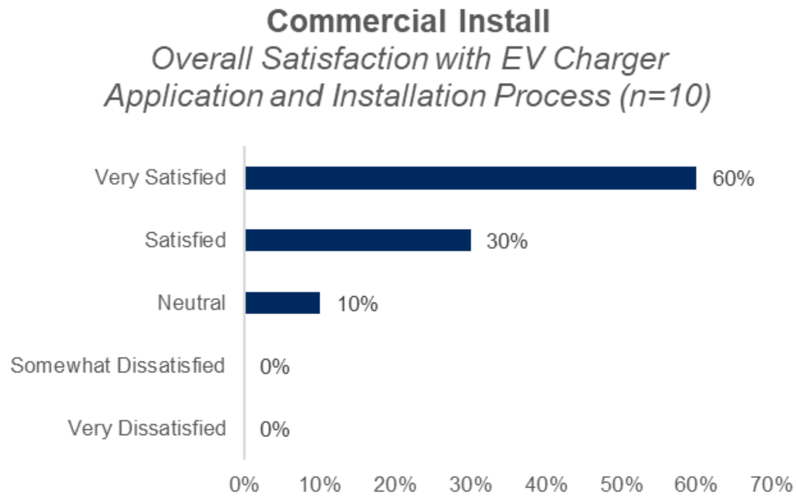
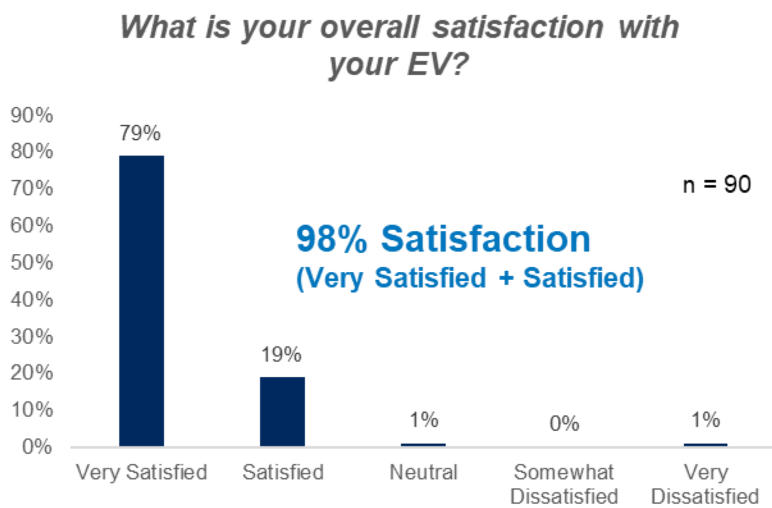


Chart 8



The Nissan Leaf continues to be the most represented vehicle in the program at 33% of the total. Larger battery vehicles like the Chevy Bolt and Tesla EVs are increasing their share of the total, currently at 19% combined. A majority of participants in the program operate EVs introduced after program launch in June, 2016.

Chart 9

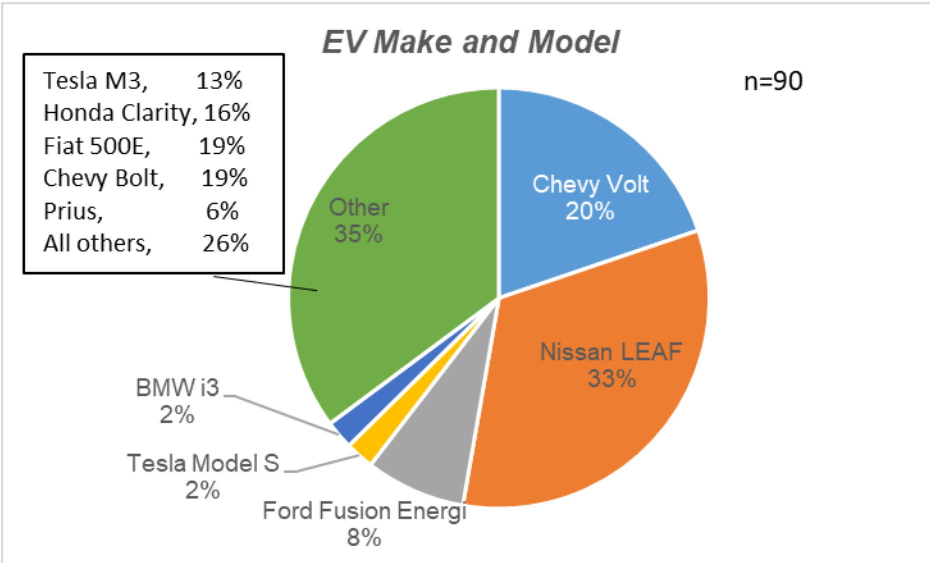
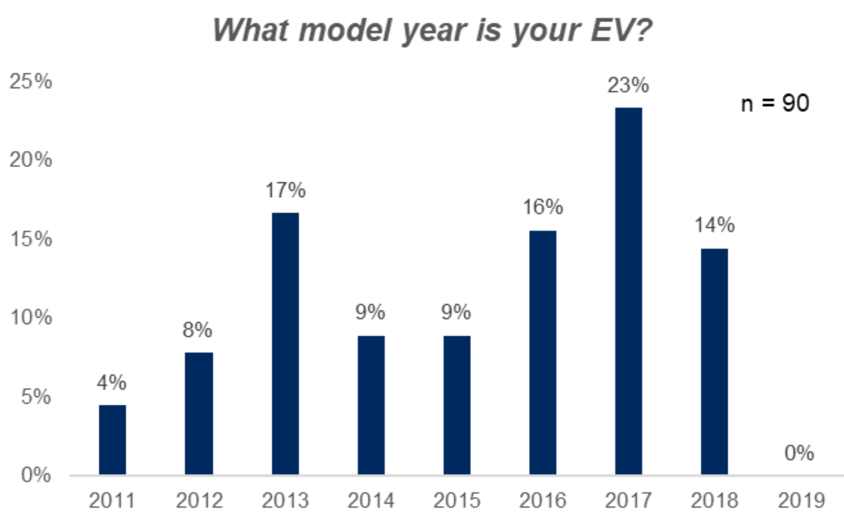
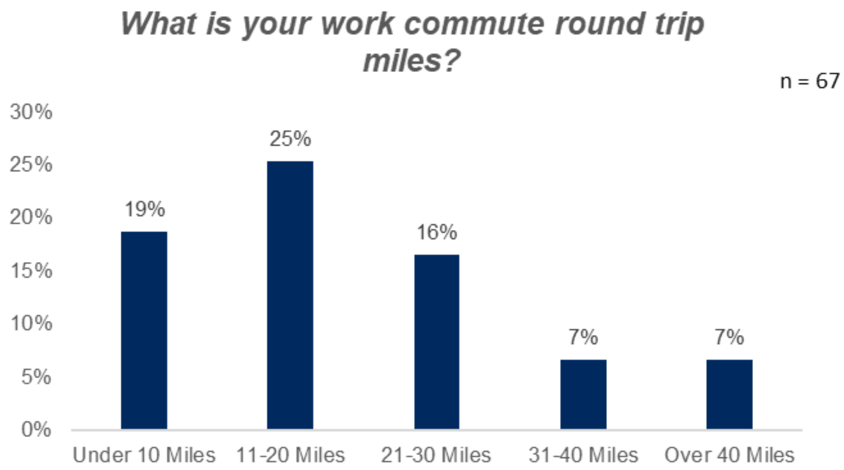


Chart 10



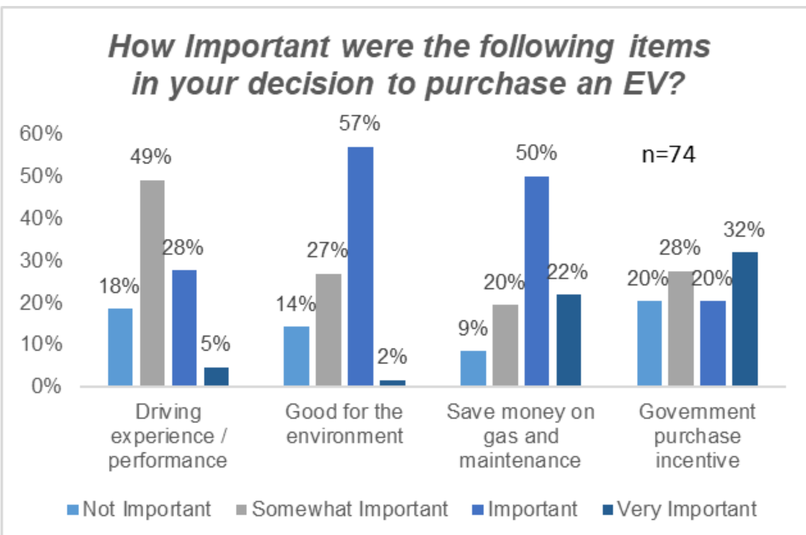
When drivers were surveyed about their commuting habits, 60% said their round trip commute was under 30 miles, while 26% had no commute. Of the 74% commuting, 72% of those said they had no workplace charging available.

Chart 11



Important factors in the decision to purchase an EV are shown in the chart below. Notably, 72% of respondents stated that "saving money on gas and maintenance" was very important or important, compared to 59% that stated the same for "good for the environment."

Chart 12



Customers indicate a moderate to high level of importance for both AC Level 2 and DCFC public charging availability, and simultaneously a low level of satisfaction for both types of charging availability as shown in the four charts below. This indicates that a need for more public AC Level 2 and DC fast charging persists.

Chart 13

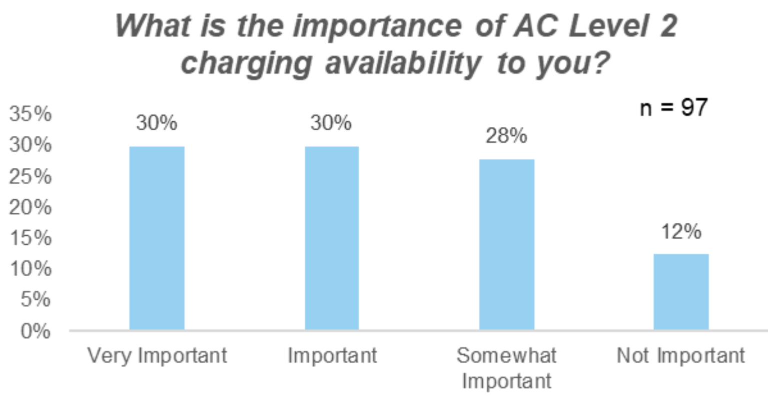


Chart 14

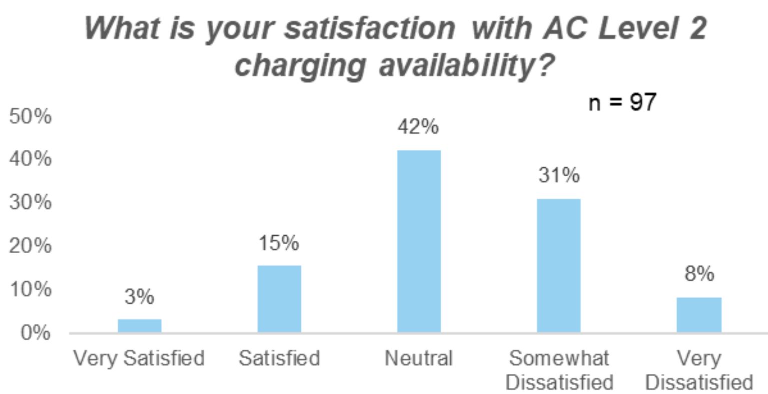


Chart 15

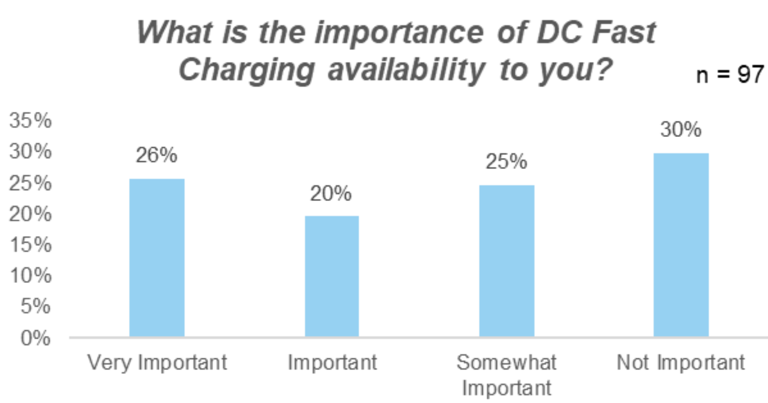
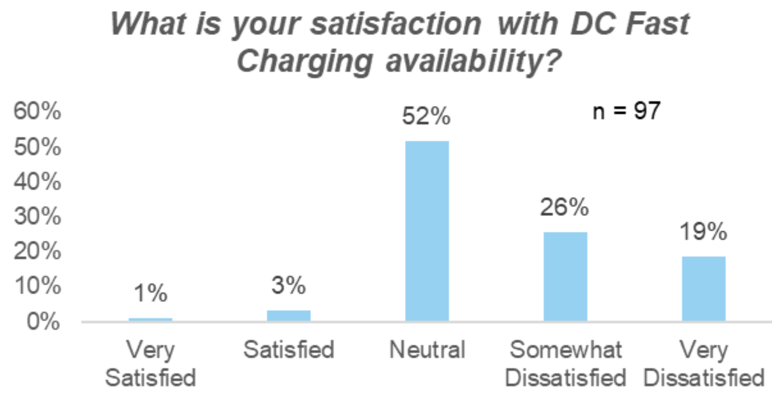


Chart 16

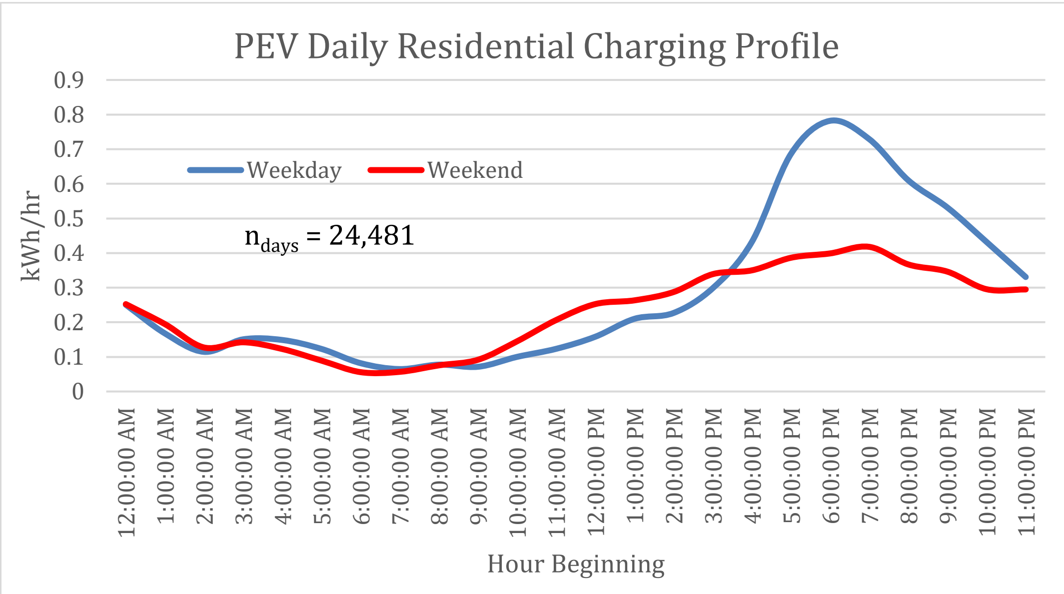


Data Analysis

Residential charging

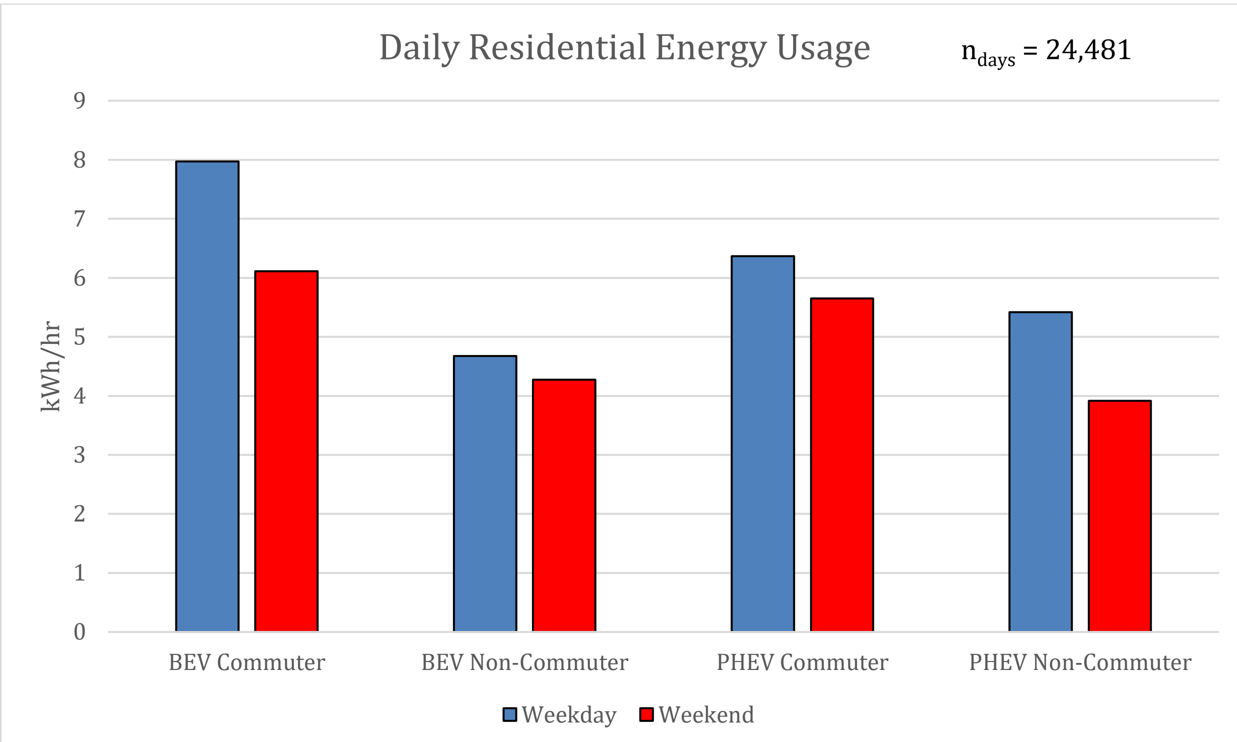
Data from 24,481 days show average demand from all vehicles peaking at 0.78 kW per vehicle, between 6pm and 7pm on weekdays. As seen in the chart below, the weekend load profile is more gradual than the weekday profile, peaking at just above 0.41 kW. On average, each PEV consumes 6.9 kWh of energy on the weekday, and 5.6 kWh on the weekend.

Chart 17



Average weekday energy demand is highest for BEV commuters at 8.0 kWh, followed by PHEV commuters and PHEV non-commuters at 6.4 kWh and 5.4 kWh, respectively. BEV non-commuters have a slightly lower average weekday demand at 4.7 kWh. Daily energy demand in all categories is lower on the weekend compared to the weekdays as seen in the chart below.

Chart 18



As shown in previous reports, BEV commuters have the highest peak weekday demand of 1.01 kW, occurring at 6 pm. With BEV commuters, weekend demand is lower and steadily increases throughout the day, peaking at 0.45 kW at 6 pm. For non-commuter drivers, both PHEV and BEV have smaller peaks relative to their load profile's trough than their commuter counterparts. Non-commuters of both categories also tend to have profiles that appear flatter, with a smaller slope incline when approaching peak hours. Within each category, the weekday and weekend load profiles tend to be similar during off-peak hours, and then diverge during peak times in the afternoons and evenings. Each individual charging session typically draws power at 3.3 or 6.6

kW for the bulk of EVs currently used by customers, mostly dependent on the rectifier capacity in each vehicle.

The profiles below are useful for system-wide capacity planning for electric vehicle loads, especially when demonstrating the potential for peak shaving in the afternoon and evening using EVSE-controlled demand response technology.

Chart 19

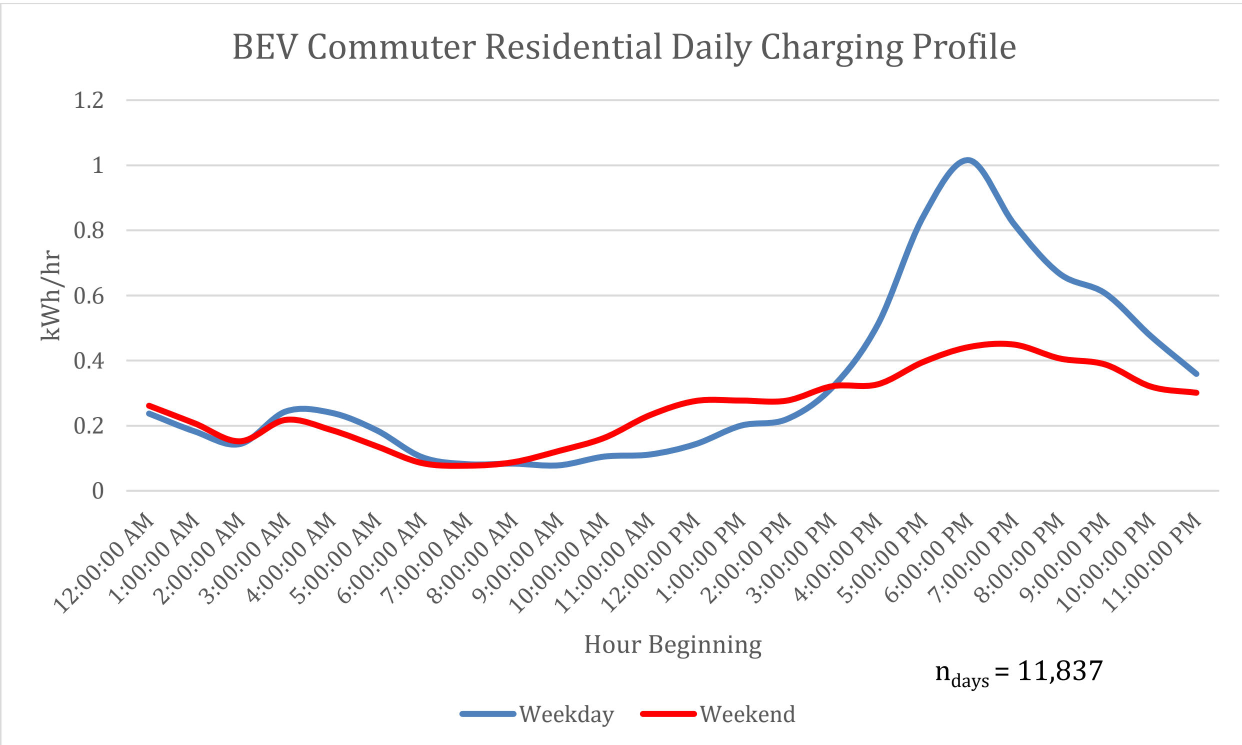


Chart 20

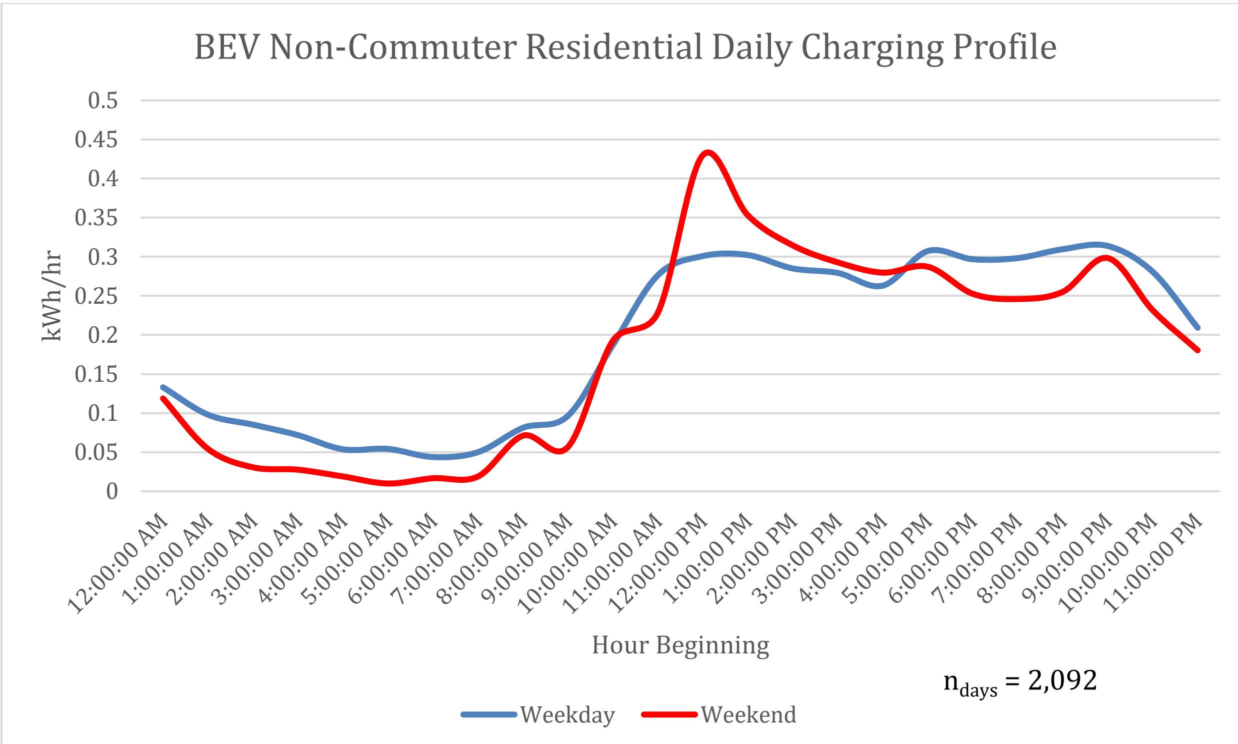


Chart 21

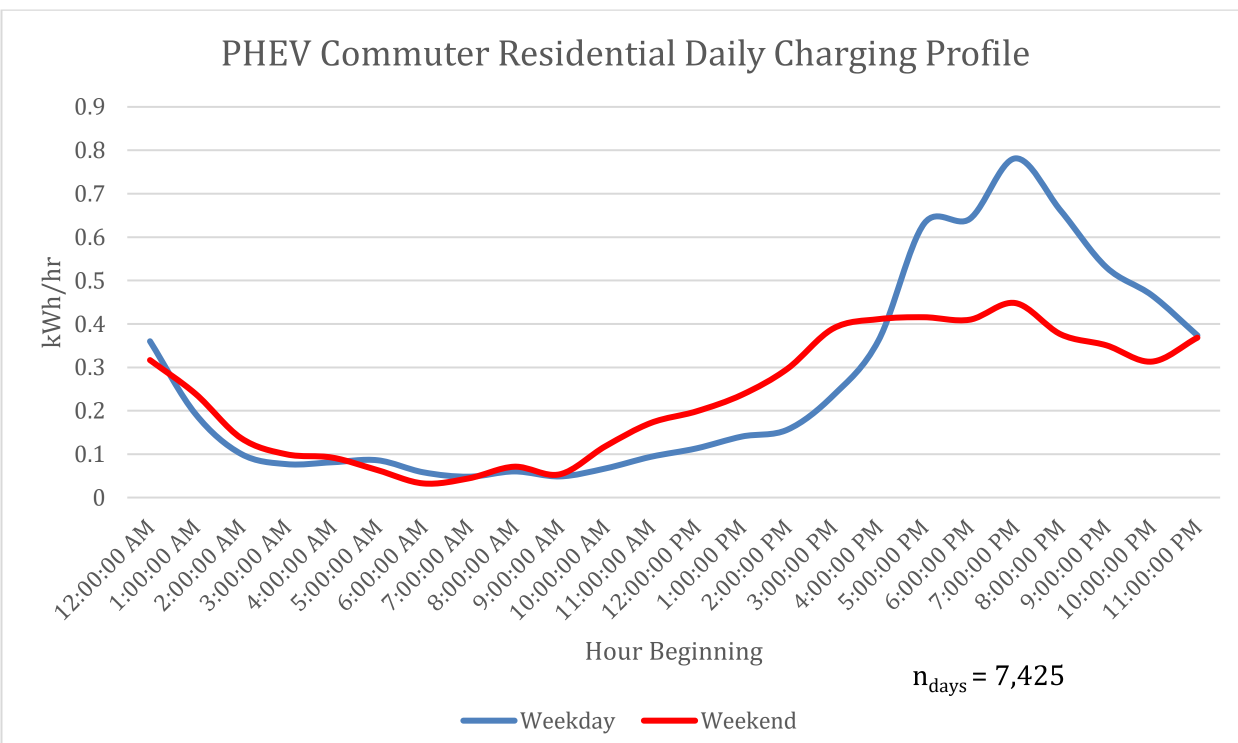
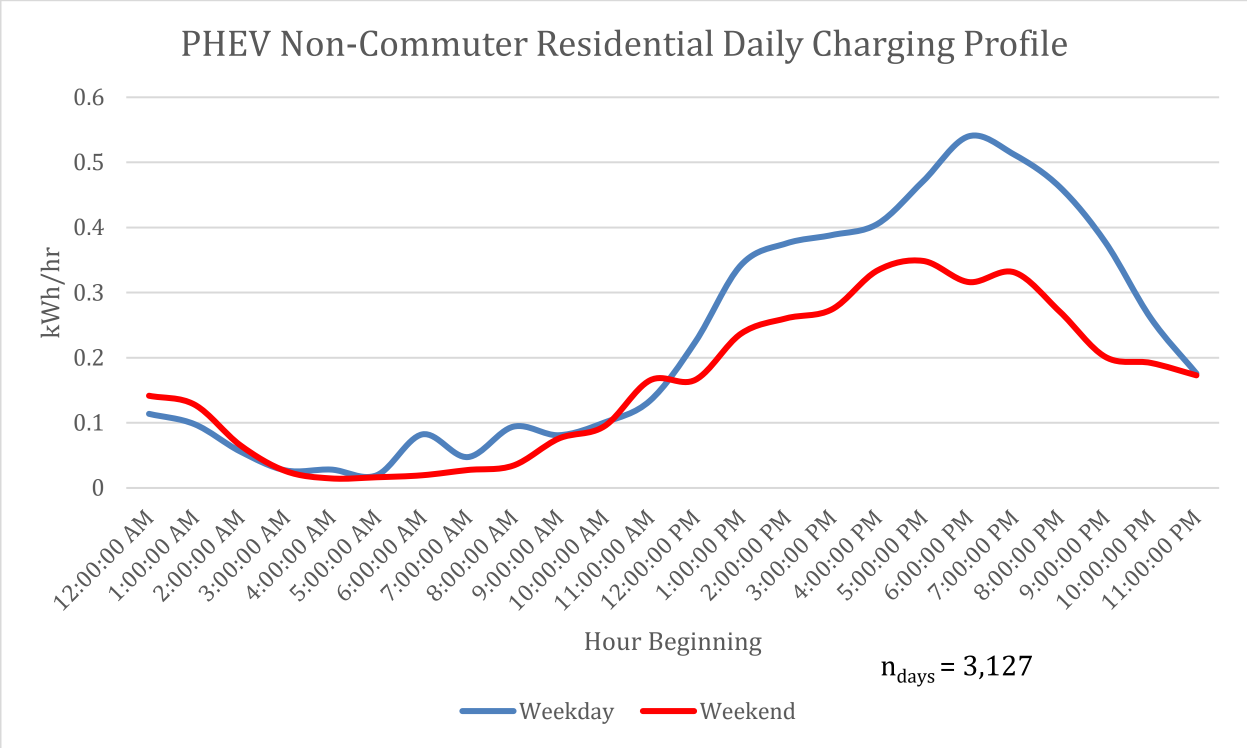


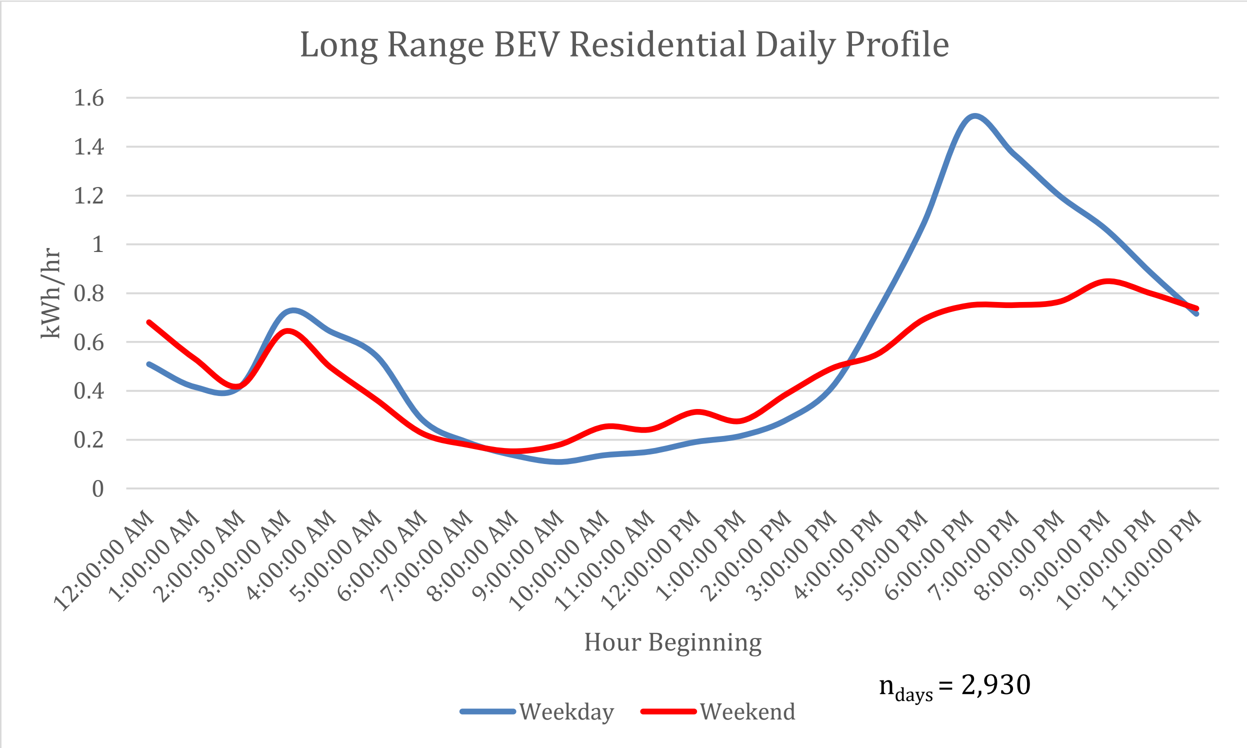
Chart 22



Long range BEV charging

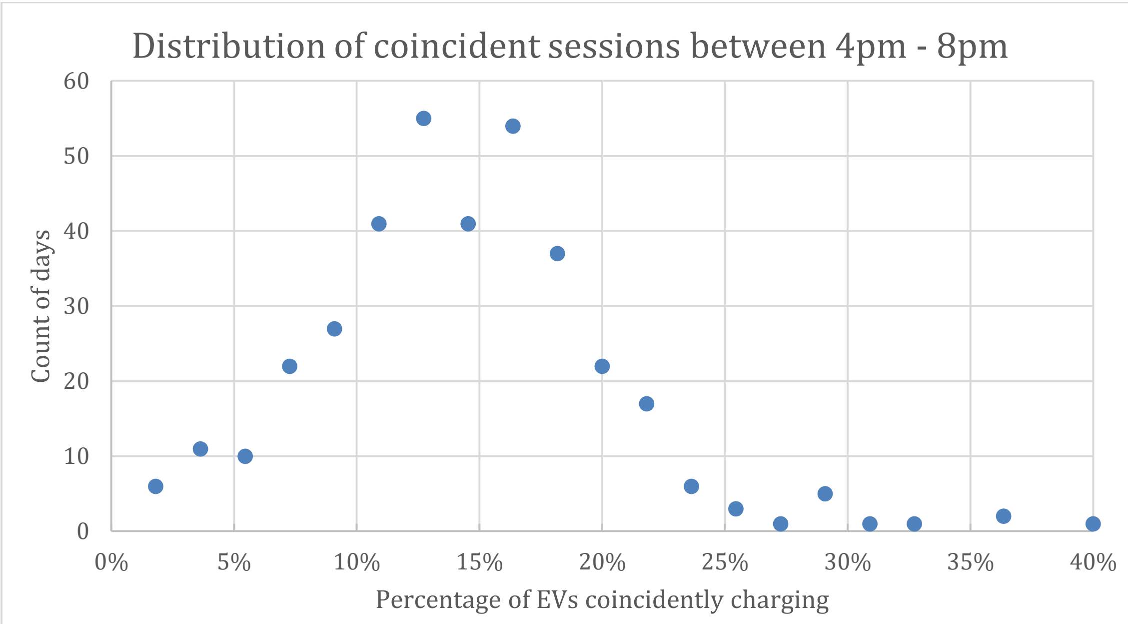
Long range BEVs (LBEV) include vehicles with battery capacities of 60 kWh or greater, resulting in driving range greater than 200 miles between charging sessions. To date, 31 out of 188 residential customers enrolled in the program drive LBEVs, 15 of which have networked EVSEs providing charging data. Residential LBEVs continue to demonstrate significantly greater energy consumption on average than the typical PEV in the program. Average weekday and weekend home energy usage is between 13.9 and 11.7 kWh – an increase in energy usage of 101% and 112%, respectively, over typical residential PEV energy usage for weekdays and weekends. Additionally, the peak residential energy demand of 1.51 kW for LBEVs is 92% greater than the average PEV peak of 0.78 kW. It's important to point out that while the daily energy usage and peak demand are clearly much higher compared to the typical PEV, the smaller sample size of the LBEV data is more easily skewed. For example, the noticeable "bump" starting at 2 am is due to a single driver consistently setting their vehicle to start charging at that time. Observing a larger sample size and dataset for LBEVs over time will help smooth loading profiles that more closely approximate the overall larger population, providing better assessments of future system loads from EVs.

Chart 23



In an analysis of 6,274 sessions from 56 residential EVSEs during the last year, on any given day an average of 15% of drivers were charging during peak system demand hours between 4pm and 8pm. When observing the upper limit, or three standard deviations above the average, the data shows 33% of drivers will be charging during peak hours on any given day. Coincidence factors are particularly important when considering smaller groups of EV charging on common distribution transformers and feeders. Understanding the grid impacts of this coincident charging at the more local level, especially in geographic areas of higher than average adoption or "clustering", will allow for more robust distribution modeling and planning.

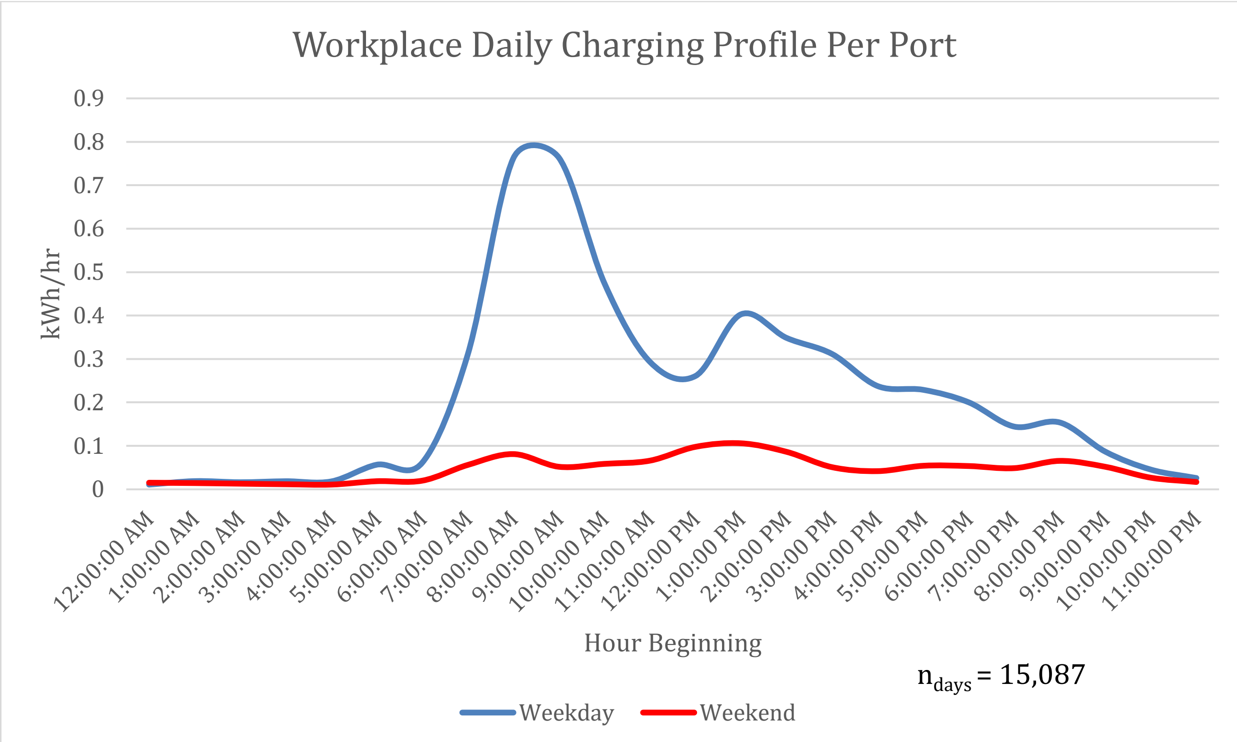
Chart 24



Workplace charging

Workplace commuter charging data from 24 sites with an average of 2.1 ports per location, showed the highest demand occuring on weekdays between 9am and 10am at 0.79 kW, with a smaller afternoon peak between 1pm and 2pm. Average daily energy usage is 5.3 kWh per port on weekdays. From a system perspective, charging during the day at the workplace reduces the amount of afternoon and evening on-peak energy consumption at residences throughout the year. However, Avista's system demand is also high in the morning during the winter season. Taking this into account, closer analysis is expected to show overall net shifts of on-peak to off-peak loads due to workplace charging, with or without networked EVSE and demand response.

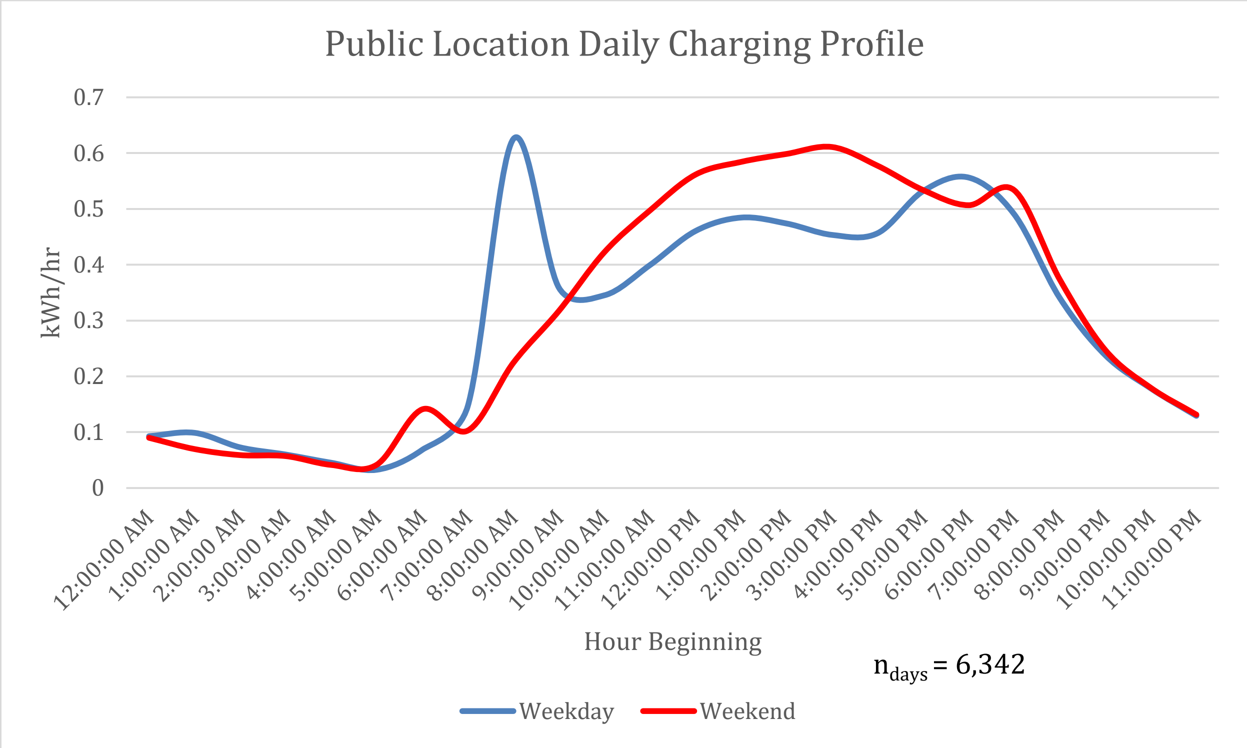
Chart 25



Public charging

On a location basis, each of the 27 public stations in the program with networked EVSE have distinctly different profiles during the weekdays and weekends. During weekdays a site peak of 0.63 kW at 9am occurs with a second, smaller afternoon peak of 0.56 kW at 6pm with daily energy usage averaging 7.1 kWh. The weekend has a much more gradual increase in demand throughout the day, peaking at 0.61 kW at 3pm. It's important to clarify that these profiles are on a per location basis with an average of 2.1 ports, making the impact of public charging much lower than workplace and fleet locations. However, given the nascent state of EV adoption, this component is being closely monitored for changes.

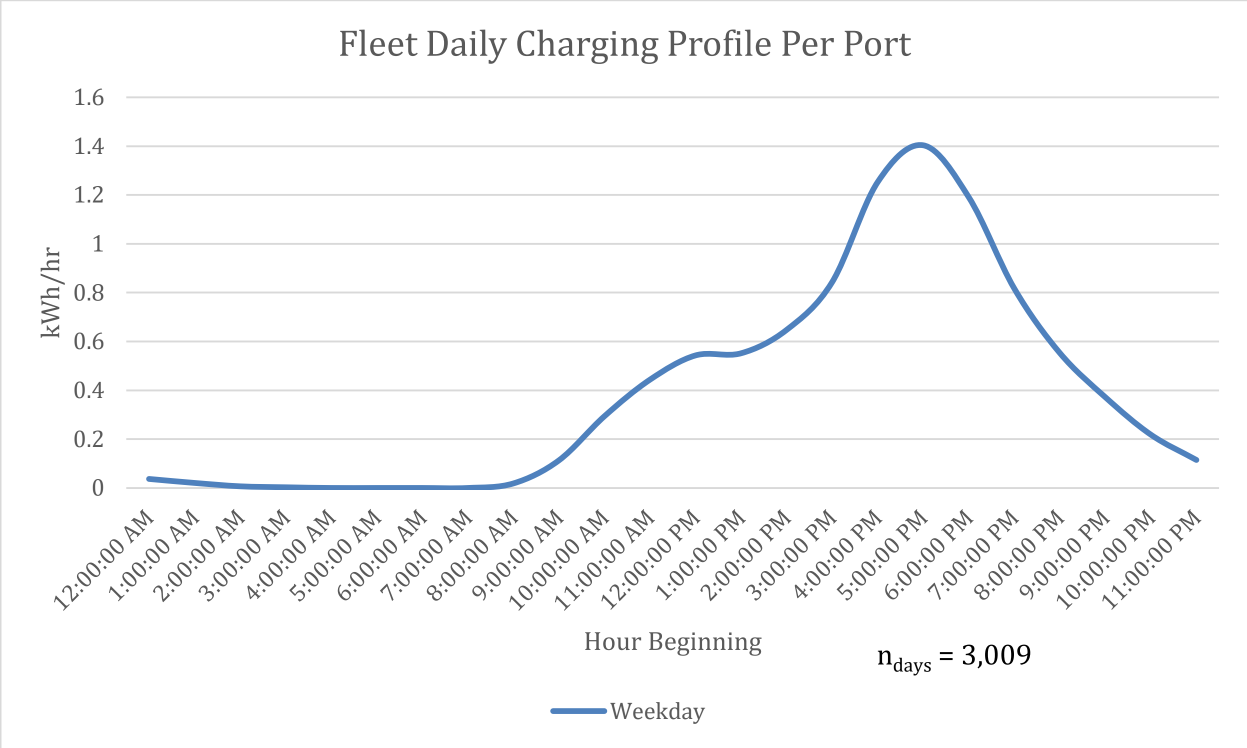
Chart 26



Fleet charging

Data analyzed for fleet charging included 3 sites with a total of 7 ports. On a per port basis, fleet demand peaks at 1.4 kW at 5pm following a gradual increase throughout the workday, resulting in average daily energy usage of 9.4 kWh per EVSE port. This is in line with expected usage. While some organizations are considering electric vehicles for their fleets, adoption in Avista's service territory is relatively low and seems likely that the load profiles and usage will change as the industry matures.

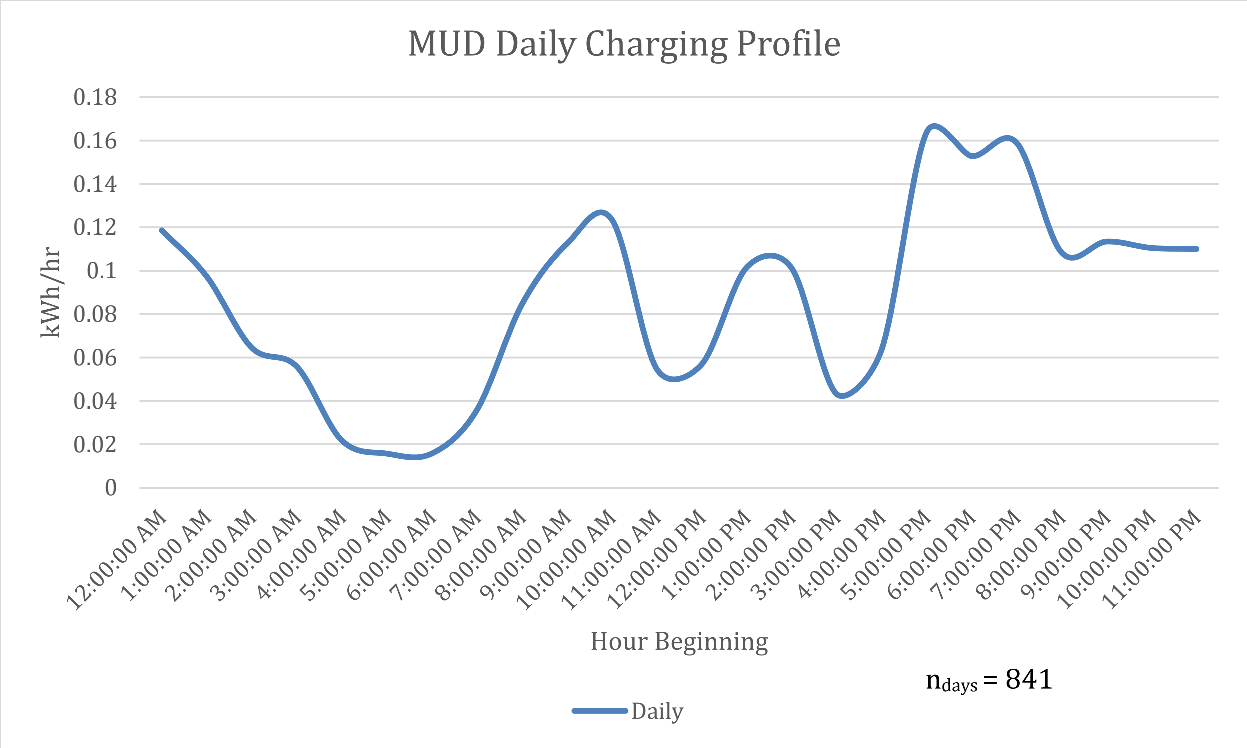
Chart 27



MUD charging

Overnight lodging hotels and extended stay housing along with apartment complexes comprise the limited MUD dataset. Session data from three apartment complexes with a total of six ports and two hotels with a total of four ports show relatively low usage and demand compared to other commercial categories, with peak demand at 0.15 kW and daily energy use of 2.0 kWh per location. As with other categories, MUD usage is expected to grow as the industry matures and adoption increases.

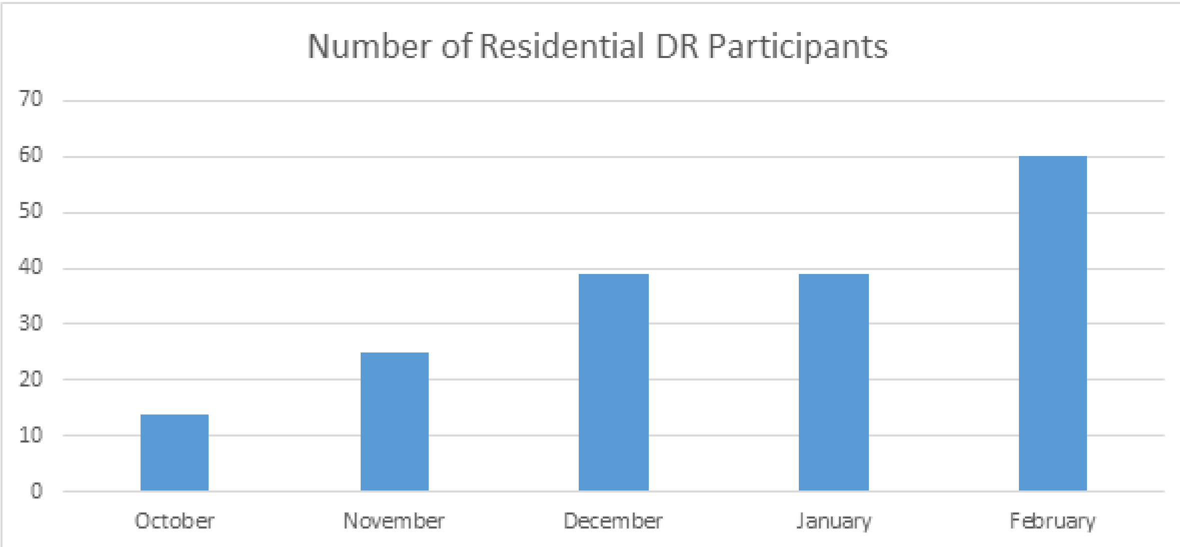
Chart 28



Demand Response

Since July 2018, a growing pool of residential customers are participating in demand response (DR) experiments, where the EVSE's maximum charging power is curtailed from 6.6 kW to 1.8 kW (75% curtailment), between the hours of 4pm and 8pm. After initially testing DR with a small group, the number of residential DR participants has grown to 38 customers. An additional 17 residential customers are expected to join the DR control group by July, 2019, bringing the total to 55 participants.

Chart 29



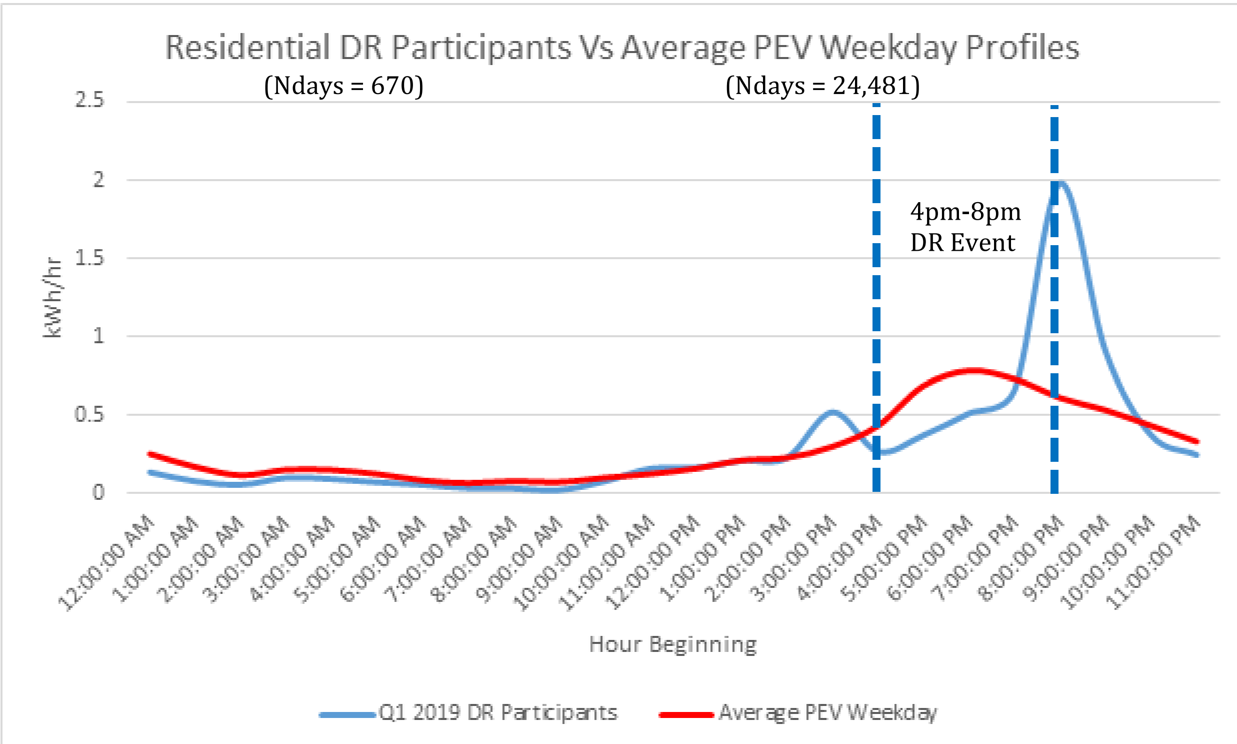
The table below includes residential DR sessions conducted from October, 2018 through February, 2019. During this time, 2,541 DR signals were successfully sent by the network and received by the EVSE, resulting in 431 sessions (17%) that were actually curtailed from 6.6 kW maximum power to 1.8 kW. In the remainder of other cases the customer did not plug-in the vehicle during the DR event between 4pm to 8pm, and/or opted. Records from 249 events registered the customer's choice to "opt-out" of the DR event 31 times, a rate of 13%.

Table 10

Month	Number of EVSE receiving DR events	Number of curtailed sessions
Oct-18	198	28
Nov-18	448	20
Dec-18	725	32
Jan-19	614	217
Feb-19	556	134

The chart below shows the average daily profile for a driver participating in the DR program. During peak demand hours between 4pm and 8pm, aggregate hourly demand is reduced by .07 kW to as much as .32 kW per PEV. While curtailment was proven successful, a DR time window of four hours was not sufficient to fully charge many vehicles, resulting in an aggregated load for the control group to increase to 2 kW per PEV from 8pm to 9pm, with a steep drop in demand from 9pm thereafter.

Chart 30



Although DR progress has been delayed due to a combination of technical problems related to connectivity, EVSE hardware and firmware, and network controls, overall improvements and initial results indicate that DR learning objectives will be met as the number of participants increase, and additional control group experimentation and data accumulate over time.

Community Programs

The Company initially held a meeting in December, 2017, with attending representatives from 15 agencies and non-profit organizations serving local disadvantaged customers and community groups. Discussions included basic information about electric vehicles and charging, as well as ideas and opportunities to serve disadvantaged individuals and communities. Six proposals were received and competitively evaluated based on estimated benefit and cost criteria, with the top two proposals selected for implementation from the Spokane Regional Health District and Transitions for Women organizations. In both cases, the Company provided an EV and an EVSE to operate for the benefit of customers, including transport to critical medical services, job skills training, shuttle services for overnight shelter, and food deliveries. Each organization secured insurance and accepted responsibility for EV maintenance and operational costs.

Since implementation, both agencies were able to substantially increase both the volume of transportation services, as well as operational savings. For example, Transitions for Women reports transportation cost savings of 54% utilizing their EV, compared to previous transportation costs.

Avista staff hosted a meeting in January, 2019, with community partner and pilot participant agency representatives to discuss initial experiences and consider ideas for future programs, taking into account target populations, access, cost effectiveness, and awareness issues. This included representatives from the Spokane Regional Transportation Council, Spokane Housing Ventures, Spokane Neighborhood Action Partners (SNAP), and Habitat for Humanity. The Company will continue to meet with area stakeholders several times each year to review results and explore new ideas for community program initiatives, with the intent to expand programs beyond the pilot.

Revenues and Expenditures

Expenditures through April 15, 2019 totaled $3,309,502. A more detailed breakdown is provided in Attachment A.

Revenues to date based on charging session data from the Greenlots network are per the table below.

Table No. 11

Type	**No. of Charging Sessions**	**kWh Consumed**	**Avg. kWh Consumed per Session**	**Rate**	**Revenue**
Residential AC Level 2	36,288	274,175	7.6	$0.09134/kWh	$25,043
Commercial AC Level 2	15,411	148,538	9.6	$0.1162/kWh	$17,260
DC Fast Charging	741	10,156	13.8	$0.35/kWh (previously $0.30/min)	$3,978
Total	52,440	432,869	-	-	$46,281

Note that these figures do not include charging sessions and respective revenue from pilot participants utilizing networked EVSE that are offline, as they provide charging to the vehicle but are not communicating data. It also does not include charging sessions for participants utilizing non-networked EVSE, and other EV charging occurring from non-participants in the program. A comprehensive assessment of current and projected revenue from all these categories will be provided in the pilot's final report.

Please direct any questions regarding this report to Rendall Farley at 509-495-2823, rendall.farley@avistacorp.com, or Karen Schuh at 509-495-2293, karen.schuh@avistacorp.com.

Sincerely,

/s/Linda Gervais

Sr. Manager, Regulatory Policy
Avista Utilities

Attachment A
Avista EVSE Pilot Program Expenditures through October 22, 2018

Expenditures include all costs for both completed EVSE installations and installations in progress, as well as program administrative costs.

Expenditure Category / Type		CAP	OPER	Total
Residential Level 2 EVSE	Design & Installation	$228,044	-	$228,044
	Hardware	$230,639	-	$230,639
	Maintenance & Repairs	-	$12,269	$12,269
	Premises Wiring Reimbursements	-	$125,191	$125,191
	Total	$458,683	$137,461	$596,144
Workplace-Fleet-MUD Level 2 EVSE	Design & Installation	$250,197	-	$250,197
	Hardware	$367,825	-	$367,825
	Maintenance & Repairs	-	$6,462	$6,462
	Premises Wiring Reimbursements	-	$120,289	$120,289
	Total	$618,022	$126,752	$744,774
Public Level 2 EVSE	Design & Installation	$237,654	-	$237,654
	Hardware	$296,569	-	$296,569
	Maintenance & Repairs	-	$14,180	$14,180
	Premises Wiring Reimbursements	-	$55,934	$55,934
	Total	$534,223	$70,115	$604,337
DC Fast Charging Stations	Design & Installation	$310,055	-	$310,055
	Hardware	$304,865	-	$304,865
	Maintenance & Repairs	-	$2,474	$2,474
	Meter Billing	-	$19,704	$19,704
	Total	$614,920	$22,178	$637,098
Other Project Expenses	Communications	-	$28,614	$28,614
	Community Programs	-	$60,433	$60,433
	EVSE Network & Data Management	$501,330	-	$501,330
	Misc General Expenses/Incentives	-	$21,737	$21,737
	Project Management/A&G Salaries	-	$115,037	$115,037
	Total	$501,330	$225,820	$727,150
Total		$2,727,178	$582,324	$3,309,502