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Electric Momentum: Dynamics of Transportation Electrification and Stories from the Road

Amelia Liberatore

Amelia R G Liberatore
University of Montana, Missoula

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ELECTRIC MOMENTUM: DYNAMICS OF TRANSPORTATION ELECTRIFICATION AND STORIES

FROM THE ROAD

By

AMELIA RACHEL GRAYER LIBERATORE

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Professional Paper

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Approved by:

Ashby Kinch, Dean of the Graduate School

Graduate School

Clemens Work, Chair

Journalism

Ray Fanning

Journalism

Derek Kellenberg

Economics

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Electric Momentum: Dynamics of Transportation Electrification and Stories from the Road

Chairperson: Clemens Work

Abstract:

The climate is undeniably changing. The Intergovernmental Panel on Climate Change (IPCC) published yet another report this year outlining how extreme weather, brought on by our use of Earth's resources, causes loss of nature and human life around the world. The summer of 2023 broke records for high ocean temperatures and melting polar ice, and abnormally potent floods and fires touched all corners of the Earth. Industrial production of goods, and the personal choices that purchase them, are responsible for massive amounts of greenhouse gases (GHG), including carbon dioxide and methane. GHG emissions thicken the Earth's atmosphere and continue the destabilization of the climate. It's an all-encompassing phenomenon that asks us to reevaluate our relationship with the world: how we extract, consume, and dispose of renewable and non-renewable resources. The United States ranks second in the world for GHG emissions. Transportation is the most significant GHG-emitting sector of the US economy. Passenger vehicles contribute more than half of all transportation emissions. Electric vehicles may be one useful solution to reducing GHG emissions in this country. Rural schools and households have a unique opportunity to benefit from transportation electrification, if government subsidies and public charging infrastructure are in place. This portfolio of journalistic work explores the dynamics of emerging EV technology and to what extent the efficiency and reliability of these vehicles may reduce our climate impacts.

Amelia Liberatore

Thesis Part 1 – Electric School Buses in Montana

August 31, 2023

(Anchor)

Electric vehicles, especially large ones like buses and heavy-duty trucks, are the sleek and silent image of the future. But have you ever seen one bouncing down a dirt road or chugging along through a snow storm? Montana school district superintendents believe that electric school buses could be the solution to some common problems but they also have some reservations about how well the new technology will hold up in the elements. Amelia Liberatore reports on the challenges and opportunities of converting a fleet.

Runs: 5:13

Outcue: For KBGA News, I'm Amelia Liberatore.

[Nat sound – school bus pulling up and parking]

(Liberatore)

It's the end of the day at Arlee Public School, located on the Flathead Reservation in Western Montana.

[Nat Sound – buses running]

(Liberatore)

The K through 12 school serves 435 students. The elementary school buildings, playground, and high school are all nestled together, in the shadow of the Mission Mountains. Each morning and afternoon, six diesel-powered buses shuttle students of all ages from the surrounding area. Arlee School Superintendent Mike Perry sometimes drives one of the routes himself.

[Perry – ...probably 15 or 20 minutes ahead of time, we have a gentleman that comes out and goes and gets the buses and lines them all up in front of the high school :07]

(Liberatore)

The six buses idle for at least 15 minutes while the engines warm up in the winter months.

[Perry – And so all that diesel is going into our high school and then into our high school shop.:04]

(Liberatore)

According to the Environmental Protection Agency, diesel exhaust contains carcinogenic particulate matter that can cause asthma and other health problems, especially in children. The EPA is working to reduce diesel exhaust emissions through the Clean School Bus Program, a rebate program open to school districts in all 50 states and US territories. The Clean School Bus Program is part of the Bipartisan Infrastructure Law and will distribute five billion dollars over five years. The EPA pledges to prioritize school districts that serve rural, low-income, and/or Tribal communities. About 94% of Montana schools meet these priority requirements, including Arlee. Last year Arlee School applied for two buses.

[Perry – If we were to able to put the two electric buses on the back of the line, those would be the ones right next to the building and it would make a huge impact. :07]

(Liberatore)

Converting a third of Arlee's fleet to electric would undoubtedly improve air quality and noise around campus. But the option to apply was not immediately obvious to Perry.

[Perry - I just figured it was probably meant for bigger schools, bigger districts, more urban districts.

(Liberatore)

Other rural school administrators encouraged Perry to apply. But even after applying, he still had other concerns about the range and the durability of electric buses compared to traditional diesel-powered ones. All of Arlee's school buses trundle down gravel roads, in rain or shine, ice and snow.

[Perry – I don't know like the impact of dust. You know, because we get a lot of dust obviously out in the dirt roads. I don't know how that will impact, you know, the electric engines and the battery systems.

(Liberatore)

Perry was also unsure about how and when to charge the buses. He already knew that there

weren't any public charging stations between Missoula and Polson, a span of 70 miles. That would likely limit the opportunities to use the buses for field trips or athletic competitions.

[Perry - So I think there were just a lot of unknowns. And so that's why I was hesitant to do it, again, until I've talked to some other people.]

(Liberatore)

One school in Montana is leading the way on electrification. Havre Public School, located about 300 miles northeast of Arlee, started operating two electric buses in January, after receiving funds through the Volkswagen settlement. Volkswagen violated the Clean Air Act by selling over 500,000 diesel vehicles from model years 2009 to 2016 that were programmed to cheat federal emissions tests. In total, Volkswagen had to pay 33 billion dollars in fines and buybacks. Three billion dollars of those funds go towards reducing future emissions, such as school bus electrification.

Allen Woodwick has been driving Havre school buses for 15 years and says the new electric buses are handling rural routes just fine.

[Woodwick - So far, the drivers like them quite a bit. And they're, they're very similar to our diesel and gas buses. One is on a partial rural route. So he does go down gravel roads, and it handles just fine. The batteries are pretty substantially heavy. So you still have, they're about the same weight as a regular bus even though they don't have an engine or transmission. So they're right in the same ballpark, so they handle pretty much the same.]

(Liberatore)

The Clean School Bus rebate covers up to \$375,000 per bus and can include \$20,000 for charging stations. Electric buses can cost three times as much as diesel-powered ones, so the rebate brings electric buses within reach for school budgets.

[Woodwick - As I said it was around just a little more than \$100,000 for both buses, the charging system systems and infrastructure, compared to about \$144,000 was what we paid for our last new diesel bus.]

(Liberatore)

The rebate unlocks even more savings in the long term. Electric buses are cheaper to operate because they require less maintenance than gas- or diesel-powered buses. It's also cheaper to fuel up with electricity.

[Woodwick - Well, we keep very detailed records, and keep track of everything our all of our buses do. And so we show - we found that the diesels averaged about 56 cents a mile to run. That's what the fuel cost was. Our gas buses averaged around 83 cents a mile. And the electric buses averaged 23 cents a mile for the electricity costs. So the electrics are approximately a third cost per mile. But that didn't also include the fact that our diesel and gas buses are plugged in with a block heater in the wintertime. You know, that cost didn't wasn't, wasn't factored in either. So we're using nearly the same amount of electricity just to plug the heaters in on the diesels as it does takes to charge the electrics.]

(Liberatore)

This year's round of Clean School Bus rebate awards will be announced this fall. In the meantime, Woodwick is helping other Montana schools to understand the benefits of going electric.

[Woodwick - I've had several schools come get a hold of me, and Montana's not that big, they'll come up to Havre, and I'll show him the bus, take them for a drive, give them a demonstration. We're pretty much sharing information with everybody.]

(Liberatore)

Arlee and the nine other Montana schools on the EPA's waitlist will have to be patient for their chance to make the switch. Arlee Superintendent Mike Perry remains hopeful.

[Perry - So I felt like this was our way to try and jump into as a district to say, Yeah, this is the type of things that we want to support. And so hopefully, we'll make that make that change and, and lead, lead this area in that direction.]

For KBGA news, I'm Amelia Liberatore.

[Nat sound - bus driving away and kids yelling]