STATE OF UTAH ELECTRIC VEHICLE MASTER PLAN

SECOND EDITION

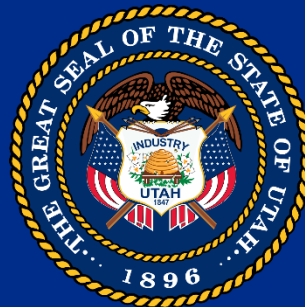## 2020

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State Agency Committee Members

Listed in Alphabetical Order

Andrew Gillman	*Office of Tourism*
Annie Schneider	*Governor's Office of Energy Development*
CJ Connor	*Department of Transportation*
Corey Unger	*Department of Transportation*
Daniel Black	*Department of Administrative Services*
Eric Gardner	*Department of Administrative Services*
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Division of Fleet Operations Support Team

Department of Administrative Services
Listed in Alphabetical Order

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Eric Gardner   *Vehicle Expert and Support*
Dan Black   *Vehicle Expert and Support*
Michelle Austin   *Fueling and Site Expert*
Michelle Brown   *Team Lead*
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Mission Statement

Create and implement a unified electric vehicle infrastructure strategy for enhanced transportation and better air quality for Utah.

Project Overview

The State Agency Electric Vehicle (EV) Expansion Committee was assembled in order to create a unified, coordinated, and responsible EV infrastructure strategy for the advancement of EV charging across Utah, thereby improving air quality through increased zero emission transportation. This five-year Master Plan acts as a guide for best practices in helping guide State Agencies and other interested parties in the implementation of EV technologies at their place of business and operation.

Members of the Committee were selected by their agency's leadership in EV adoption, technology, interest, involvement, and/or outreach.

Project Priorities

1. To Align with HB0259

During the 2020 Legislative Session, HB0259: Electric Vehicle Charging Network was passed. This bill suggests that " 72-1-215 (2) The statewide electric vehicle charging network plan shall provide implementation strategies to ensure that electric vehicle charging stations are available:

a) at strategic locations as determined by the department [Utah Department of Transportation] by June 30, 2021;

b) at incremental distances no greater than every 50 miles along the state's interstate highway system by December 31, 2025; and

c) along other major highways within the state as the department [Utah Department of Transportation] finds appropriate."

This State of Utah EV Master Plan secondary edition is designed to support this legislation and aid in its implementation.

2. Connection and Enhancement within the Region

In 2019, Governor Gary Herbert joined the governors of Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, and Wyoming to sign an updated Memorandum of Understanding (MOU) for Regional Electrical Vehicle Plan for the West (REV West) with a goal to enable drivers to "seamlessly drive an electric vehicle across the Signatory States' major transportation corridors." The new MOU builds on lessons learned by the REV West states as they work together to encourage public and private sector investment in electric vehicle charging stations to help grow EV adoption in the region. The REV West partnership also released Voluntary Minimum Standards for Direct-Current Fast Charging (DCFC) stations, covering administration, interoperability, operations, and management. This information can serve as guidance for station developers, public entities, and businesses looking to build EV charging stations.

3. Diversification of Fueling for State Fleet

The Utah Division of Fleet Operations sees the expansion of EV infrastructure as a way of solidifying electricity as an additional fueling category for the State. It would also allow for the continued increase of EVs and electric hybrids within the State Fleet. Members of the Fleet EV Expansion Team would continue to provide technical and infrastructure support and expertise, as they have through the development of this Master Plan.

4. Improved EV Travel Experience

Utah continues to add more EVs onto its roads, and the improved electric infrastructure is greatly needed for Utah commuters [2]. Additionally, Utah continues to be a popular travel destination especially for those seeking outdoor recreation.

As Utah continues to be a popular location for travel, especially for those wanting to experience the great outdoors, the increased ease of EV travel through improved infrastructure will facilitate access to Utah's range of visitor destinations, from popular sites such as The Mighty 5® national parks of Southern Utah to all the national monuments, recreation areas, forests, state parks, open spaces and cultural offerings along the way. By targeting priority locations at gateway and base camp towns with opportunities to dine or explore nearby cultural attractions while charging, improved EV infrastructure can further support economic growth in Utah's rural communities.

5. Improved Air Quality

Behind every action of this project is the State's continued goal to decrease emissions through vehicle transportation as an effort to improve air quality for Utah. Motor vehicles are the largest source of emissions in the state. Electrifying transportation will assist with reducing emissions that contribute to both ozone and particulate matter 2.5 ($PM_{2.5}$).

6. Building Fuel Resilience

The State of Utah encourages building resilience across transportation operations. Through diversified transportation options, the State of Utah can enhance fleet operations and be better prepared to withstand fuel disruptions. Electric Vehicle Supply Equipment (EVSE) can also become more resilient to grid disruptions with onsite energy generation and storage.

State of Utah Accomplishments to Date

FY20 Allocation for EV Charging at State Facilities

During the 2019 General Legislative Session, the State of Utah Legislature appropriated $2 million in one-time funding to the Department of Administrative Services for the installation of Level 2 chargers at state-owned facilities. Installation of 121 Level 2 dual-port ChargePoint charging stations across twenty-three state-owned facilities is on track for completion by June 30, 2020. One station will be installed at a later date at either the new State Prison or new State Surplus. The project was also made possible thanks to funding from Rocky Mountain Power. The project was managed by the Coordinator of Resource Stewardship and supported by the Division of Fleet Operations and the Division of Facility Construction and Management (DFCM).

Table 1

Source: Utah Department of Administrative Services FY2020 State of Utah EV Charging Station Expansion Project Site List

County	City	Zip Code	Address	Site Name	# of Stations Installed
Salt Lake	Salt Lake City	84114	450 S State St	Salt Lake City District Court	8
Salt Lake	West Valley City	84119	4501 S 2700 W	Calvin Rampton Complex	14
Salt Lake	Draper	84020	14717 Minuteman Dr.	Draper Department of Corrections	6
Salt Lake	Draper	84020	14727 Minuteman Dr.	Fred House	**6**
Salt Lake	Salt Lake City	84116	288 N 1460 W	Department of Health Building	4
Salt Lake	Salt Lake City	84114	300 N State St	Utah State Office of Tourism	2
Davis	Clearfield	84015	1290 E 1450 S	DWS Clearfield	4
Davis	Clearfield	84015	1291 E 1450 S	DHS Clearfield	3
Weber	Ogden	84401	950 E 25th St	DCFS Ogden	6
Weber	Ogden	84404	742 Harrison Blvd.	Utah Schools for the Deaf and Blind	5
Weber	Ogden	84401	2540 Washington Blvd	Ogden Regional Center	6
Salt Lake	Salt Lake City	84111	250 East 500 South	State Board of Education	2
Salt Lake	Salt Lake City	84104	1625 S 900 W	DABC Admin Building	5
Box Elder	Brigham City	84302	138 W 990 S	DWS Brigham City	**2**
Box Elder	Brigham City	84302	195 W 1100 S	SBDC	**2**
Utah	American Fork	84003	895 N 900 E	State of Utah Developmental Center	**1**
Utah	Orem	84057	658 N 1500 W	UDOT Region III Admin Building	2
Utah	Provo	84606	150 E Center St	Utah State Government Provo Regional Center	6
Utah	Provo	84606	1300 E Center St	Utah State Hospital	6
Utah	Provo	84606	137 Freedom Blvd 200 W	New Provo Courthouse - 4th District	6
Salt Lake	Salt Lake City	84184	4315 S 2700 W	AmEx Building	16
Cache	Logan	84321	180 N 100 W	DWS Logan	3
Salt Lake	Salt Lake City	8411	195 N 1950 W	Multi Agency State Office Building	6
TBD	TBD	TBD	TBD	TBD	1
				TOTAL	**122**

Division of Air Quality Workplace Electric Vehicle Charging Funding Assistance Program

During the 2019 General Legislative Session, the State Legislature appropriated $4.9 million to be used as an incentive for the installation of EVSE throughout the State. The EVSE incentive Program, managed by the Division of Air Quality (DAQ) in the Department of Environmental Quality (DEQ), allows businesses, non-profit organizations, and other governmental entities (excluding State Executive Branch agencies) to apply for a grant for reimbursement of up to 50% of the purchase and installation costs for a pre-approved EVSE project. Funds can be used for the purchase and installation of both Level 2 or DC fast charging EVSE.

As of April 2020, 35 different entities have successfully applied for funding to install Level 2 and DC Fast chargers throughout Utah. These projects have proposed to install 107 Level 2 and 11 DC Fast chargers at workplaces in Utah. As a result of the economic impact of the COVID-19 pandemic, the program is currently suspended; however, plans are currently in place to continue the program after July 1, 2020.

Volkswagen Settlement Funding: Utah Department of Transportation Rural EVSE Expansion

The Utah Department of Transportation (UDOT) is supporting the early adoption of EVs by improving regional availability of EV Charging Infrastructure. This will increase access to Utah highways, and promote tourism and recreation in our rural communities. As EV adoption increases UDOT will encourage privatization of charging infrastructure.

In the 2018 legislative session, UDOT received $200,000 in House Bill 3 (HB 3) to "partner with other entities to expand availability of infrastructure for emerging vehicle technology." In an effort to maximize the value of the funding, UDOT used the legislative funds to utilize the Utah State University (USU) EVSE Tool. Utah State University is building an EV charging station mapping tool that will help users determine what destinations are accessible based upon their unique vehicle specifications such as battery capacity. The tool will continue to evolve as more charging and vehicle data is collected.

The Utah Department of Environmental Quality (DEQ) chose to direct part of funds from a settlement received from Volkswagen towards EVSE grants. On December 17, 2019, the DEQ awarded UDOT $1,047,623 towards its proposal to implement EVSE at 11 locations statewide. UDOT proposed to utilize $190,000 of the 2018 HB 3 funds as a grant match for the grant. Additionally, UDOT obtained a commitment from Rocky Mountain Power for $150,000 to $220,000 in incentives, for a combined project total of $1,197,623 to $1,267,623. Figure 1 shows a breakout of funding for the project.

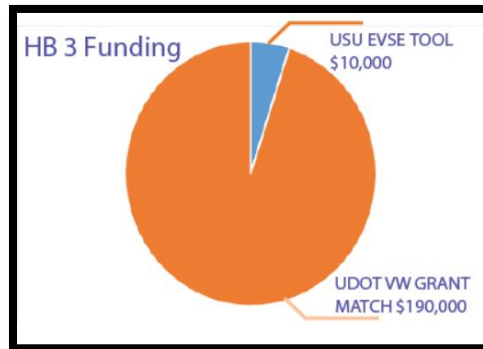The EVSE sites included in the UDOT VW grant funding are currently being installed.
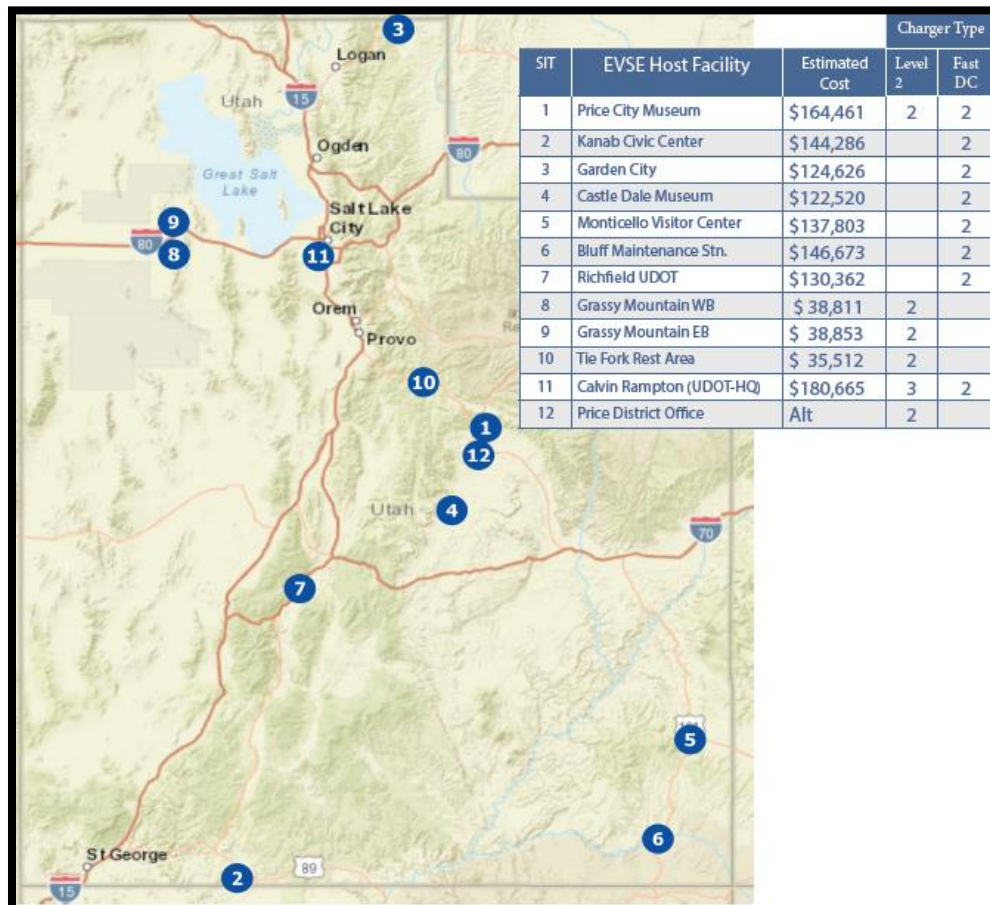

Figure 1
Source: UDOT EVSE One Page Summary Report

SIT	EVSE Host Facility	Estimated Cost	Level 2	Fast DC
1	Price City Museum	$164,461	2	2
2	Kanab Civic Center	$144,286		2
3	Garden City	$124,626		2
4	Castle Dale Museum	$122,520		2
5	Monticello Visitor Center	$137,803		2
6	Bluff Maintenance Stn.	$146,673		2
7	Richfield UDOT	$130,362		2
8	Grassy Mountain WB	$ 38,811	2	
9	Grassy Mountain EB	$ 38,853	2	
10	Tie Fork Rest Area	$ 35,512	2	
11	Calvin Rampton (UDOT-HQ)	$180,665	3	2
12	Price District Office	Alt	2	

Figure 2
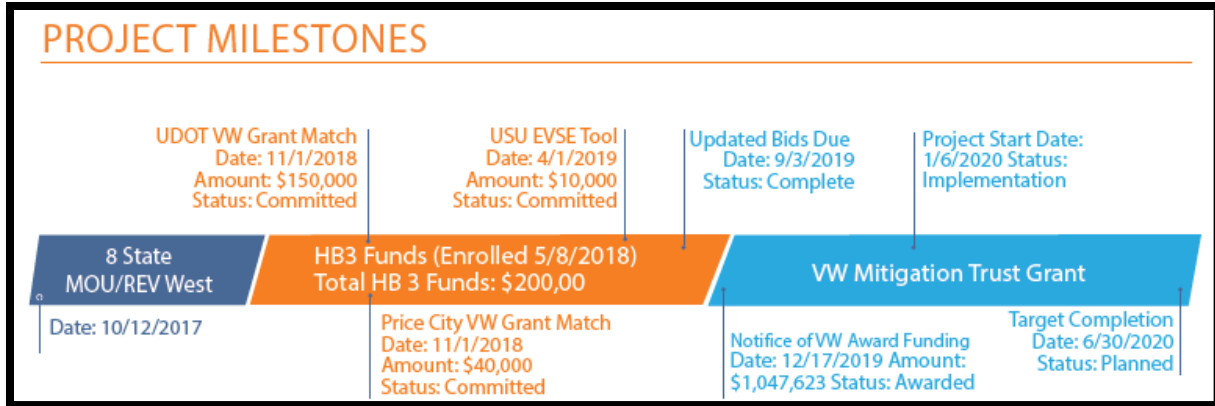*Source: UDOT EVSE One Page Summary Report*

Figure 3
Source: UDOT EVSE one Page Summary Report

Considerations & Factors

Air Quality

Utah has several areas of non-attainment for particulate matter 2.5 ($PM_{2.5}$) and ozone as designated by the Environmental Protection Agency (EPA). $PM_{2.5}$ Non-attainment areas include [3]:

- Provo City
- Logan City and Franklin County, Idaho
- Salt Lake City
- Davis County
- Parts of Weber County
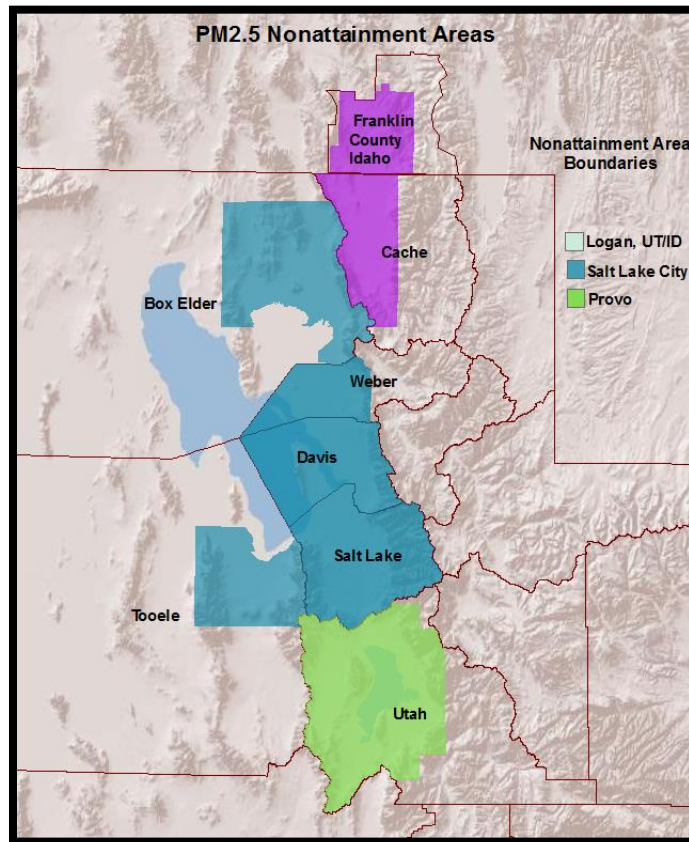- Parts of Box Elder County
- Parts of Tooele County

Figure 4

Source: "Area Designations: PM2.5 State Implementation Plan Development." Utah Department of Environmental Quality, www.deq.utah.gov/legacy/pollutants/p/particulate-matter/pm25/areas.htm.

Ozone Non-attainment areas include:

- Northern Wasatch Front
    - Salt Lake County
    - Davis County
    - Parts of Weber County
    - Parts of Tooele County
- Southern Wasatch Front, including part of Utah County
- Uinta Basin, including parts of Uintah and Duchesne County below 6,250 feet elevation
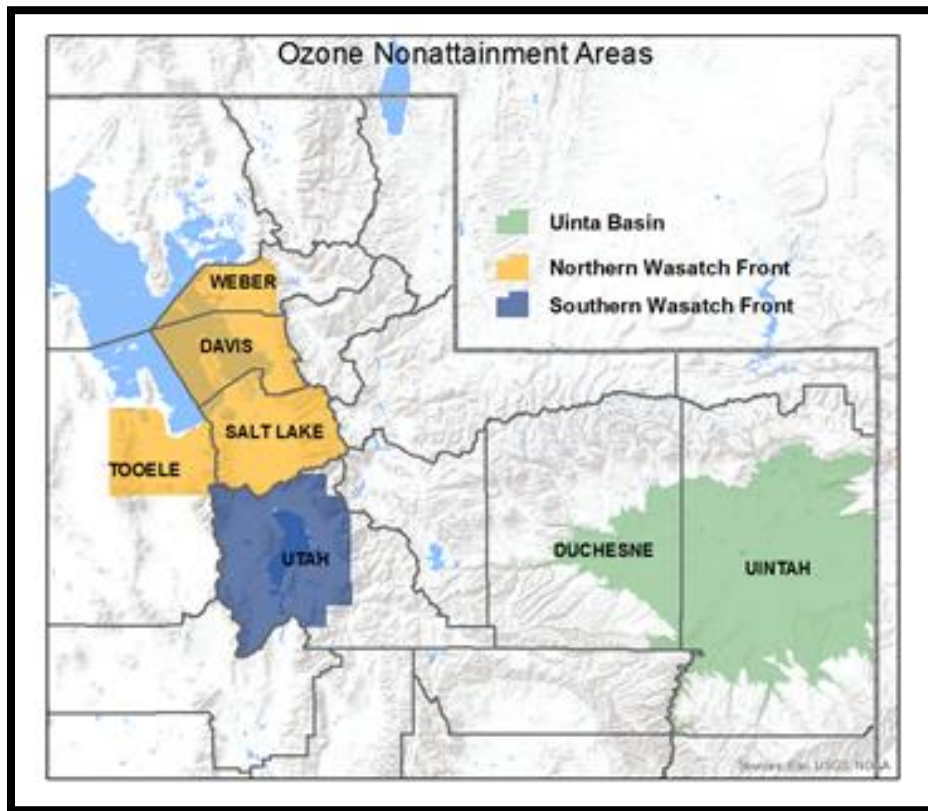

Figure 5

For more information, visit the DAQ Non-Attainment Map

Charging stations within these non-attainment areas will be a priority, as an effort to help move those zones into compliance through increased EV adoption as a result of improved infrastructure.

Utility Infrastructure

While selecting sites for EV installment, power provider service territories will need to be considered. Particularly in circumstances in which Sustainable Transportation & Energy Plan (STEP) funds are utilized from Rocky Mountain Power, and must therefore be utilized in Rocky Mountain Power service areas only.
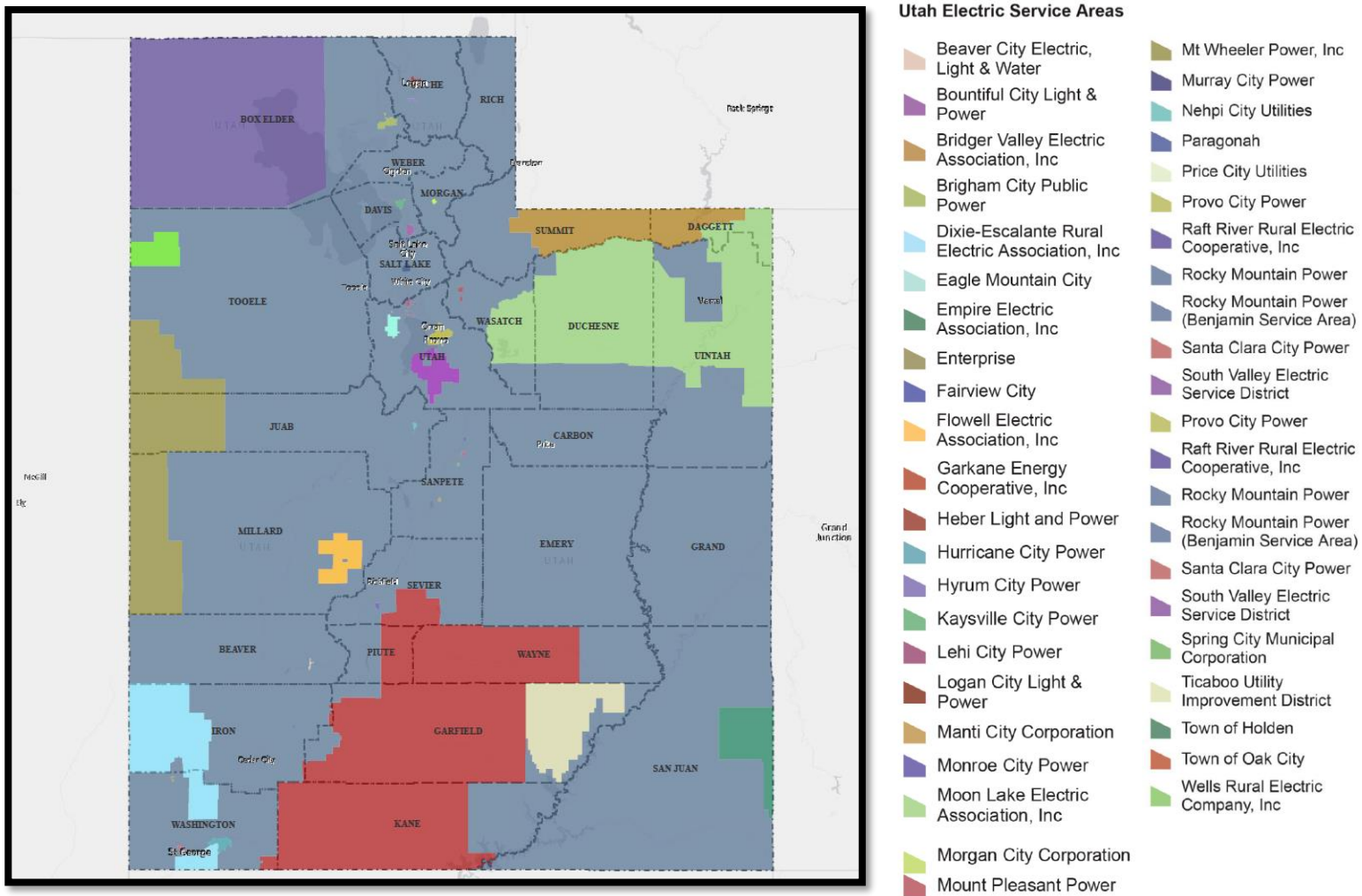

Figure 6
This map depicts service area boundaries for electric utilities. Boundaries are approximate and based on information provided to the Utah Division of Public Utilities.
Source: Utilities, Utah Public. "Utah Electric Service Areas." Utah.maps.arcgis.com,
www.utah.maps.arcgis.com/apps/Viewer/index.html?appid=573dfdb6220d4fada6d833def633b866

- Rocky Mountain Power Service Area
    - With the desire to create partnerships outside the State of Utah, the service map of Rocky Mountain Power to all areas has also been provided.
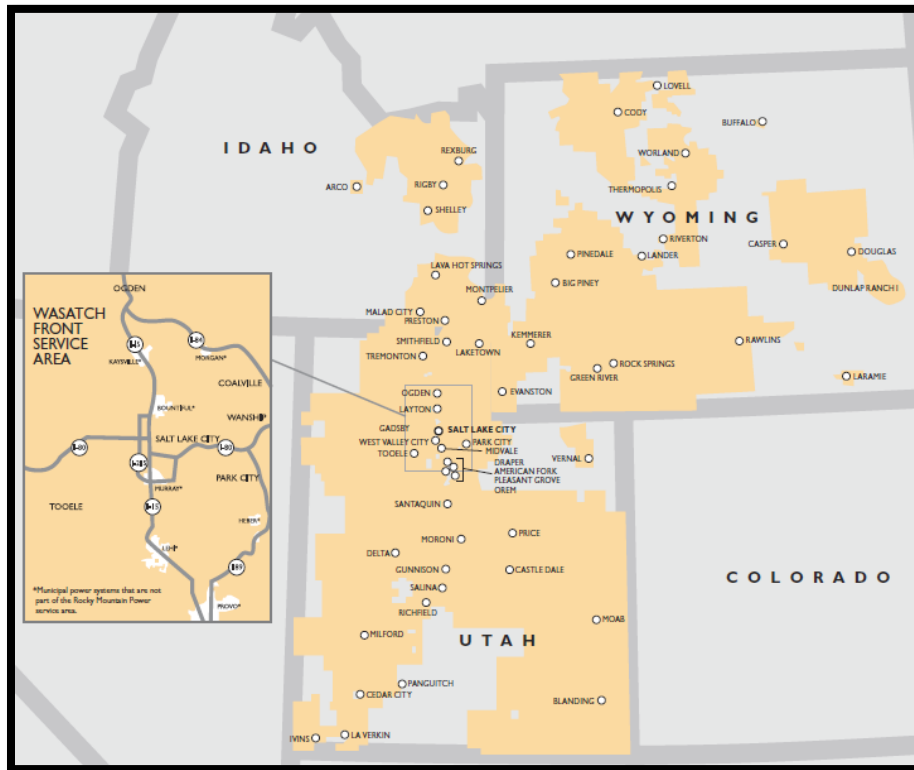

Figure 7
Rocky Mountain Service Area Map. Source: "Service Area Map." Glossary of Electrical Terms,
www.rockymountainpower.net/about/cf/sam.html.

Reaching The Mighty 5® and Beyond

Utah is well known for its Mighty 5 ® national parks: Arches, Canyonlands, Capitol Reef, Bryce Canyon, and Zion. These destinations are so important to Utah's tourism economy that they motivated a previous initiative by the Governor's Office of Energy Development to help EV travelers experience them. But in the years since The Mighty 5 EV road trip was created, the Utah Office of Tourism (UOT) has stepped in to respond to the rapid growth in visitation at our national parks by promoting a wider range of destinations through public-facing campaign that build stronger regional understanding of the state's many outdoor recreation assets and gateway communities. In 2020, the UOT launched its three-year Red Emerald Strategic Plan.

UOT marketing and content highlight road trips along Utah's incredibly scenic roads, many of them designated scenic byways across southern Utah. The popularity of scenic byways for auto tourists also presents a powerful opportunity for growing EV infrastructure organized around logical resident and visitor routes. Meanwhile, the Red Emerald Strategic Plan

prioritizes quality visitation and not simply quantity of visitation, distributes visitation, continues powerful branding and enables community-led visitor readiness.

While The Mighty 5® and The Greatest Snow on Earth® will continue to anchor Utah's tourism economy, the UOT is working with engaged partners and communities to increase their viability as a sustainable tourism destination through cooperative marketing and destination development – including the increase in EV infrastructure. Underscoring these efforts is an emphasis on maintaining the high quality of life for Utahns, which includes pride in our state and a passion to responsibly share authentic experiences with well-prepared visitors. This emphasis is part of a resident- and visitor-facing initiative and ethic called Forever Mighty. The UOT has set a goal to become an industry leader in responsible visitation messaging and education and will seek to help establish and promote the state's sustainable tourism portfolio.
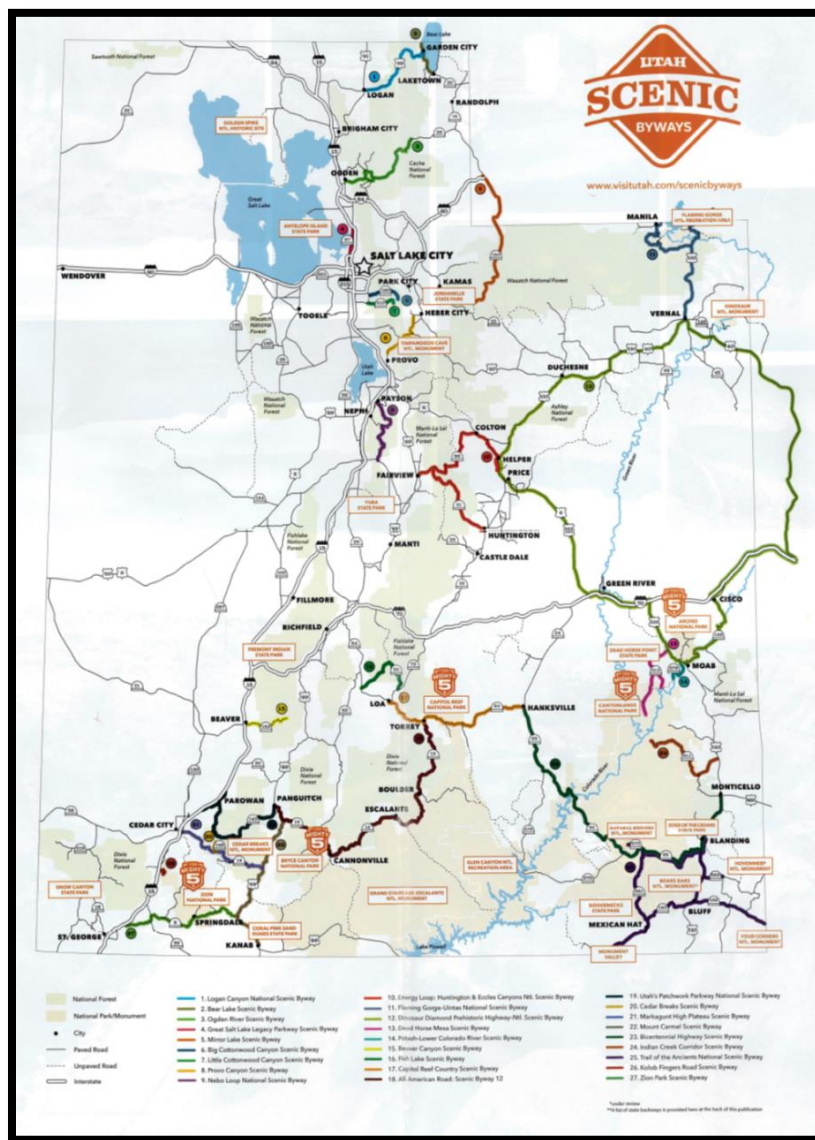

Figure 8
Map highlighting the Mighty 5, as well as federal and state scenic byways.

Transportation Resilience

In 2019, OED released the report *Alternative Fuel Vehicle and Emergency Plans: A Planning and Policy Report for Utah*. The report examines how alternative fuel vehicles can potentially bolster Utah's resilience and be leveraged as an emergency response resource in the event of a disruption to the state's transportation fuels sector. The report identified that 46 alternative fuel fleets operate across Utah with more than 6,400 light and heavy-duty vehicles operating on natural gas, propane, biodiesel, ethanol, electricity or hybrid fuels.

EV Development Efforts

Regional Efforts

On October 4, 2017, Governor Herbert signed a MOU between Utah and seven western states to collaborate on Regional Electric Vehicle infrastructure development in the west (REV West). The Utah corridors of specific focus are interstates 15, 70, 80, and 84. The State of Utah would also welcome partnership opportunities with other border-sharing REV West partners that will create additional connections along major roadways.

Utility Efforts

Rocky Mountain Power has been able to leverage funding through the West Smart EV grant for EV infrastructure deployment across their service territory. With many associated partners, they are prioritizing projects to expand the electric vehicle corridor along I-15. Additionally, workplace charging and fleet conversions to EVs are incentivized to those operating within their service territory.

County Efforts

Of the 29 counties in Utah, only two have begun organized efforts of installing chargers within their county limits.

- Salt Lake County installed chargers for their County Office buildings and Public Works building.
- Summit County, in partnership with Salt Lake City and Rocky Mountain Power, installed new EV fast-charging stations at Kimball Junction. The installations are part of the Live Electric campaign to improve air quality between Salt Lake City and Park City.[4]

City Efforts

Multiple cities across Utah have expanded, begun implementation, or have plans to install EVSE in their communities.

- Salt Lake City, in partnership with Utah Clean Energy, created the, "Electrified Transportation Roadmap: Best Practices and Clean Air Solutions Guide for Local Governments in Utah".
  - In 2018, Salt Lake City installed 28 EV chargers for the public and converted all city parking enforcement vehicles to electric. This conversion to EVs has reduced fuel costs by 90 percent.
- Sandy City received funding through the Rocky Mountain Power West Smart EV grant.
- West Jordan City has installed chargers at their City Hall and Public Works buildings.

- West Valley City is working with the West Smart EV grant in hopes of being able to install chargers at their city offices and parks.
- South Jordan City is applying for West Smart EV funding to initiate EV charging installations.

State Fleet Efforts & Support

Over the last several years, State Fleet has increased adoption of electric vehicles with the help of telematics (technology outlined below). Currently, State Fleet has 8,534 vehicles, of which 608 are hybrid and all-electric vehicles. As with personal EV owners, the lack of EV infrastructure across the entire state has limited the full potential of EVs within the Fleet. In order to increase driver confidence in both State employees and the public alike, Fleet has supported the EV expansion effort as a new sector in fuel for the State.

State Fleet continues to convert vehicles to lower emission vehicles. Since June 2018, Fleet has 608 hybrid and all-electric vehicles with the hopes of continued infiltration as the EV infrastructure continues to expand.

Telematics

State Fleet completed a one-year pilot to view possible seasonal variations in travel patterns and vehicle usage. As of June 2018, one-fourth of all State Fleet vehicles have telematics units installed. This Smart technology is designed to allow agencies to implement driver parameters that promote increased driver safety and improved fuel efficiency that lead to decreased fuel emissions. In particular, for this project telematics allows for agencies to see which of their vehicles are best suited to be converted to an electric model (i.e. short trips and city-travel).

State Contracts Available

Five EV vendors are now available under State contract. Contract availability for EVs streamlines support of the Governor's involvement of the regional EV Corridor, improves cost efficiency for participating agencies, and provides a more uniform user experience as a whole. For a full list of vendors and detail access, see Appendix C.

Phased Implementation

Over the course of five years, a three-phase implementation program will go into effect. Each phase of the program expands upon existing infrastructure. Cost of implementation and challenge of install increases with each phase. The goal is that by the third phase of the program, the State EV charging network will be realized in rural communities providing connections to complete electrified transportation throughout the state. Throughout the planning process the state EV mapping platform, state park visitation data, and site-specific analyses will be evaluated to determine the most economic development strategies.

Phase 1 - Completed

- Through the FY20 State of Utah EVSE project, installation of charging stations across the state will be completed as of June 30, 2020.
- Goals of the Project:
  - Connection to the major corridors (I-15, 70, 80, 84) for continued enhancement of the existing Alternative Fuels Corridor.
  - Installation Locations Characteristics:
    - State-owned facilities within the non-attainment zones for PM2.5 and ozone
    - State-owned facilities optimal for transition of EVs and plug-in hybrids
    - Areas near major freeways/interstates
    - Low construction requirements
- Level 2 charger installation.
- See for a full site list summary.

Phase 2 – In Progress

- See for the *Utah Department of Transportation Rural EVSE Expansion* project summary
- Installation Locations Characteristics:
  - State Parks
  - Areas of high entertainment
  - Accessibility to electricity on site
- Level 2 and Level 3 charger installation.

Phase 3 – In Progress

- Chargers will be suggested in rural communities that would provide high benefit and are considered necessary to state-wide EV travel
- Location Characteristics:
    - Outlined in HB0259
    - Strategic locations determined by the department [Utah Department of Transportation] by June 30, 2021
    - Incremental distances no greater than every 50 miles along the state's interstate highway system by December 31, 2025
    - Along other major highways within the state as the department [Utah Department of Transportation] finds appropriate
- Level 3 charger installation.

Funding Opportunities

Rocky Mountain Power WestSmart EV Grant

Rocky Mountain Power incentives are offered to Utah non-residential customers and multifamily dwellings to offset the cost of installing charging stations. Funds are limited and are available on a first-come, first-served basis:

- Non-residential & multifamily AC Level 2 Charger
    - Single port
        - $1,000 per charger up to 75% of total charger cost
    - Multi-port
        - $1,500 per charger up to 75% of total charger cost
- Non-residential & multifamily DC Fast Charger
    - Single port
        - $30,000 per charger up to 75% of total charger and installation costs
    - Multi-port
        - $42,000 per charger up to 75% of total charger and installation costs
- Non-residential & multifamily grant-based custom projects
    - Custom incentives

For additional information, visit: https://www.rockymountainpower.net/savings-energy-choices/electric-vehicles/utah-incentives.html

*DAQ: EVSE Incentive Program**

The EVSE incentive Program, managed by the Division of Air Quality (DAQ) in the Department of Environmental Quality (DEQ), allows businesses, non-profit organizations, and other governmental entities (excluding State Executive Branch agencies) to apply for a grant for reimbursement of up to 50% of the purchase and installation costs for a pre-approved EVSE project. Funds can be used for the purchase and installation of both Level 2 or DC fast charging EVSE. The program began accepting applications on September 16, 2019. For additional information, visit: https://deq.utah.gov/air-quality/workplace-electric-vehicle-charging-funding-assistance-program[1]

Eligible entities include:

1. Registered businesses that have a business license from the State of Utah,
2. Non-profit entities (as defined in Title 26 US Code Section 501(c)) from the State of Utah, or

*As a result of the economic impact of the COVID-19 pandemic, the program is currently suspended; however, plans are currently in place to continue the program after July 1, 2020.

3. A government entity from Utah, such as local governments or higher education institutions. Agencies within the Executive Branch of the State are excluded from participating in this program.

Equipment that is eligible to be covered by grant funds include light-duty EVSE, both Level 2 and DC fast charging EVSE. Eligible entities may receive reimbursement for EVSE costs and some costs association with EVSE installation.

Costs that will not be eligible for reimbursement includes operational, warranty, cloud service or networking, permit fees, bonds, engineering and design, real estate purchases or rent for EVSE, capital costs (construction of building, parking facilities, etc), or general maintenance

For businesses and non-profit organizations, 50% of the cost to purchase and install eligible light-duty EVSE with a $75,000 maximum reimbursable amount for businesses and non-profit organizations. For government entity-owned property, 50% of the cost to purchase and install eligible light-duty EVSE with a maximum level to be determined by DAQ.

EVSE project shall be completed and fully operational on or before two years from the approval date of the preliminary application.

Electrify America

Electrify America is a private company formed in 2016. Its stated purpose is to promote greater Zero-Emission Vehicle adoption by investing $2 billion in fast charging EV infrastructure, access and education programs in the United States. Eight EV charging stations have been installed along interstates 15 and 70, and another two will be installed along interstate 70 as part of its current investment cycle. Varying levels of charger outputs will be installed at these locations and will be dependent on economic feasibility and public usage. The locations are determined based on business partnerships and are intended to establish a convenient national charging network. For additional information, visit: https://www.electrifyamerica.com/submissions

UCAIR Grant

The goal of the UCAIR Grants Program is to reduce emissions of criteria pollutants that cause Utah's poor air quality. The recurring grant can be up to $60,000. For additional information, visit: https://www.ucair.org/grants/

Partner Funding

For many locations in Utah, particularly in the rural community areas, partnership development will be crucial for the success of the program. Partnership recommendations are preferable

when both organizations provide a matching contribution to the project at hand. A MOU or other formal agreement is also strongly recommended.

Partnership Development

City & County Governments

In areas that show significant benefits to expanding the EV infrastructure along major corridors and/or for State Fleet usage, the State can provide a matching program if funds are available and can provide similar application assistance as provided with State agencies that utilize this Master Plan as well.

Non-Profit: Utah Clean Cities

Utah Clean Cities Coalition (UCCC), formerly Salt Lake Clean Cities, was the 16th coalition in the nation to join the U.S. Department of Energy's (DOE) Clean Cities Program in 1994. Today it is one of nearly 100 coalitions across the country that is part of the U.S. DOE's Vehicle Technologies Program, "a program designed to reduce the U.S. import and overall consumption of petroleum". Since its establishment, UCCC has grown into a statewide, 501(c)3 nonprofit with a robust network that spans Utah and the nation.

Membership is required to gain access to:
- program grants
- strategic planning tools
- event and campaign partnerships
- school curriculum materials
- incentives

For more information, please visit: http://utahcleancities.org/electricity/#/find/nearest?fuel=HY

Private Business

Particularly in areas of rural development, the State would be happy to develop partnerships with community businesses. Cost matching will be required for projects between private entities and the State of Utah.

State Government

The State of Utah is open to developing partnerships with bordering states as it continues to support the Governor's efforts on the REV West initiative. Particular areas of interest include state locations running along the major corridors, as well as areas along state and federal designated byways.

Application Management

The State EV Expansion Committee, along with Fleet EV Expansion Committee, are available to answer questions on the various grant applications outlined in this document. Each agency will be responsible for submitting their own application. This document is designed to help guide EV development across Utah in an efficient and unified manner so that the developing EV infrastructure can be accessed by the greatest number of EV users across the State as a whole.

Site Assessment Considerations

To begin site assessments, below is a checklist of some of the top characteristics to consider when looking to install a charging station at your desired location:

Table 2: Site Assessment Checklist

| Did you...	Completed
Consider the charging needs of your intended audience (how long do EV users stay in/around your facility)?	☐
Dedicate a circuit for each EVSE unit on the electrical panel (needed in most cases)?	☐
Verify you have sufficient electrical capacity from the utility connection to the electrical panel?	☐
Decide if you want your chargers network connected or not? The network allows for retrieval of usage data.	☐
Make sure that your data connection is strong enough to support network operation?	☐
Ensure that selected stalls for install are ADA compliant?	☐
Consider signage for EV-designated stalls?	☐
Design for future expansion of the system?	☐
Place conduit for future expansion or require additional conduit on all future builds?	☐
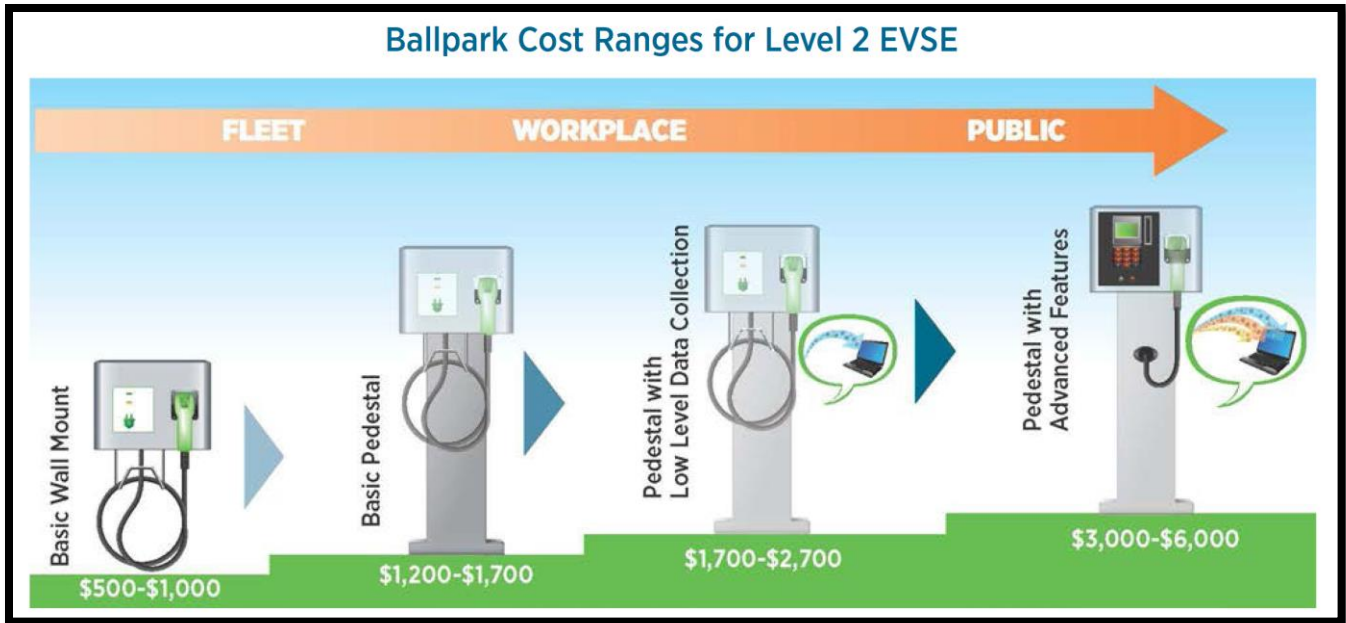
Figure 9
Ballpark cost ranges for different tiers of Level 2 EVSE units.
Image from Kristina Riverbark, New West Technologies

EVSE Type	Average Installation Cost (per unit)	Installation Cost Range (per unit)
Level 2	-$3,000 EV Project (INL 2015b)	$600-$12,700 EV Project (INL 2015b)
DCFC	-$21,000 EV Project (INL 2015d)	$4,000-$51,000 EV Project (INL 2015d) and (OUC 2014)

Ballpark EVSE Installation Costs

Figure 10
Image edited from Kristina Riverbark, New West Technologies

EVSE installation costs are highly variable and are difficult to compare from one site to another. For more specifics on site selection, and other EVSE information, visit:
https://www.afdc.energy.gov/uploads/publication/evse_cost_report_2015.pdf

On-Going Cost Considerations

Non-Networked vs Networked Chargers

Non-networked, also known as "dumb", chargers mean that the charging unit is not connected to the internet. By selecting a non-networked charger, you are providing free charging to those that use the unit. There is no monitoring, or fee application available. They can also not be remotely managed. There are no on-going costs associated with these models, other than energy usage that occurs from users using the unit and are usually the "best" fit for residential units and small businesses that simply want EV charging available on-site.

Networked, also known as "smart", chargers mean that the charging unit is connected to the internet and contain hardware and software which makes remote management possible. Managed stations can be electronically monitored, observed, diagnosed and reset remotely. They also provide driver support (access to customer service if the user has difficulty using the unit). By selecting a networked charger, you can accept payment from the user for energy used while charging. By using a networked charger, you can gain usage data (i.e. length of charging session, time of charge, stall turnover, energy consumption, etc.).

To enable networking, an additional plan must be purchased in addition to the purchase of the charging unit itself. These costs are significant and should be considered in the budget of the program. Some plans are also per charging head. For example, if you have one dual-port charging unit, you may have to pay for two data plans.
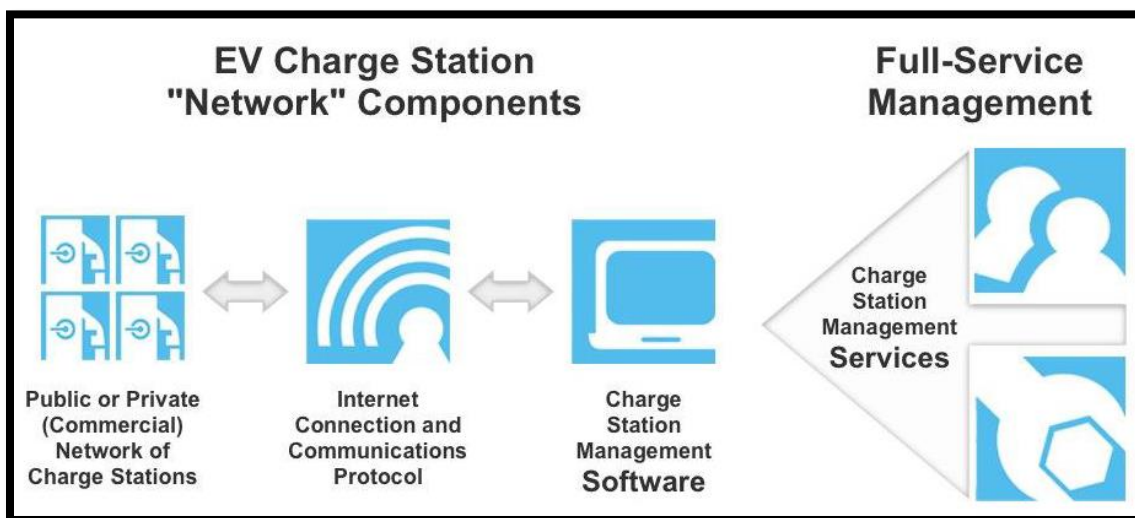

Figure 11
Functional Components of an EV Charging Station Network
Image from EV Connect, Inc.: http://www.evconnect.com/wp-content/uploads/2018/05/6-Questions-You-Should-Ask-EV-Connect-18.pdf

Operation & Maintenance (O&M)

Maintenance needs vary by the types of chargers. Non-networked chargers, in particular Levels 1 and 2, require little regular maintenance. Non-networked chargers, "are typically modular in design, so any malfunctioning components can be replaced separately rather than replacing an entire unit."[5] Networked chargers, on the other hand, can require more periodic maintenance due to the additional software and communication equipment installed in the unit. "The most common issue with these is wear on the pins in the connector due to frequent use which may eventually not make a good connection and need to be replaced."[5]

Maintenance plans and extended warranties for your EV chargers can be added at an additional cost. A maintenance plan can help ensure that the stations you have installed are always in operation. If one does fall out of service, the plans often include maintenance service that is sent out to fix the unit.

Appendix A

Map Modeling

Various mapping tools were developed and/or enhanced by UDOT to help aid in the site selection for this project, and combined to help ease site selection for entities interested in installing EV infrastructure. These map sets will continue to be maintained and expanded upon in the upcoming years of the Master Plan. To view any or all of the listed layers available below, please visit:

http://uplan.maps.arcgis.com/apps/Cascade/index.html?appid=f4c96f6e586746ada05f2223aae963dc

- General EV Master Plan Mapping Tools Including:
    - Current Level 2 & Level 3 Charger Locations
    - Completed and Proposed EV Charging Locations for each Phase
    - State Fuel Site Locations
    - State Facility Locations
    - Utah Electric Service Areas
    - State and Federal Scenic Byway Designations
    - State and National Park Locations

Appendix B

Telematics

Smart technology designed to allow agencies to implement driver parameters that promote increased driver safety and improved fuel efficiency that lead to decreased fuel emissions.

GeoTab: SmartCities

A Smart City is defined as "an urban development vision to integrate information and communication technology (ICT) and Internet of things (IoT) technology in a secure fashion to manage a city's assets." "…Smart City initiatives can involve a varying degree of technology implementation. Everything from a simple public-facing downtown development map to a complicated deployment of Bluetooth sensors to track traffic patterns. In almost every case, however, sensor data is critical to an effective Smart City strategy".[6]

For additional information, visit: https://www.geotab.com/smart-city-insights/

Appendix C

State of Utah Contracts

In 2018, five vendors entered into cooperative contracts with the State of Utah which can be utilized by all public entities (i.e. schools, local government, etc.). These vendors include:

Contract ID	Contract Name	Contractor Name	End Date	
AR2842	Chargepoint Electrical Vehicle Charging Station Equipment And Supplies	VERDEK LLC	3/31/2023	View Details
AR2841	Chargepoint Electrical Vehicle Charging Station Equipment And Supplies	NATIONAL CAR CHARGING LLC	3/31/2023	View Details
AR2843	Chargepoint Electrical Vehicle Charging Station Equipment And Supplies	VIDEO VOICE DATA COMMUNICATIONS (VVDC)	3/31/2023	View Details
AR2840	Chargepoint Electrical Vehicle Charging Station Equipment And Supplies	LILYPAD EV LLC	3/31/2023	View Details
AR2839	Chargepoint Electrical Vehicle Charging Station Equipment And Supplies	THE ELECTRIC HIGHWAY CO	3/31/2023	View Details

To view the EVSE State Cooperative Contracts, as well as other State Contracts, please visit: https://statecontracts.utah.gov/Home/Search

Frequently Asked Questions (FAQ's)

For Drivers:

Q: What's the difference between a hybrid and an electric vehicle?

A: A conventional hybrid vehicle refers to one which has both a gasoline engine and an electric motor. Hybrid vehicles cannot charge off of Level 3, or DC Fast Charging (also known as DCFC).

An electric vehicle runs solely on an electric motor and requires no additional fuel for power, but instead, stores its energy in on-board battery systems.

For more information, visit: https://blog.ucsusa.org/josh-goldman/comparing-electric-vehicles-hybrid-vs-bev-vs-phev-vs-fcev-411

Q: What is the difference between a level 1, level 2, and level 3 (DC Fast) charger?

A: Please see below for basic differences between charging levels. For more information visit:
https://www.afdc.energy.gov/uploads/publication/evse_cost_report_2015.pdf

Charging Level	Vehicle Range Added per Charging Time and Power	Supply Power
AC Level 1	4 mi/hour @ 1.4kW 6 mi/hour @ 1.9kW	120VAC/20A *(12-16A continuous)*
AC Level 2	10 mi/hour @ 3.4kW 20 mi/hour @ 6.6kW 60 mi/hour @ 19.2 kW	208/240VAC/20-100A *(16-80A continuous)*
DC Fast Charging	24 mi/20minutes @24kW 50 mi/20minutes @50kW 90 mi/20minutes @90kW	208/480VAC 3-phase *(input current proportional to output power; ~20-400A AC)*

Q: How will I know when I need to charge the vehicle?

A: Each EV model has its own notification system, but most models have a charging gauge that looks very similar, and acts similarly to a gas gauge on the vehicle dashboard.

Q: Can I overcharge the battery?

A: No, the charging station will automatically shut off once the battery system in the EV has been fully charged.

Q: How do I know where to charge?

A: There are many information sources available. Many newer models come with an EV charger locator application already installed in the vehicle. You can also view available chargers in your community by visiting PlugShare (https://www.plugshare.com/).

Q: Will State of Utah chargers work for all EVs?

A: Yes. All electric cars in Canada and in the US can charge using this plug, even Tesla cars as they come with an adapter. The J1772 connector is only available for level 1 and 2 charging (visit https://chargehub.com/en/electric-car-charging-guide.html#charginglevels for more information). For Tesla vehicles, an adapter is required which comes with the purchase of the Tesla. An additional charging adapter can be purchased online to use for CHAdeMO DC fast charging (visit https://www.chargepoint.com/index.php/drivers/join/tesla for more information).

For Building Managers:

Q: Who is responsible for maintenance and/or replacement of parts of the EV charger?
A: If chargers are purchased under State contract, operations and maintenance is covered by the contract and managed by the EVSE manufacturer.

Q: Are people allowed to stay parking in a stall once their vehicle has completed charging?
A: That is a decision up to those installing the chargers. Common practice is to add signage at each EV stall and only allow charging EVs to park there.

Q: Who do we contact if there is a problem with the EV charger?
A: If you have a problem with your EV charger, contact the phone number provided by the manufacturer. If purchased under State contract, service should be provided within 24 hours.

Q: How do you decide where to install an EV charger?
A: Please refer to "Site Assessment Checklist" on page 18. Or visit:
https://www.afdc.energy.gov/uploads/publication/evse_cost_report_2015.pdf

Q: What type of EV charger should you install?
A: It depends on several factors, how much funding you have available for the project, energy availability, and audience characteristics. Think of how people typically use the parking site that you are considering; are they there for 30 minutes or less, or for several hours (4 +). If in the shorter time range (less than 1 hour) a DC fast charger would be

the most beneficial, but if parking times are typically longer, then a Level 2, or even Level 1 could be beneficial. For more information on charging selection, visit: https://www.afdc.energy.gov/uploads/publication/evse_cost_report_2015.pdf

Q: Who is responsible for collecting/maintaining data gathered from EV chargers?
A: If your EVSE is a "smart charger" and connected with a network, then the manufacturer will provide an account to which you can access usage data from the chargers. If they are not connected to a network, then there is limited or no data that can be pulled from the units.

For Administrators:

Q: Who pays for the energy used at the changing station?

A: Whoever pays the electrical bill. If you choose to allow payment for power used at your charger, then you can have the individual who is charging their car pay for the energy. In this situation, the facility would receive a credit on their bill for this energy cost.

Q: Does the public have to pay to utilize a charging station at a State facility?

A: Currently, no State facility requires payment for any of the EV charging stations.

Q: Do we have to reimburse drivers that charge their personal electric vehicles while on work duty?

A: No.

Q: Who is responsible for the costs of maintenance and repair (who is billed)?

A: The owner of the charging station.

Q: How much does it cost to install an EV charger?

A: The average cost of an EVSE install ranges from:

- Level 1 $300-$1,500
- Level 2 $400-$6,500
- DCFC $10,000-$40,000

For more information, visit:
https://www.afdc.energy.gov/uploads/publication/evse_cost_report_2015.pdf

Q: Is there a State contract for EV chargers?

A: Yes, please refer to Appendix C of this report for further details.

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Sources

1. "All-Electric Vehicles." *Fuel Economy*, www.fueleconomy.gov/feg/evtech.shtml.
2. "Autos Drive Utah Forward." *Alliance of Automobile Manufacturers*, www.autoalliance.org/in-your-state/UT/.
3. "Area Designations: PM2.5 State Implementation Plan Development." *Utah Department of Environmental Quality*, www.deq.utah.gov/legacy/pollutants/p/particulate-matter/pm25/areas.htm.
4. "Rocky Mountain Power, Summit County and Salt Lake City Partner with Uber and Lyft to Reduce Emissions." *Glossary of Electrical Terms*, Rocky Mountain Power, 17 Jan. 2018, www.rockymountainpower.net/about/nr/nr2018/electric-vehicle-charging-station-summit-county.html.
5. Deploying EV Charging infrastructure: What Site Hosts Need to Know (2018). Retrieved from https://www.sccgov.org/sites/dnz/Documents/Task4B-Deploying-EV-Charging-Infrastructure.pdf
6. "Data-Driven Smart City Insights - Geotab." *Geotab Blog*, www.geotab.com/smart-city-insights/.