



South Dakota Electric Vehicle Infrastructure Deployment Plan



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Office of Energy and
Transportation

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Contents

Executive Summary	ES-1
1. Introduction	1
1.1. Plan Development	1
2. State Agency Coordination	3
3. Public Engagement.....	4
3.1. Stakeholders Involved in Plan Development	4
3.1.1. Study Advisory Team	5
3.1.2. Charging Equipment Suppliers	6
3.1.3. Utility Providers	7
3.1.4. Tribal Nations	8
3.2. Public Outreach	9
3.2.1. Open House Public Meetings	9
3.2.2. Virtual Meeting.....	11
3.2.3. Social and Traditional Media Feedback	11
3.2.4. Public Engagement Survey Results	11
3.2.5. Additional Feedback Received.....	13
4. Plan Vision and Goals.....	14
5. Contracting	16
6. Existing and Future Conditions Analysis	18
6.1. EV Adoption and Usage	19
6.2. State Geography, Terrain, Climate and Land Use Patterns.....	22
6.3. State Travel Patterns, Public Transportation Needs, Freight and Other Supply Chain Needs	25
6.3.1. Travel Characteristics of South Dakota Residents	25
6.3.2. Freight Movements	27
6.3.3. Tourism Traffic.....	28
6.3.4. Public Transportation	29
6.4. AFC - Corridor Networks.....	30
6.5. Existing Locations of Charging Infrastructure Along AFCs	32
6.6. Known Risks and Challenges.....	33
6.6.1. Challenge #1: Attracting Private Interest Due to Return on Investment	33
6.6.2. Challenge #2: Impact of Peak Demand Charges on Profitability.....	35
6.6.3. Challenge #3: Creating Opportunities for Small or Disadvantaged Business	37
6.6.4. Challenge #4: Geographic Diversification Post-Interstate Build-Out	38
7. EV Charging Infrastructure Deployment.....	38
7.1. Funding Sources	41
7.2. 2022 Infrastructure Deployments/Upgrades.....	41
7.3. Electric Vehicle Freight Considerations	41



- 7.4. Public Transportation Considerations..... 41
- 7.5. FY23-26 Infrastructure Deployments..... 42
- 7.6. State, Regional, and Local Policy..... 42
- 8. Implementation..... 42**
 - 8.1. Strategies for EVSE Operations & Maintenance 43
 - 8.2. Strategies for Identifying Electric Vehicle Charger Service Providers and Station Owners 43
 - 8.3. Strategies for EVSE Data Collection & Sharing 46
 - 8.4. Strategies to Address Resilience, Emergency Evacuation, Snow Removal/Seasonal Needs 46
 - 8.5. Strategies to Promote Strong Labor, Safety, Training, and Installation Standards 46
 - 8.6. Charger Types 47
 - 8.7. Potential Site Layouts 47
- 9. Civil Rights..... 51**
- 10. Equity Considerations..... 52**
 - 10.1. Identification and Outreach to DACs in the State 53
 - 10.2. Process to Identify, Quantify, and Measure Benefits to DACs 54
 - 10.3. Benefits to DACs through this Plan 55
 - 10.3.1. Estimating Benefits due to Supporting Tourism with EVs..... 55
 - 10.3.2. Estimating Benefits Associated with Commuting Trips by Residents of DACs 57
- 11. Labor and Workforce..... 59**
- 12. Cybersecurity 61**
- 13. Program Evaluation 62**
- 14. Discretionary Exceptions..... 63**

Figures

- Figure 1. Steps Conducted to Develop the Plan2
- Figure 2. Stakeholders Involved in the Plan Development5
- Figure 3. Study Advisory Team Supporting the Plan Development6
- Figure 4. Utility Service Providers Along Designated AFCs8
- Figure 5. Proposed Upper Midwest Inter-Tribal Electronic Vehicle (EV) Charging Community Network.....9
- Figure 6. Open House #1, Rapid City 10
- Figure 7. Open House #2, Sioux Falls.....10
- Figure 8. Landing Page for Virtual Meeting 11
- Figure 9. Geographic Dispersion of Survey Respondents 12
- Figure 10. Percentage of Survey Respondents Indicating the Amenity Was Very Important..... 13
- Figure 11. Population Centers in South Dakota..... 19
- Figure 12. Registrations by Vehicle Type in 2021 19
- Figure 13. Projected Growth of Passenger EV Registrations Under Low-, Medium-, and High-Growth Scenarios21



Figure 14. Projected Number of EVs Entering South Dakota from Nearby States Annually (2022-2026)22

Figure 15. Estimated EV Average Daily Traffic (ADT) Volumes at Potential EV DCFC Infrastructure Locations
(July 2023 and 2026) 23

Figure 16. Average Annual Daily Non-Commercial Vehicle Volumes26

Figure 17. In-State Travel Patterns26

Figure 18. Annual Average Daily Truck Volumes27

Figure 19. South Dakota Tourist Attractions28

Figure 20. Monthly Traffic Variation on I-90 Due to Elevated Numbers of Tourism Traffic29

Figure 21. Designated Alternative Fuel Corridor EV Pending Corridors31

Figure 22. Existing and Planned EV Charging Infrastructure Locations32

Figure 23. July 2023 Estimated Daily EV Volumes at Potential EV DCFC infrastructure Locations with Various
Levels of Utilization 34

Figure 24. July 2026 Estimated Daily EV Volumes at Potential EV DCFC infrastructure Locations with Various
Levels of Utilization 34

Figure 25. EV DCFC infrastructure Minimum of 13 New Locations to Meet the NEVI Program Distance
Requirements, for a Total of 14 Locations.....39

Figure 26. Alternative EV DCFC infrastructure Locations on AFCs.....40

Figure 27. SDDOT Division Director for Planning and Engineering Mike Behm and Christine Erickson
Director of the South Dakota Automobile Dealers Association discussing the SD EV
Infrastructure Deployment Plan with the South Dakota Automobile Dealers Association
Members (June 2022) 44

Figure 28. Basic Site Layout with Dimensions.....48

Figure 29. Potential EV DCFC Infrastructure Layout at a Travel Plaza, or Strip Mall.....49

Figure 30. Potential EV DCFC Infrastructure Layout at a Large Commercial Box Store49

Figure 31. Potential EV DCFC Infrastructure Layout at a Refueling Station50

Figure 32. Potential EV DCFC Infrastructure Layout for a Standalone Location50

Figure 33. Illustration of EV DCFC Infrastructure Distributed Across Multiple Sites for a Given Interstate
Interchange. 51

Figure 34. DACs in South Dakota as Defined by FHWA’s Interim Guidance53

Figure 35. Transportation Priorities that Should Receive the Most Emphasis.....55

Figure 36. Estimated Tourism Revenue by County, January 1 through April 30, 2022.....56

Figure 37. Estimated Benefits for the Rapid City DAC Based Upon EV Tourism57



Tables

Table 1. Milestones for Plan Development and Implementation 1
 Table 2. Most Important Factors when Considering Locations for Public Fast Charging Infrastructure 12
 Table 3. Draft Goals of the South Dakota Electric Vehicle Infrastructure Deployment Plan 15
 Table 4. EV DCFC Infrastructure Funded Through Two Rounds of the South Dakota EVCS Program 33
 Table 5. Impact of Assessed Electricity Demand Charges on Profitability of EV Locations, 76 Charging
 Sessions per Location for 30 Days 36
 Table 6. Impact of Assessed Electricity Demand Charges on Profitability of EV Locations, 4 Charging
 Sessions per Location for 30 Days 37
 Table 7. Recommended Scoring Criteria and Associated Weights 45
 Table 8. Cybersecurity Concepts for Applicants of NEVI Program Funding 62
 Table 9. State Plan Performance Measures 63

The South Dakota Department of Transportation provides services without regard to race, color, gender, religion, national origin, age or disability, according to the provisions contained in SDCL 20-13, Title VI of the Civil Rights Act of 1964, the Rehabilitation Act of 1973, as amended, the Americans with Disabilities Act of 1990 and Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, 1994. Any person who has questions concerning this policy or who believes he or she has been discriminated against should contact the Department’s Civil Rights Office at 605-773-3540.



Acronyms

°F	Degrees Fahrenheit
AA	Affirmative Action
AADT	Annual average daily traffic
ADA	Americans with Disabilities Act
AFC	Alternative Fuel Corridor
AFV	Alternative fuel vehicle
API	Application programming interface
BES	Bulk Electric System
CCS	Combined Charging System
CIP	Critical Infrastructure Protection
CVSS	Common Vulnerability Scoring System
DAC	Disadvantaged Communities
DBE	Disadvantaged Business Enterprises
DC	Direct Current
DCFC	Direct Current Fast Charger
DFA	Warm-summer humid continental climate
DFB	Hot-summer humid continental climate
DOE	U.S. Department of Energy
DOT	Department of Transportation
EEO	Equal Employment Opportunity
EV	Electric Vehicle
EVCS	Electric Vehicle Charging Station
EVITP	Electric Vehicle Infrastructure Training Program
EVSE	Electric Vehicle Supply Equipment
FAQ	Frequently Asked Questions
FHWA	Federal Highway Administration
FY	Federal fiscal year
GDP	Gross Domestic Product
IDS	Intrusion Detection Systems
IIJA	Infrastructure Investment and Jobs Act, Public Law 117-58
IoT	Internet of Things
IPS	Intrusion Prevention Systems
ISCM	Information Security Continuous Monitoring
IT	Information Technology
kW	Kilowatt
mpg	Miles per gallon
MPO	Metropolitan Planning Organization



NEPA	National Environmental Policy Act
NERC	North American Electric Reliability Corporation
NEVI	National Electric Vehicle Infrastructure
NIST	National Institute of Standards and Technology
NPRM	Notice of Proposed Rulemaking
OCPD	Open charge-point protocol
P3	Public private partnership
QPL	Qualified Product List
RFI	Request for Information
SAT	Study Advisory Team
SDDOT	South Dakota Department of Transportation
SDCL	South Dakota Codified Law
SIEM	Security Information and Event Management
SOC	State of charge
STIP	Statewide Transportation Improvement Program
SUV	Sports utility vehicle



Executive Summary

The Infrastructure Investment and Jobs Act, Public Law 117-58 (Nov. 15, 2021) (IIJA) provides funding for the National Electric Vehicle Infrastructure Formula Program (NEVI Program). Under this program, South Dakota is set to receive \$29 million in funding over the course of the next five years. However, to receive these funds, South Dakota Department of Transportation (SDDOT) is required to develop a statewide plan that provides details on how the funds will be used, the expected deployment strategies, and other factors provided in subsequent guidance documents issued by the Joint Office on Energy and Transportation (Joint Office). This document represents SDDOT's required plan, following the template developed and issued by the Joint Office.

Currently, there is a very low adoption of electric vehicles (EV) in South Dakota. In 2022, there are only 1,429 EV passenger vehicles in the State, which represents 0.12% of all State passenger vehicle registrations. This rate is expected to grow over the next decade as new EVs are introduced into the market, although the adoption of EVs in South Dakota will likely remain relatively low compared to the national average and States with a denser population base. By 2026, the number of registered EVs in the State is expected to reach 22,000 passenger vehicles or 0.56% of all passenger vehicle registrations. In short, while there is no doubt that there will be national build-out and adoption of EVs over the next several years, adoption in South Dakota will likely lag behind the national curve and remain relatively modest even under the most aggressive growth projections.

Electric vehicle adoption in South Dakota is low and expected to remain relatively low for the next several years

South Dakota has the third lowest number of EVs among all States in the U.S. having only 1,429 registered EVs in the State representing 0.12% of all registered passenger vehicles, SUVs, vans, and light-duty trucks. Even under an aggressive growth projection, registered EVs in South Dakota are not expected to be more than 0.56% of all State passenger vehicle, SUV, vans, and light-duty trucks registered in 2026.

South Dakota has four designated Alternative Fuel Corridors (AFC) consisting of Interstate 29 (I-29), Interstate 90 (I-90), Interstate 229 (I-229), and Interstate 190 (I-190). Per the IIJA and NEVI Program guidelines, build-out of these corridors, until they can be designated by the Federal Highway Administration (FHWA) as "EV Corridor Ready," is required before NEVI Program funds can be used in other locations. The NEVI Program requirements include a "not to exceed" spacing requirement of 50 miles between EV Direct Current Fast Charging (DCFC) infrastructure locations and the requirement that the EV DCFC infrastructure be placed within one travel mile of the Interstate exchange. Installation of EV DCFC infrastructure at Interstate rest-areas and welcome centers that generate revenue is currently prohibited by Federal law, so all EV DCFC infrastructure is expected to be installed on private property at various Interstate interchanges. Based upon the NEVI Program requirements, SDDOT has determined that a minimum of 13 additional EV DCFC infrastructure locations will be needed to achieve the EV Corridor



Ready designation for the four Interstate corridors in South Dakota. As part of this plan development, SDDOT engaged with South Dakota utility providers who provide service along the four Interstate corridors to specifically investigate the feasibility and ability of the utilities to provide electrical service at over 45 potential locations. With relatively few exceptions, the utilities have indicated that under normal operating conditions the electrical grid in South Dakota can support the expected equipment and charging infrastructure.

Provided this plan is approved by the Joint Office, approximately \$4 million in NEVI Program funding would become available to SDDOT annually in FY22 and subsequent years. SDDOT anticipates developing a specific grant program that will be used to administer the NEVI Program funds to applicants who desire to deploy EV DCFC infrastructure at one or more of the Interstate locations. Applicants will be required to provide the requisite 20% in matching funds, as well as adhere to other State and Federal requirements, such as data reporting, compliance with the Americans with Disabilities Act (ADA), operating and maintaining the equipment for at least a five-year period, and other requirements. Given the anticipated low adoption rate for EVs in South Dakota, the need to develop a new grant program within the State, detailed requirements, and contractual agreements, SDDOT anticipates that the first NEVI Program-funded fast chargers will be installed no sooner than FY24.

Following the completion of the required Interstate build-out, SDDOT will utilize the remaining funds from the NEVI Program to install EV DCFC infrastructure in locations throughout the remainder of the State. Several different potential strategies have been identified and are included in this plan to guide the placement of these off-Interstate EV DCFC infrastructure elements. SDDOT intends to gather additional usage and EV adoption information over the next several years and use this information to guide future non-Interstate deployments, provided funding is available.

Core elements of the South Dakota EV Infrastructure Deployment Plan

SDDOT estimates that a minimum of 13 additional EV DCFC infrastructure locations will be needed to achieve “EV Corridor Ready” status on the four AFCs (Interstates) in the State. Infrastructure is expected to be installed at locations along the Interstates no sooner than FY24, which will allow for a measured and thoughtful approach for implementation. Following the completion of the Interstate build-out, additional locations on non-AFCs will be deployed based upon funding availability and private sector interest. No State highway funds will be used for meeting the 20% matching requirement. The 20% match will be met by the private sector who will be awarded grants corresponding to the 80% Federal NEVI Program funds under a competitive grant application process.

There are significant challenges facing the adoption of EVs and the deployment of EV DCFC infrastructure within South Dakota. Weather and the extended distances between population centers in South Dakota will certainly impact EV adoption and performance. Extremely cold temperatures have been demonstrated to reduce the effective range and extend the charging time of EVs by 40 to 50%. As new battery technologies become available, they will mitigate many of these issues. However, these



breakthroughs are not generally expected to be available in vehicles on the market within the NEVI Program deployment timeline of FY22 to FY26. As such, adoption of EVs in South Dakota and use of EVs by tourists visiting South Dakota are expected to remain low. This low adoption rate directly translates into relatively low estimates of the expected usage of the EV DCFC infrastructure to be deployed in South Dakota under the NEVI Program, which results in the four challenges facing this deployment:

- › **Challenge 1: Attracting Private Investment.** SDDOT does not intend to use State highway funds for meeting the 20% matching requirement of the NEVI Program to cover the expected \$140,000 to \$240,000 in capital costs needed to install a NEVI Program-compliant EV DCFC infrastructure location. Matching funds will need to be provided by private organizations. With the low usage rates, the return-on-investment may not be sufficient to generate interest from the private sector. SDDOT proposes to vary the relative matching requirements by location, while maintaining the overall 20%/80% required by the NEVI Program. This approach will enhance the attractiveness to private industry for the more rural locations in South Dakota.
- › **Challenge 2: South Dakota Utility Peak Demand Charges Significantly Impact Profitability.** Currently in South Dakota, a monthly peak demand charge is assessed by the utility for each commercial customer based on the 15-minute average of peak load of energy provided to that customer during the month. To be compliant with the NEVI Program, four 150 kilowatt (kW) chargers capable of simultaneous charging need to be installed. This represents a potential of 600kW in peak demand for a given location if all four chargers are used simultaneously. At the anticipated low usage rates, this peak demand charge has a major impact on the per-session charging costs of the electricity to the EV DCFC infrastructure owner/operator. Higher demand charges will potentially reduce or negate profitability, thus reducing interest in participation by businesses in this program.
- › **Challenge 3: Creating Opportunities for Small or Disadvantaged Businesses.** Each EV DCFC infrastructure location is estimated to represent roughly \$1 million in capital costs. Although the NEVI Program will cover 80% of the costs, the remaining 20% may be too large for a small and/or disadvantaged business to meet, especially with the anticipated low usage for the first several years. SDDOT intends to meet the NEVI Program requirements but allow for the four 150kW EV DCFC infrastructure to potentially be physically separated and located at different establishments at a given Interstate location. Splitting the four chargers across businesses has the potential of reducing the investment needed by a single business that wishes to have an EV DCFC infrastructure installed at its location and will increase resiliency and redundancy within the network.
- › **Challenge #4. Geographic Diversification Post-Interstate Build-Out.** Similar to EV DCFC infrastructure locations along Interstate corridors, usage in the coming years will be a challenge when deploying additional EV DCFC infrastructure locations along trunk highways. Post Interstate build-out, SDDOT intends to “right-size” the number and power output of EV DCFC infrastructure based upon estimated usage to maximize geographic coverage throughout the State. The purpose of adopting this approach is to create broader geographic coverage in lieu of deploying a very small number of NEVI Program-compliant locations with four 150kW charging dispensers.



There are very real, and significant challenges to deployment of the required NEVI Program-compliant charging locations in South Dakota

EV adoption and therefore usage of EVs within the State are expected to remain low for the next five years. This low adoption and usage within the State may make the return-on-investment unattractive to the private sector, who the SDDOT is relying upon to meet the 20% matching requirements. Peak demand electricity costs also have a significant impact on return-on-investment. These challenges impact both large and small businesses but may be particularly challenging for small and disadvantaged businesses to meet. Deployment of a full NEVI Program-compliant EV DCFC infrastructure consisting of four 150kW chargers is expected to cost between \$700,000 and \$1,200,000 per location. This level of deployment may not be suitable for South Dakota, especially on State highways and other non-Interstate locations.

While these challenges are real, they can be overcome. In this Plan, SDDOT has provided potential strategies, if accepted by the Joint Office, that can be used to address the challenges. Additional strategies will emerge over time. By taking a measured and stepped approach to this program, SDDOT will be in position to capitalize on new strategies and guidance as they emerge.



1. Introduction

The South Dakota Electric Vehicle Infrastructure Deployment Plan (Plan) was developed to meet the requirements for the National Electric Vehicle Infrastructure Formula Program (NEVI Program) established under the Infrastructure Investment and Jobs Act (IIJA), Public Law 117-58 (Nov. 15, 2021). Upon approval of its Plan, each State will receive NEVI Program formula funding to deploy a statewide network of Direct Current Fast Charging (DCFC) infrastructure as part of a national network. South Dakota is expected to receive \$4 to \$5 million in Federal funding per year between 2022 and 2026 for a total of approximately \$29 million. The NEVI Program requires that each State develop a Plan outlining how the formula funding would be utilized. This document represents the State of South Dakota’s Plan.

South Dakota DOT was required to develop this Plan by the National Electric Vehicle Infrastructure Program established under the Bipartisan Infrastructure Law

1.1. Plan Development

South Dakota Department of Transportation (SDDOT) initiated development of the Plan in March 2022. Key milestones for Plan development and implementation are indicated in Table 1.

Table 1. Milestones for Plan Development and Implementation

Milestone	Date
SDDOT issues RFP for contractual support for the Plan development	March 17, 2022
Notice to Proceed issued to consultant	May 9, 2022
SDDOT submits application for Round 6 of the Alternative Fuel Corridor Program; four Interstates are identified: I-90, I-29, I-129, and I-190	May 13, 2022
Planning is launched with SDDOT and key stakeholders	May 18, 2022
Stakeholder engagement	May 19, 2022 - July 8, 2022
Public meetings (in-person and virtual)	June 21, 2022 - July 8, 2022
State Plan submission to Joint Office of Energy and Environment	Aug. 1, 2022
Joint Office approves Plan	Sept. 30, 2022
SDDOT develops detailed specifications, procurement processes, and contracting mechanisms	Nov. 30, 2022 – July 30, 2023
SDDOT releases notice of availability of funding	Aug. 1, 2023 ^a
Applications are received and agreements finalized	March 1, 2024 ^a
Deployment initiates on selected locations	March 2, 2024 ^a

a. Dates are tentative and subject to change.



SDDOT directed a three-step Plan development process with input and guidance from a 25-person Study Advisory Team (SAT). The SAT included representatives from State agencies, utility providers, Metropolitan Planning Organizations (MPO), automotive and other private industries, Tribes, and others (Section 3.1.1). Input from stakeholders and the general public was solicited during each step of the process and was used to formulate the Plan. The three-step process is illustrated in Figure 1.

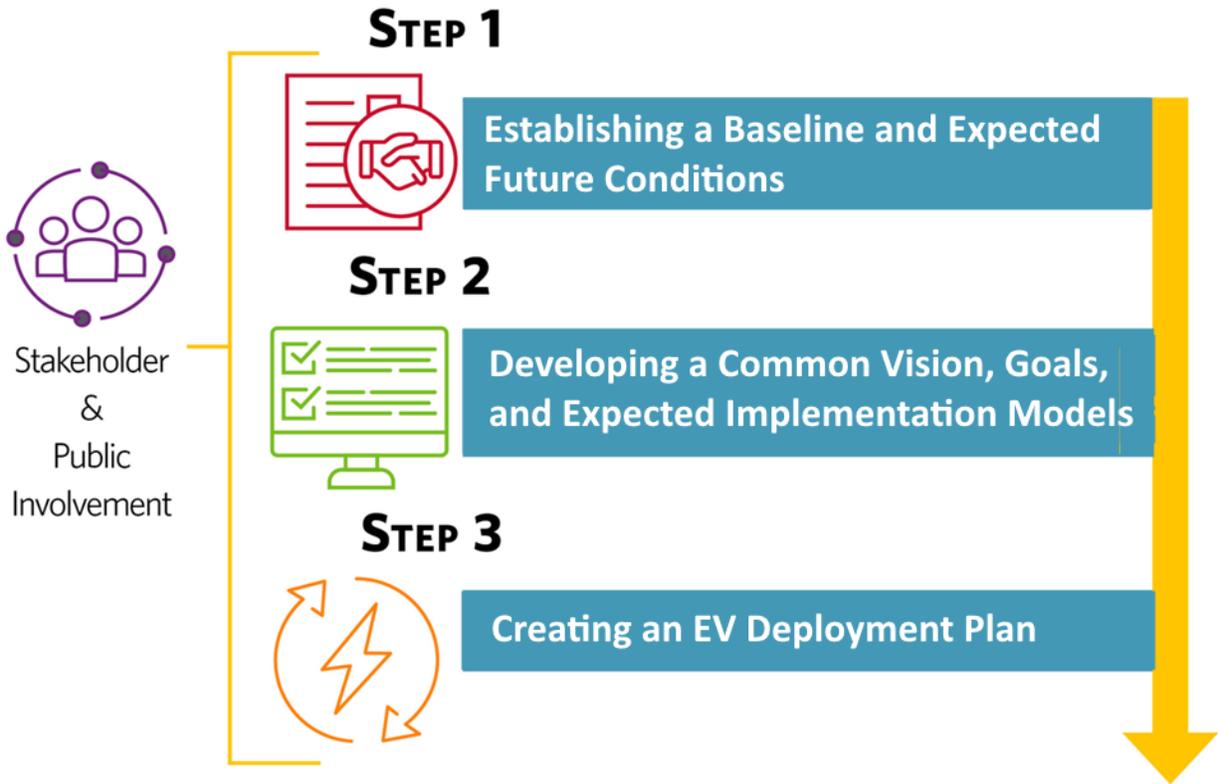


Figure 1. Steps Conducted to Develop the Plan

Step 1 assessed the following:

- › Policy and regulatory environment.
- › Electrical vehicle (EV) ownership and adoption rates.
- › Status of existing charging facilities.
- › Travel patterns.
- › Statewide economic drivers, such as revenue from tourism and how tourists typically travel to and through the State.

In Step 2, SDDOT used a combination of surveys and engagement with the SAT, stakeholders, and the public to gain input to a common vision for the Plan. Implementation models previously employed by the State were considered, such as the grant rebate approach used by the Department of Agriculture and Natural Resources to distribute Volkswagen Environmental Mitigation Trust funds for South Dakota.



In Step 3, SDDOT developed a State-specific Plan to deploy EV DCFC infrastructure at locations not more than 50 miles apart. Each of 45 interchanges on four Interstates in South Dakota was evaluated for its suitability to accommodate EV DCFC infrastructure, based upon the availability and number of commercial and publicly accessible establishments within one travel mile of the Interstate exits and the availability of electrical service to support the infrastructure. SDDOT identified one existing EV DCFC site within the town of Wall that would meet the suitability requirements and is also NEVI Program-compliant. To meet the minimum distance requirements for deployment of the additional EV DCFC infrastructure locations, the SDDOT will need to deploy EV DCFC infrastructure at 13 additional locations along the designated Alternative Fuel Corridors (AFC).

2. State Agency Coordination

As required by the IJJA, SDDOT led the development of this Plan while coordinating with key representatives from the following State agencies:

- > Department of Transportation.
- > Department of Public Safety.
- > Department of Tourism.
- > Bureau of Information and Telecommunications.
- > Department of Agriculture and Natural Resources.
- > Department of Revenue.

SDDOT met with representatives from each of these agencies to gather information relevant to the development of the Plan. The Department of Tourism provided detailed information regarding the volume and nature of tourism in South Dakota, including identification of the origin markets for visitors to South Dakota's main tourist attractions. The Bureau of Information and Telecommunications provided data regarding the cellular and communication coverage throughout the State, as well as supporting the development of the cybersecurity portion of this Plan. The Department of Agriculture and Natural Resources provided information regarding how the Volkswagen Environmental Mitigation Trust funds for South Dakota were administered throughout the State, including the status of those planned installations and the lessons learned. The Department of Revenue provided updated and detailed counts of EV registrations within the South Dakota and by county. Additional communication and dialogue with each agency occurred through individual outreach, data collection activities, and other engagements.

SDDOT engaged representatives from additional State agencies to explore and develop concepts for contractual options associated with the deployment, to enhance public outreach, to increase the potential for stakeholder engagement, and to exchange information regarding the Plan. These State agencies included:

- > Governor's Office.
- > Office of the State Engineer.
- > Department of Game, Fish and Parks.



- › Department of Tribal Relations.

SDDOT staff also participated in coordination meetings with representatives from departments of transportation (DOT) of the surrounding States, including Minnesota, Iowa, North Dakota, Nebraska, and Wyoming. Additional stakeholder engagement, described in Chapter 3, included discussions with representatives from the Federal Highway Administration (FHWA), the National Park Service, and Tribal representatives from the nine Tribes located in South Dakota.

3. Public Engagement

SDDOT implemented an equitable and effective public engagement process to inform stakeholders and the public about the development of the Plan and to gather meaningful input. An inclusive and comprehensive engagement process was essential to developing the final Plan so that it addressed a broad base of needs and future opportunities.

The public engagement process was developed and implemented with the following primary goals:

- › Facilitate stakeholder and public engagement throughout the planning process.
- › Provide timely options for receiving input from stakeholders and the public.
- › Engage stakeholders and the public to collect meaningful feedback for development of the Plan.
- › Transform complex technical data into comprehensive communication materials.
- › Implement tools and tactics to create accessible, strategic, and inclusive communication materials.

3.1. Stakeholders Involved in Plan Development

During the development of the Plan, SDDOT involved the general public, key stakeholders, and advisory groups to build consensus and gather meaningful input. Stakeholders were identified as those having a vested interest in the outcomes and process of the Plan and anyone affected or impacted by the Plan. Figure 2 illustrates the various stakeholders engaged during the planning process.



Figure 2. Stakeholders Involved in the Plan Development

3.1.1. Study Advisory Team

The SAT (Figure 3) provided management, oversight, and decisions concerning the organization and direction of the Plan. The SAT included representatives from State agencies, utility providers, MPOs, automotive and other private industries, Tribes, and others. SDDOT engaged the SAT during six in-person and virtual meetings throughout the development of the Plan and will continue to meet with the group during Plan implementation. Meetings included interactive activities and roundtable discussions to help advise and inform the Plan.



Figure 3. Study Advisory Team Supporting the Plan Development

3.1.2. Charging Equipment Suppliers

SDDOT met with several EV DCFC infrastructure operators, suppliers, and developers throughout the development of this Plan. Several of these organizations provided information regarding their plans for future deployment of EV DCFC infrastructure in South Dakota, which was considered in SDDOT’s plans for NEVI Program deployment. Others expressed interest to SDDOT in supporting its implementation plan. The following reflects a summary of these discussions:

- › There are no EV DCFC infrastructure owner/operators/suppliers currently planning to deploy a statewide network within South Dakota that would fulfill the requirements for the Interstates being classified as EV Corridor Ready.



- › Planned EV DCFC infrastructure by private organizations would be concentrated within the more populated areas of the State, particularly within the cities of Rapid City and Sioux Falls.
- › Electric charging rates are expected to be similar to those in surrounding States.
- › Only one of the EV DCFC infrastructure providers currently installs equipment in a configuration that could be readily converted to be compliant with the Americans with Disabilities Act (ADA).
- › The suppliers expect to experience significant lead times associated with obtaining 150kW EV DCFC charging equipment. Current lead times ranged from 6 to 18 months.

3.1.3. Utility Providers

Electric power in South Dakota is distributed by investor-owned utilities (IOU), municipal electric systems, and rural electric cooperatives. The South Dakota Public Utilities Commission approves the service territory boundaries for these various entities. Generally, the IOUs serve the more densely populated areas, such as Aberdeen, Mitchell, Rapid City, Sioux Falls, and Yankton. Many small and mid-sized cities have their own municipal electric utilities; and the more rural areas are served by rural electric cooperatives. South Dakota continues to benefit from low electricity rates because of an abundance of hydroelectric resources along the Missouri River and wind generation throughout the State.

Utilities in South Dakota indicated that the electrical grid could meet the required electrical load under normal operating conditions

Utility providers with service territories around the EV DCFC infrastructure locations at exits on the I-90 and I-29 designated AFCs were contacted to determine their ability and capacity to provide the minimum electrical demand of NEVI-compliant charging stations. Interstate exits suitable for potential hosting of DCFC charging equipment and the respective utility providers are shown in Figure 4. Requests were made for the providers to confirm:

- › Service territory jurisdiction.
- › Proximity to existing electrical distribution facilities.
- › Existing upstream electrical substation capacity to serve projected demand increases.
- › Ampacity limitations of existing distribution feeders.
- › Any other concerns.

Preliminary responses from the providers indicated that a majority do have capacity to serve the projected demand, although some minor distribution line extensions may be required to provide three-phase power to the identified locations. One utility provider suggested an alternative location to an identified potential EV DCFC infrastructure location.



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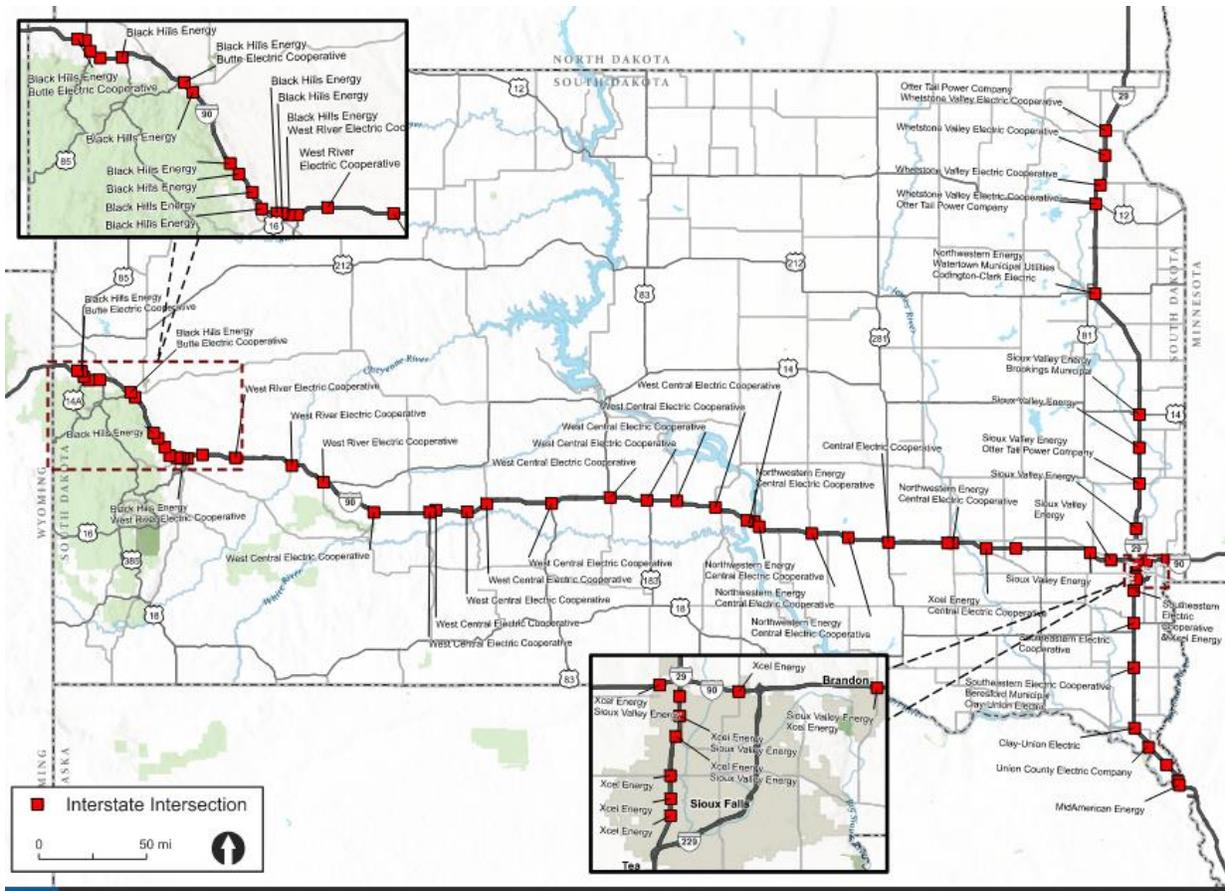


Figure 4. Utility Service Providers Along Designated AFCs

3.1.4. Tribal Nations

SDDOT routinely engages with the nine Tribal Nations in South Dakota. During a pre-planning coordination meeting regarding the Statewide Transportation Improvement Program (STIP), representatives from SDDOT discussed the development of the Plan with representatives from the Tribal Nations and encouraged their participation in plan development. Subsequently, SDDOT distributed social media and direct e-mail correspondence to Tribal representatives inviting their feedback. Two online webinars were conducted exclusively for the Tribal Nations to obtain feedback regarding the Plan, address questions, and provide information regarding the Plan development.

SDDOT was aware that the Native Sun Community Power Development organization, based in Minnesota, received a \$6.5 million grant from the U.S. Department of Energy (DOE). The grant “will be used for electric vehicles for Minnesota’s Red Lake Tribal Nation and the Standing Rock Sioux Tribe of the Dakotas, a part of what is now being called the Upper Midwest Inter-Tribal Electronic Vehicle (EV) Charging Community Network.” A map of the potential deployment plan is provided in Figure 5. SDDOT will coordinate with the Native Sun Community Power Development group as the Plan continues to move forward.



Source: <https://www.nativesun.org/>

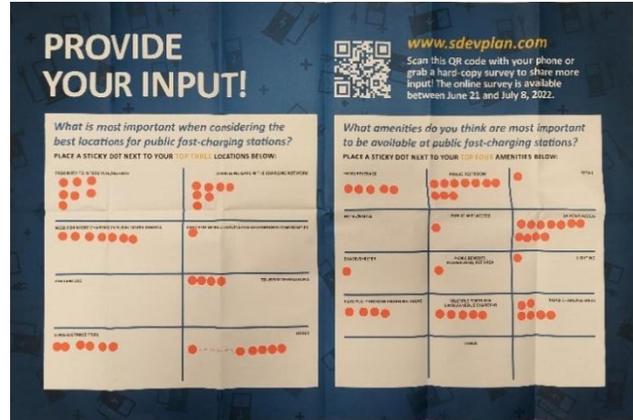
Figure 5. Proposed Upper Midwest Inter-Tribal Electronic Vehicle (EV) Charging Community Network

3.2. Public Outreach

A variety of meeting types and tools were used to educate the general public about the Plan and provide opportunities for input. The outreach approach incorporated digital and in-person engagement opportunities. To build project awareness and promote the opportunities to get involved, social media posts, press releases, newspaper advertisements, and eblasts were distributed to SDDOT’s followers and contacts.

3.2.1. Open House Public Meetings

SDDOT hosted two in-person open house public meetings to discuss and receive public input on the Plan (Figure 6 and Figure 7). The in-person meetings were informal, with a short presentation followed by one-on-one discussion with SDDOT and consultant staff. Input was collected at the meetings using hard-copy surveys and an interactive board activity with sticky dots. Input helped SDDOT make informed decisions about potential locations and amenities of EV DVFC infrastructure around the State. Open house public meeting topics included details about the Plan, Federal funding opportunities, and the future of EVs in South Dakota.



Tuesday, June 21, 2022
 5-6:30 p.m. (Mountain Time)
 Western Dakota Technical College
 800 Mickelson Dr., Rapid City
*Located within a Disadvantaged Community
 (Justice40 Zone)*

Attendees: 32
Surveys Completed: 17

Figure 6. Open House #1, Rapid City



Wednesday, June 22, 2022
 5-6:30 p.m. (Central Time)
 University Center Avera Hall
 4801 N. Career Ave., Sioux Falls

Attendees: 50
Surveys Completed: 15

Figure 7. Open House #2, Sioux Falls



3.2.2. Virtual Meeting

SDDOT hosted a self-guided, virtual meeting that was open to participants any time between June 22 and July 8, 2022 (Figure 8). Topics of the meeting included:

- > About the EV Plan.
- > Results of the Plan.
- > Types of EV chargers.
- > Existing EV chargers in South Dakota.
- > Federal requirements for funding.
- > Public survey to gather input on the potential locations and amenities of EV fast-charging stations around the State.

Over 1,180 people visited the web-portal during the three-week period where public comment was requested. Following the

initial in-person public meetings, a video recording of the presentation and a Frequently Asked Questions (FAQ) document were prepared and included as part of the virtual public meeting materials.

3.2.3. Social and Traditional Media Feedback

Facebook and Twitter were used to promote opportunities for engagement directing people to the open houses and online meeting. Six posts were distributed through SDDOT's social media outlets. SDDOT estimates that its Facebook social media platform has a reach of roughly 31,000 followers with its Twitter account also reaching thousands of followers. Facebook posts by SDDOT resulted in 1,123 engagements, 27 shares, and 137 comments. Twitter posts resulted in 130 engagements, 4,525 impressions, and 47 Twitter link clicks. Comments on each social media post were reviewed and incorporated in the summary presented in Section 3.2.5 of this Plan.

3.2.4. Public Engagement Survey Results

The surveys administered at the in-person open house public meetings and virtual meeting had the same questions, and the responses were compiled together to analyze the results. Overall, there were 546 surveys completed by persons residing throughout the State, as illustrated in Figure 9. Survey respondents were generally white (83%) and predominantly male (66%). The majority were between the ages of 26 and 49 (50%) although 20% were aged 14-25 and another 21% were aged 50-64.

Based upon the number of EV registrations in South Dakota, most of the survey participants did not currently own an EV (79%). EV ownership was over-represented relative to registrations with 21% of survey participants being EV owners relative to the 0.12% of active registrations within the State. Further, although they were not current owners, most of the survey participants were interested in or intending to purchase an EV in the near future (58%).



Figure 8. Landing Page for Virtual Meeting

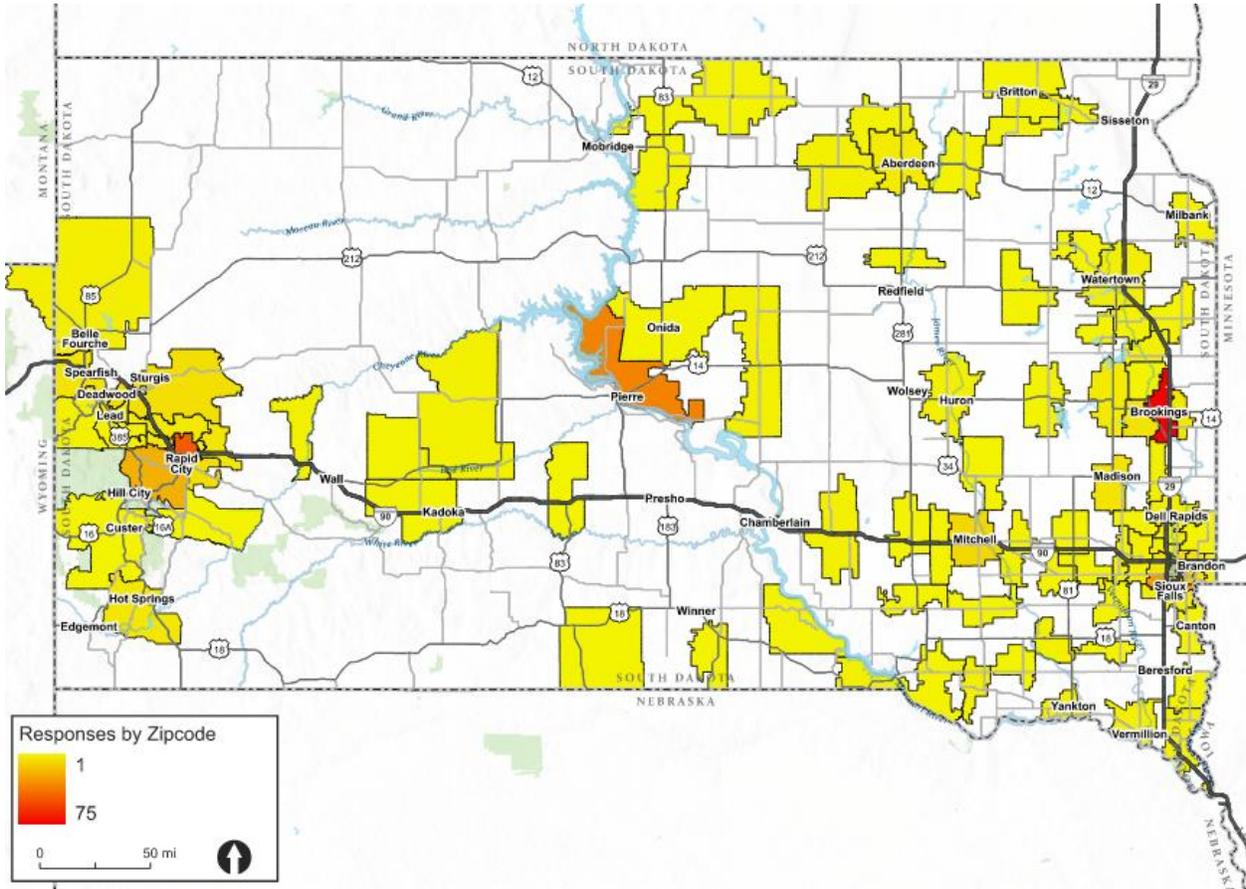


Figure 9. Geographic Dispersion of Survey Respondents

Survey participants were asked to identify the most important factors that influence adoption of EVs in the State. They were also asked to rank various factors that they would consider a priority regarding the location of an EV DCFC infrastructure. Proximity of the EV DCFC infrastructure to the Interstate or highway was ranked as the most important factor by survey respondents, as shown in Table 2.

Table 2. Most Important Factors when Considering Locations for Public Fast Charging Infrastructure

What are the most important factors when considering the best locations for public fast-charging stations? Responders were asked to rank the factors in order of priority. Below are the top priorities, as well as other options to consider.	
<p>Top Three Priorities</p> <ol style="list-style-type: none"> 1. Proximity to Interstate/highway (47% ranked as #1 priority) 2. Addressing gaps in the charging network (25% ranked as #1 priority) 3. Need for more charging in rural South Dakota (11% ranked as #1 priority) 	<p>Other</p> <ul style="list-style-type: none"> › Need for more charging in disadvantaged communities › Work locations › Tourism destinations › Near colleges and grocery stores › At apartment complexes



Survey participants were asked their preference on what SDDOT’s focus should be for deploying the EV DCFC infrastructure. One-half (56%) of the survey respondents indicated that their desire would be for SDDOT to focus on supporting long-distance travel in South Dakota, with 38% desiring a focus associated with more localized travel. The remaining 6% of survey respondents provided their own ideas for the deployment focus.

The survey participants were asked to indicate their opinion on the relative importance of 12 potential amenities at the EV DCFC infrastructure location DCFC infrastructure sites (Figure 10). Participants ranked each amenity according to a three-point Likert Scale, consisting of “Not Very Important,” “Neutral,” and “Very Important.” Having 24-hour access, a publicly accessible rest room, multiple rapid charging ports, and adequate lighting were ranked the highest by participants. The least important amenity was access to retail shopping, which was ranked as very important by only 11% of the respondents.

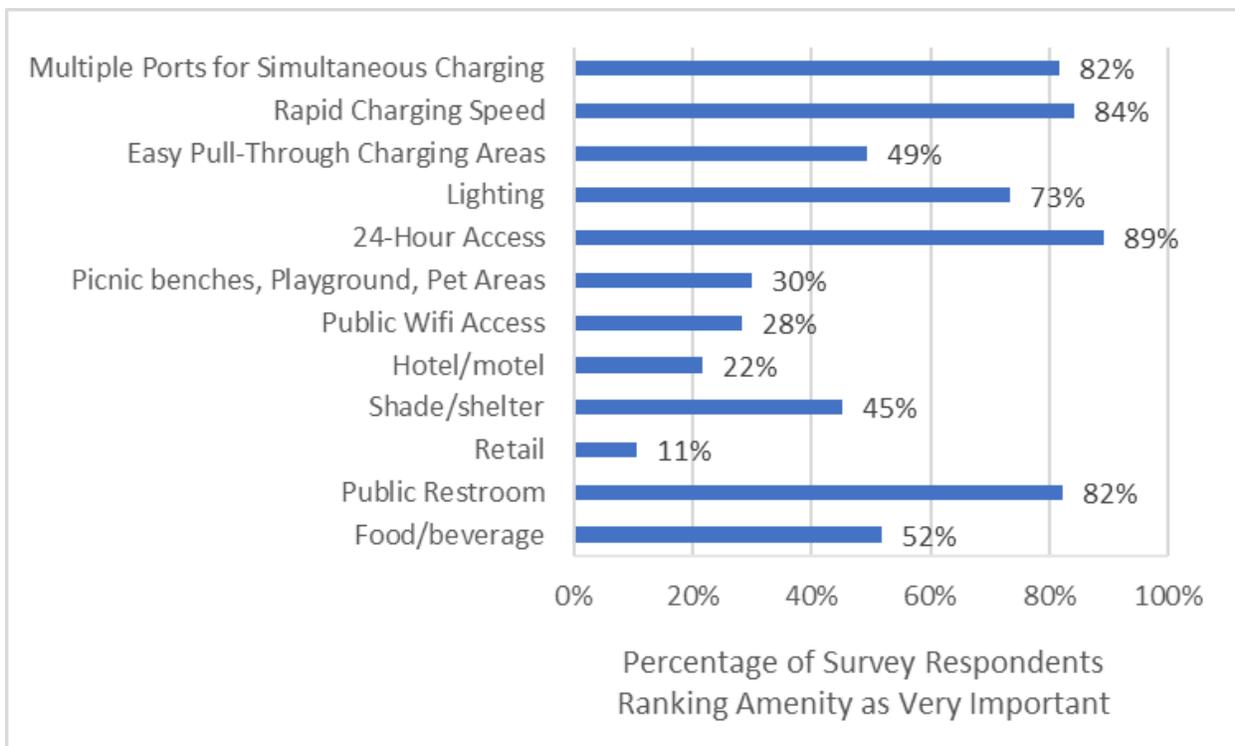


Figure 10. Percentage of Survey Respondents Indicating the Amenity Was Very Important

3.2.5. Additional Feedback Received

Throughout the engagement process, feedback was collected from a wide variety of stakeholders and participants. Participants were asked to explore barriers to deployment, opportunities for successful implementation, and areas where additional coordination of efforts need to be made. The feedback received informed specific elements of this Plan and will guide future NEVI Program implementation and future EV-related efforts. While the key takeaways provided below do not capture every comment received, they do highlight areas that are critical to make this Plan and future EV adoption successful in South Dakota.



- › **Financial Considerations.** Several members of the public provided feedback questioning why the Federal and State governments should be investing to build out EV DCFC infrastructure rather than leaving this to private investors. Further, others expressed concern about the financial viability of this type of equipment in States like South Dakota where there may not be significant adoption of EVs.
- › **Potential Locations.** Many members of the public provided information on potential locations or types of locations where the EV DCFC infrastructure should be located. Common themes included close to amenities, such as food and locations with a significant number of drivers, such as at colleges and large retail shopping plazas. Others suggested the use of rest areas or dedicated roadside usage within the Interstate right-of-way as these would be the most convenient for travelers needing a charge to use. There were conflicting opinions on whether the presence of EV DCFC infrastructure would be a boon to local businesses on “main street” or whether this type of infrastructure should be kept separate from main street businesses.
- › **Electrical Grid/Environmental Impacts.** There seemed to be concern by a small, but consistent, portion of the public providing input that the installation of the EV DCFC infrastructure would result in increased failure to the electrical grid or that the current electrical grid was insufficient to handle the increased load. Others suggested that the installation of these facilities would potentially create more environmental damage than is being solved by the conversion from petroleum-based vehicles to EVs.
- › **Site Configurations.** There was mixed feedback on site configurations in terms of the EV DCFC infrastructure being close to the building or at the farthest end of the parking facility. However, one concern was that non-EVs should not be permitted to block access to or utilize a parking space that has been dedicated for EVs. One common thread reported was the need for “gasoline station like” pull-through accommodations for EV charging, including being able to handle vehicles with trailers.
- › **Other topics.** A small group of people provided thoughts on a variety of different topics including the speed of EV charging needing to be comparable with a petroleum refuel timing, cold weather impacts to EV performance, and the need for EV chargers at multifamily or apartment buildings.

4. Plan Vision and Goals

The Plan supports the vision to:

“Create a framework for a reliable, accessible, convenient, and complete EV fast-charging network that supports transportation choices, safety, economic development, tourism, and innovation.”

Importantly, this vision recognizes the unique nature of current and future EV usage within South Dakota by residents, through-State travelers, and tourists, who contribute a significant component of South Dakota’s overall Gross Domestic Product (GDP). South Dakota welcomes travelers of all types and, by adopting this vision, the Plan emphasizes the overall State vision for travel as embodied in the Stated mission contained in the South Dakota Long-Range Transportation Plan:¹ *“Achieve excellence in providing*

¹ SDDOT, August 2021, Available at <https://dot.sd.gov/projects-studies/planning/long-range-plan>



transportation facilities that meet the needs of the public, leading towards Better Lives through Better Transportation, By Being the Best.”

To develop the vision and associated goals for this Plan, SDDOT reviewed the Statewide Long-Range Transportation Plan, as well as the Long-Range Transportation Plans prepared by the MPOs of Rapid City and Sioux Falls, the two largest population centers within the State. Additionally, the published NEVI Program and statewide plans for other States were reviewed. Based on these reviews, a set of candidate vision Statements and goals were developed. The SAT participated in a survey of six potential vision Statements and 13 potential goals. The SAT met in person to review the results of the survey and to discuss the proposed vision and goals for the Plan (Table 3).

Table 3. Draft Goals of the South Dakota Electric Vehicle Infrastructure Deployment Plan

Goal	Cross Reference to Long-Range Transportation Plan Goals		
	Statewide	Rapid City	Sioux Falls
Provide continuous linkage to national EV fast charging network in surrounding States.	S2, S3	R2	SF3
Support South Dakota’s economic vitality by enabling tourists with EVs to reach and visit South Dakota’s attractions.	S5	R5	SF2
“Right size” the EV infrastructure to accommodate the current and future EV charging needs balancing geographic coverage with the number and size of charging ports at each location.	S2, S3, S4	R2, R4	SF1
Gather data and monitor the utilization of EV fast chargers within South Dakota.	S2	R2	SF1
Achieve a “complete build-out” on all Interstate segments within South Dakota.	S2, S3, S5, S6, S7	R2, R5, R6	SF2, SF3

- Statewide Long Range Transportation Plan Goals
- > S1 - Improve Transportation Safety and Security for all Modes of Transportation
 - > S2 - Preserve and Maintain the Transportation System
 - > S3 - Improve Mobility, Reliability and Accessibility
 - > S4 - Preserve South Dakota’s Quality of Life
 - > S5 - Support Economic Growth and Development
 - > S6 - Promote Environmental Stewardship
 - > S7 - Promote Innovative Transportation Technologies

- Rapid City Long-Range Transportation Plan Goals
- > R1 - Safety
 - > R2 - System Preservation
 - > R3 - Multi-Modal Mobility and Accessibility
 - > R4 - System Operations
 - > R5 - Economic Vitality



Goal	Cross Reference to Long-Range Transportation Plan Goals		
	Statewide	Rapid City	Sioux Falls
	<ul style="list-style-type: none"> > R6 - Environmental Sustainability > R7 - Project Delivery 		
Sioux Falls Long-Range Transportation Plan Goals		<ul style="list-style-type: none"> > SF1 - Operational Efficiency > SF2 - Connectivity and Economic Vitality > SF3 - Livability and Environmental Sustainability > SF4 - Multimodal Integration > SF5 - Safety and Security > SF6 - System Preservation 	

5. Contracting

As part of the development of this Plan, a review of existing State of South Dakota codes and regulations was conducted. Currently, the State does not have any laws regulating the sale of EVs, hybrids, and alternative fuel vehicles (AFV).² The State does, however, currently assess a \$50 annual registration fee to EV registrations to offset the lack of motor fuel tax collected.

Prior to 2022, the State Utility Code restricted assessing a fee to the provision of EV charging, as that would identify the provider as a utility. In 2022, a law was passed in South Dakota that explicitly exempted the provision of electricity through EV charging stations from the definition of an electric utility.

Per 23 U.S. Code §1111, SDDOT is not permitted to install and operate EV charging stations and assess a fee to recoup costs of electricity and operation within Interstate right-of-way. Therefore, SDDOT will need to engage private property owners or other publicly owned property owners outside of the highway right-of-way to host the EV DCFC infrastructure deployments. Development will be monitored throughout the five-year deployment period and, if the Federal law is modified, South Dakota will revisit its strategy to determine if Interstate rest areas make sense for the State as a NEVI Program-compliant EV DCFC charging location.

Potential contracting mechanisms that SDDOT could use to deploy EV DCFC infrastructure include the following:

- > **Public-Private Partnership (P3).** By definition, a P3 is a contractual arrangement between a government entity and a private company for the purposes of creating or installing infrastructure for the public’s benefit. Typically, under these arrangements, the public entity provides value to the contract through tax concessions, lease/land agreements, guaranteed revenue agreement, etc. The private company provides the financing to construct, operate, and maintain the infrastructure. P3s are not authorized in South Dakota for projects pertaining to transportation infrastructure, municipal

² (Department of Motor Vehicles, 2022)



facilities (public works infrastructure), and environmental projects.³ It may still be possible, however, for South Dakota to employ a P3 model for the deployment of EV DCFC infrastructure, provided that this infrastructure is not classified as traditional transportation infrastructure that is typically installed within the DOT right-of-way, such as dynamic message boards, rest-areas, etc.

- **Design-Build** refers to a contracting mechanism that is a specialized type of P3 whereby a government entity contracts with a private entity, who is then responsible for completing both the design and the construction of the infrastructure. These types of contracts are beneficial because they cut out the “middleman” and assign design and construction accountability to a single entity. There are various types of Design-Build contracts, including Design-Bid-Build and Design-Bid-Operate-Maintain structures. Public agencies in South Dakota are authorized to utilize design-build procurement for any type of design or construction project per SDCL §5-18b-20. However, SDCL §5-18A-22 exempts the Design-Build authorization from the DOT for highway construction projects. Because EV DCFC infrastructure in South Dakota must be installed on property not located within the DOT right-of-way, this type of project may qualify under statute as a potential contracting mechanism that can be used by the SDDOT. As an alternative, the Office of the State Engineer has experience with Design-Build contracting and could potentially provide another avenue for the use of this contracting method.
- **Grant-style** programs have been previously used by SDDOT and other State agencies and are permitted under current statutes. For example, the SDDOT uses a grant-type program for the administration of local bridge improvement funds. This grant program was established during the 2015 legislative session and has administered seven cycles of grants (2016-2022). The State Department of Agriculture and Natural Resources currently utilizes a grant-style mechanism to distribute funds for EV infrastructure associated with the State’s Volkswagen Settlement agreement. Under this program, applicants apply for funding, build the EV chargers to meet the requirements, and then receive a rebate corresponding to 80% of the project costs once the location has been determined to meet the specifications.

Of these contracting mechanisms, SDDOT has the authority and most experience with administering State and Federally funded transportation programs through a grant program. This would not be a new contracting mechanism for SDDOT, and existing procedures and policies developed from

previous grant programs could be applied by staff within the agency who that have direct, relevant experience with this type of contracting. SDDOT may implement a grant program using internal staff or a procured consultant. Regardless, SDDOT intends for the required matching funds (20% of the total project costs) to be supplied by private industry and does not intend to lease or make available DOT-owned property for EV DCFC infrastructure.

SDDOT expects to utilize a competitive grant program to administer the NEVI Program funds

³ Association for the Improvement of American Infrastructure: <https://aii-infra.info/wp-content/uploads/SD-Snapshot-Summary.pdf>



Volkswagen Environmental Mitigation Trust funds for South Dakota were administered by the Department of Agriculture and National Resources through a grant-style program. With this program, the State used a rebate approach where the private entity was required to front the capital costs and be rebated 80% of the costs by the State after the project has been completed. This approach was subsequently found to reduce competition and the ability of small businesses to participate in the program. Milestone or progress payments and reimbursements will need to be considered in the final contracting approach. Other challenges will be to address the National Environmental Policy Act (NEPA) requirements and reporting requirements necessary for Federally funded projects.

The NEVI Program is subject to the Build America, Buy America Act (Pub. L. No 117-58, div. G §§ 70901–70927). Therefore, SDDOT expects to include the appropriate language and requirements regarding the Build America, Buy America Act into agreements and contracts issued or signed by the department as part of this Program. It is noted, however, that there are currently a relatively small number of suppliers of EV DCFC 150kW chargers, most of which are currently not compliant with the Build/Buy America Act. Several agencies, including the DOE, have issued a request for information (RFI) on Buy America requirements related to EV chargers (Nov. 24, 2021, 86 FR 67115). In providing comments to this RFI, the Regional Transportation Council, the North Central Texas Council of Governments, and the Dallas MPO noted that out of approximately 1,800 contacts, only one DCFC manufacturer, Freewire, currently claimed to be Build/Buy America compliant.⁴ SDDOT therefore assumes that the Joint Office will either resolve the availability of Build/Buy America-compliant suppliers of DCFC chargers or waive this requirement to facilitate the installation of charging equipment during the initial years of the program.

6. Existing and Future Conditions Analysis

South Dakota's geography, demographics, climate, and economy combine to pose unique challenges and opportunities for planning and implementation of effective EV DCFC infrastructure. Located in the northern Great Plains, South Dakota is the 17th largest State with a land area of approximately 76,000 square miles and a population of approximately 895,376 individuals. In terms of population density, South Dakota ranks 46th with an average of 10.7 people per square mile. The largest city in South Dakota is Sioux Falls, with a population of 194,000, representing approximately 22% of South Dakota's population. Roughly 47% of the population in South Dakota reside in one of 10 population centers in the State (Figure 11).⁵

⁴ https://www.nctcog.org/getattachment/trans/funds/cfps/Electric-Vehicle-Charging-Station-CFP/Buy-America-RFI_Responses.pdf.aspx?lang=en-U

⁵ US Census Bureau

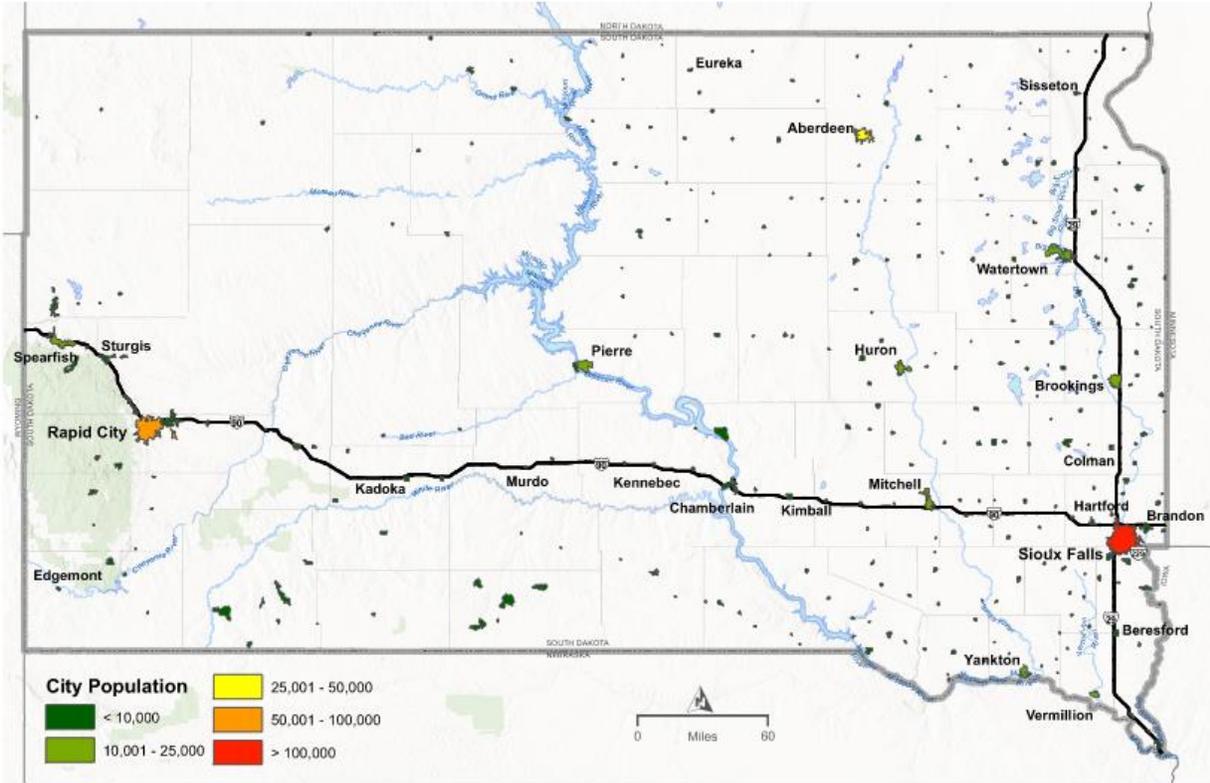


Figure 11. Population Centers in South Dakota

6.1. EV Adoption and Usage

As of 2021, the total number of all vehicles registered in South Dakota was 1,594,954.⁶ There were 1,429 registered EVs, although the State estimates that between 10% and 20% of these represent out-of-State registrations and are not driven within South Dakota. EV registrations accounted for only 0.12% of the total passenger vehicle and motorcycle registrations. 71% of the EV registrations were passenger vehicles; and 29% were sports utility vehicles (SUV), vans, and pickup trucks. By comparison, only 27% of total passenger vehicles registered in the State were passenger vehicles or sedans and 63% were SUVs, vans, and pickup trucks (Figure 12).

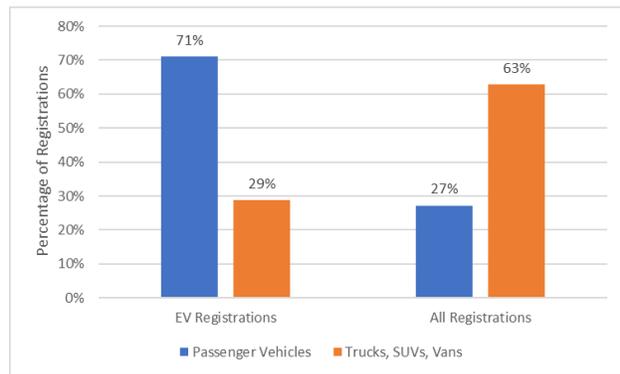


Figure 12. Registrations by Vehicle Type in 2021

According to data collected by the Alternative Fuel Data Center,⁷ South Dakota has one of the lowest EV adoption rates in the country and currently ranks 48th in EV adoption as of 2021, leading only Wyoming

⁶ South Dakota State Treasurer

⁷ <https://afdc.energy.gov/data/10962>



and North Dakota. The EV adoption rate in South Dakota is trending upward but will likely remain at the lower end of the EV adoption spectrum and will continue to lag adoption rates observed in other States. In South Dakota, trucks/vans/SUVs are outselling passenger cars, following the U.S. trend of trucks outselling cars three to one. In 2020, trucks accounted for 74.8% of new vehicle sales in the U.S. While EV offerings of pickup trucks have traditionally been very limited, market share is expected to increase once EV pickup trucks are readily available to consumers in the future.

Factors influencing EV adoption in South Dakota include:

- › Availability and travel range of EV pickup trucks.
- › Increased affordability of EV models across all segments.
- › Increased access to fast-charging or DCFC infrastructure in the State.
- › Gas prices remaining elevated.
- › Stricter or additional Federal regulations governing miles per gallon (mpg) and emission requirements.

Three EV adoption growth scenarios for South Dakota were developed to facilitate planning activities and determine potential EV DCFC infrastructure locations.

- › The “**low-growth**” scenario assumes that the adoption rate of EV passenger cars or sedans continues to follow the 2020-2021 growth rate, the adoption rate of EV trucks/van/SUVs follows the 2020-2021 growth rate, and the adoption rate for motorcycles follows the overall EV adoption rate. Under this scenario, registrations of EVs in South Dakota would increase by 2,000 per year on average adding approximately 10,000 new EV registrations during the 2022-2026 NEVI Program appropriation period. By 2026, the overall percentage of EVs registered in South Dakota would be 0.20%.
- › The “**medium growth**” scenario uses the passenger car growth rate from the “low-growth” scenario at the 2020-2021 growth rate, but doubles the 2020-2021 truck/van/SUV and motorcycle growth rate. This scenario takes into consideration the higher number of registrations that are expected once EV trucks become available in the South Dakota market. Under this scenario, registrations of EVs in South Dakota would increase by 3,000 per year on average, adding approximately 15,000 new EV registrations from 2022-2026. By 2026, the overall percentage of EVs registered in South Dakota would be 0.29%. This scenario most closely aligns with EV sales projections provided by *EV adoption.com*, which estimates annual EV sales in South Dakota at 5,369 in 2026.⁸
- › A “**high growth**” scenario doubles the 2020-2021 passenger sedan and motorcycle EV growth rate and quadruples the 2021-2022 truck/van/SUV EV growth rate. This scenario takes into consideration a strong uptick in adoption of EV pickup trucks. Under this scenario, registrations of EVs in South Dakota would increase by 4,400 per year on average, adding approximately 22,000 new EVs from 2022-2026. By 2026, the overall percentage of EVs registered in South Dakota would be 0.56%.

⁸ <https://evadoption.com/ev-sales/ev-sales-forecasts/>



Figure 13 summarizes the projected growth of EVs in South Dakota under each of the three scenarios. As shown, even under the high-growth scenario, the projected numbers of EVs registered in South Dakota will remain relatively low during the five-year period, increasing from 2021 at 0.12% to no more than 0.56%.

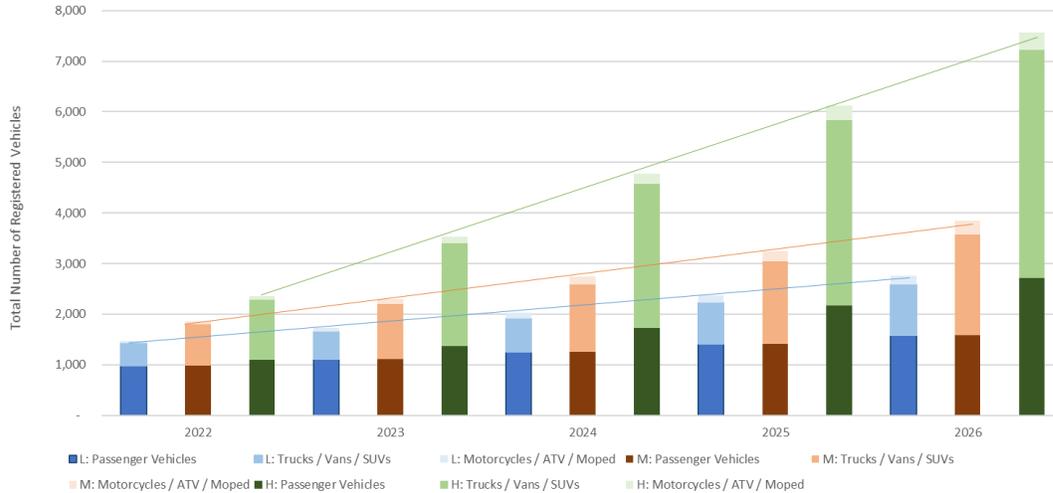


Figure 13. Projected Growth of Passenger EV Registrations Under Low-, Medium-, and High-Growth Scenarios

Tourism represents a significant amount of vehicle travel within and through South Dakota. The South Dakota Department of Tourism notes that 13.5 million visitors spent \$4.4 billion in South Dakota in 2021, accounting for nearly 7% of the total State GDP. It can be assumed that a growing percentage of travel will be by EV.

Electric vehicle adoption in South Dakota is low and expected to remain relatively low for the next several years

South Dakota has the third lowest number of EVs among all States in the U.S., currently having only 1,429 registered EVs in the State representing 0.12% of all registered passenger vehicles, SUVs, vans, and light-duty trucks. Even under an aggressive growth projection, registered EVs in South Dakota are not expected to be more than 0.56% of all passenger vehicles, SUVs, vans, and light-duty trucks registered in 2026.

The projected EV adoption rates in States surrounding South Dakota and the expected growth of tourism in South Dakota from those States were used to estimate the projected EV DCFC infrastructure use in South Dakota. Tourism data from South Dakota Department of Tourism is based upon mobile device data and represents the number of visitors visiting South Dakota from adjacent States. An estimate of the corresponding number of vehicles was derived by assuming that there was an average of 2.5 mobile devices per vehicle. The total number of EV vehicles visiting the State was then estimated by multiplying the total number of vehicles by the estimated market penetration rate of EVs in the adjacent State.



The historical five-year growth rate in registered EVs in each nearby State was applied to obtain the projected growth of EVs from that State during the 2022-2026 timeframe. Figure 14 shows the projected number of EVs entering South Dakota from nearby States for that timeframe.

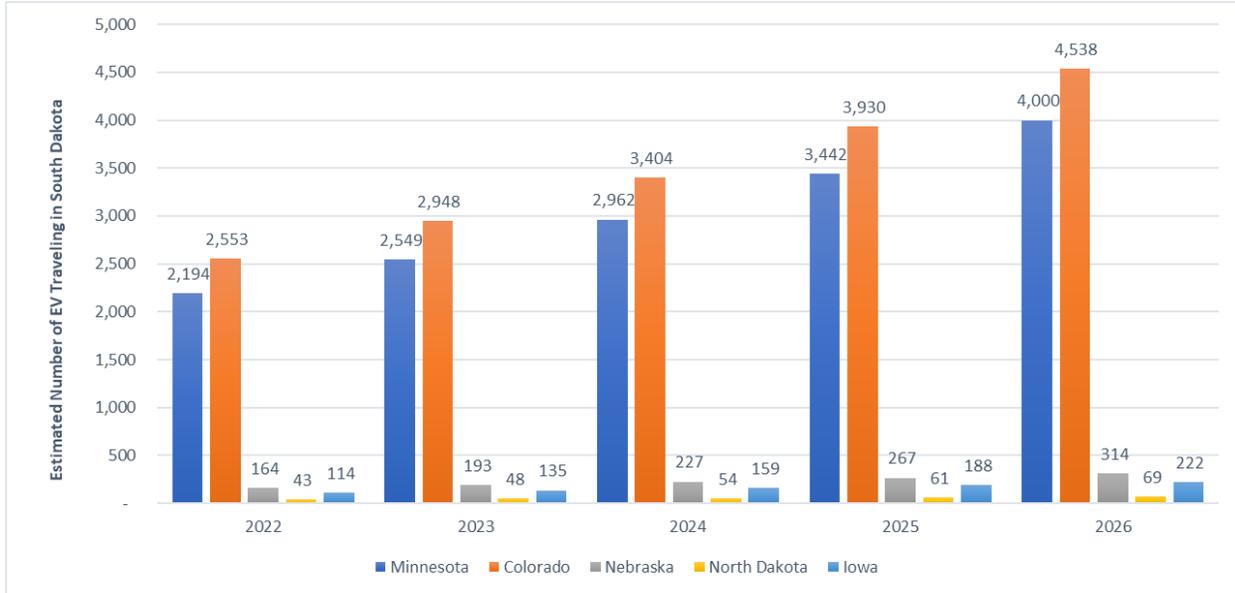


Figure 14. Projected Number of EVs Entering South Dakota from Nearby States Annually (2022-2026)

Data from the South Dakota Department of Tourism also provides insight into where projected EVs will be traveling within South Dakota. Using GIS mapping techniques that match the city of origin to destination to specific routes using algorithms, such as the “shortest path” approach, it is possible to distribute the out-of-State EVs from various States presented in Figure 14 to the South Dakota road network. Combining estimates of tourism by EVs with the travel from in-State registered EVs provides the ability to estimate the Average Daily Traffic (ADT) of EVs along the Interstate corridors by month and year. **Error! Reference s** **ource not found.** illustrates the expected number of EVs per day passing by potential EV DCFC infrastructure locations in July.

6.2. State Geography, Terrain, Climate and Land Use Patterns

Topography and conditions generally progress in a continuum across the State, from lower elevations and wetter areas in the east to higher elevations and drier areas in the west. The Missouri River bisects the State and is extensively dammed, creating Lake Oahe, Lake Sharpe, Lake Francis Case, and Lewis and Clark Lake, which have a combined surface area of about 1,300 square miles. These lakes serve as recreational amenities but also restrict east-west travel movements.

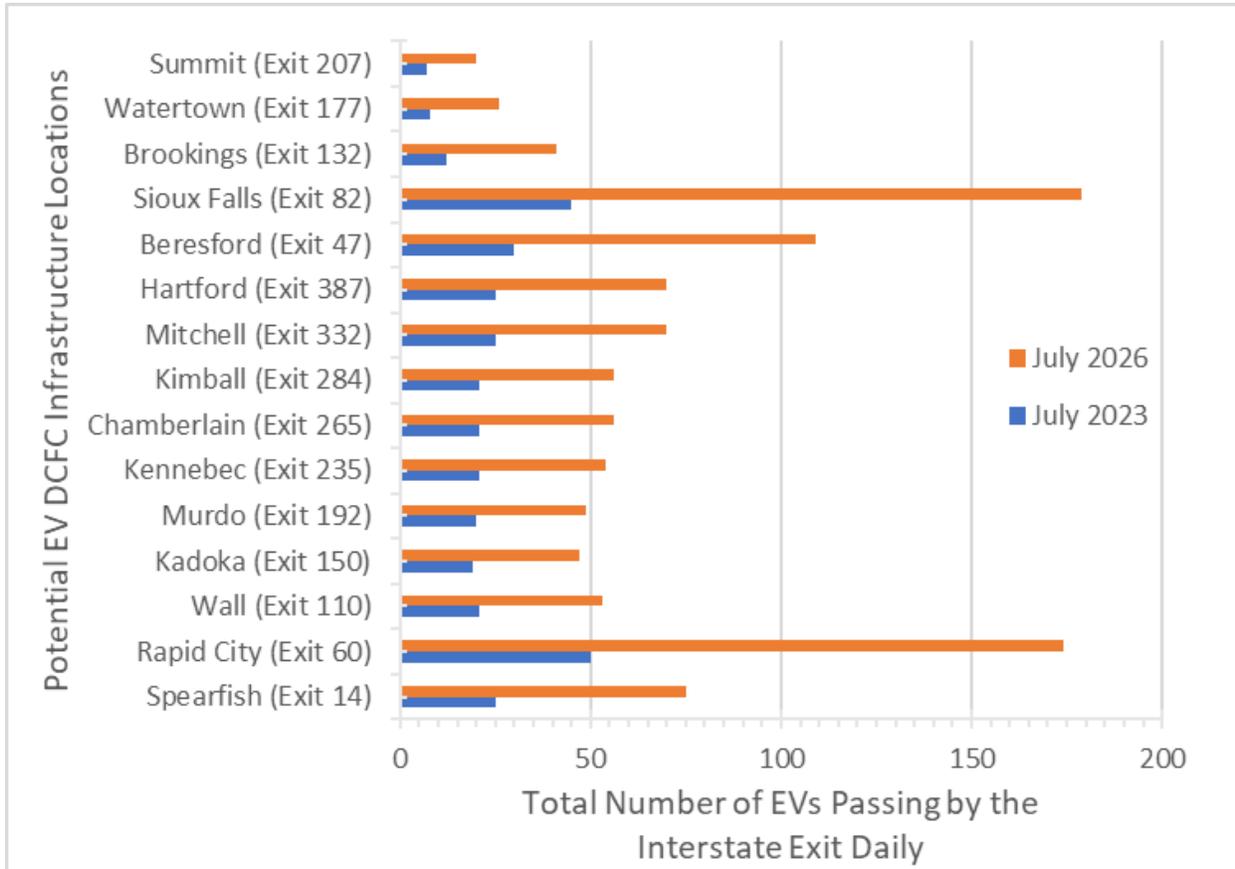


Figure 15. Estimated EV Average Daily Traffic (ADT) Volumes at Potential EV DCFC Infrastructure Locations (July 2023 and 2026)

South Dakota is comprised of four physiographic regions that, along with elevation changes, may have some impact on the effective range of EVs. The Drift Prairie region is located in the James and Minnesota River Valleys, an area of low hills and glacial lakes. The Dissected Till Plains are located in the southeastern corner of the State, an area of rolling hills and many streams. The Great Plains region covers about two-thirds of the State and consists of rolling hills in the east and more rugged terrain with plains, canyons, and buttes in the west. The far central western portion of the State is the Black Hills region that consists of low mountains and significant elevation changes.

Terrain and climate considerations

South Dakota topography and temperature fluctuations can be expected to have a significant impact on EV charging times and range. EV DCFC infrastructure generally spaced 50 miles apart should be more than sufficient to meet the expected demand.

Elevations generally rise from the east to the west, with the lowest elevation of 968 feet measured at Big Stone Lake on the Minnesota border to an elevation over 3,000 feet at the Montana border. Individual buttes and hills commonly rise 400 to 600 feet above the surrounding plains. In the Black Hills, mountains rise from 2,000 to 4,000 feet above the terrain, with the highest peak reaching 7,242 feet above sea level.



The average elevation statewide is approximately 2,200 feet. The physiographic characteristics and the high elevations across the State, particularly in the Black Hills region, suggest that the effective range of EVs will be somewhat reduced.

Located in the northern Great Plains, South Dakota is subjected to extreme temperature fluctuations that must be considered in planning for EV usage. Colder temperatures can have a significant impact on EV charging times and range. Reduced chemical and physical reactions within the battery at lower temperatures reduce power output and increase the time required to charge the battery. Lower temperatures increase power usage due to heating the interior of the vehicles for passenger comfort.

South Dakota encompasses a broad range of climate types, with the majority of the State falling into Koppen classification type Dfa (hot-summer humid continental) or classification type Dfb (warm-summer humid continental). The western portion of the State falls into more arid classifications. In addition to the hot or warm, humid summer weather, these zones are characterized by extremely cold winter temperature extremes, reaching a low as -35° F in northern areas, with subzero temperatures possible statewide. These extremes are not frequent, but average winter low temperatures are 18° F in Sioux Falls and 6° F in Aberdeen.

According to field testing performed by the Norwegian Auto Federation, operation on a standardized test course in temperatures ranging 21° F to 37° F reduced EV range by approximately 20%⁹ and they also lengthened charging times in cold temperatures. A similar result was observed in dynamometer testing by the American Automobile Association¹⁰ that indicated that without internal vehicle heating, EV battery range dropped by 12% at 20° F, but with the heater in operation, it dropped roughly 41%. Consistent with other studies, at 95° F, EV battery range dropped by 4% without air conditioning and by 17% with air conditioning in operation. The Idaho National Laboratory conducted a study of EV charging under a broad range of temperature conditions over a nearly two-year period, using data collected from a taxi fleet operating in New York City.¹¹ The study determined that the time to reach 80% state of charge (SOC) doubled or tripled at temperatures below 32° F.

The findings from these studies, taking the climate and topology of South Dakota into consideration, suggest that 50-mile spacing for EV DCFC infrastructure on designated AFCs as required by the NEVI Program is more than sufficient to support EV travel during times of low temperatures and in times of high temperatures during the summer months—peak tourism times within the State. Therefore, it is South Dakota’s intention to meet this NEVI Program spacing requirement to the extent possible or until additional real-world data from charging stations in South Dakota that is systematically captured and analyzed demonstrates that this spacing is not needed along South Dakota Interstates to support EV use.

⁹ <https://www.naf.no/elbil/aktuelt/elbiltest/ev-winter-range-test-2020/>

¹⁰ <https://www.aaa.com/AAA/common/AAR/files/AAA-Electric-Vehicle-Range-Testing-Report.pdf>

¹¹ <https://inl.gov/article/ev-charging-in-cold-temperatures-could-pose-challenges-for-drivers/>



6.3. State Travel Patterns, Public Transportation Needs, Freight and Other Supply Chain Needs

South Dakota has 82,501 miles of roadway—7,794 miles are State highways maintained by SDDOT. Although this represents only 9.4% of the total roadway mileage in the State, the State highway system carries approximately 68% of all vehicle miles traveled. Key facilities are the transcontinental I-90 that runs east-west, and I-29 that runs north-south from Canada to Mexico. Two additional Interstates, I-190 and I-229, are in the Rapid City and Sioux Falls urban areas.

Travel patterns considerations

I-90 is the most heavily traveled Interstate for both non-commercial and freight traffic. Traffic volumes on all Interstates are relatively low outside of urban centers. Many in-State trips are under 60 miles. Tourism is a significant contributor to Interstate traffic, with peak traffic volumes in the summer months. Public intercity bus service connects cities along I-90 and I-29.

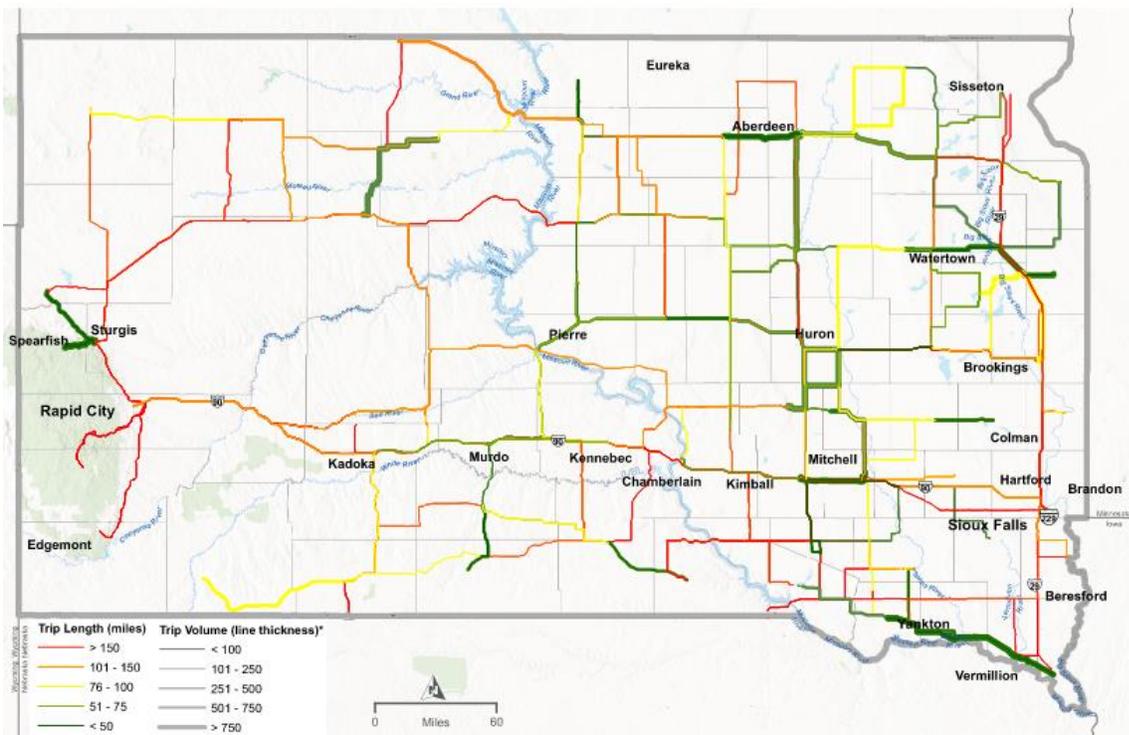
As shown in Figure 16, I-90 is by far the busiest highway in the State, with non-commercial annual average daily traffic (AADT) volumes over 20,000 in the urbanized eastern and western portions of the State. Volumes are relatively low on State highways outside the urban centers. Even on the Interstate highways, traffic volumes drop to relatively low levels (below 5,000 vehicles per day in some rural areas).

6.3.1. Travel Characteristics of South Dakota Residents

In-State trips by South Dakota residents are heavily concentrated in the southeastern and western areas of the State, reflecting the heavy concentration of population and business in the Rapid City and Sioux Falls areas (Figure 17). On I-90, in-State traffic is concentrated between Exits 10 (Spearfish) and 127 (Kadoka), and between Exits 330 (Mitchell) and 410 (Valley Springs), with a low, relatively uniform number of trips between communities in the central area of the State. On I-29, in-State trips are concentrated between Exits 18 (Elk Point) and 133 (Brookings), with a lower, relatively uniform, number of trips between communities in the northern area of the State. This indicates that many in-State trips are under 60 miles each direction. Commuter travel patterns indicated that longer-distance travel, over 150 miles in length, primarily occurs in the less-populated areas of the State, along I-29, and in the eastern and western segments of I-90.



Figure 16. Average Annual Daily Non-Commercial Vehicle Volumes



Source: Replica Travel Data Obtained and Processed by HDR

Figure 17. In-State Travel Patterns



6.3.2. Freight Movements

Truck traffic in South Dakota is concentrated on I-90, as shown in Figure 18. Significant volumes are also noted on I-29, particularly in the southern portion of the State. Trucks travel to all parts of the State. South Dakota supplies the world with agricultural commodities. Farm-to-market freight movement is vital to the State’s economy for both production and export purposes. Most of the top commodities moving to and through South Dakota are related to the agriculture industry. It is projected South Dakota will continue this trend into the future. In 2020, cereal grains, other agricultural products, and animal feed accounted for 65% of the freight by weight transported within the State.¹²

Trucks continue to dominate from 2020 and 2050 as the top mode of freight transportation. In 2020, trucks accounted for 71% of the freight movement, by value, and are expected to account for nearly 73% of the freight movement, by value, in 2050. South Dakota’s top domestic trading partners in 2020 are bordering States and the State of Washington. In 2020, Minnesota remained the top partner with the most tonnage and value and is projected to continue at the top through 2050 in weight. The other top major domestic trading partners in 2020 included Nebraska, Washington, North Dakota, and Iowa. The 2050 projections indicate that Iowa is second to Minnesota in freight value as it is today.

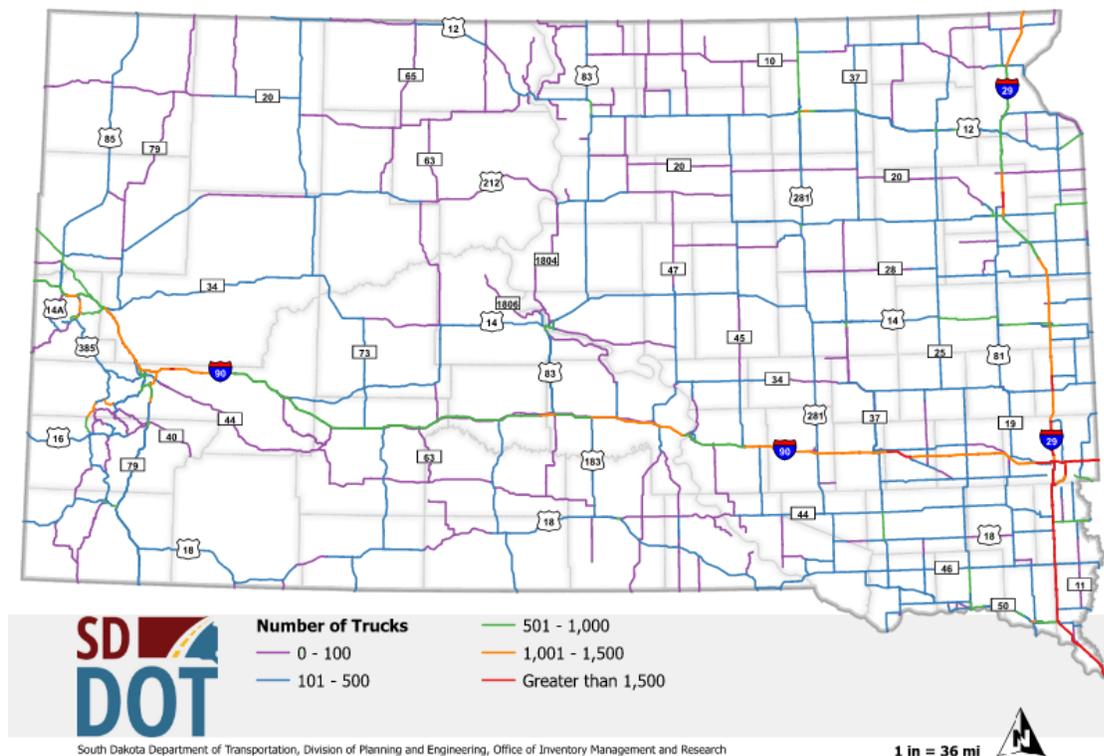


Figure 18. Annual Average Daily Truck Volumes

¹² <https://dot.sd.gov/media/documents/SDDOTFreightPlanApproved.pdf>



6.3.3. Tourism Traffic

Tourism is an important contributor to the South Dakota economy and is a significant generator of traffic on the State's roads. Many of the State's biggest attractions are in the Black Hills and the adjacent Badlands, including Mount Rushmore, Wind Cave, Custer State Park, and Crazy Horse Memorial. Many other State parks and attractions within South Dakota are located conveniently to I-29 and I-90 and readily accessible to travel by automobile (Figure 19).

Tourism contributes to traffic volumes on I-90 in the peak summer travel months of June, July, and August that are double or nearly triple the levels in midwinter (Figure 20). Traffic counts taken near Tilford show an even more extreme peak in August largely due to the Sturgis Motorcycle Rally, which attracts 500,000 people over a 10-day period. Traffic on I-29 shows a similar seasonal peak, but only about 60% to 75% higher than midwinter volumes.

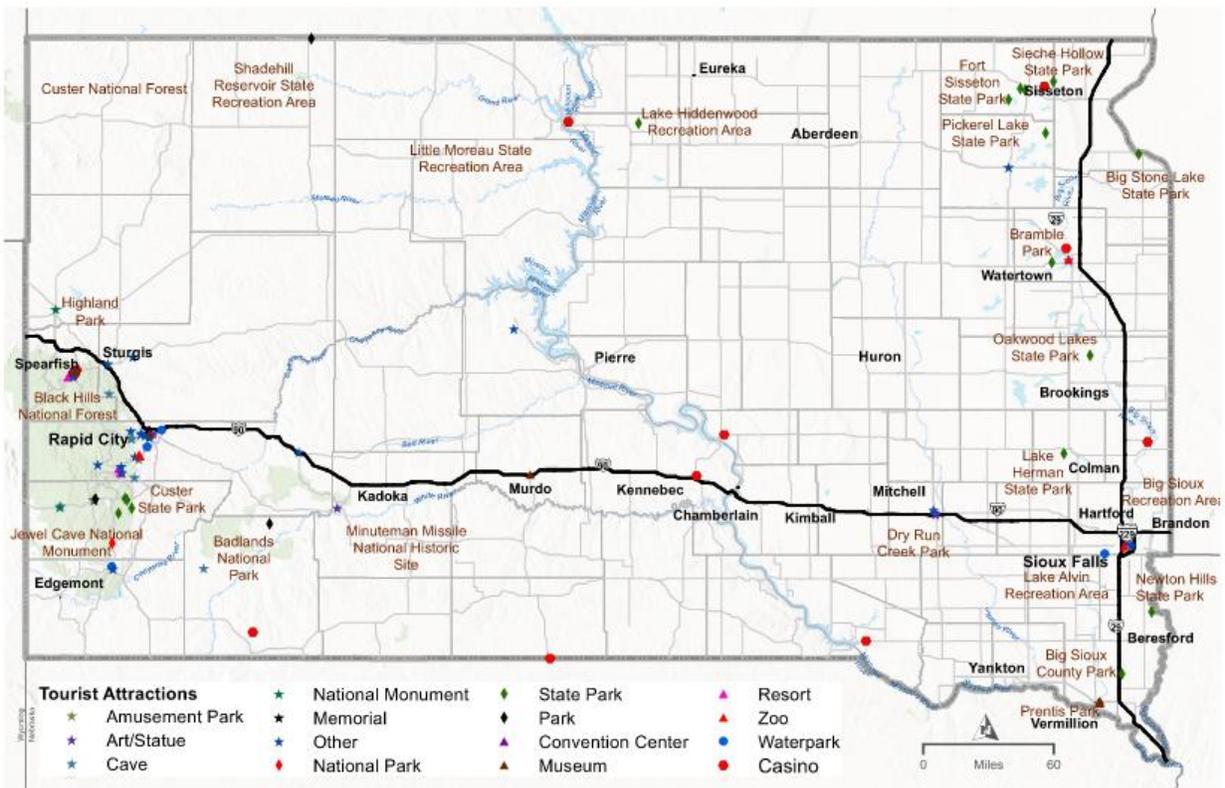


Figure 19. South Dakota Tourist Attractions

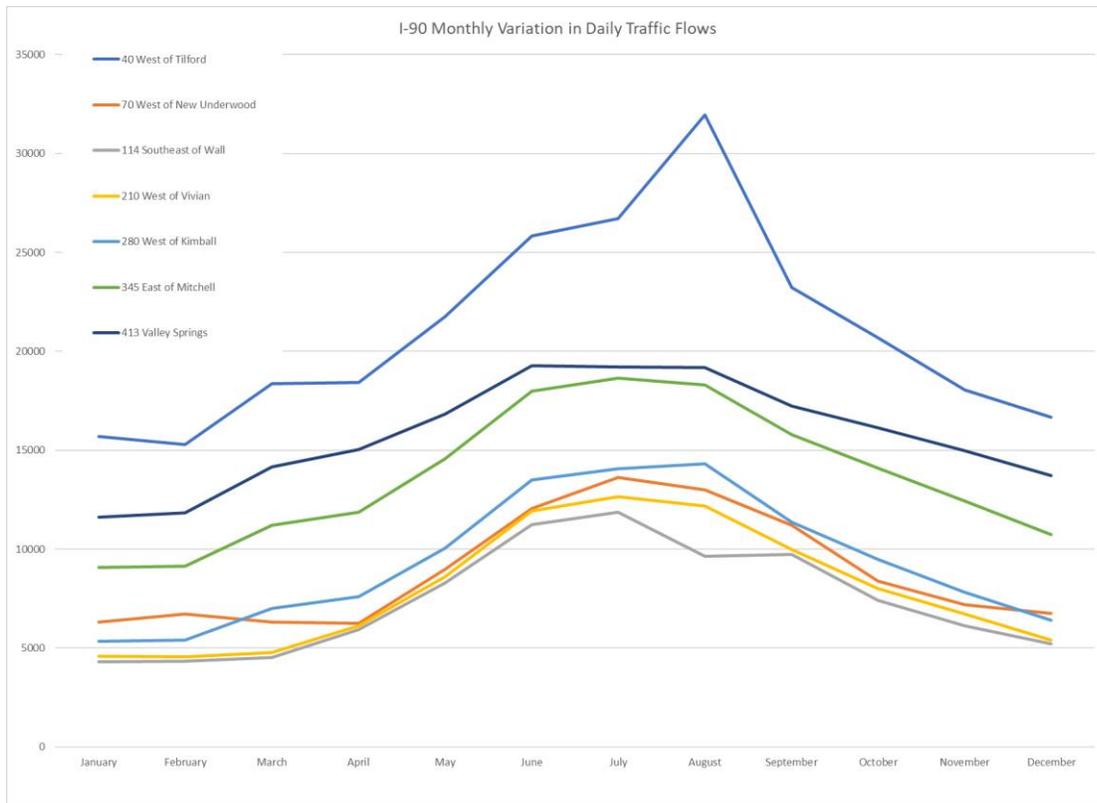


Figure 20. Monthly Traffic Variation on I-90 Due to Elevated Numbers of Tourism Traffic

6.3.4. Public Transportation

Intercity bus service within South Dakota is operated by Jefferson Lines, with daily service in the I-29 corridor connecting to Fargo, North Dakota, and Kansas City, Missouri; and in the I-90 corridor, connecting to Billings, Montana, and Minneapolis, Minnesota. Daily service is provided between Pierre and Vivian, connecting to the I-90 service. Weekly connections are provided to Huron, Aberdeen, and the Missouri River Valley. Fixed-route transit service is operated Monday-Saturday in Rapid City by RapidRide, and in Sioux Falls by the City of Sioux Falls.

Several regional providers provide demand-responsive transportation in multiple counties across the State. This service is only operated during limited hours and days, requires advance registration and scheduling, and may be limited to transportation to and from medical facilities. In most cases, this service is limited to within a local community or county, although in some cases transportation can be arranged to Rapid City, Sioux Falls, or Pierre. The following is a summary of the available public transportation services:¹³

- › Aberdeen Ride Line | 605-626-3333 | Serves Aberdeen and Brown County; as requested in the County and smaller communities within 2.5 miles of Aberdeen city limits.
- › Brandon City Transit | 605-256-6518 | Serves Brandon.

¹³ <https://dot.sd.gov/dot-fact-book/air-rail-and-transit>



- › Brookings Area Transit Authority 605-692-5416 | Serves Brookings, Aurora, Volga, Sinai, Bruce, Bushnell, White, Esteline, Elkton, Arlington, and Brookings and Hutchinson Counties.
- › Community Transit of Watertown | Sisseton | 605-882-5287 | 605-698-7511 | 605-397-8661 | 605-472-1552 | Serves Watertown, Sisseton, Webster, Redfield, Groton, Milbank, Britton, Lennox, Faulkton, and Grant, Roberts, Faulk, Campbell, McPherson, Edmunds, Codington, Spink, and part of Brown County.
- › East Dakota Transit | 605-256-6518 | Serves Madison and Lake County.
- › Palace Transit | 605-995-8440 | Serves Mitchell and Davison County; service in the County and smaller communities is provided upon request.
- › People's Transit | 605-353-0100 | Serves Beadle County.
- › Prairie Hills Transit | 605-642-6613 | Serves Lawrence, Meade, Custer, Fall River, Butte communities, and Pennington County, as well as Lemmon and limited service for Bison and Faith.
- › Rapid Transit System 605-394-6631 | Serves Rapid City.
- › River Cities Public Transit | 605-945-3166 | Serves Hughes, Stanley, Hand, Hyde, Dewey, Ziebach, Haakon, East Pennington, Jones, Lyman, and northern Jackson County and the surrounding area.
- › Rural Office of Community Services 605-487-7635 | Serves Beresford, Canton, Wessington Springs, Tripp, Winner, and Aurora, Bon Homme, Brule, Charles Mix, Gregory, Jerald, McCook, and Turner County.
- › Sioux Area Metro | 605-367-7151 | Serves Sioux Falls.
- › Standing Rock Transportation | 701-854-8090 | Serves Corson and Walworth Counties in South Dakota and Sioux, Morton, and Burleigh Counties in North Dakota.
- › Vermillion Public Transit | 605-624-7433 | Serves Vermillion, Burbank, Meckling, and the surrounding area.
- › Yankton Transit | 605-668-4610 | Serves the Yankton and Yankton County.

6.4. AFC - Corridor Networks

South Dakota currently has four Interstate corridors (I-29, I-90, I-190, I-229) that were officially designated under Round 6 of the Alternative Fuel Corridor Request for Nominations, as “EV Corridor Pending” corridors (Figure 21).¹⁴

Per the NEVI Program guidelines, South Dakota is required to utilize NEVI funding to first convert AFCs from “EV Corridor Pending” to “EV Corridor Ready” before using the funds for charging infrastructure on non-AFCs.

¹⁴ Corridors that do not have sufficient alternative fuel facilities to support alternative fuel vehicle travel are designated as corridor-pending



NEVI Program requirements

The NEVI Program has several requirements that must be met for the Federal funding to be distributed, including:

- › A maximum limit of 50 miles between consecutive EV DCFC infrastructure locations.
- › EV DCFC infrastructure located no more than one travel mile from the Interstate.
- › Stations that include four Combined Charging System (CCS) connectors.
- › Site power capability no less than 600kW (supporting at least 150kW per port simultaneously across four ports).

In addition, each of the locations must meet all requirements for Federally funded infrastructure, such as being compliant with ADA and NEPA.

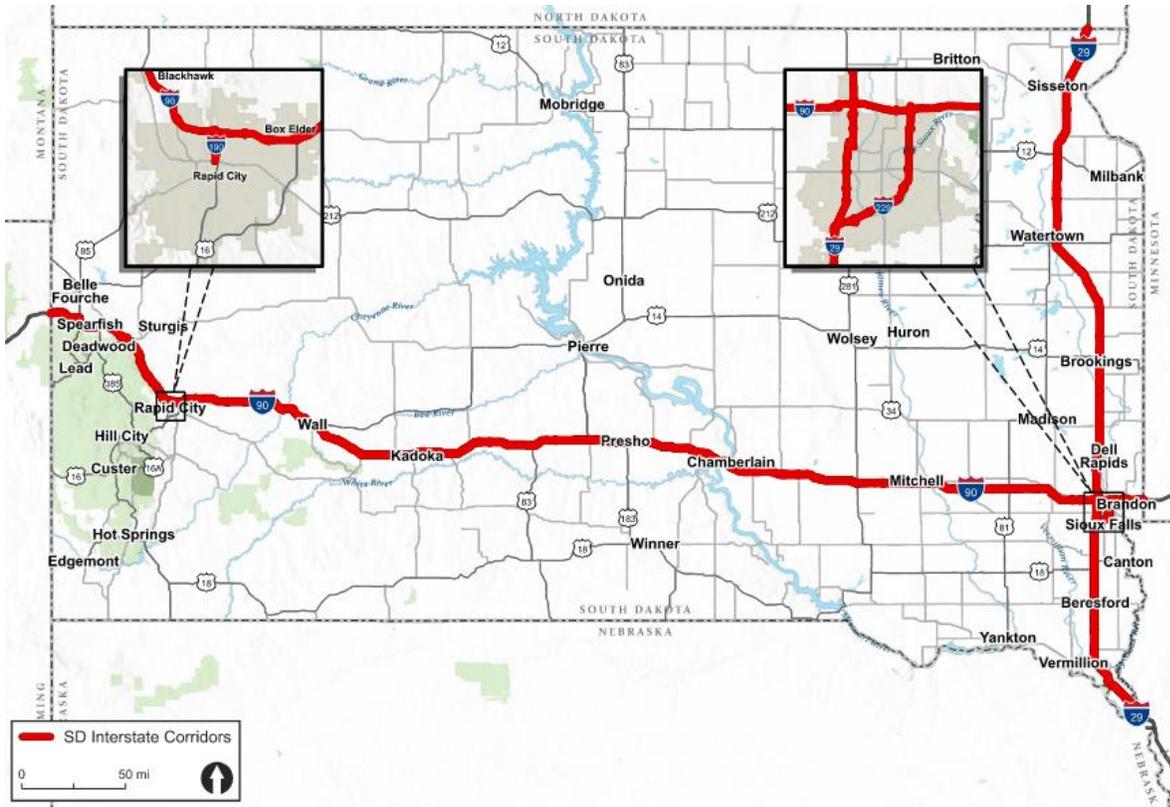


Figure 21. Designated Alternative Fuel Corridor EV Pending Corridors



6.5. Existing Locations of Charging Infrastructure Along AFCs

As of May 27, 2022, there were 59 charging infrastructure locations in South Dakota, comprising 163 Electric Vehicle Supply Equipment (EVSE) ports, some of which are located on non-AFCs.¹⁵ The locations and types of chargers are shown in Figure 22. Existing charging infrastructure locations tend to be in the urban areas of Sioux Falls and Rapid City, the tourism region around the Mount Rushmore National Memorial, and along the I-90 corridor. Currently, there is only one NEVI Program-compliant charging infrastructure location in the town of Wall, installed by Electrify America. Most of the charging infrastructure does not meet NEVI Program requirements, and many along I-90 are proprietary and can only be used by a specific brand of EV.

There is only one existing EV DCFC infrastructure location in South Dakota that is currently NEVI Program-compliant (Wall, SD)

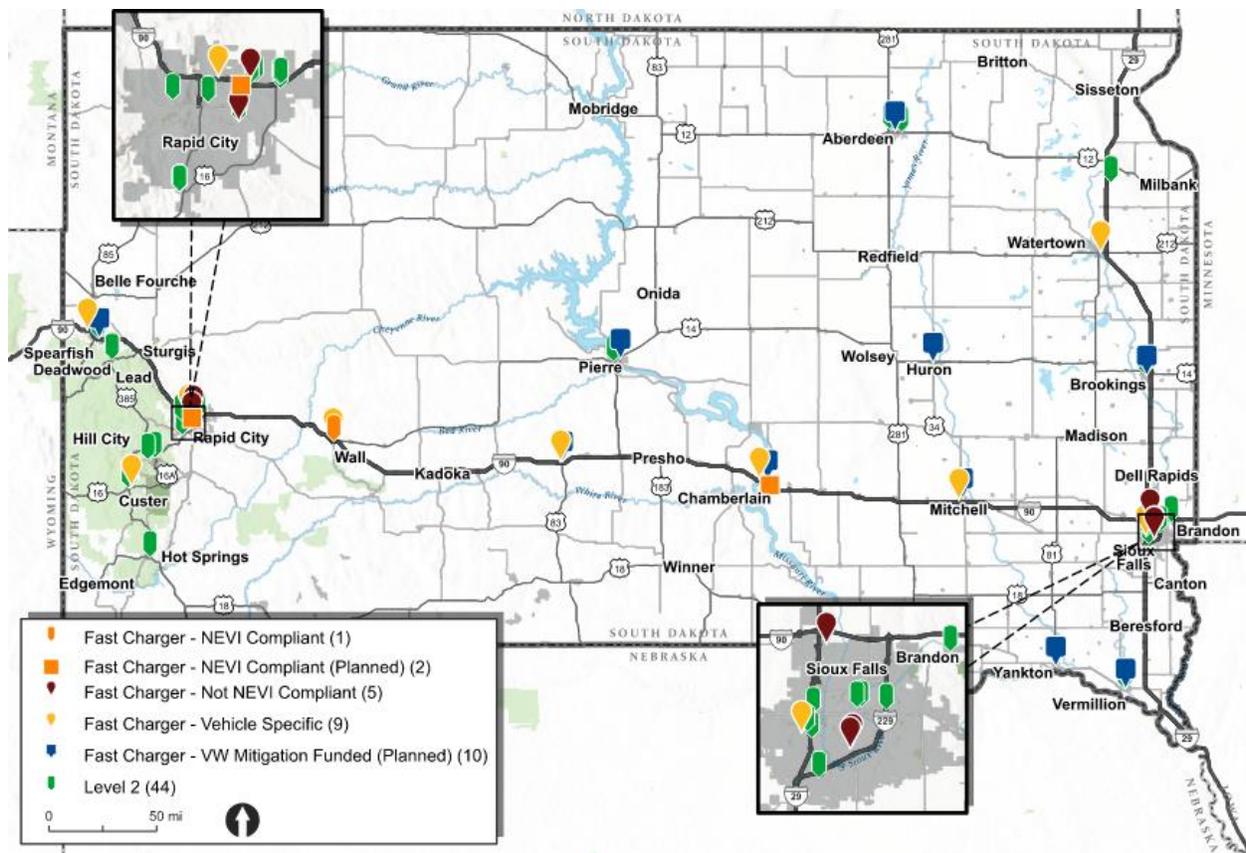


Figure 22. Existing and Planned EV Charging Infrastructure Locations

Several fast chargers are planned to be installed in South Dakota. Electrify America is planning to install two NEVI Program-compliant chargers in Rapid City and Chamberlain. Several chargers are being installed under Round Two of the Volkswagen Environmental Mitigation Trust funds for South Dakota Electric Vehicle Charging Station (EVCS) Program (the current program has up to \$1,218,750 available for EV DCFC infrastructure). EV DCFC infrastructure funded through the two rounds of the EVCS Program are

¹⁵ <https://afdc.energy.gov/stations/States>



identified in Table 4. However, these charging stations are not expected to meet NEVI Program requirements because of the number of ports or the available output wattage of the equipment.

Table 4. EV DCFC Infrastructure Funded Through Two Rounds of the South Dakota EVCS Program

Applicant	Location	Charger Type
City of Vermillion	Vermillion	DCFC
Northwestern Energy	Aberdeen	DCFC
Northwestern Energy	Chamberlain	DCFC/Level 2
Northwestern Energy	Huron	DCFC
Northwestern Energy	Mitchell	DCFC/Level 2
Northwestern Energy	Yankton	DCFC
Oahe Electric Cooperative	Pierre	DCFC
Red E Charging	Brookings	DCFC
Red E Charging	Murdo	DCFC
Red E Charging	Spearfish	DCFC

6.6. Known Risks and Challenges

South Dakota, like many of the Great Plains States, has a relatively low population density and corresponding low traffic volumes on its highway system. The nature of tourism in South Dakota, travel patterns of South Dakota residents, and the topography and climate create challenges for the deployment of EV DCFC infrastructure that meets NEVI Program requirements. These challenges include the following.

6.6.1. Challenge #1: Attracting Private Interest Due to Return on Investment

The relatively low EV adoption rates under the growth scenarios described in Section 6.1 of this Plan and the projected low volume of EVs using the AFCs make private investment and development of EV DCFC infrastructure unattractive, particularly in more remote locations. Figure 23 and Figure 24 illustrate the estimated number of EVs passing by potential EV DCFC infrastructure locations in July 2023 and 2026, respectively, under a medium-growth adoption rate scenario. Also depicted in the figures are estimates of the potential utilization of DCFC infrastructure at a given exit under a variety of assumptions. However, it should be noted that these likely over-estimate usage as they are based upon a percentage of vehicles passing by the exit, when in reality, EV owners are not likely to stop at more than one exit per trip.

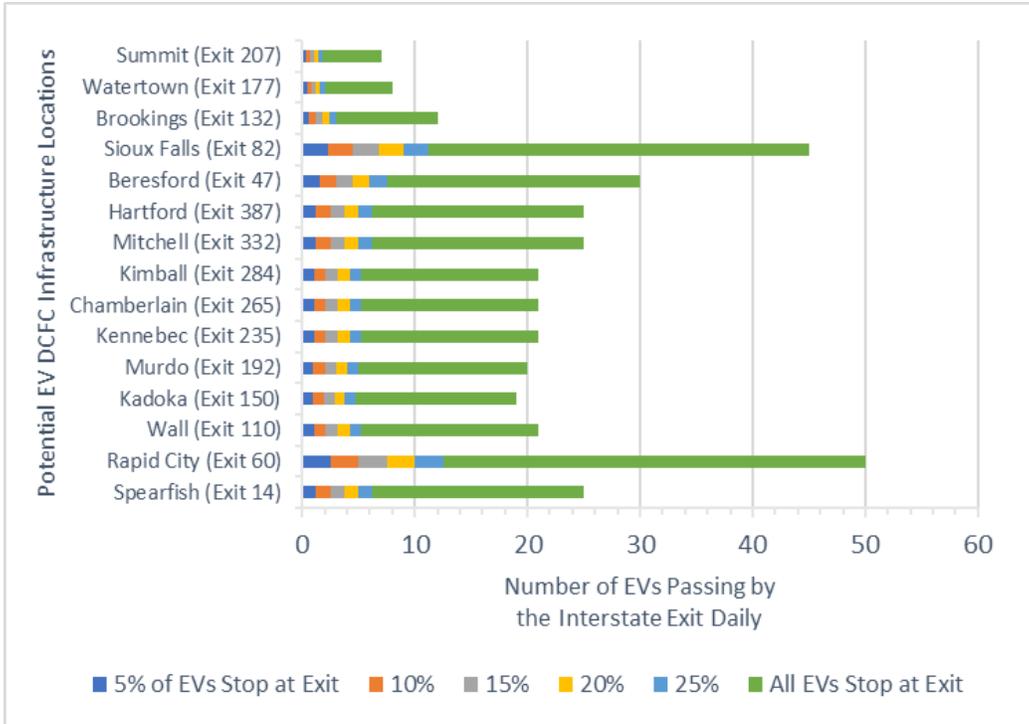


Figure 23. July 2023 Estimated Daily EV Volumes at Potential EV DCFC infrastructure Locations with Various Levels of Utilization

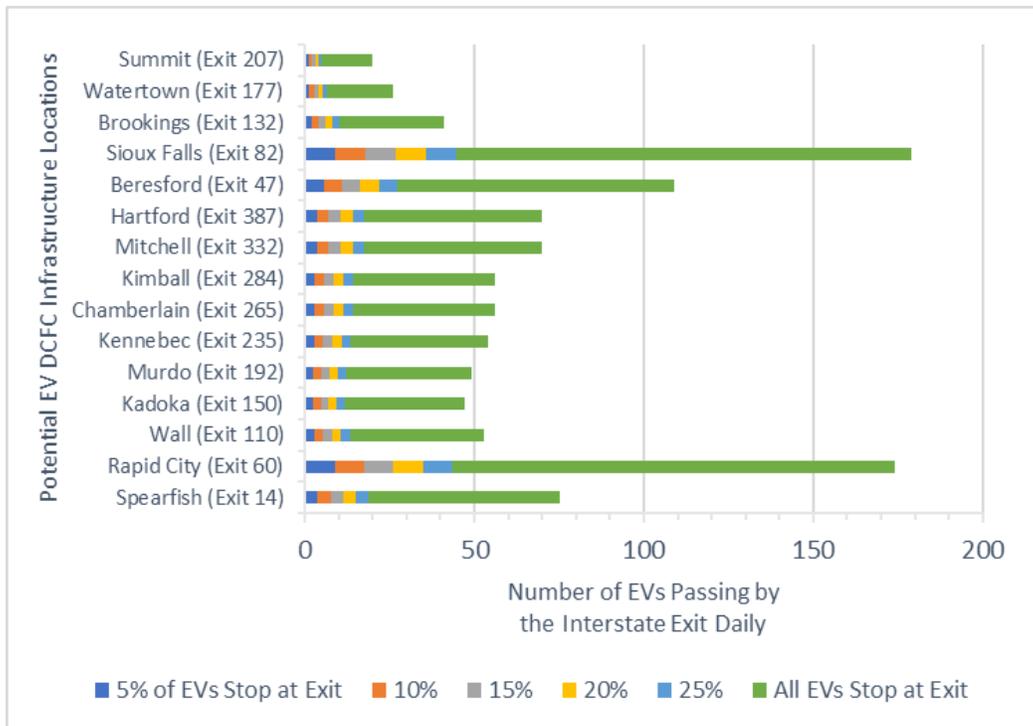


Figure 24. July 2026 Estimated Daily EV Volumes at Potential EV DCFC infrastructure Locations with Various Levels of Utilization



The Great Plains Institute has estimated that each EV DCFC 150kW port would require nine charges per day to break even assuming no capital costs, and 18 charges a day to achieve profitability (break even and recover the initial capital costs). A NEVI Program-compliant location with four 150kW ports would therefore require 36 charges per day to break even without consideration of capital costs, or 72 charges per day to break even and cover capital investment.¹⁶ As part of this Plan preparation, SDDOT prepared estimates using conditions and factors suitable for South Dakota that resulted in similar findings of 76 charges per day¹⁷ under the assumptions that (1) the EV owner is charged \$0.20/minute, (2) there are four 150kW ports, (3) \$240,000 in capital costs representing the 20% match for the location, and (4) the need to achieve positive revenue during the 2022 to 2026 timeframe. Raising the charge per minute to \$0.40/minute reduces the minimum number of charges per day to 40 charges per day. As observed in Figure 24, even in July 2026, which is expected to be one of the heaviest travel months in South Dakota, very few of the potential EV DCFC infrastructure locations will meet or exceed 40 or 76 charges per day even if every EV passing by a given Interstate exit stops to make use of a EV DCFC infrastructure location at the exits.

Profitability within the five-year period will be a direct function of the number of charges per day, the revenue that can be generated by this usage, the cost of the energy (particularly peak demand charges), and the size of the capital investment. Reducing the required match for private partners from 20% to 10% would reduce the number of charges needed per day to achieve profitability from 76 to 60 charges under a \$0.20 per minute charging schedule or from 40 to 32 under a \$0.40 per minute charging schedule. Similarly, a 5% match would further decrease the number of charges needed to 48 or 28 charges per day, respectively. This provides a potential approach to mitigate the risk to private partners who may not be willing to deploy NEVI Program-compliant infrastructure at locations where there is expected to be low utilization.

For its deployment plan, SDDOT proposes to maintain the overall 20% matching funds requirement across the program but vary the match requirements by location to incentivize private investment. Locations that are expected to have lower utilization would require <20% in matching funds, which would be offset by higher matching requirements (i.e., >20%) at locations with expected higher utilization or charges per day. The exact match requirements for a specific location will be determined by SDDOT on an ongoing basis as a function of EV adoption rates and analysis of the data collected from deployed chargers.

6.6.2. Challenge #2: Impact of Peak Demand Charges on Profitability

The configuration of the EV DCFC infrastructure required by the NEVI Program, along with the expected usage and the current practice for setting peak demand charges for electricity within South Dakota, represents a significant challenge to the potential profitability of a charging location. South Dakota utility providers apply peak demand charges monthly based upon the highest peak load during a 15-minute period within the month. The expected usage of the EV DCFC infrastructure in South Dakota is only expected to occupy 22% of the total capacity of the EV DCFC infrastructure at a given location, assuming

¹⁶ https://scripts.betterenergy.org/reports/GPI_DCFC_Analysis_July_2019.pdf

¹⁷ Assumes demand charges of \$6.6 per kW at 600kW, 20% of the capital costs of \$1M amortized over five years, and current market usage and electricity costs.



76 charges per day per location at 17 minutes each. However, it is very likely that at some point during the month, multiple vehicles would be simultaneously charging, which would result in an increased demand charge without the corresponding revenue. Table 5 summarizes this potential phenomenon. As observed in the table, there can be significant variability in the profitability per charging session simply due to the number of vehicles that simultaneously charge at least once during the month and the assessed demand fee.

Table 5. Impact of Assessed Electricity Demand Charges on Profitability of EV Locations, 76 Charging Sessions per Location for 30 Days

Scenarios	Revenue per Charging Session	Per Charging Session Electrical Cost	Assessed Monthly Demand Charges	Effective Electricity Costs per Charging Session	Total Monthly Revenue/ Electricity Costs
Assumptions: 76 charging sessions per location for 30 days Each charging session is 17 minutes long requiring 42.5kW hours	\$3 per session; \$0.20 /per minute charging fee	\$0.07 per kW hour	\$6.60 per kW		
Only one vehicle charging at a time (150kW Demand Assessed)	\$6.40	\$2.98	\$990/ month (\$6.60*150 kW)	\$3.41 (\$2.98 + \$0.43)	\$14,592 Revenue ^a / \$7,775 Costs ^b
Two vehicles simultaneously charged at least once (300kW Demand Assessed)	\$6.40	\$2.98	\$1,980/ month	\$3.85 (\$2.98 + \$0.87)	\$14,592 Revenue/ \$8,778 Costs
Three vehicles simultaneously charged at least once (450kW Demand Assessed)	\$6.40	\$2.98	\$2,970/ month	\$4.28 (\$2.98 + \$1.30)	\$14,592 Revenue/ \$9,758 Costs
Four vehicles simultaneously charged at least once (600kW Demand Assessed)	\$6.40	\$2.98	\$3,960/ month	\$4.72 (\$2.98 + \$1.74)	\$14,592 Revenue/ \$10,762 Costs

a. Monthly revenue of \$14,592 = 76 charging session per day * 30 days* \$6.40 per session

b. Monthly costs = Cost of charging session * 76 charging sessions per day* 30 days

Table 6 illustrates a similar scenario, but where there are only four charges per day or 120 charging sessions over the entire month. This level of utilization is much more realistic for South Dakota. Although the odds that four vehicles are simultaneously charging at a location is relatively low (assuming four charges per day), it is not improbable; and it *only needs to be experienced once during the month* for the peak demand rate corresponding to 600kW to be applied.



Table 6. Impact of Assessed Electricity Demand Charges on Profitability of EV Locations, 4 Charging Sessions per Location for 30 Days

Scenario	Revenue per Charging Session	Per Charging Session Electrical Cost	Assessed Monthly Demand Charges	Effective Electricity Costs per Charging Session	Total Monthly Revenue/ Electricity Costs
Assumptions: 4 Charging Sessions per Location for 30 Days Each Charging Session is 17 minutes long requiring 42.5kW hours	\$3 per session access charge \$0.20 /per minute charging fee	\$0.07 per kW hour	\$6.60 per kW		
Only one vehicle charging at a time (150kW Demand Assessed)	\$6.40	\$2.98	\$990/ month	\$11.23 (\$2.98 + \$8.25)	\$768 Revenue ^a / \$1,348 Costs ^b
Two vehicles simultaneously charged at least once (300kW Demand Assessed)	\$6.40	\$2.98	\$1,980/ month	\$19.68 (\$2.98 + \$16.50)	\$768 Revenue/ \$2,362 Costs
Three vehicles simultaneously charged at least once (450kW Demand Assessed)	\$6.40	\$2.98	\$2,970/ month	\$27.65 (\$2.98 + \$24.75)	\$768 Revenue/ \$3,318 Costs
Four vehicles simultaneously charged at least once (600kW Demand Assessed)	\$6.40	\$2.98	\$3,960/ month	\$35.98 (\$2.98 + \$33.0)	\$768 Revenue/ \$4,318 Costs

- a. Monthly revenue of \$768 = 4 charging session per day * 30 days* \$6.40 per session
- b. Monthly costs = Cost of charging session * 76 charging sessions per day* 30 days

The NEVI Program-compliant configuration of four simultaneous 150kW chargers may not be feasible from a profitability standpoint in South Dakota under the expected usage rates unless changes can be made to how the peak demand rate is calculated and applied to EV DCFC infrastructure.

6.6.3. Challenge #3: Creating Opportunities for Small or Disadvantaged Business

SDDOT wants to deliver the best network of EV DCFC infrastructure to the traveling public as possible and be inclusive and creative with engaging private partners to invest in the program. SDDOT estimates that the anticipated costs for a complete NEVI Program-compliant EV DCFC infrastructure location would be between \$700,000 and \$1.2 million, depending upon location conditions. With a 20% match, this would equate to an investment of \$140,000 to \$240,000 by a private entity. Recognizing that this may be a challenging investment for many small businesses, SDDOT is proposing to meet the NEVI Program guidelines at an EV DCFC infrastructure location by allowing multiple private entities to provide physically separated DCFC charging ports at individual sites within the overall geographic location, provided that



each site meets the remaining NEVI Program requirements. SDDOT believes that this will enhance competition among private entities and reduce overall costs, while providing accessibility to the NEVI Program funds for small or disadvantaged businesses. Another possible solution is allowing for a phasing in of the number of charging ports at a location as they become cost effective with the increase in the EV fleet/usage.

6.6.4. Challenge #4: Geographic Diversification Post-Interstate Build-Out

The IIJA and subsequent NEVI Program guidelines clearly require the completion of a full build-out of the designated AFCs before the funds can be used on non-AFCs. SDDOT estimates that there will need to be a minimum of 14 EV DCFC infrastructure locations (13 new and 1 existing) on the designated AFCs to achieve this full build-out, assuming no other planned charging stations are installed and that the current vehicle-specific charging locations remain restricted. Assuming a cost per location of between \$700,000 and \$1.2 million, 13 new locations would require between \$9.1 million and \$15.6 million in NEVI Program funding, or between 31% to 53% of the total NEVI Program funding available to South Dakota. SDDOT intends to continue to monitor and examine EV adoption rates and charging usage statistics and tailor the deployment of EV DCFC infrastructure in terms of the number and kW output of the ports off of the AFCs to achieve geographic diversification while maintaining an appropriate level of service at each location.

There are very real, and significant challenges to deployment of the required NEVI Program-compliant charging locations in South Dakota

EV adoption and therefore usage of EVs within the State is expected to remain low for the next five years. This low adoption and usage within the State may make the return-on-investment unattractive to the private sector, who the SDDOT is relying upon to meet the 20% matching requirements. Peak demand electricity costs also have a significant impact on this same return-on-investment. These challenges impact both large and small businesses but may be particularly challenging for small and disadvantaged businesses in the State to meet. Deployment of a full NEVI Program-compliant EV DCFC infrastructure consisting of four 150kW, simultaneous chargers is expected to cost between \$700,000 and \$1,200,000 per location. This level of deployment may not be suitable for South Dakota, especially on State highways and other non-Interstate locations.

7. EV Charging Infrastructure Deployment

South Dakota's overarching strategy will be to prioritize the build-out of the EV DCFC infrastructure on the State's Interstates in accordance with NEVI Program standards, and with as few exceptions as possible. SDDOT's plan includes the minimum potential deployment option to be 14 EV DCFC infrastructure locations (13 new and one existing) to be situated along these Interstate corridors (Figure 25) so they can be designated as EV Corridor Ready.



It is important to note, however, that the configuration shown in Figure 25 represents one potential deployment option – one that minimizes the total number of EV DCFC infrastructure locations that would need to be installed, with one exception of 55 miles between Exits 332 and 387. The actual deployment may differ greatly from this initial Plan depending upon the level of interest from private partners or other public partners willing to install, operate, and maintain the EV DCFC infrastructure.

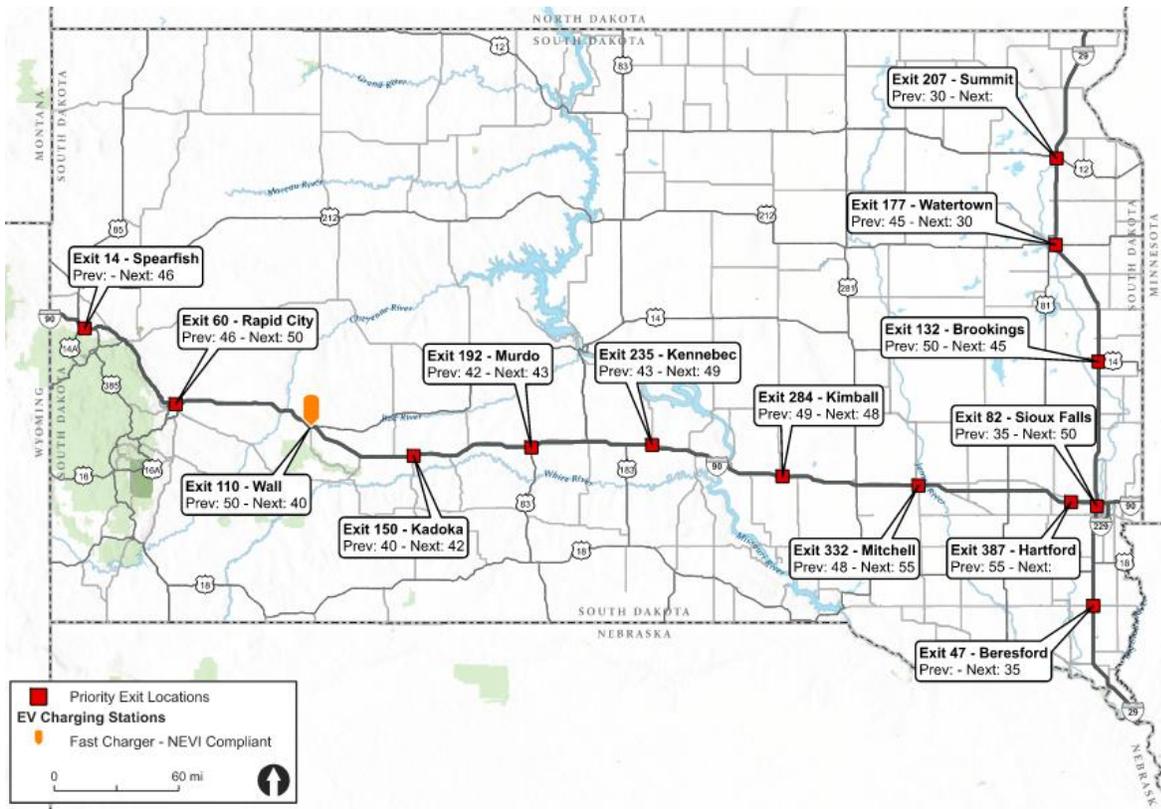


Figure 25. EV DCFC infrastructure - Minimum of 13 New Locations to Meet the NEVI Program Distance Requirements, for a Total of 14 Locations

As EV DCFC infrastructure is installed, SDDOT will reevaluate and reprioritize future locations on an ongoing basis. To facilitate this, SDDOT investigated 45 of the Interstate interchanges within the State for suitability in accommodating EV DCFC infrastructure, as a function of the presence of multiple commercial establishments within one travel mile of the interchange and the availability of suitable power from the corresponding utility provider (Figure 26). Any combination of these alternative locations could be included in a future or revised deployment plan.

Based upon current estimates of the expected costs at a given site, approximately four to six locations could be developed each year. However, SDDOT expects that the installation of EV DCFC infrastructure would likely begin no sooner than FY24 due to the need for development of the grant program described in Chapter 5. The build-out will begin with locations along the designated AFCs. The full-build out of the designated AFCs should be completed by NEVI Program years four and five, with additional deployments following in different locations throughout the State, subject to private partner interest.

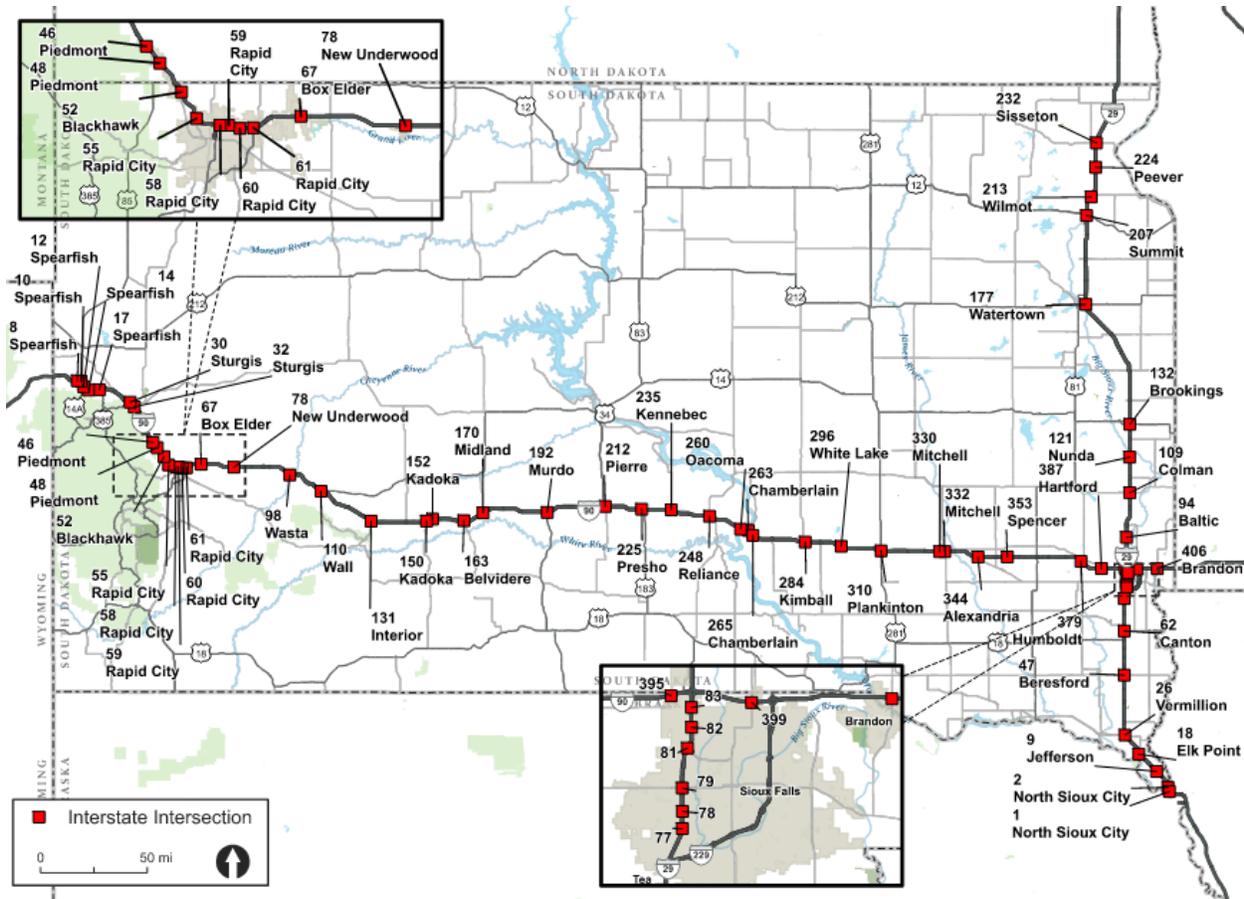


Figure 26. Alternative EV DCFC infrastructure Locations on AFCs

With respect to deployment of EV DCFC infrastructure after full build-out on the AFCs, SDDOT has identified several potential strategies that will be considered. SDDOT expects to determine the specific strategy(ies) from these based upon EV DCFC infrastructure usage and EV adoption rate data gathered during the first three to five years of the Plan.

- **Reduce Distance Between Consecutive Charging Stations Along Interstate Corridors.** Deployments following the build-out of the AFCs would focus on adding NEVI Program-compliant locations along the Interstates to reduce the maximum distances between charging locations.
- **Concentrate Charging Locations at Tourist Destinations.** SDDOT would deploy additional EV DCFC infrastructure at tourist destinations or along routes heavily used by tourists.
- **Establish DCFC Charging Capabilities in Population Centers.** SDDOT would deploy additional EV DCFC infrastructure at population centers that are more than 50 miles from an EV DCFC infrastructure location that was deployed as part of the AFC build-out.
- **Saturate Heavily Traveled Interstate Segments.** Placement of additional EV DCFC infrastructure along Interstate corridors at interchanges that correspond to heavily traveled segments based upon AADT. That is, placement would be determined in ranked order based upon AADT.



- **Maximize Geographic Coverage Through Using Reduced Requirements for Non-Interstate Locations.**
If the data collected from the EV DCFC infrastructure from the AFC build-out reveals that many of the EV DCFC infrastructure locations are not heavily utilized, this strategy would be used in combination with one of the above to broaden the geographic spread of deployments at State highways, tourist destinations, etc., by reducing the requirements at each location related to the number and potentially the kW of the chargers. For example, one option might be to install two 100kW chargers, that could provide simultaneous 100kW charging when two vehicles are using the chargers, or 200kW charging if a single vehicle is using one of the chargers.

Again, it is the intent of the SDDOT to obtain and analyze usage and other performance data as EV DCFC infrastructure is deployed to provide insight and guidance on which one or more of the above post-AFC deployment strategies would best achieve the vision and goals of this Plan.

7.1. Funding Sources

The deployment described in this Plan will be funded by 80% Federal (NEVI Program) funds, with a 20% match by private partners or by other governmental agencies, such as cities, MPOs, etc. SDDOT is not anticipating using State DOT funds as part of the 20% match. As discussed in Chapter 6 of this Plan, to facilitate participation by small, local businesses, SDDOT is contemplating varying the matching requirement at each EV DCFC infrastructure location based upon its expected usage rate. Private partners for EV DCFC infrastructure locations that have higher expected usage may be required to contribute more than a 20% match, while partners for locations with lower expected usage may be allowed to contribute less than 20% as long as the overall program remains at a 20% match.

7.2. 2022 Infrastructure Deployments/Upgrades

SDDOT is not expecting to initiate the actual installation of EV DCFC infrastructure sooner than FY24.

7.3. Electric Vehicle Freight Considerations

This Plan does not specifically address heavy-duty freight vehicles because they will require EV DCFC infrastructure that can handle the larger-sized vehicles that will have higher power requirements. However, as discussed in Chapter 6, I-90 and I-29 both play an important role with freight movements within South Dakota and between South Dakota and the surrounding States. Commercial truck parking facilities are located throughout the State and represent potential EV DCFC infrastructure locations for passenger vehicle charging as they frequently include 24/7 public access; are in proximity to Interstates; and can incorporate all types of vehicles, such as light-duty trucks and SUVs pulling a trailer, etc.

7.4. Public Transportation Considerations

The EV DCFC infrastructure that will be deployed under this Plan and as required by the NEVI Program, *can* be used by some public transportation EVs, such as the smaller transit vehicles and school buses. Because of the nature and lack of density of public transportation within South Dakota, this Plan has not been developed to optimize usage by these types of vehicles. Nevertheless, by including the requirement that vehicles with trailers be accommodated, SDDOT is also implicitly enabling the use of the EV DCFC infrastructure by smaller transit vehicles and school buses.



7.5. FY23-26 Infrastructure Deployments

Deployment of EV DCFC infrastructure is expected to begin no sooner than FY24. EV DCFC infrastructure along I-90 and I-29 will be deployed FY24 to FY26 and will be focused on completing the build-out on AFCs so they can be designated as EV Corridor Ready. In FY26 and beyond, it is expected that additional EV DCFC infrastructure deployments will be completed on non-AFCs, i.e., along US and State highways, under one or more of the deployment strategies described earlier in this chapter.

Installation of EV DCFC infrastructure is expected to begin no sooner than FY24

7.6. State, Regional, and Local Policy

Relevant State legislation and policy is discussed in Chapter 6. No barriers have been identified during the development of this Plan to administering the NEVI Program funds through a grant-type process, as described in Chapter 5.

8. Implementation

The contracting process described in Chapter 5 will be the primary guide for implementation of the NEVI Program funds in South Dakota. As SDDOT will be relying upon others for matching funds, these partners will also have the primary responsibility for constructing, owning, operating, and maintaining the EV DCFC infrastructure.

The contracting process was designed to provide flexibility for the deployment of the EV DCFC infrastructure, as well as to provide a breadth of opportunities for private partners, and other governmental agencies to participate in the Program. SDDOT has identified the minimal required number of potential EV DCFC infrastructure locations DCFC infrastructure along Interstate corridors so they can be classified as EV Corridor Ready. However, other locations will also be considered, and deployment plans are expected to be adjusted over time based upon the data gathered and lessons learned from the locations already deployed.

SDDOT will incorporate guidance and requirements from the Joint Office into components of the contracting requirements. Proposed rules outlined in the FHWA/DOT Notice of Proposed Rulemaking (NPRM) will be included in the implementation and contracting requirements for DCFC infrastructure providers. The six categories covered in the NPRM are:

- › Installation, operation, and maintenance by qualified technicians of EV infrastructure.
- › Interoperability of EV charging infrastructure.
- › Traffic control devices and on-premises signs acquired, installed, or operated.
- › Data requested related to a project funded under the NEVI Formula Program, including the format and schedule for the submission of such data.
- › Network connectivity of EV charging infrastructure.



- Information on publicly available EV charging infrastructure locations, pricing, real-time availability, and accessibility through mapping applications.

8.1. Strategies for EVSE Operations & Maintenance

SDDOT anticipates that the operations and maintenance of the EV DCFC infrastructure and the associated location will be performed by the location owner, the provider of the EVSE, or a contracted third-party under agreement with the private partner. As part of the contracting process, minimum requirements will be defined for charger uptime (97% as defined by the NEVI Program requirements), repair lead time, repair responsiveness, failure/fault reporting, regular maintenance, cleaning, and station upkeep. The requirements will also meet the NPRM issued on June 22, 2022. It is anticipated that different partners will have different business models, but each would need to demonstrate that the location host or some other third party is under a contractual agreement with the partner to monitor, routinely inspect, perform basic site cleaning functions, and perform snow and ice removal. In addition, operation and maintenance of the infrastructure will be required to be performed by qualified technicians that meet the June 22, 2022, NPRM guidance, specifically as specified by Section 680.106(j) that requires States to *“ensure that the installation and maintenance of EVSE is performed safely by a skilled workforce that has appropriate licenses, certifications, and training. The proposed regulation would further encourage States to utilize a diverse workforce of electricians and other laborers. The proposed regulation also requires that, with the exception of apprentices, all electricians installing, maintaining, and operating EVSE be certified through the Electric Vehicle Infrastructure Training Program (EVITP).”* The EVITP refers to a comprehensive training program for the installation of EV supply equipment.

8.2. Strategies for Identifying Electric Vehicle Charger Service Providers and Station Owners

SDDOT is intending to establish a contracting process that will provide opportunity for small and large businesses or a broad spectrum of potential partners to participate in the program. Much of the strategy for identifying EV providers and location owners has been undertaken as part of the development of this Plan through the engagement of stakeholders that are potential providers and owners. For example, SDDOT has had communication with several national EV DCFC equipment manufacturers to discuss their products, potential plans for South Dakota, and the NEVI Program. Similarly, SDDOT has engaged in communications with potential site owners to familiarize them with the Program (Figure 27). SDDOT expects that when funding becomes available and following the approval of this Plan, public announcements will be placed following SDDOT’s procurement process announcing the availability of funding and inviting potential partners to submit applications for the funds. At the same time, SDDOT will continue to have discussions and dialogue regarding the Plan, the contractual process, etc., to generate and maintain exposure and interest in the Program.



Source: Christine Erickson, South Dakota Auto Dealers Association

Figure 27. SDDOT Division Director for Planning and Engineering Mike Behm and Christine Erickson Director of the South Dakota Automobile Dealers Association discussing the SD EV Infrastructure Deployment Plan with the South Dakota Automobile Dealers Association Members (June 2022)

As part of developing the Plan, several potential EV DCFC locations and one existing location were identified. Each of these potential locations is at an Interstate exit within one travel mile of the Interstate. Additional interchanges could potentially serve as alternatives, provided a private entity at the location is interested in providing the matching funds. Each of the potential EV DCFC locations or other interchange locations have the potential for multiple private organizations to apply for and receive funding from SDDOT for the installation of EV DCFC infrastructure.

SDDOT intends to utilize a two-step process for prioritizing and selecting EV DCFC infrastructure locations from among the applications received. First, SDDOT will screen potential applications to determine if they are at locations needed to achieve the NEVI Program 50-mile spacing requirement, as well as the other NEVI Program and Federal requirements, including:

- › EV charging infrastructure is located within one travel mile of the Interstate.
- › EV charging infrastructure includes at least four 150kW direct current (DC) fast chargers with CCS ports capable of simultaneously DC charging four EVs.
- › EV charging infrastructure has minimum station power capability at or above 600kW.
- › The EV charging infrastructure must be publicly available 24/7.
- › The EV charging infrastructure must be accessible to all travelers, including meeting the relevant ADA requirements.



SDDOT Will Use a Two-step Process for Determining Locations and Awarding Grants for EV DCFC Infrastructure Locations

1. SDDOT will screen potential applications to determine if they are at locations needed to achieve the NEVI Program 50-mile spacing requirement, as well as the other NEVI Program and Federal requirements.
2. If multiple applications are received for a given location, SDDOT will use a methodology to develop a site suitability score to prioritize applications for award.

Following this initial screening, the remaining applications for a given location will be prioritized using a methodology and rubric that assigns a single Site Suitability Score to each application using a set of quantifiable site and applicant characteristics. This methodology combines objective scores from several individual criteria into a single metric, whereby each application can then be arranged in priority order. This algorithm is reflected in the following equation and is a weighted sum of the individual criteria scores.

$$\text{Site Suitability Score} = \sum_i w_i * CS_i \text{ where } CS_i \text{ is the Criteria Score for criterion } i$$

Each criterion has its own recommended scoring rubric that is also a weighted average of the individual scores within that criterion. Table 7 summarizes the recommended criteria and weights for calculating a Site Suitability Score. The specific scoring values for each criterion will be publicly published as part of the notice of funding availability.

Table 7. Recommended Scoring Criteria and Associated Weights

Criterion	Rationale for this Criterion	Weight
Total Amount of Public Funding being Requested	Gives higher priority to applications that are more cost effective in requesting a lower amount of public funding.	25%
Percentage of Matching Funding Being Requested	Gives higher priority to applications where the private company is providing a higher percentage of the total costs. Maximizes public investment funds.	25%
Total Number of Locations Applicant is Applying For	Gives higher priority to applicants who are applying for multiple locations. Reduces administrative burden and costs.	10%
Availability of Amenities	Sites with more accessible amenities, such as restrooms, are prioritized over sites with restrictions on availability.	25%
Disadvantaged Business Enterprise	Applicants that represent a small or disadvantaged business will receive a priority.	7.5%
Located within a Justice40 or Disadvantaged Community (DAC) Zone	Gives priority to sites located within a Justice 40 Zone.	7.5%



8.3. Strategies for EVSE Data Collection & Sharing

As noted in Chapter 12, SDDOT does not anticipate that any of the deployed EV DCFC infrastructure will be directly tied to any SDDOT information technology (IT) network. The responsibility for capturing and reporting data on usage, uptime, and any other information needed for Program Evaluation (Chapter 13) will be required and designated as the responsibility of the partner under the contractual conditions for receiving funding.

SDDOT anticipates the contractor will generate and provide data describing charging usage, cost, and reliability that can be shared with the Joint Office to support Program evaluation and improvement efforts. SDDOT will use the template provided in the June 22, 2022, NPRM to submit data to the Joint Office. SDDOT will consider requiring data describing charging station location, type of equipment available, price for charging, and status that can be shared via an application programming interface (API) through the open charge-point protocol (OCPP) with public-facing directories, including the Alternative Fuel Data Center's Station Locator. Data sharing will conform to the requirements now being developed by the Joint Office.

8.4. Strategies to Address Resilience, Emergency Evacuation, Snow Removal/Seasonal Needs

South Dakota experiences a range of natural and manmade disasters, such as wildfires, flooding, high-winds, tornados, winter storms, and other events that may require evacuation of the population. SDDOT intends to install EV DCFC infrastructure first along the primary travel routes (i.e., Interstates) and near other travel corridors, such trunk highways. To facilitate evacuations should they be needed, SDDOT will endeavor to place all EV DCFC infrastructure within one travel mile of the Interstate or proximity to a trunk highway.

Snow removal will be the responsibility of the partner and will be included as a contractual requirement.

Following the build-out of the designated AFCs (i.e., the Interstates in South Dakota), SDDOT is willing to consider other potential deployment strategies to enhance resiliency and address the seasonality travel aspects associated with tourism to the State.

8.5. Strategies to Promote Strong Labor, Safety, Training, and Installation Standards

SDDOT will require all successful applicants to comply with applicable Federal and State labor, safety, training, and installation standards as a condition of receiving funding. As described in Section 8.1 of this Plan, SDDOT intends to require that operation and maintenance of the EV DCFC infrastructure be performed by qualified technicians that meet the June 22, 2022, NPRM guidance, as specified by Section 680.106(j). SDDOT will look to the Joint Office for additional Safety, Training, and Installation guidance and Standards as they become available.

SDDOT intends, as described in Section 6.1 of this Plan, to promote the participation of a variety of different size businesses in the program by adjusting the required matching percentages, allowing the splitting EV DCFC infrastructure at a given location into multiple physical sites, and by installing EV DCFC infrastructure across the State, including in Justice40 Zones. These strategies could facilitate creation of jobs and support different levels of skilled labor populations throughout the State.



8.6. Charger Types

SDDOT intends to require that the AFCs are constructed to full NEVI Program compliance and prioritize EV DCFC infrastructure locations that can be constructed quickly and easily. Currently, the NEVI Program requires the utilization of four, simultaneous 150kW CCS chargers. There are not many vehicles available today that can make use of a charger with more than 150kW of available power. Chargers and vehicles that support 350kW are the direction of the future. High-power DCFCs that supply 350 kW are available on the market now and can be deployed to support future high-power vehicles when they ultimately become available. A 350kW charger will cost roughly double what a 150kW charger will cost. Given the limited funding available under the NEVI Program, deploying these high-power chargers will limit the amount of infrastructure that can be installed. Additionally, the maximum power that a vehicle can support is not constant throughout the charging period. The vehicle can only reach the maximum power level for a short time, and then will fall off to a lower power level based on the vehicle's specific charging curve. SDDOT does intend to allow potential applicants to construct and operate EV DCFC infrastructure locations that are above the minimum NEVI Program standards but may limit the amount of funding made available to that needed to deploy the minimum NEVI Program-compliant DCFC infrastructure.

SDDOT has examined the relative benefits of using a requirements specification approach versus establishing a Qualified Product List (QPL) for EV DCFC infrastructure. A QPL is an exhaustive list of all the exact EV DCFC infrastructure manufacturer and model numbers that are approved for deployment. This approach reduces confusion and ambiguity across EV DCFC infrastructure locations, promotes consistency, and streamlines the contractual process. On the other hand, developing specific requirements that EV DCFC infrastructure must meet provides for flexibility with equipment supply and potentially adds resiliency to the system by introducing a spectrum of suppliers. SDDOT intends to consult with the Joint Office and other State DOTs to develop specific equipment requirements that will be included in the notice of funding availability and subsequent contractual agreements. These requirements will be updated over time depending upon market conditions, availability of equipment, introduction of new standards, etc.

8.7. Potential Site Layouts

There are many different potential configurations for how EV DCFC infrastructure could be deployed at a specific location depending upon the site conditions, space, traffic flow, etc. SDDOT recognizes that the unique conditions of travel in South Dakota, as described in Chapter 6, require additional considerations for site layouts, including the following principles:

- **Accommodation for Vehicles with Trailers.** Many vehicles in South Dakota pull a trailer for leisure or work activities, such as snowmobiling, camping, water sports, agricultural, business activities, etc. Having at least one space that can accommodate these vehicles without disengaging the vehicle from their trailer is important.
- **Minimizing Traffic Flow Impacts.** The EV DCFC infrastructure orientation should be intuitive and not disruptive of the normal traffic flows within the location. The EV DCFC infrastructure should be positioned in a fashion that would discourage non-EVs from using these parking spots.



- > **Compliant with Americans with Disabilities Act (ADA).** At least one of the four charging ports at each location should be ADA accessible and compliant.
- > **Maximizing Usage.** Recognizing that compliance with the ADA and vehicles with trailers will require at least two parking locations, SDDOT will encourage applicants to share a charging port between a standard parking space and one or both of these more specialized parking spaces. That is, the charging ports should be offset and orientated so that the plug can reach both the ADA parking space and an adjacent standard parking space.
- > **Accommodate Weather Conditions.** The EV DCFC infrastructure should be installed in such a fashion to easily allow for operation following an adverse weather event. For example, the orientation within a site should enable snowplow operations. Charging equipment should not be installed in locations that are prone to flooding or pooling of water during or after rain or snow events.

Figures 28 through 33 illustrate potential site layouts for different potential types of sites. For reference, Figure 28 provides typical dimensions for EV DCFC infrastructure and parking spaces. These same dimensions are maintained throughout all figures.

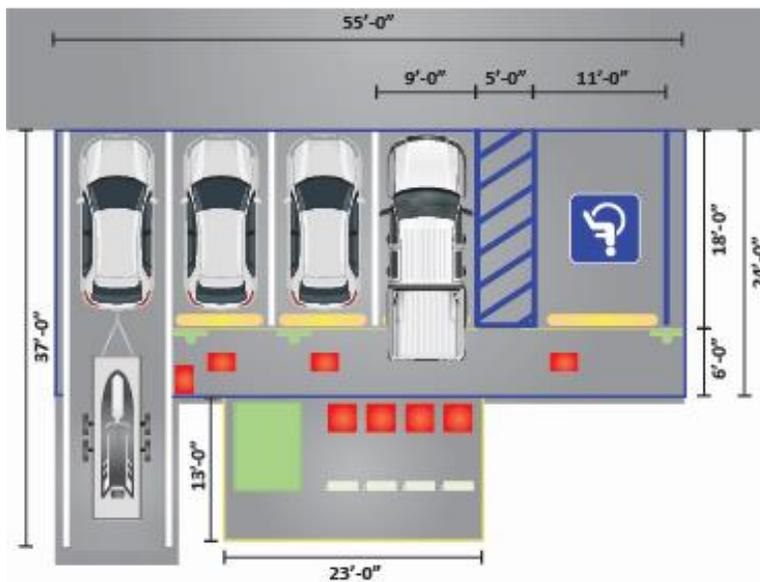


Figure 28. Basic Site Layout with Dimensions



Figure 29. Potential EV DCFC Infrastructure Layout at a Travel Plaza, or Strip Mall

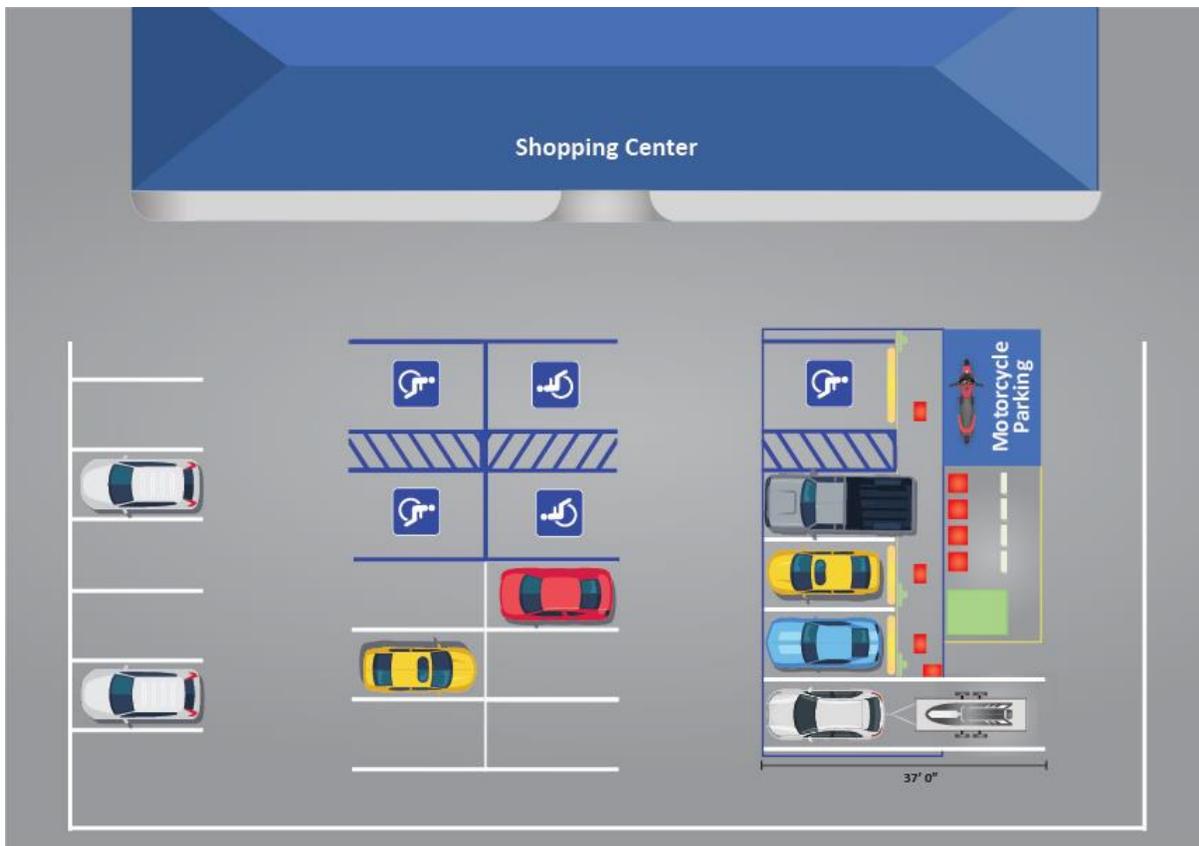


Figure 30. Potential EV DCFC Infrastructure Layout at a Large Commercial Box Store

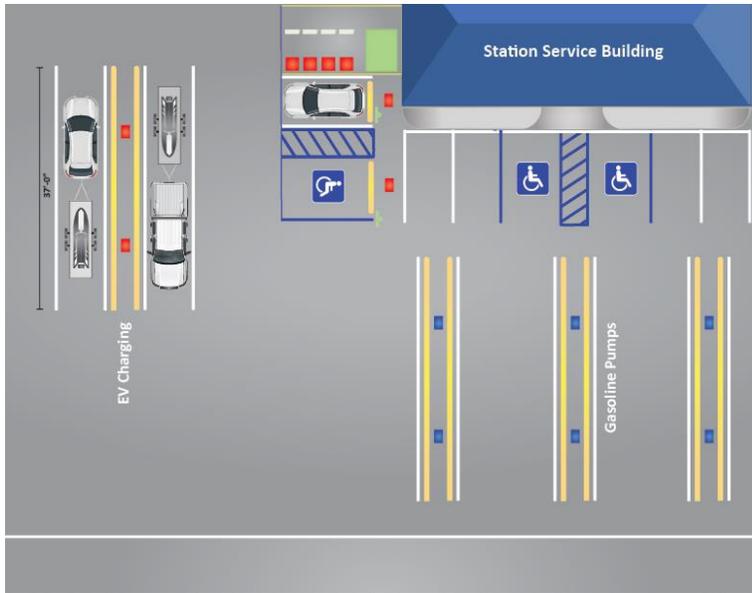


Figure 31. Potential EV DCFC Infrastructure Layout at a Refueling Station

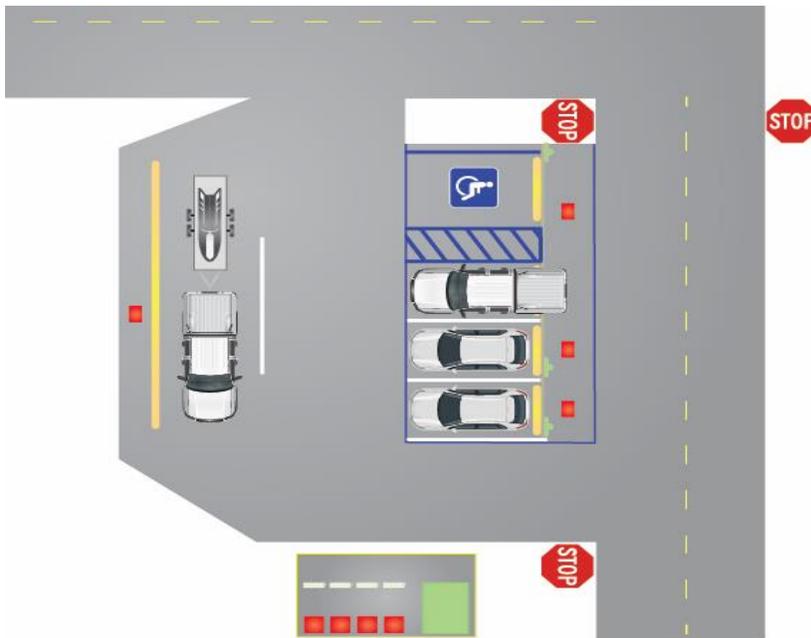


Figure 32. Potential EV DCFC Infrastructure Layout for a Standalone Location

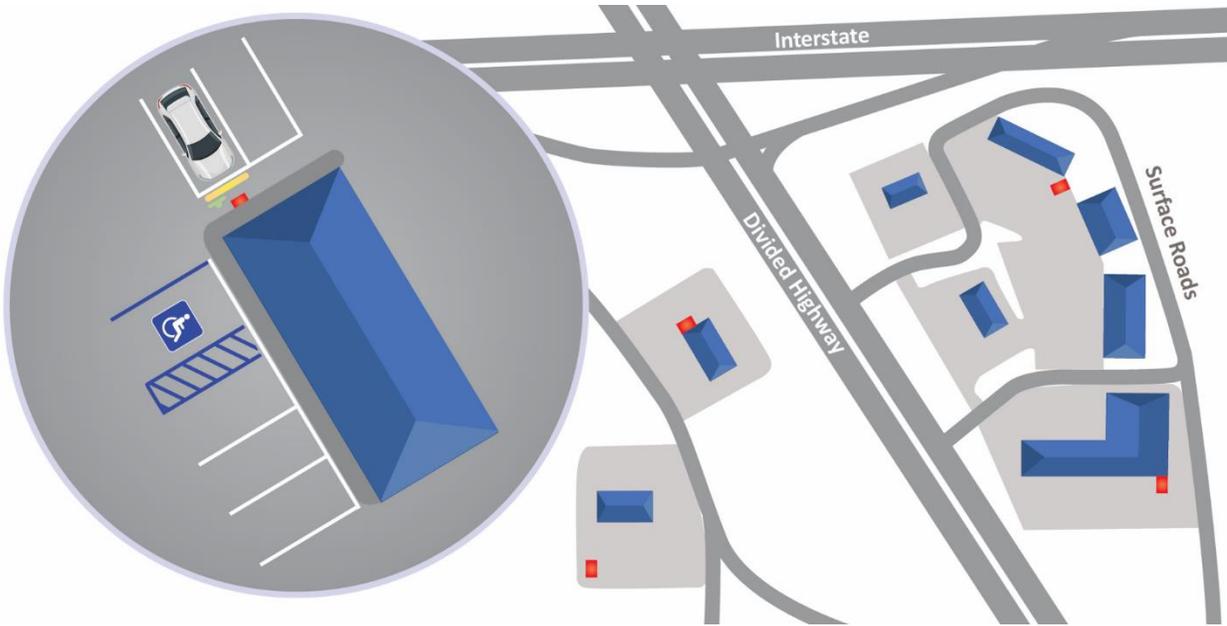


Figure 33. Illustration of EV DCFC Infrastructure Distributed Across Multiple Sites for a Given Interstate Interchange.

9. Civil Rights

Title VI requires that no person in the United States shall on the grounds of race, color, or national origin as protected groups, be excluded from participation in, denied benefits of, or be otherwise subjected to discrimination under any program or activity for which the recipient receives Federal assistance. To ensure adherence to Title VI, the SDDOT FY22 FHWA Title VI Program Implementation Plan governs DOT employees and all programs receiving Federal assistance within the department and was most recently updated in September 2021 for FHWA.

SDDOT has a Civil Rights Compliance Officer, who is also the ADA Coordinator, who monitors adherence to Title VI, updates policies accordingly, and ensures that programs and procurements follow the requirements agreed to between the U.S. Department of Transportation and SDDOT. Any sub-recipients of Federal funds are subject to monitoring for conformance to Title VI, including MPOs, counties, cities, townships, colleges, universities, and consultants (including contractors and subcontractors).

As part of the Title VI Program Implementation Plan, it is agreed upon between the U.S. Department of Transportation and SDDOT that the following language will be included in all procurements that are inclusive of Federal funds, which would include the NEVI Program deployment procurement:

"The South Dakota Department of Transportation, in accordance with the provisions of Title VI of the Civil Rights Act of 1964 (78 Stat. 252, 42 U.S.C. §§ 2000d to 2000d-4) and the Regulations, hereby notifies all bidders that it will affirmatively ensure that any contract entered into pursuant to this advertisement, disadvantaged business enterprises will be afforded full and fair opportunity to submit bids in response to this invitation and will not be



discriminated against on the grounds of race, color, or national origin in consideration for an award."

When posting public notices for public meetings, the following must also be included to allow for special accommodations, if needed:

"Notice is further given to individuals with disabilities that this [open house/public hearing/public meeting/board meeting/commission meeting] is being held in a physically accessible place. Any individuals with disabilities who will require a reasonable accommodation in order to participate in the [open house/public hearing/public meeting/board meeting/commission meeting] should submit a request to the department's ADA Coordinator at 605-773-3540 or 1-800-877-1113 (Telecommunication Relay Services for the Deaf). Please request the accommodations no later than 2 business days prior to the meeting in order to ensure accommodations are available."

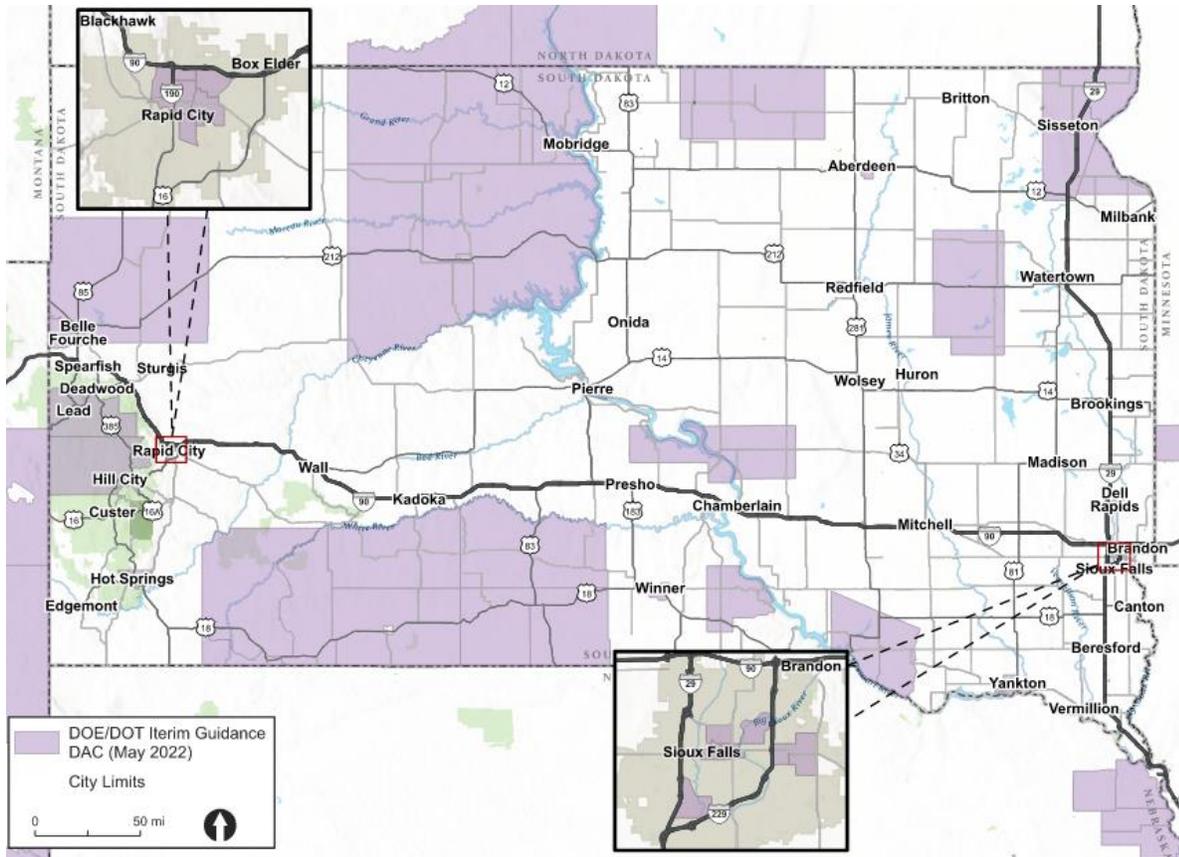
With a Title VI Program Plan in place to govern the dissemination of Federal funds and Federal projects, SDDOT can assure that NEVI Program will adhere to the civil rights requirements of Title VI.

10. Equity Considerations

The Justice40 Initiative, established in January 2021 by Presidential Executive Order 14008 on Tackling the Climate Crisis at Home and Abroad, provides a goal that at least 40 percent of the overall benefits of certain Federal investments flow to Disadvantaged Communities (DAC). The Interim Implementation Guidance for the Justice40 Initiative (released July 2021) and the NEVI Guidance (released in February 2022 and June 2022) identifies clean transportation as a Justice40 covered program.

SDDOT supports equity considerations when planning investments in EV infrastructure. As discussed in this Plan, there is the expectation that there will be growth in the adoption of EVs in South Dakota along with the surrounding States. As additional EV makes and models come to market, EV adoption will increase and a secondary vehicle market in EVs will continue to emerge. SDDOT is committed to the concept that investments in publicly funded EV infrastructure as part of this Program continue to benefit all populations across the State both today and in the future.

Using data from the mapping tool developed by Argonne National Laboratory, SDDOT has identified the DACs within South Dakota (Argonne National Laboratory Interactive Electric Vehicle Charging Justice40 Map [Figure 34]). The DACs are spread throughout the State in both urban zones (Rapid City, Sioux Falls, etc.) and large rural zones that include Tribal lands and Tribal reservations.



Source: Argonne National Laboratory Interactive Electric Vehicle Charging Justice40 Map

Figure 34. DACs in South Dakota as Defined by FHWA's Interim Guidance

Under the scenario involving a minimal build-out needed for all Interstate corridors to be certified as EV Corridor Ready, 3 of the 13 locations would fall within a DAC, and a fourth could be in near proximity within Sioux Falls. This would represent 28% of the total NEVI Program funding being placed into or near Justice40 communities during the AFC build-out phase. Other components of this Plan that are designed to achieve the goals of the Justice40 Initiative include:

- Providing priority to placement of EV DCFC infrastructure within a Justice40 Zone.
- Splitting locations into multiple sites, as described in Chapter 6, to facilitate the investment and involvement of DAC businesses.
- Continued engagement and coordination with DACs regarding EV and other infrastructure improvements throughout the State.

10.1. Identification and Outreach to DACs in the State

As discussed in Chapter 3, South Dakota is committed to public outreach to all residents and businesses in South Dakota and has recently updated its Public Involvement Plan outlining the department's commitment to "improve and strengthen engagement between SDDOT and the public on the range of activities, projects and plans it undertakes, building a relationship of trust and accountability between the



agency and the public it serves.”¹⁸ Development of this Plan followed the guidelines and tenets of the Statewide Public Involvement Plan. Also as discussed in Chapter 3, two in-person public meetings were held in the State’s two largest metropolitan areas—Rapid City and Sioux Falls—both of which include Justice40 Zones. One of the public meetings was held at Western Dakota Technical College at 800 Mickelson Dr, Rapid City, SD 57703, which is centered in the Rapid City Justice40 community. Virtual public meetings were used to reach a diverse population within the State, including residents of Justice40 communities. Approximately 19% of the population in South Dakota resides in a Justice40 community.

SDDOT also held two informational virtual meetings with representatives and members of the Tribes in South Dakota as many of the DACs overlap with Tribal lands, which represent 29% of the land area within the State boundary. SDDOT is committed to its partnership with the Tribal communities and intends to continue to use existing communication channels for coordination and engagement from these communities as the Plan is further refined and implemented.

One tool used by SDDOT for obtaining feedback on the perception of SDDOT’s performance in delivering services to residents and key customer groups across South Dakota is a bi-annual customer satisfaction survey. In 2021, SDDOT completed the ninth survey in the series to track and monitor attitudes and needs among SDDOT customers, including the general public, farmers, emergency vehicle operators, and trucker/shippers. The study includes opinions of 1,467 residents, 255 truckers/shippers, 81 emergency vehicle operators, 237 farmers/ranchers, 278 senior citizens, 31 State legislators, and 211 contractors. This survey collected information on a wide variety of topics and is being used by SDDOT to guide research, deployment strategies, and development of statewide plans, such as this Plan. The 2021 survey specifically included questions requesting feedback on priorities that included emerging technologies, such as EVs and automated vehicles (Figure 35).

10.2. Process to Identify, Quantify, and Measure Benefits to DACs

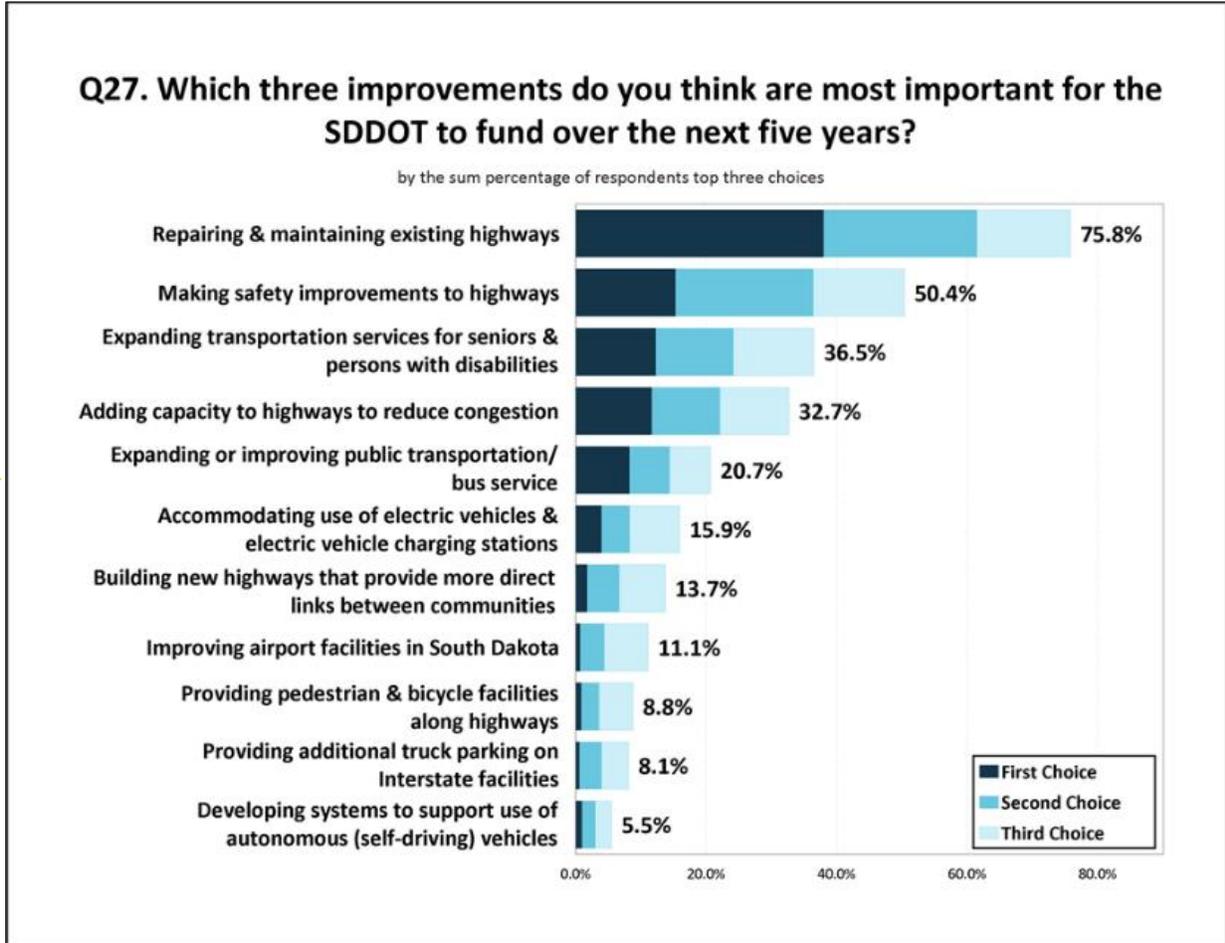
SDDOT understands the value in performance-based planning and is experienced in measuring performance and reporting in accordance with Federal requirements. At the same time, SDDOT also recognizes that the NEVI Program is a newly created program, and that additional guidance and tools will become available over time to assist in measuring its benefits. Until such tools and measurement standards have been developed, SDDOT will capture and track the following data that can be used to measure benefits to DACs:

- › **Number of charging locations located within a DAC.** Under the strategy of deploying the minimum number of EV DCFC infrastructure locations, three locations would be located within a DAC and a fourth could be in close proximity to a DAC. SDDOT will continue to track the build-out of publicly funded or assisted EV DCFC infrastructure in South Dakota noting their locations.
- › **Usage of EV DCFC infrastructure locations.** SDDOT intends to require their partners to capture and report on usage of EV DCFC infrastructure funded in part by the NEVI Program.

¹⁸ <https://dot.sd.gov/media/documents/SDDOT-PublicInvolvementPlan2022-SignatureCopy.pdf>



- > Use of Disadvantaged Business Enterprises (DBE) to support EV DCFC infrastructure design, deployment, and maintenance.



Source: SDDOT 2021 Statewide Customer Satisfaction Assessment Study SD2021-02

Figure 35. Transportation Priorities that Should Receive the Most Emphasis

10.3. Benefits to DACs through this Plan

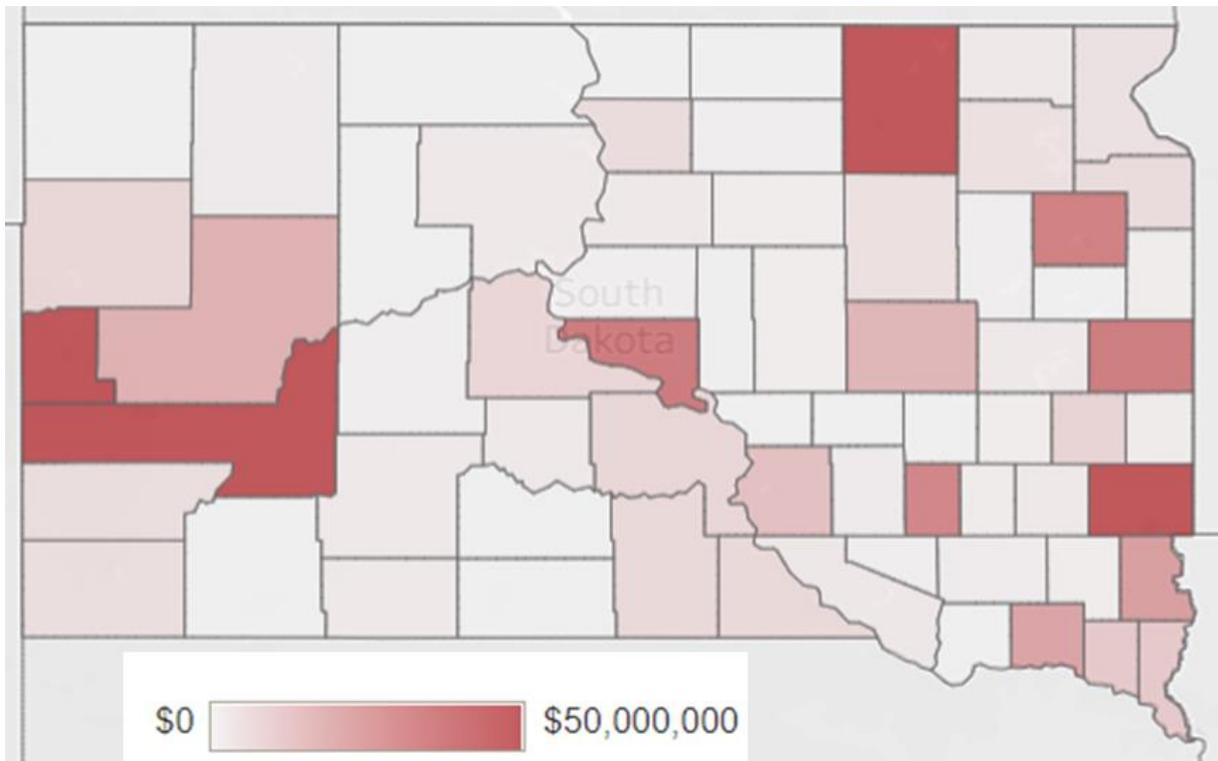
Primarily, SDDOT will use the number of EV DCFC infrastructure locations within a DAC as a metric for assessing benefits. However, other potential benefits to DACs can be attributed to tourism, and commuter trips by South Dakota residents.

10.3.1. Estimating Benefits due to Supporting Tourism with EVs

The tourism industry will be supported by the entire South Dakota EV DCFC infrastructure network and its connectivity to the national network. Assessing the specific benefits to a DAC because of the EV DCFC infrastructure will be challenging. However, it is worthwhile to note that many of the Justice40 Zones are located at or near a large number of South Dakota’s primary tourist attractions, such as the Black Hills National Forest, Mount Rushmore, Custer State Park, Crazy Horse Memorial, etc. As EV adoption increases among South Dakota residents and among tourists from neighboring States, particularly Minnesota and Colorado, tracking of EV DCFC infrastructure usage along with annual volumes of tourists



from these States at these attractions will allow SDDOT to estimate the percentage of tourism that was supported by the EV DCFC infrastructure network. In turn, econometric tools, such as those used annually by the South Dakota Department of Tourism, can then be applied to assess the impact of tourism on the GDP of South Dakota at large, which will serve as a surrogate for estimating the impact on DACs as these again encompass or are nearby many of the primary tourist destinations. More specifically, the South Dakota Department of Tourism currently captures and estimates tourism spending by category and city/county (Figure 36), which can be roughly mapped to DACs.¹⁹



Source: South Dakota Department of Tourism. Available at: <https://sdvisit.com/research-reports>

Figure 36. Estimated Tourism Revenue by County, January 1 through April 30, 2022

To estimate the economic impacts of the EV DCFC infrastructure on DACs, the expected EV traffic that is supported by the infrastructure will be calculated and proportioned to the tourism revenue. The following example uses this methodology described to project benefits to DACs in Pennington County.

Pennington County is the second-most populous county in South Dakota. The county includes the cities of Box Elder, Hill City, New Underwood, and Rapid City. The County seat, Rapid City, is the second most populous city in South Dakota. Pennington County has the top tourist attraction in South Dakota (Mount Rushmore) and contains parts of the Badlands National Park, Black Hills National Forest, and Minuteman Missile National Historic Site. The County has two DACs, in Black Hills National Forests and Rapid City. As of July 2022, Pennington County had around \$35 million in taxable sales. Using the previously defined origin and destination method of using EVs traveling from nearby States to Rapid City, the estimated

¹⁹ <https://sdvisit.com/research-reports>



Rapid City gross tourism revenue from EVs is a yearly average of around \$92,000 over the next five years. This estimate assumed a total number of out-of-State EV trips as 1,307,187 and a percentage of trip Origin/Destination distribution for Rapid City out-of-State EVs based on a previously defined Origin/Destination matrix, resulting in approximately 39,900 Rapid City EV trips yearly by out-of-State visitors. Dividing the total Pennington County tourism revenue of \$35 million by the number of visitors, the revenue per trip is estimated to be around \$877. The existing calculated trips to the County were removed from the NEVI benefits to achieve the annual revenue generated from the EV DCFC infrastructure deployment (Figure 37).

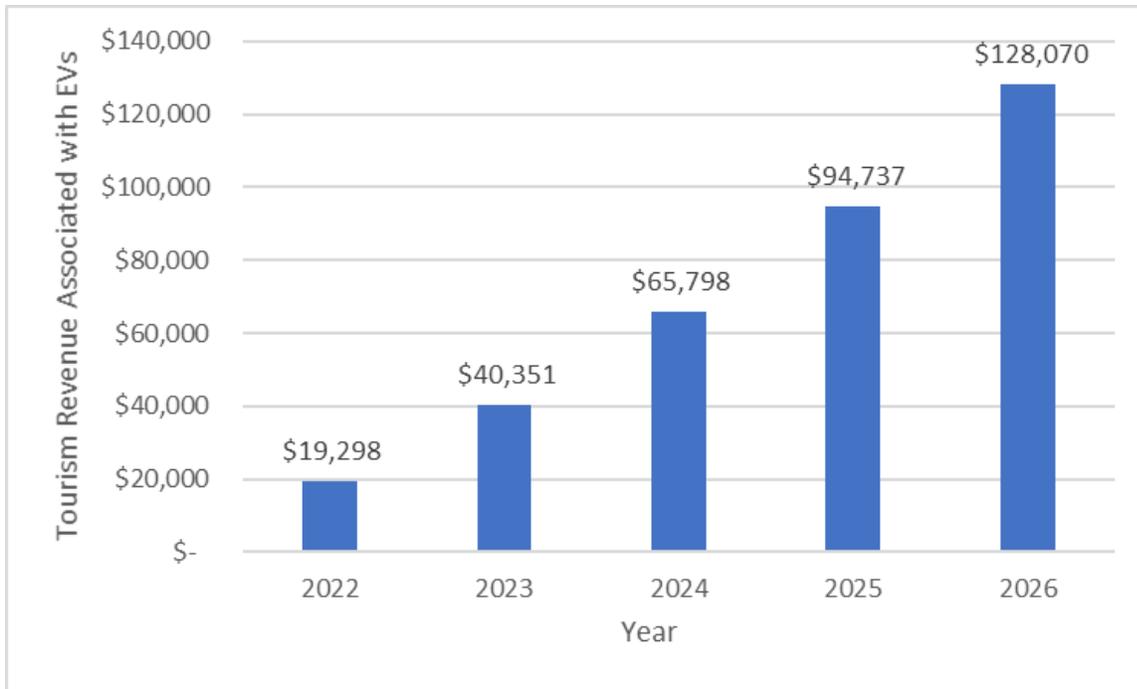


Figure 37. Estimated Benefits for the Rapid City DAC Based Upon EV Tourism

10.3.2. Estimating Benefits Associated with Commuting Trips by Residents of DACs

It is relevant to note that 19.6% of the population in South Dakota resides within a designated Justice40 Zone, based upon the 2020 Census. The daily trips by these residents may ultimately utilize one or more EV DCFC infrastructure locations installed as part of the NEVI Program in lieu of, or in addition to, charging at their residence. For example, there is significant daily traffic from the Rosebud, Oglala Sioux, and Cheyenne River Tribal Lands to Rapid City that will be captured from the usage data, which can be directly traced back to benefitting a Justice40 community.

The commuters that travel daily from or to DACs will likely utilize home charging stations, but they could also use the EV DCFC infrastructure in their commute. This evaluation assumes there is a group of EV commuters that typically don't have access to charging stations at their home locations (e.g., apartment/multi-home residents, renters) or may travel far enough with each commute to require a "top off." For the purposes of this Plan, it is assumed that 20% of EV commuters would use a DCFC charging



station to supplement, or instead of, home charging. The following is the formula used to determine the EV DCFC infrastructure annual benefit to DACs:

$$\left(\tilde{x} \sum J\right) WPHJ = EV \text{ Annual Benefit}$$

Where,

\tilde{x} = Median Household Income

$\sum J$ = Total Jobs in County

W = Workers whose commute is greater than 50 miles

P = EV Penetration Rate

H = Home charging Commuters

J = Estimate of J40 Coverage in County

Continuing with the Pennington County example, the DACs for the County would receive an annual benefit of \$74,372.48 from the EV DCFC infrastructure when using *workplace location* as the origin-destination based on the numbers below.

\tilde{x} = \$57,039.00²⁰

$\sum J$ = 55,853²¹

W = 11.5%

P = 0.29% , As previously defined in this document at Medium Growth

H = 20% , Assumption of 80% of Commuters charge at Home

J = 35%²² , Assumption based on estimation of Justice40 Regions within the county

When using *home* as the origin-destination, the DACs in the County would receive an annual benefit of \$70,663.88 from EV DCFC infrastructure based on the numbers below.

\tilde{x} = \$57,039.00²³

$\sum J$ = 50,023²⁴

W = 12.20%

P = 0.29% , As previously Defined in this document at Medium Growth

H = 20% , Assumption of 80% of Commuters charge at Home

J = 35%²⁵ , Assumption based on visual perception of Justice40 Regions map

²⁰ <https://datausa.io/profile/geo/pennington-county-sd>

²¹ <https://onthemap.ces.census.gov/>

²² <https://anl.maps.arcgis.com/apps/webappviewer/index.html?id=33f3e1fc30bf476099923224a1c1b3ee>

²³ <https://datausa.io/profile/geo/pennington-county-sd>

²⁴ <https://onthemap.ces.census.gov/>

²⁵ <https://anl.maps.arcgis.com/apps/webappviewer/index.html?id=33f3e1fc30bf476099923224a1c1b3ee>



These numbers are proposed to be averaged to account for the impacts within each county, as adjacent county commuters will be factored into that community’s commuting patterns and calculations. Therefore, the annual DAC benefit in Pennington County would be estimated to be \$72,518.18.

For Minnehaha County, the DACs would receive an annual benefit of \$33,182.44 when using workplace location as the origin-destination.

$$\tilde{x} = \$61,772.00^{26}$$

$$\sum J = 131,371^{27}$$

$$W = 14.10\%$$

$$P = 0.29\% , \text{As previously Defined in this document at Medium Growth}$$

$$H = 20\% , \text{Assumption of 80\% of Commuters charge at Home}$$

$$J = 5\%^{28} , \text{Assumption based on visual perception of Justice40 Regions map}$$

When using home as the origin-destination, the DACs in the County will receive an annual benefit of \$15,939.53 from EV DCFC infrastructure based on the numbers below.

$$\tilde{x} = \$61,772.00^{29}$$

$$\sum J = 105,927^{30}$$

$$W = 8.40\%$$

$$P = 0.29\% , \text{As previously Defined in this document at Medium Growth}$$

$$H = 20\% , \text{Assumption of 80\% of Commuters charge at Home}$$

$$J = 5\%^{31} , \text{Assumption based on visual perception of Justice40 Regions map}$$

The average annual benefit to DACs in Minnehaha County would be \$24,560.99.

11. Labor and Workforce

The NEVI Formula Program will create new labor and workforce opportunities for local workers in the electrical power and construction labor industries. The local workforce will provide support to the installation, operation, and maintenance of the EV DCFC infrastructure. SDDOT will require that the workforce technicians comply with NEVI Program requirements for licenses, certifications, and training. This includes having a diverse workforce trained in programs like the EVITP or graduated from an electrician Registered Apprenticeship Program that includes EVSE-specific training, as included in the June 22, 2022, NPRM. The NPRM established minimum standards and requirements for projects funded under the NEVI Program, and SDDOT intends to comply with the guidance. Currently, the EVITP site shows 15

²⁶ <https://datausa.io/profile/geo/pennington-county-sd>

²⁷ <https://onthemap.ces.census.gov/>

²⁸ <https://anl.maps.arcgis.com/apps/webappviewer/index.html?id=33f3e1fc30bf476099923224a1c1b3ee>

²⁹ <https://datausa.io/profile/geo/pennington-county-sd>

³⁰ <https://onthemap.ces.census.gov/>

³¹ <https://anl.maps.arcgis.com/apps/webappviewer/index.html?id=33f3e1fc30bf476099923224a1c1b3ee>



certified providers in South Dakota. While this number of providers appears to be acceptable to deliver on the NEVI Program installations, given the size of South Dakota's program, SDDOT will continue to engage trade groups within the State to increase these numbers to support the industry.

The diverse workforce required for the EV DCFC infrastructure includes general construction trades and skilled workforce. The latter includes skill sets and training in networking, communications, internet of things (IoT), and others that will be required by industry standards currently being developed. These skills, in addition to those during construction, will be important during the maintenance and operations phase as well.

Businesses and learning institutions are already developing and implementing programming for training electricians and installers of EV DCFC infrastructure. For example, Lake Area Technical College is now offering a training program to support maintenance of EVs.³² Other institutions are expected to follow suit.

South Dakota has policies to protect against discrimination. The anti-discrimination laws are found in South Dakota Codified Law (SDLC) Chapter 20, section 13. The State is committed and fully supports Equal Employment Opportunity (EEO); Affirmative Action (AA); and promoting diversity, equity, and inclusion in the workplace. When contractors sign a contract for a Federal-aid project, such as the NEVI Program, they agree to be an EEO employer and adopt the State-specific requirements related to that designation.

South Dakota supports the growth and usage of small and diverse businesses. The objectives of SDDOT's DBE program are:

- › Ensure nondiscrimination in the award and administration of Federal-aid contracts.
- › Create a level playing field on which DBEs can compete fairly for Federal-aid contracts.
- › Ensure that the Department's DBE program is narrowly tailored.
- › Ensure that only firms that fully meet the eligibility standards are permitted to participate as DBEs.
- › Help remove barriers to participation of DBEs in Federal-aid contracts.
- › Assist in the development of firms that can compete successfully in the marketplace outside the DBE program.

SDDOT sets an overall DBE goal for Federal-aid contracts annually. The department attempts to meet the overall goal without using individual contract goals. However, individual contract goals are assigned if the overall goal is not being met. The EV DCFC infrastructure deployment will fall under this program, and DBE participation will be monitored.

³² www.lakearetech.edu



12. Cybersecurity

Historically, cyber-attacks to transportation infrastructure have been relatively few and far between. Within the last few years, however, cyber-attacks and threats have grown substantially in number and sophistication, and in their impact to the traveling public.³³ Although EV DCFC infrastructure under the NEVI Program will not be installed within the SDDOT right-of-way and is not a typical transportation infrastructure component, SDDOT is committed to the promotion and inclusion of best practices and cybersecurity standards with the deployment of EV DCFC infrastructure under the NEVI Program. SDDOT intends to stipulate, as a requirement for receipt of NEVI Program funding, that these practices and standards are followed.

There are several potential cybersecurity risks that have been identified as part of deploying EV DCFC infrastructure. First, there is the potential risk that, if hacked, a specific DCFC port could “infect” a vehicle with malicious code resulting in vehicle failure, damage to the EV battery or inherent control systems, etc. The reverse pathway of a vehicle infecting a specific charging port is also a potential vector where hackers “power-jack” the EV DCFC equipment and use the network and power grid connectivity to damage the downstream electrical grid causing black- or brown-outs, hold the EV equipment supplier hostage, or other malicious activity.³⁴

According to a September 2021 joint report by Sandia National Labs and the DOE, “... *there is no comprehensive EVSE [Electric Vehicle Supply Equipment] cybersecurity approach and limited best practices have been adopted by the EV/EVSE industry.*”³⁵ Some EV charging manufacturers have proactively begun self-adopting cybersecurity standards, such as following many of the North American Electric Reliability Corporation (NERC) Critical Infrastructure Protection (CIP) standards that were introduced to ensure the reliability of the nation’s Bulk Electric System (BES).

The June 22, 2022, NPRM provided a high-level outline of minimum requirements for EV DCFC infrastructure deployed using NEVI Program funds. The agencies are required by Congress to release a final set of rules and minimum standards within 180 days of the NPRM. SDDOT will require all applicants to meet the guidance suggested by the Joint Office once it is finalized and in the interim, the concepts presented by Johnson and Slezak³⁵ summarized in Table 8 will be required.

³³ Numaan Huq, Rainer Vosseler, and Morton Swimmer, “Cyberattacks Against Intelligent Transportation Systems,” available at https://documents.trendmicro.com/assets/white_papers/wp-cyberattacks-against-intelligent-transportation-systems.pdf

³⁴ <https://thedriven.io/2022/02/16/hackers-could-power-jack-ev-chargers-to-cause-blackouts-and-steal-data-study-finds/>

³⁵ Johnson, J and Slezak, L in a report for U.S. Department of Energy, *Securing Vehicle Charging Infrastructure*, SAND2020-11971R, September 30th, 2021. Available from: <https://doi.org/10.2172/1706221>



Table 8. Cybersecurity Concepts for Applicants of NEVI Program Funding

Cybersecurity Category	Characterization of Requirements
Risk Management	Complete and provide documentation of a cybersecurity risk review.
	Maintain updated architecture diagrams to identify critical assets, internet connections, open ports, and supported protocols throughout the maintenance period for the equipment.
	Have a documented, formal schedule for active security patch management.
Configuration and Change Management	Create and document a formal process for software and firmware patches and updates.
	Properly secure digital keys, credentials, passwords, and other similar items.
Identity and Access Management	Require individual credentials for system login and prevent the reuse of credentials.
	Limit the use of system/maintenance accounts.
Threat and Vulnerability Management	Use a Common Vulnerability Scoring System (CVSS) to evaluate potential vulnerabilities and prioritize response.
	Establish and regularly update a comprehensive threat profile.
Communications	Encrypt all information internally and externally transferred to and from the EV charging dispensers, ports, cellular connections, etc.
	Apply network segmentation and security systems including Intrusion Detection Systems (IDS), Intrusion Prevention Systems (IPS) and firewalls.
Event and Incident Response, Continuity of Operations	Implement Information Security Continuous Monitoring (ISCM) per National Institute of Standards and Technology Special Publication (NIST SP) 800-137.
	Establish protocols and procedures for immediate response to logs or alerts from ISCM, Security Information and Event Management (SIEM) and IDS/IPS systems.

SDDOT does not intend to permit applicants, installers, operators, maintenance crews, or any other party outside of DOT staff and facilities to directly access the State IT network as part of installation, deployment, or operation of an EV DCFC infrastructure. All charging equipment shall make use of public or private telecommunication methods outside of the State Virtual Private Network or IT system. SDDOT does intend to require applicants to provide performance metrics to the SDDOT on a regular basis. This information should be hosted securely by the operator and made available to the SDDOT through a secure API, encrypted file transfer, or some other digital method that enables cybersecurity scanning of the file(s).

13. Program Evaluation

The program evaluation plan aims to collect data and information to assist in monitoring progress toward the State of South Dakota’s goals, and to track the overall performance of the EV network funded by the NEVI Program. The program and evaluation plan would also support data gathering and reporting



required by FHWA, as and when these are further developed. Example indicators and metrics that may be adopted by SDDOT are shown in Table 9.

Table 9. State Plan Performance Measures

State Goals	Indicator	Measures
Provide continuous linkage to national EV fast charging network in surrounding States.	Network completion	<ul style="list-style-type: none"> › Number of NEVI Program-compliant stations on I-29 and I-90. › Achieving “EV Corridor Ready” status for designated AFCs.
Achieve a “complete build-out” on all Interstate segments within South Dakota.		
Support South Dakota’s economic vitality by enabling tourists with EVs to reach and visit South Dakota’s attractions.	Access and satisfaction	<ul style="list-style-type: none"> › Number of publicly accessible chargers serving key tourist routes. › Number of unique users per charging station. › Survey by South Dakota Department of Tourism includes satisfaction measure associated with charging infrastructure in the State.
Gather data and monitor the utilization of EV fast chargers within South Dakota.	Reporting process	<ul style="list-style-type: none"> › Reporting requirements included in contracting/procurement with vendors. › On time reporting by vendors.
“Right size” the EV infrastructure to accommodate the current and future EV charging needs balancing geographic coverage with the number and size of charging ports at each location.	Utilization and reliability	<ul style="list-style-type: none"> › Charger utilization. › Reliability of chargers.

14. Discretionary Exceptions

SDDOT recognizes there are very real challenges, as discussed in Chapter 6, associated with the deployment of NEVI Program-compliant EV DCFC infrastructure locations in South Dakota. SDDOT is committed to working with the Joint Office to overcome these challenges to the extent that is possible or requesting the appropriated exceptions in future updates to this Plan.