Hamre, John G.

From: Eberl, Stacy L.
Sent: Friday, October 28, 2022 1:52 PM
To: -Info-Public Service Commission
Subject: FW: Public Comment for the upcoming PSC Meeting November 3rd. - Links to sources are integrated in this document and should be opened as an HTML document.

Importance: High

John – Please docket this public comment for PU-22-147.

From: Paul Jensen <paul.n.jensen@outlook.com>
Sent: Friday, October 28, 2022 1:27 PM
To: -Info-Public Service Commission <ndpsc@nd.gov>
Subject: Public Comment for the upcoming PSC Meeting November 3rd. - Links to sources are integrated in this document and should be opened as an HTML document.
Importance: High

To the Public Service Commission of North Dakota,

Thank you for the opportunity to express my support for the improved electrification of transportation in North Dakota. The IIJA HR 3684 Bill gives ND utilities an important role to play in mitigating the costs of transportation, which are currently placing an unusually high burden on Americans.

The following aims to provide examples of how the Electric Vehicle Service Equipment (EVSE) and practical measurement of Kilo Watt Hours (kWh) generated and delivered to end users, speak for the adoption of an equitable ruleset to benefit all North Dakotans. I will give an example of fuel costs for a North Dakotan vehicle owner, who drives ~16266 miles annually .

Sedan vehicles.
As an example of current costs associated with fuel consumption and at an average range of 24.2 miles per gallon for a sedan vehicle, this milage will translate into an annual consumption of 672 gallons of fuel with a current retail price of $3.70/Gal, giving an annual cost for the vehicle owner of $2,487. This is a significant cost for many wage earners and families, typically owning more than one vehicle with which to service their daily transportation needs.

Light Truck vehicles Ford F150 4x4.
The combined average miles per gallon is estimated to be ~17.5 miles per gallon, which results in an annual cost for a similar mileage fueled by gasoline to be approximately $3,439.

EV Light Truck Comparison

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Paul Jensen

Ford estimates that its model F150 Lightning, with a battery capacity of 131 kWh, has a driving range of ~320 miles.
With North Dakota's average cost being $0.0944 kWh, a full charge for a light EV truck like the Ford model will therefore cost the owner $12.36 assuming that the vehicle is charged in a home garage from a 240 or 208 Volt split phase, respectively single phase residential supply. Note, that when consumers are using DC Fast Charging (DCFC) outside their garage, demand charges may be added to the equation. This can raise the price to over $0.25/kWh when utilizing fast charging. Assuming that the vehicle is charged at the owners' home, the annual average driving of 16,266 miles will, when applying today's electricity price, translate into an annual cost of $628.27 as compared to $3,439 for a gasoline pickup. This is a significant advantage over oil and gas sources. In conclusion, the cost of transportation can be reduced significantly for all categories of drivers in North Dakota when utilizing Electrical Vehicles.

The lifetime of a battery pack is currently warranted by manufacturers from 8-10 years meaning that all else equal, a fuel cost saving of $2,810.73 annually and over the 8 years $22,485.84 compared to a similar vehicle powered by gasoline. The cost of new batteries continues to improve in competitiveness as the growth in volumes and improvement in technology takes place. An example of such a development is the price of solar panels, which dropped from $5.75 per watt in 2010 to $1.50 per watt in 2021. We may expect similar efficiency gains for EV Batteries but it would be wrong of me to assume what a replacement battery will cost after 8 year of use since recycling values may be considerable or not.

The economic benefit to the consumer and extended to the state, will be significant when promoting electric vehicle usage, as these vehicles also have dramatically lower maintenance costs due to far fewer moving parts compared to an Internal Combustion Engine (ICE) vehicle. While conventional drivetrains have as many as 2,000 parts, electric drivetrains can have fewer than 20. Source: About Electric Transport. Furthermore, the average maintenance cost for Battery Electric Vehicles is estimated to be 25% to 30% of that of Internal Combustion Vehicles, according to a study by the Argonne National Laboratories.

Transitioning to electricity as a source for transportation, therefore offers great opportunities for North Dakota's power system operators. Even with the high emissions from lignite-fueled power plants, the overall emission avoidance as expressed in a recent Ford study, likely has a 64% lower lifetime emission for an EV vehicle. Also, when considering electricity produced from lignite, the comparative reduction in CO2 is significant.

Comparing lignite to gasoline we know that per Gigajoule lignite produces 101.2 kg CO2 and Gasoline is 69.3 kg CO2, which is ~32% more emission from a lignite source as compared to gasoline. However, the North Dakota Utility grid is not purely supplied by lignite power but comprised of several generation sources which will bring the CO2 contents of charging vehicles fueling to a lower average, more likely around 70 kg CO2 per Gigajoule.

With the existing generation sources of coal-fired power plants providing 57% of North Dakota's electricity generation, wind energy providing 34%, hydroelectric (5%), natural gas 3% and 1% other, an overall reduction of greenhouse gases can therefore be achieved by converting to electric vehicles. Viewing Electric Vehicles as an economic motivator for installing EV Charging systems throughout our state is therefore important. There may be

objections regarding the utility networks' transmission capacity, but decentralized generation sources built on, for example, CO2 batteries can stabilize the distribution grid at a lower cost than lithium-ion battery storage. Not only are our cooperatives and utilities therefore able to store energy at distributed locations, but they can also avoid significant upgrades to the power distribution network by applying CO2 batteries at strategic locations on our grid.

Overall, the path forward is advantageous when utilizing more electricity for transportation. The state of North Dakota should begin hedging itself against future social cost charges currently suggested at $51 per Ton of CO2, which is an external factor for CO2 emissions that may in the future inhibit North Dakota's export of energy as and when global warming becomes financially more apparent.

Production costs for our farmers will be significantly less if electrification of transportation can take hold in rural locations, while taking advantage of local alternative energy sources such as solar and wind. Cooperatives and utilities will take on an important role in becoming prepared for a future with more power utilized by electrical vehicles, thereby giving our state an upper hand on its trading balance and relieving our dependency on oil currently being manipulated by unfavorable competitors or adversaries of our country. An element of patriotism could come to mind when deciding on a strategy forward.

It is therefore important that North Dakota already now introduces the ability for consumers to buy electricity from resellers by the kWh and that the rates are controlled to the competitive benefit of farmers, our citizens, and local industries. Due to the variations in charging capacity, pricing per minute or hour is not an equitable strategy to sell energy. Most States have already enacted retail sales per kWh and North Dakota should do the same.

The PSC should work on preventing the state from becoming beholden to external forces like those expressed by the reduction in oil flows from the OPEC countries and working against us. It is estimated that adequate energy sources in North Dakota is available to develop energy independence in our state for the transportation sector and the state should strive to make that possible.

The SPC should therefore welcome the effects and benefits of the IIJA Bill as it should do towards the recent IRA Bill enacted by Congress. It is advantageous to be in control over the electric energy generated from powerplants in our state and to balance our energy pricing to the benefit of our citizens, whether they adapt electricity for transportation or not. Certainly, attempting to have the electricity markets imitate pricing methods like those of products ruled by world commodity prices, should be avoided. Instead, North Dakota can and should attract business and workers to the state in greater numbers if it adopts an independent strategy for energy pricing for transportation.

Starting the discussion on grid reliability is imperative, but I suggest being conservative, not rushing forward with recommendations that may prevent North Dakota citizens, the state's industries, and our farmers from improving their competitiveness in the national and international markets.

My responses to your questions as publicized are:

Q: Whether ownership of electric vehicle charging stations should be permitted by regulated utilities. If permitted, under what conditions?
A: should initially be involved in the granular day-to-day operations of EV charging stations and the electrical switchgear supplying the EV Charging equipment. However, as the market matures this role can be taken over by private enterprises. The main requirement to enable this, is to make sure the EV charger sub-meters are utility grade and provide fair pricing to consumers. Yes,

Q: What should the Commission consider regarding unfair competition between third-party charging entities and regulated utilities?
A: The commission should be cautious with potential competition between Utilities, Cooperatives, and the third-party charging resellers but to create an even platform, resellers should be able to bill their sales per kWh dispensed. Utilities have a potential to strangle the adoption of EV charging especially if various levels of responsible maintenance could create supply and availability issues. Home charging and commercial charging need each a different rule set which should be monitored by the PSC. It is important that conflicts of interest are prevented between electrical utilities and the oil and gas industry.

Q: Should the Commission consider special tariffs or rates for residential electric vehicle charging?
A: Electric Vehicle Supply Equipment with appropriate sub-meters to separate the EV load from the balance of a facility is favorable. Time of day rate programs can be beneficial if they specifically drive behavior of EV recharging and can also support the Vehicle to Grid and X scenarios (V2G and V2X) However, it is important that price controls are maintained. Detrimental pricing policies, both with IPP Generators and Cooperatives, must be avoided to the benefit of the consumers. Expansions of EVSE equipment in households is not always managed best by traditional market forces. Utilities should be able to control a gradual integration of vehicle charging as and when the distribution lines can serve the new loads. On the other hand, upgrading distribution systems should not be unreasonably delayed if they are preventing quick adaption of Electric Vehicle charging.

Q: Whether the Commission should consider pilot programs in anticipation of the electrification of the transportation sector? If so, what pilot programs?
A: Yes, the Commission should consider pilot projects to evaluate the effect of vehicle charging in the state throughout its power lines and the distribution network. This can be done with and AI-Driven Distribution Load Profiling/Forecasting system analysis to Improve O&M, Seasonal & Event Preparedness for example.

- Trends in load growth (e.g., AC) and mix (i.e., EV), forecasts and capacity issues
- Scenario modeling for weather and other extreme events such as drought and wildfire.
- Potential impacts of distributed energy resources (DER)
- Improved distribution Capex planning
- Operational Systems optimization
- Piloting integration of solar, stationary storage (including CO2), EV charging, smart technologies, managed charging, V2X and V2G.

Q: What is the anticipated distribution system impact from residential and fleet charging?
A: For the near future it will be a gradual adaptation for North Dakota with manageable impact, but it is important to carry out analysis as mentioned in the above suggestions.

Substations and distribution transformers may need to be upgraded or older transformers and switchgear may need to be replaced. Fleet charging is typically located in already well supplied regions and there are many methods available to do load sharing in a manner not disruptive to owners of grid and distribution operation. I recommend a study to be carried out soonest.

Sincerely,

Best regards,

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