



Plug-in electric vehicles charging at the University of Colorado, Boulder.

Electric Transportation

Moving Toward 100% Clean, Renewable Energy on Campus

Renewable electricity, plus fossil-fuel free heating and cooling aren't enough to get colleges to 100 percent clean, renewable energy – they must also clean up their transportation systems. Advances in technology and declining costs make electric transportation a feasible option for colleges and universities. Campuses across the U.S. are realizing the synergy between clean energy and electric vehicles and the indispensable role they can play in shifting to 100 percent clean, renewable energy on campus.

Transportation Electrification Is Key to a Clean Energy Future

Transportation surpassed electricity generation as the leading source of greenhouse gas emissions in the United States in 2016. Electric vehicles that run on clean energy are essential to reducing the use of fossil fuels for moving people to, from and around college campuses. America's vast renewable electricity potential is more than sufficient to meet future demand created by the adoption of electric vehicles on college campuses.

Colleges and Universities Benefit from Electrifying Transportation

Going electric benefits campuses in multiple ways:

- **Renewable Energy Integration:** Adopting electric vehicles makes it easier to integrate more wind and solar power on college campuses.
- **Quality of Life:** Going electric reduces vehicle exhaust, heat and noise.
- **Cost:** Driving on electricity is cheaper than using gas in all 50 states.
- **Research opportunities:** Students at University of Michigan have access to state-of-the-art equipment and collaborate with industry experts through the university's "Battery Lab."

Colleges and Universities Are Taking on the Challenges of Electrification

Colleges are uniquely suited to tackle the challenges of electrifying their transportation options:

- **Cost:** Battery prices fell by 80 percent in six years, but their upfront cost still makes electric vehicles expensive for many buyers. Universities can leverage funding from several sources, including federal and private funds, to reduce the upfront cost of electric vehicles, which can be defrayed by lower energy and operating costs over time.
- **Charging:** Campus shuttles may charge at night in a campus garage, or even along their route. Campuses like University of Wisconsin-Madison have added fast-charge stations for electric vehicles, and Utah State University has pioneered a new "charge-as-you-go" technology. In this system, charging plates at each bus stop charge the buses from underneath, using induction charging, each time they stop. This is ideal for campuses buses that make frequent stops on fixed routes.



After studying low-carbon and zero-emission bus technologies in a 2013 workshop (above), UC Irvine switched to an all-electric bus fleet.

University of California, Irvine, Is First Campus in the U.S. to Convert to All-Electric Bus Fleet

In the 2017-2018 academic year, 20 all-electric buses rolled onto the University of California, Irvine (UCI) campus, making it the first campus in the U.S. to completely phase out fossil fuels in its on-campus transportation services. This initiative was voted for and is funded by students, who will pay up to \$40 each quarter to student services to cover the bus purchase and operating costs. Individual rides on the shuttle service, the Anteater Express, are free.

Electrifying the bus fleet is part of UCI's larger Sustainable Transportation program to decrease private vehicle trips around campus. As well as offering a clean energy shuttle service, UCI encourages students, faculty and staff to walk, bike and carpool.

Converting to an all-electric fleet improves air quality, decreases street noise, and helps UCI toward its goal to emit zero greenhouse gases from campus buildings and transportation by 2025. UCI has made the Princeton Review's Green College Honor Roll for four consecutive years, earning a perfect score on the 2017 list, in recognition of the university's commitment to clean energy and environmental sustainability.

Western Michigan University Is One of the Best U.S. Campuses for Electric Cars

Western Michigan University has garnered a reputation for support of electric vehicles, ranking fourth in the nation in 2014 for the number of electric vehicle charging stations on campus.

The campus is equipped with 22 electric vehicle charging stations, 15 of which are powered by a 50-kilowatt solar array. The panels generate enough solar energy each day to fully charge 11 Chevrolet Volts, and excess solar energy is stored in vehicle batteries for later use. The charging stations are available to anyone around the clock free of charge. A \$700,000 state grant funded the solar-powered charging stations, as well as the purchase of five electric vans and a hybrid-hydraulic truck.

WMU's solar-powered charging stations support research, providing real-time data on solar energy production and electric vehicle energy use. WMU is also known for its strong electrical engineering department, which offers courses on fuel cells and alternative energy sources, automotive electrical systems, and automotive design and life cycle performance.

This factsheet is one of an 11-piece series. For citations, and to read the other factsheets, please visit EnvironmentAmericaCenter.org/Campus101



List of Resources

To electrify campus transportation:

- Check out George Washington University's fleet electrification toolbox: provost.gwu.edu/fleet-electrification-toolbox-0
- Identify public funding opportunities: energy.gov/eere/vehicles/funding-opportunities
- Learn about laws and incentives in your state: www.afdc.energy.gov/laws
- Locate alternative fueling stations near campus: www.afdc.energy.gov/locator/stations

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