ADDITIONAL RESOURCES

Charging Stations & Resources

ChargeHub provides information on the types and number of EV charging stations in Philadelphia. They also provide a map of charging locations, including ones on Penn’s campus, which can be viewed here (type Philadelphia, PA into the “Search for a location” bar).

Currently, all installed EV charging stations on campus are provided by Blink Charging Co. Campus charging locations are as follows:

- 34th & Chestnut – x4 Level 2 Plugs
- 38th & Walnut – x4 Level 2 Plugs
- Penn Museum – x4 Level 2 Plugs

If your department would like to purchase and install its own charging stations (Level 1 or Level 2), please reach out to Penn Transportation and Parking. The cost of the project will vary, but funding assistance may be available through the state of Pennsylvania and through PECO. Please refer to the Funding Quick Guide under Funding Resources for more information.

Fleet Certification

CALSTART Sustainable Fleet Accreditation recognizes sustainable fleets by setting objective, meaningful standards and guidelines. This accreditation stems from a partnership between CALSTART and NAFA and performs a rigorous assessment of your fleet’s sustainable vehicle inventory and sustainable practices. There is a focus on collection and organization of data, so documentation is important for fleets interested in this accreditation.

FAQ

Are electric vehicles able to travel as long as or as far as we need it to before running out of battery?

Though the range varies with each vehicle make and model, the average electric vehicle (EV) has a range of around 250 miles. Select parking lots at Penn host Level 2 electric chargers that reach full charge in 4-6 hours. In the rare case that a Penn vehicle needs to travel long distances, Fast Chargers (Level 3 chargers) reach full charge in around an hour. There are 22 Fast Chargers in Philadelphia, and a map of their locations can be viewed on ChargeHub.

It should be noted that overusing Fast Chargers may reduce the lifespan of the vehicle’s battery.

Are electric vehicle alternatives as powerful as gasoline or diesel-powered models?
Electric motors generate 100% of their available torque instantly, enabling them to accelerate even faster than gasoline-powered vehicles. Although most electric vehicles (EVs) are able to deliver equivalent power, they do typically have added weight from their fuel cells, which can cut into their total hauling capacity. For some models such as the upcoming Ford electric F-150, this issue has been overcome; it is projected to be the most powerful F-150 to date. For comparison, the diesel-fueled 2021 F-150 is able to haul 5,000-11,300 lbs, meaning the upcoming electric model will have an even higher hauling capability. Therefore, care should be taken in selecting which EV model to consider when purchasing specialized utility vehicles to ensure the vehicle will be able to meet the desired use.

Though EVs aren’t currently able to cover every corner of the market, the number and variety of EVs has been expanding steadily and equivalent electric options are expected to emerge steadily.

What if electric models are prohibitively expensive?

The cost of most electric vehicles (EVs) is higher than internal combustion vehicles because of the cost to manufacture their batteries. Market trends show that battery prices are decreasing, indicating a lowering cost of EVs as well. Given the Federal government’s goal to achieve a 50-52% reduction in emissions by 2030, the market also expects to see further incentives to reduce the cost of EVs.

Do electric vehicle batteries present a safety risk?

A 2017 report by NHTSA on the safety of lithium-ion batteries, which power battery electric vehicles, states that fires and explosions from lithium-ion batteries are estimated to be comparable or less than those for gasoline or diesel vehicles.

Are electric vehicles more costly to maintain and repair than vehicles with internal combustion engines?

While electric vehicles (EVs) can have a higher upfront cost for each maintenance event, EVs cost less on average to keep running than internal combustion engine vehicles (ICEVs) since they don’t need regular oil changes. Additionally, EVs don't have parts such as spark plugs, valves, and catalytic converters that have a tendency to fail and need replacement.

The cost to fuel EVs is also lower than it is for ICEVs. In Philadelphia, the average commercial electricity rate is $0.0854/kWh. The average battery electric sedan reaches a full charge of 60kWh and is able to run for about 250 miles per charge – each full charge costs about $5.12. In comparison, the average internal combustion sedan has a fuel economy of 39.4 mpg (based on data from the Federal Bureau of Transportation). Philadelphia’s gas is $2.98/gallon on average, so it costs $18.90 to travel 250 miles. That means it costs almost 4 times more to fuel an ICEV than an EV in our region.
Are the emissions from charging an electric vehicle as bad as internal combustion engine vehicle emissions?

No, the overall carbon footprint for electric vehicles has been shown to be lower than that of internal combustion engines.

Philadelphia’s electric grid draws its power from four main categories: nuclear power, coal, and natural gas, and “other” sources. Our region’s energy sources have been trending towards an increase in renewable energy sources, especially in wind and solar. This has resulted in an overall decrease in emissions associated with electricity production in Pennsylvania.

In March of 2021, Pennsylvania governor Tom Wolf announced a major clean energy initiative that will implement 191-megawatts of new solar energy arrays across the state and will contribute significantly to the energy grid. Also in 2020, Penn signed a Power Purchase Agreement that involves the construction of two solar energy facilities in central Pennsylvania. Penn will purchase all energy produced, which is estimated to amount to 75% of the campus’s demand.

Additionally, Penn’s emissions have been decreasing due in large part to shifts towards renewable energy grid sources. Penn’s recent Power Purchase Agreement combined with our region’s general trends towards more sustainable energy sources will result in Penn’s energy being sourced from predominantly renewable sources, decreasing the carbon footprint of campus operations including vehicle charging.

More information can be found in the Achieving Penn’s CSAP Goals under the Vehicle Types & Impacts section.

Can we support the infrastructure needed to use electric vehicles?

While Penn has 12 charging stations across campus, the capacity is currently larger than the demand. Additionally, as batteries become cheaper and more electric vehicles (EVs) populate the roads, the cost of charging stations is estimated to go down. There are also multiple grant and rebate programs for funding EV charging stations, such as the Driving PA Forward’s DC Fast Charging Grant and Level 2 EV Charging Station Rebate Program. Due to these factors and rising demand, an increase in charging stations is predicted to be seen not just at Penn but across the region, expanding the number of stations available in general.

How does the manufacturing process for EV batteries impact their overall carbon emissions?

The manufacturing of EVs is more energy intensive and produces more emissions than manufacturing a conventional car because of the electric vehicles’ complex batteries. Lithium-ion battery production requires extracting and refining rare earth metals and is energy intensive because of the high heat and sterile conditions needed. However,
increasing the percentage of renewable energy used in plants that produce EV batteries would significantly reduce these emissions. Increased demand for EVs have led to the development of larger, more efficient factories that produce a lower carbon footprint per battery. Even without these improvements in manufacturing, EVs still have a lower lifetime carbon footprint than ICVs. Based on recent European studies of life-cycle emissions of EVs, an average EV produces 50% less life-cycle greenhouse gases over the first 150,000 kilometers (about 93,200 miles) of driving than an ICV.

What happens to the batteries of EVs at the end of their useful life?

Currently, it is difficult to recycle most EV batteries. There is no standardized design for EV batteries and most are not designed with recycling in mind. Some governments are beginning to promote the recycling of EV batteries. China imposed new laws in 2018 that made EV manufacturers responsible for ensuring batteries are recycled, and as a result recycles more lithium-ion batteries than the rest of the world combined. In the US, the federal government has yet to tackle EV battery recycling laws, but several states, including California—the nation’s largest car market—are exploring setting their own rules. Pennsylvania currently does not have state battery regulations in place. In the US, most EV manufacturers can recycle parts of used batteries, but what cannot be recycled goes into the landfill. Tesla reportedly recycles 60 percent of the components from its lithium-ion batteries once they’ve reached end of life.

References

- Information on the Health Effects of Ozone Pollution by the EPA
- Calculator from the Union of Concerned Scientists showing comparisons of emissions from EVs versus internal combustion engines
- EV Battery Degradation Comparison Tool by Geotab
- Case Studies on Fleet Electrification by the Climate Mayors Electrification Coalition
- Electrifying Transportation in Municipalities guide by the Electrification Coalition
- Plug-In Hybrid & Electric Vehicle Research Center at UC Davis
- Electric Vehicle Resource Kit provided by the Delaware Valley Regional Planning Commission
- Resources for Plugin Electric Vehicles and Charging Equipment provided by the Delaware Valley Regional Planning Commission