

Beaverton School District Electrification

CLIFF HARRELL TRANSPORTATION
MAINTENANCE SUPERVISOR

- **BSD currently has 83 EV School Buses on the road daily**
 - **Four OEM's Blue Bird, IC Navistar, Ride (BYD), and Green Power**
 - **28 Blue Bird's (2 Micro Birds on Order)**
 - **36 IC Navistar's**
 - **17 Ride's (13 more to be delivered)**
 - **3 Green Powers**
 - **1 Diesel to EV Repower**
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- **BSD currently has 111 Chargers**
 - **Charger Breakdown**
 - **95 19.2 KW Enphase CS-100**
 - **8 7.68 KW**
 - **3 Borg Warner 60 KW DCFC**
 - **4 Evesco 60 KW DCFC Mobile Chargers**
 - **1 EvoCharge 50KW dual port Mobile Charger**
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- BSD initiated School Bus Electrification back in 2021 we ordered two Blue Bird RE EV's**
 - Since then, BSD has been awarded many grants to help expand our EV footprint to where we are at currently**
 - BSD has been able to keep adding to our fleet because of our reserve/spare buses (66 total REGED and SPED combined)**
 - BSD has been able to bring in some nontraditional EV Bus OEMs to test out for other districts**
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Maintenance

- Has been a learning curve as there is no national standard to work on all OEMs
 - We have started to establish our own pipeline of internal training working with OEMs, and other EV fleets for HV Work
 - Technology is constantly changing; then in turn OEM manuals and documentation changes
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Maintenance

- EV buses are cheaper to work on in general, but you can not forget the cost of insulated tools, different tire sizes when purchasing them.
 - We have seen on some OEM's a state mandated inspection go from 6-8 hours on a diesel bus to around 3 on an EV.
 - Parts may not be as easy to find for some OEM's
 - Getting technicians trained on all the parts
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Charging

- Currently have four different depots, three of them are on managed charging schedules where we charge off peak.
- We ran a project with PGE and Opconnect (CMS) to test V2G capabilities
- Technicians open up and troubleshoot and repair chargers



The future of electrification at BSD is we will hit our goal of 100 EV buses by July 1, 2026. There are no plans for expansion, but we will be swapping out our Borg Warner DCFC with Heliox DCFC to keep testing V2G with PGE and Opconnect.

Lessons Learned

- When running multiple OEM's there is no portal that will house all the different information from all OEM's (State of Charge, Charging History, Performance Data, Fault Codes)
 - Certain EV tires may be a little more expensive
 - Be willing to adjust and have buses down for extended times
 - Share knowledge with others who are interested in EV
 - Always ask OEM's for HV training and what options they have
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Link to BSD's Data:

<https://www.beaverton.k12.or.us/departments/transportation/environmental-efforts>

