North Dakota Legislative Council

Prepared for the Energy Development
and Transmission Committee
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ELECTRIC VEHICLES STUDY - BACKGROUND MEMORANDUM

INTRODUCTION

Section 16 of House Bill No. 1012 (appendix) directs the Legislative Management to study the effect of electric vehicles (EVs) in the state. The study must include consideration of:

- The assessment of fees to offset reductions in motor fuel tax revenues;
- The impact of EVs on electric demand and the electrical grid;
- The installation of EV charging infrastructure by private and public entities, including potential funding sources;
- The impact to public services and public transportation providers; and
- The effect on employment opportunities and other economic impacts, including tourism, automobile dealers, the energy industry, and the critical minerals industry.

The study must include input from key stakeholders, including EV manufacturers, EV dealers, electric utilities, EV charging station manufacturers, and other transportation entities.

BACKGROUND

The EV market in the United States has grown rapidly, from an estimated 320,000 EV units in 2019, to an estimated 800,000 EVs sold in 2022.[1] By 2030, industry analysts predict EVs will comprise 40 to 50 percent of new car sales. As of June 2022, the United States Department of Energy estimates 640 EVs are registered in North Dakota, the fewest in any state. In comparison, more than 750,000 traditional fuel vehicles are registered in the state.

Federal and state policies have supported growth in the EV industry by encouraging the use of electric vehicles and the development of charging infrastructure. The Inflation Reduction Act of 2022 extends to 2032, the Internal Revenue Service clean vehicle tax credit of up to $7,500 for new EV or fuel cell EV purchases. The Act also provides incentives for electrifying heavy-duty vehicles and funding for charging infrastructure.

As of July 2021, 47 states and the District of Columbia offer incentives to support deployment of EVs and related infrastructure, either through state legislation or private utility incentives within the state. Common EV incentives offered by states include tax credits for purchasing EVs, inspection or emissions test exemptions, parking incentives, utility rate reductions, and high-occupancy vehicle lane exemptions. Electric vehicle incentives have not been adopted in North Dakota, Kansas, or Kentucky.

Historically, repairs and improvements to highways have been funded by federal and state taxes collected on fuel sales. In North Dakota, a substantial portion of the state's road and bridge construction and maintenance costs are paid with motor fuel tax revenues. Decreased motor fuel tax collections resulting from increased fuel efficiency and the use of EVs is leading some state policymakers to consider other ways to pay for transportation infrastructure.

OFFSETTING MOTOR FUEL TAX REVENUE LOSSES

Estimates indicate state motor fuel tax revenues could decrease by $87 billion by 2050. Some states have attempted to offset motor fuel tax revenue losses through the imposition of EV registration fees, road use charges, and fees for the use of EV charging stations.

[1] Ingleheart, Austin. *Special Fees on Plug-In Hybrid and Electric Vehicles,* National Conference of State Legislatures, 2023.

Increased EV Registration Fees

Thirty-three states have implemented a separate EV registration fee in addition to the standard registration fee for motor vehicles. These fees range from $50 to $225 per year, adjusted annually for inflation. In North Dakota, an additional $120 annual registration fee is imposed on EVs.

Road Usage Charging Programs

Other states have implemented road usage charging (RUC) programs to assess a fee on EV drivers based on the miles traveled within a state's roadways. Maine, Nevada, New Mexico, Oregon, Utah, Virginia, and Washington have instituted RUC programs for EV users.

The first RUC program was implemented in 2015 as a pilot program in Oregon. In Oregon, EV users are required to pay an annual electric registration fee of $316 or participate in the OReGO program, under which a reduced annual registration fee of $86 is imposed, in addition to a fee of 2 cents per mile driven. In Utah, EV users are required to pay an annual registration fee of $130.25 or enroll in the RUC program, under which a fee of 1.6 cents per mile is imposed, which may not exceed an annual amount of $138.50. Both Oregon and Utah use third party vendors to track enrollee mileage. The programs were developed to incentivize EV users, rather than penalize them, and to help states understand how to better develop RUC programs.

In Virginia, EV drivers are required to pay an additional annual highway use fee of $123.98 or enroll in the mileage choice RUC program. The mileage fee under the RUC program is calculated by dividing the amount of the highway use fee by the average number of miles traveled in a passenger vehicle in Virginia. The fee is approximately one cent per mile based on the average number of miles driven annually by a driver in Virginia.

Public EV Charging Station User Fees

Some states assess a per kilowatt-hour fee for the amount of energy consumed at a public EV charging station. This approach is similar to the imposition of fuel tax because EV users pay a fee proportionate to the amount of resources being purchased. Public EV charging station user fees are imposed in Iowa, Kentucky, Oklahoma, and Pennsylvania. This fee is not imposed on users charging EVs at private stations.

IMPACTS ON THE ELECTRICAL GRID

Demand for electricity will increase as the use and number of EVs increase, which will place an additional strain on the nation's power grid. These impacts are compounded by the electric industry's increased reliance on renewable energy sources. Many states have set ambitious goals toward decarbonization of the electrical infrastructure serving their states, including members of the Midcontinent Independent System Operator (MISO) and Southwest Power Pool (SPP) networks.

The Midcontinent Independent System Operator and SPP serve the state of North Dakota by providing power transmission and infrastructure. In addition, the state is served by 18 individual electric utility providers. Due to the interconnected nature of the nation's power grid, the supply and demand for electricity in one state can have a substantial impact on the entire power grid. Federal law recognizes the power grid as a public asset.

Information published by the Energy Information Administration indicates 60.2 percent of the electricity generated in the United States in 2022 was from fossil fuels[2]. In comparison, 21.5 percent of the country's electricity in 2022 was from renewable energy sources, including wind, hydropower, and solar. One detriment to the use of renewable energy sources is the lack of consistent availability. The power grid also is increasingly susceptible to severe weather events, which are becoming more common and extreme. Additionally, because 60 percent of electric energy is generated from fossil fuels, the electricity used to power an EV is not always generated from renewable resources and still results in carbon emissions.

The North American Electric Reliability Corporation, which is an international regulatory authority that ensures the reliability of North American bulk power systems, indicates North America will face growing concerns over resource adequacy during the next 10 years. The 2023 long-term reliability report published by the North American Electric Reliability Corporation indicates peak electricity demands and energy growth are projected to hit record highs. Projected growth in the use of EVs are a factor in increased demand and energy estimates from each assessment area.

Capacity deficits are projected for areas where future generator retirements are expected before replacement resources are in service to meet rising demand. Energy risks are projected in areas where the future resource mix

[2] *The most common fossil fuel used in electricity production was natural gas (39.8 percent) followed by coal (19.5 percent) and petroleum (0.6 percent).*

could fail to deliver the necessary supply of electricity under normal to energy-constrained conditions. For instance, subfreezing temperatures or periods of low wind are examples of potential energy-constrained conditions if the resource mix is not balanced with reliable resources to prevent electricity shortfalls.

The MISO and SPP are included in the growing number of areas facing resource capacity at risk of shortfalls. The MISO was placed in the highest risk of assessment and the SPP was placed in an elevated risk for shortfalls occurring at normal peak and extreme peak conditions, with both the MISO and SPP failing to meet resource adequacy criteria during the 10-year assessment period. These findings indicate the supply of electricity for these areas likely is insufficient for the forecasted period and more reliable resources are needed.

CHARGING INFRASTRUCTURE

Charging infrastructure in public, home, and work environments will need to be bolstered as the use of EVs increase. As of August 2023, the United States Department of Energy indicated there are 89 public EV stations with 188 charging ports in North Dakota. Of the 188 individual ports, 117 of those are level 2 chargers, while the remaining 71 are direct current fast chargers. The following table provides the U.S. Department of Transportation's description of charger types.

Charger Type	Voltage and Speed
Level 1	Provides charging through a common residential 120 volt alternating current outlet and can charge an EV to 80 percent from empty in 40 or more hours.
Level 2	Provides higher rate alternating current charging, 240 volt in residential applications or 208 volt in commercial applications, and can charge an EV to 80 percent from empty in 4 to 10 hours.
Direct current fast charging	Provides rapid charging, 400 to 1,000 volts, along heavy-traffic corridors and can charge an EV to 80 percent in 20 minutes to an hour.

As part of the 2021 Federal Infrastructure Investment and Jobs Act, $7.5 billion was allocated to building the nation's network of fast charging stations for EVs. As part of the legislation, $25.9 million was allocated to North Dakota for purposes of building the state's charging infrastructure over the next 5 years. Interstate 29 and Interstate 94, which traverse the state, are designated as alternative fuel corridors. The North Dakota Department of Transportation (DOT) intends to have EV charging infrastructure for the corridors operational by 2026. Studies indicate at least one public charger is needed for every 10 to 15 EVs[3].

Benefits of Infrastructure Deployment

New charging infrastructure will ease range anxiety and provide confidence for EV users to travel long distances within the state. The ability to freely travel using an EV has the potential to enhance tourism and instill confidence in residents looking to invest in electrification.

Barriers to Infrastructure Deployment

According to the Federal Highway Administration's report *Impacts of Automated Vehicles on Highway Infrastructure*, EVs have placed new demands on roadway infrastructure, including the quality and uniformity of traffic control devices, the changing demands of intelligent transportation system devices, structural requirements for pavements and bridges, impacts on multimodal infrastructure, and the need for other roadside infrastructure.[4] The substantial upfront cost of investing in and maintaining charging infrastructure may be a barrier to providing EV charging stations. Cold weather conditions also can complicate maintenance and dramatically impact battery range. Concerns also exist with the power grid, especially during peak demand hours. Further, the rural nature of the state can complicate long-distance travel in North Dakota, especially to locations far from critical alternative fuel corridors. Small towns and cities may lack the resources or local demand to implement and maintain EV charging stations.

ECONOMIC IMPACTS

The United States Bureau of Labor Statistics projects growth in a multitude of occupations associated with the transition to EVs. Occupations relating to the design and development of EVs include software developers, electrical engineers, electronics engineers, and chemical engineers. These occupations all are expected to grow by as much as 26 percent from 2021 to 2031. Opportunities for occupations involved in the development and maintenance of the charging network, including electricians, linemen, and urban planners, also are expected to grow.

[3] *Cage, Feilding. The Long Road to Electric Cars, Reuters, 2022.*

[4] *Impacts of Automated Vehicles on Highway Infrastructure, U.S. Department of Transportation, Federal Highway Administration, Publication No. FHWA-HRT-21-015, March 2021.*

The Society of Automotive Engineers International established six levels of driving automation in 2014. In the context of motor vehicles and their operation on roadways, the levels range from level 0, no driving automation, to level 5, full driving automation. Mercedes-Benz is the first motor vehicle manufacturer to achieve an SAE International level 3 conditional automated driving level in the United States market. Passenger vehicles with level 5, a fully automated driving system, are not yet available.

According to a 2022 survey conducted by the Alliance for Automotive Innovation, more than 80 companies in 30 states are operating with nearly 170 autonomous technology programs, including EVs used for ride-sharing services in cities. Level 4, highly autonomous technologies, also can support first- and last-mile delivery routes and could revolutionize the commercial trucking industry.

RECENT NORTH DAKOTA ELECTRIC VEHICLE LEGISLATION

Senate Bill No. 2063 (2023) created a reimbursable federal EV infrastructure grant program administered by the Director of the DOT. The bill allows the DOT to enter cooperative agreements with public or private entities to administer funds received by the federal government for EV charging programs. This grant program will facilitate the construction, operation, administration, and maintenance of EV charging infrastructure in accordance with the DOT's plan. The bill requires at least 10 percent federal cost-sharing but may not exceed 80 percent.

House Bill No. 1310 (2023) created greater flexibility to install EV charging stations at homes by those who are governed by a homeowners association. The bill prohibits condominium and homeowners associations from preventing the installation of charging stations on a homeowner's property as long as certain minimum qualifications are met.

House Bill No. 1519 (2023) directs the Legislative Management:

1. To study the use of existing autonomous system capabilities and infrastructure.
2. To provide solutions to workforce and safety needs in North Dakota.
3. To appropriate $475,000 of federal funds and $12,500 from the strategic investment and improvements fund to the Department of Career and Technical Education for uncrewed aircraft systems, autonomous vehicles, or other autonomous technology grants for the workforce training center serving northwest North Dakota.

Senate Bill No. 2091 (2021) created the ability for private entities, including gas stations and convenience stores, to sell electricity for the purpose of charging EVs. The bill allows electricity obtained from an authorized electric public utility or rural electric cooperative to be resold exclusively for the purpose of charging an EV.

House Bill No. 1405 (2019) created a penalty of $50 for the unauthorized use of an EV-designated parking stall or space when designated as reserved for EV charging with approved signage. The bill requires these spaces to be used exclusively for EV charging.

Senate Bill No. 2061 (2019) created annual road use fees for electric and plug-in hybrid vehicles to be deposited in the highway tax distribution fund and provides a definition for these vehicles. The annual fee for EVs is $120 and the annual plug-in hybrid fee is $50. This bill also directed the Legislative Management to study EV infrastructure in collaboration with DOT, the utility industry, and EV stakeholder groups.

PROPOSED STUDY APPROACH

In conducting this study, the committee may wish to receive testimony from representatives from:

1. The DOT;
2. The North Dakota Industrial Commission, Public Service Commission, and Transmission Authority, as well as MISO, SPP, and all electric utility providers serving the state;
3. Electric vehicle manufacturers, EV dealers, and EV charging station manufacturers;
4. The North Dakota Department of Commerce and the tourism division; and
5. The National Conference of State Legislatures and other interested parties regarding best practices and other state approaches to EV infrastructure and taxation.

ATTACH:1