



+ E-BOOK

EV Charging for Universities

How Campuses Benefit From
Smart, Large-Scale Deployments

9-MINUTE READ

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Electric vehicle adoption continues to accelerate. Estimates show more than 26 million EVs will be on U.S. roads by 2030, more than doubling the 10 million EVs driven in 2022.

Increasingly, many of those vehicles will be operated by students, faculty, staff, and visitors who spend a significant portion of their day on university campuses.

Universities that invest in reliable, intelligently managed EV charging today can do more than simply keep up with demand. They can enhance recruitment and retention, improve local air quality, electrify their fleets in a cost-effective way, and reinforce their position as leaders in innovation and climate action.

This e-book examines why universities should prioritize EV charging for both personal vehicles and campus fleets, explores the operational, environmental, and reputational benefits that come with doing so; and illustrates how PowerFlex has helped universities deploy large-scale, load-managed charging networks using dependable hardware and intelligent software.

Why Universities Need EV Charging

Many campuses are located in states with ambitious climate goals and robust EV incentives, which encourages adoption among students, faculty, and staff. The result is that a growing share of people arriving on campus each day expect to plug in while they study, teach, and work.

■ Public Charging Needs

The profile of the campus EV driver is diverse. Undergraduate students may drive EVs purchased or leased by their families. Graduate students and postdocs living off campus often have longer commutes that make EVs

attractive for their lower operating costs. Faculty and staff, particularly those with long-term appointments and stable commuting patterns, see EVs as a practical choice that aligns with their values and financial goals. Visitors attending conferences, performances, athletic events, and alumni weekends increasingly arrive in electric vehicles and look for charging options as a normal part of trip planning.

For many of these drivers, home charging is not guaranteed. Students frequently live in residence halls or off-campus apartments without dedicated parking. Staff and faculty may reside in multi-unit buildings where installing chargers is complicated or prohibitively expensive. In these cases, campus charging becomes a primary source of reliable energy, not just a convenient amenity. When universities do not provide adequate charging, some drivers may delay purchasing an EV or choose another institution that better supports their mobility needs.

■ Fleet Charging Needs

In parallel with personal vehicle adoption, university-owned fleet vehicles — from campus shuttles to public safety vehicles to maintenance trucks — are undergoing a transformation of their own. Many institutions have adopted fleet electrification programs that often go hand in hand with state or local mandates that encourage or require the electrification of public and institutional vehicles.

Electrifying these fleets without a coherent charging strategy can quickly become costly and inefficient. If vehicles are plugged in as soon as they return to a depot without regard to grid conditions, usage peaks can trigger high utility demand charges or require new panels, transformers, or service upgrades. A more intentional approach relies on smart software to manage when and how vehicles charge, aligning charging schedules with duty cycles and shift times and making the most of existing electrical infrastructure.

■ ESG Requirements

Beyond driver demand and fleet modernization, universities also face rising expectations around ESG performance. Students increasingly weigh institutional climate commitments when choosing where to enroll, and faculty and staff want their workplace to reflect their own environmental values. Boards, donors, and grantmakers often look for evidence that

institutions are taking concrete steps toward emissions reduction, rather than simply publishing aspirational goals.

EV charging infrastructure gives universities a practical lever to address on campus. By enabling more people to drive electric and by powering zero-emission campus fleets, institutions can substantively reduce their carbon footprint and report measurable progress toward climate and sustainability commitments.

The Benefits of EV Charging for Universities

When universities invest in EV charging, they unlock benefits that touch recruitment, daily operations, environmental quality, and financial sustainability.

■ Recruiting Students & Staff

One of the most immediate advantages is attracting and retaining people. Prospective students often compare campuses not only on academics and cost, but also on campus life and alignment with their values. Seeing modern EV chargers near residence halls, libraries, and student centers sends a clear signal that the institution takes sustainability and innovation seriously. For EV-driving students, the availability of on-campus charging can be a deciding factor, especially if they cannot charge where they live.

Faculty and staff make similar calculations. A campus that allows them to plug in while they teach classes, conduct research, or attend meetings makes EV ownership more practical and less stressful, especially for those with longer commutes. Over time, as more employees and students adopt EVs, charging becomes an integral part of the overall campus experience and an amenity that demonstrates that the university is responsive to modern needs.

■ Improving On-Campus Health

EV charging also contributes to cleaner air and healthier environments. Tailpipe emissions from gasoline and diesel vehicles introduce pollutants linked to respiratory and cardiovascular issues. Because campuses often function like small cities — with dense populations of pedestrians, cyclists, and transit riders — local air quality directly affects the health and comfort of the campus community. By making it easier for drivers to choose EVs, universities reduce these pollutants on and around campus. The shift from internal combustion engines to electric power cuts greenhouse gas emissions associated with commuting and campus operations, helping institutions meet their climate goals while also delivering local health benefits.

■ Enabling Electric Fleets

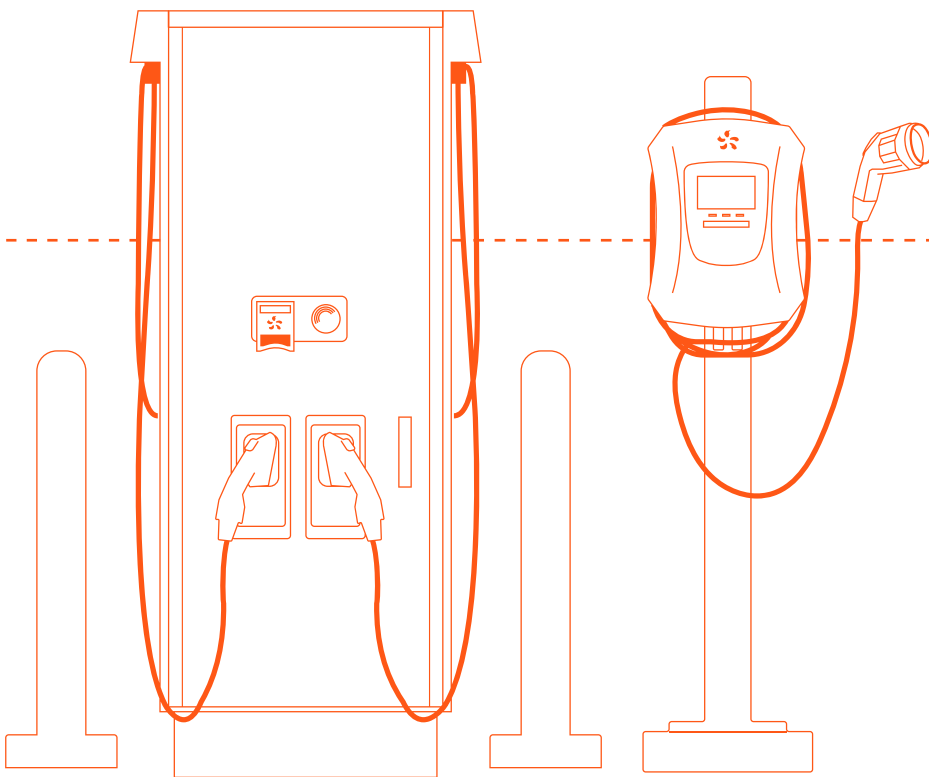
For campus operations teams, EV charging becomes a key enabler of fleet electrification. When a university deploys electric shuttles to connect parking lots, transit hubs, and academic buildings, it can reduce both local emissions and operating costs over the lifetime of the vehicles. However, these benefits are only realized when vehicles reliably reach the state of charge they need before they begin their routes. An intelligently managed charging system allows fleet managers to prioritize certain vehicles, charge during cheaper off-peak utility periods, and avoid overloading circuits. This transforms charging infrastructure into a strategic tool for fleet planning rather than a constraint.

■ Opening New Revenue Streams

From a financial perspective, EV charging can create a new, flexible revenue stream. Universities can choose to offer completely free charging as a benefit, but many opt for modest fees that help cover electricity, maintenance, and expansion. Pricing can be structured per kilowatt-hour, per session, or based on charging duration. When charging is integrated with existing parking systems, it can complement parking fees, support better turnover of spaces, and ensure EV drivers do not monopolize charger access. The ability to monitor usage and revenue through a centralized software platform allows finance and operations teams to forecast costs and returns, making EV infrastructure part of a thoughtful long-term capital plan rather than an ad hoc expense.

■ Reputational Benefits

Lastly, EV charging also plays a powerful role in branding and reputation. Universities are often looked to as societal leaders capable of piloting new technologies and setting norms for sustainable behavior. A visible network of chargers, ideally integrated with onsite solar or other clean energy resources, serves as a living demonstration of the institution's commitment to innovation and carbon reduction. It can support teaching and research by providing real-world data for engineering, policy, and sustainability courses. Students can study charging patterns, analyze grid impacts, or evaluate pricing models using actual campus data rather than hypothetical examples. This strengthens the university's identity as a forward-looking, solutions-oriented institution.



How PowerFlex Delivers On-Campus Charging Solutions

As universities move from piloting a few chargers to deploying campus-wide networks, they quickly discover that successful EV programs require more than hardware. Different parking facilities have different electrical constraints, driver profiles, and usage patterns. Campus fleets share infrastructure with personal vehicles. Utility tariffs and incentive programs add further complexity. To navigate this landscape, institutions benefit from a partner that can manage the entire project lifecycle and continuously optimize performance over time.

PowerFlex serves as that partner for universities, providing end-to-end support from initial site assessment and system design through installation, commissioning, and ongoing asset management. Rather than treating each charger as a standalone device, PowerFlex designs integrated systems that consider existing electrical capacity, likely growth in demand, and opportunities to leverage incentives and onsite clean energy resources.

Central to this approach is PowerFlex X™, an adaptive energy optimization platform that monitors, controls, and optimizes EV charging operations across one or many sites. Through a single interface, campus staff can see which chargers are in use, how much energy is being delivered, and how utilization patterns are evolving over time. PowerFlex X can also integrate with other distributed energy resources such as solar arrays and battery energy storage so that universities can coordinate EV charging with onsite generation and cost-saving strategies.

PowerFlex X includes Adaptive Load Management® (ALM), a patented technology that dynamically allocates available power among active charging sessions. ALM looks at real-time building load, charger demand, and driver needs, then distributes power in a way that smooths peaks and makes the most of existing infrastructure. This enables universities to install significantly more chargers on the same electrical service, often 6 to 10 times more

compared with a traditional, unmanaged approach. The result is a system that can scale as EV adoption grows, without requiring immediate, costly utility upgrades.

The impact of this approach becomes clear when looking at real campus deployments.

Caltech: Pioneering Campus-Wide Adaptive Charging

The California Institute of Technology in Pasadena is known worldwide for advancing science and engineering. It brings that same innovation mindset to its physical campus, where sustainability is a core priority. As EV adoption climbed among students, faculty, and staff, Caltech found that its existing charging options were no longer sufficient. More drivers were arriving with EVs, more parking areas needed coverage, and the university wanted to support research that depended on real-world charging data. At the same time, the campus did not want to undertake extensive and expensive electrical upgrades every time it added chargers.

To address these challenges, Caltech partnered with PowerFlex to design and implement a cross-campus charging network. The installation includes 211 Level 2 chargers and 6 DC Fast Chargers distributed across multiple parking garages. By using Adaptive Load Management®, PowerFlex enabled Caltech to accommodate this large number of chargers on existing infrastructure.



The system has delivered impressive results. Caltech's network supports approximately 82,000 charging sessions each year, providing about 1.5 million electric miles to drivers annually. The chargers collectively deliver around 870,000 kilowatt-hours of energy per year, which translates into avoiding roughly 700 tons of greenhouse gas emissions annually compared to equivalent gasoline driving. Beyond these quantitative outcomes, the deployment reinforces Caltech's reputation for sustainability leadership and provides a rich dataset for researchers studying driver behavior, grid impacts, and advanced charging algorithms.

University of California San Diego: Large-Scale Charging at a Leading Public University

The University of California San Diego is another institution with far-reaching ambitions in clean transportation. UC San Diego aims to electrify its fleet, encourage widespread use of zero-emission vehicles, and build one of the most extensive EV charging networks of any university in the world. Achieving this vision required a partner capable of delivering large-scale infrastructure that could expand over time while protecting the local grid and keeping costs under control.

PowerFlex worked with UC San Diego to develop an intelligent charging network spanning more than 20 sites across campus. The deployment now includes 461 Level 2 chargers and 6 DC Fast Chargers located in parking areas and garages that serve a wide range of campus users. From the start, the project was designed with scalability and economics in mind. With PowerFlex's assistance, UC San Diego secured funding from programs such as the California Electric Vehicle Infrastructure Project (CALeVIP) and Communities in Charge, significantly improving the financial outlook of the installation and enabling a more rapid expansion.

As at Caltech, PowerFlex X with Adaptive Load Management® sits at the center of the UC San Diego solution. The software monitors building loads, charging demand, and other variables, then adjusts power delivery dynamically to avoid peaks that would strain the grid or trigger high demand charges. This allows the campus to install far more chargers on its existing electrical capacity than would be possible with conventional, unmanaged systems, and it helps lower implementation costs by up to 60 percent.



UC San Diego's charging network provides about 30,000 charging sessions per year, delivering roughly 370,000 kilowatt-hours of energy and enabling more than 650,000 electric miles of driving annually. These miles avoid 258 tons of greenhouse gas emissions yearly, contributing to the university's broader climate goals. Through the PowerFlex X dashboard, campus staff can track charger status, utilization, revenue, and incentive-related metrics, which simplifies reporting to agencies such as the California Energy Commission and informs decisions about future expansion and pricing strategies.

Together, the Caltech and UC San Diego projects show how universities can move beyond small pilots to fully realized charging ecosystems. By pairing dependable hardware with a flexible, intelligent software platform, PowerFlex helps institutions design systems that grow with demand, respect grid constraints, and support both daily operations and long-term sustainability ambitions.

To learn how large-scale, adaptively load-managed EV charging can work for your university, **contact a PowerFlex expert today.**



About PowerFlex

PowerFlex is a clean technology solutions company making the transformation to carbon-free electrification and transportation possible. Our adaptive energy optimization platform PowerFlex X™ monitors, controls, and co-optimizes onsite assets like EV chargers, solar, energy storage, and microgrids — reducing overall energy costs through patented algorithms that maximize distributed energy resources.

PowerFlex is the second-largest installer of commercial solar in the United States, with over 500 megawatts (MW) of total solar capacity plus 50+ megawatt-hours (MWh) of battery energy storage. Combined, our solar and energy storage projects offset 460,000 metric tons of CO₂ each year. We also manage more than 50,000 EV chargers nationwide, making us the second-largest EV charging provider in the U.S. in terms of Level 2 port management.

PowerFlex is backed by EDF power solutions and Manulife Investments.

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