

Significance of a Tesla Supercharger in Blacksburg VA **A New Era for BEVs in the NRV!**

L. David Roper. ROPERLD@VT.EDU

Tesla and other BEV companies are planning to sell \$25,000-\$30,000 BEVs by 2025.

BEV/PHEV Fast-Charging Protocols

- There are two network protocols that will dominate fast-charging in the USA.
 - Tesla's North American Charging Standard ([NACS](#))
 - Combined Charging System ([CCS](#)) for BEVs other than Tesla's
- Tesla created the first extensive network of NACS charging stations across the USA: Tesla [Superchargers](#) (TSC). (Tesla also has a network of slower, [SAE J1772](#), [Destination Charging](#) stations in the USA.)
- Other BEV companies and independent charging companies are creating fast-charging networks across the USA; e.g., VW's [Electrify America](#). All have CCS cables, but will be adding NACS cables.
- Almost all BEV companies will adopt the NACS charging protocol for their BEVs in 2025.
- [Adapters are available for Teslas to do CCS charging](#) and will be available for other BEVs to do NACS charging. Some TSCs will have [NACS->CCS adapters on cables](#).
- Starting now, **Tesla will eventually [open its Superchargers to all BEVs!](#)**

Tesla Supercharger in Blacksburg!

- A [Tesla Supercharger](#) (TSC) will open soon in the B&B Theatre parking lot at the south end of the [First and Main Shopping Center](#) in Blacksburg.
- Note that the location is outside the store and the gas-pumps area, the entrances from both sides, the trash can near the stalls. One can walk to the store on either side of the charging area.



Blacksburg VA Supercharger



The 8 Supercharging stalls are just outside the upper right corner.

Significance for BEV Drivers Going to or Through Blacksburg

- Nearest TSC west on US460 is 50 miles away at [Princeton WV](#).
- Nearest TSC northeast on US460/I81N is 34 miles away at [Salem VA](#).
- Nearest TSC southwest on US460/I81S is 52 miles away at [Wytheville VA](#).
- Aren't those enough?
 - Is it enough to have gasoline stations in places 50 miles from Blacksburg and none in Blacksburg?
- Many people will be driving BEVs to Blacksburg to visit VT students, VT faculty, businesses, events and to use the copious NRV recreational facilities.

Significance for BEV Drivers in Apartments and Rental Houses

- Weekly <80% TSC charging for local driving
- <100% TSC charging for first leg of a long trip
- If a garage or driveway has a 120-volts outlet, a [portable J1772 charging station](#) can be used for slow-charging at <1.44-kW power to get <11.5-kWh charging 8 hours overnight; for a BEV with 3.5-miles/kWh efficiency (104-[MPGe](#)), this yields <5 miles/day and <35-miles/week. This may be enough for averaging just a few miles driving a day.
- If a garage or driveway has a 240-volts outlet, a medium-charging portable or wall or pole mounted J1772 charging station at <10-kW power to get <80-kWh charging 8 hours overnight; for a BEV with 3.5 miles/kWh efficiency, this yields <280-miles/day or <1,960 miles/week.
- Typically, it is ~2.5 times more expensive to use a TSC to charge than it is to use house power to charge.

Significance for BEV Drivers During a Power Outage

- When a local power outage occurs involving your charging location, the power may still be on at the nearest TSC; then you can use it to charge your BEV.
- If your BEV has [Vehicle-to-everything \(V2X\)](#) capability, after charging it to <100% at a TSC, it can be used to connect through a proper device to provide power to a house.
- One way to do this is [what the author can do](#), i.e., have a backup battery for the house and charge that battery from the BEV's battery, while the backup is being used. (Since my Tesla Model 3 does not have V2X capability, I connect the house backup traction battery to the Tesla's high-voltage traction battery through the Tesla's auxiliary low-voltage battery.)
- Three examples of BEVs with V2X capability are the [Hyundai Ioniq 5](#), the [Ford F150 Lightning](#) and the [Tesla Cybertruck](#). More will surely follow suit.

Significance for BEV Drivers in a Hurry

- Suppose you just learned that you need to take a long trip and your battery is only at less than 50%.
- You could drive to the nearby Tesla Supercharger and charge to just under 100%.

Reasons why Blacksburg was Chosen as a Site for a Tesla Supercharger:

- BEVs going east out of Princeton, West Virginia pass through Blacksburg along the way to Salem/Roanoke.
- Virginia Tech is in Blacksburg.
- The New River Valley has many BEVs, all of which will soon be able to charge at a Tesla Supercharger.
- There are many businesses at the First and Main area.
- Sheetz has good experience with Tesla Superchargers.

Blacksburg Tesla Supercharger at Sheetz Store



The 8 Supercharger stalls are in the upper right corner; they are outside the store and gasoline pumps area, which should help prevent [ICEing](#).

Main Street is at the bottom. The B&B-Theatre parking lot on the top and right provides ample extra parking spaces.

Blacksburg Tesla Supercharger at Sheetz Store



This is the best design I have seen for Tesla Superchargers at Sheetz stores; I have charged at many.:

- The location outside the store parking area with two entrances.
- The driveways on both sides to walk to the store, one on the right without crossing the gasoline area.
- The closest entrance to the TSC from Main St. on the upper right.

References

- <https://www.tesla.com/supercharger>
- [Sheetz Surpasses 2 Million EV Charging Sessions at Its US Convenience Stores](#)
- <http://roperId.com/science/ChargingBEVsFacts.pdf>
- <http://roperId.com/science/SignificanceTeslaSuperchargerBlacksburg.pdf>
- <http://roperId.com/science/GlobalWarmingData.pdf>