

Protecting Public Health: Plug-In Electric Vehicle Charging and the Healthcare Industry

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Protecting Public Health: Plug-In Electric Vehicle Charging and the Healthcare Industry

In 2014, the U.S. transportation sector consumed more than 13 million barrels of petroleum a day, approximately 70% of all domestic petroleum consumption.¹ Most of this petroleum was burned by internal combustion engine vehicles, which are major sources of greenhouse gases (GHGs), smog-forming compounds, particulate matter, and other air pollutants. Widespread use of alternative fuels and advanced vehicles, including plug-in electric vehicles (PEVs), can reduce our national dependence on petroleum and decrease the emissions that impact our air quality and public health.

Healthcare organizations are major employers and community leaders that are committed to public wellbeing and are often early adopters of employer best practices. These organizations are located throughout the United States—in urban and rural areas—and a growing number are offering PEV charging stations for employees to help promote driving electric vehicles, reduce their carbon footprint, and improve local air quality.

Investing in Global Health

Climate change poses a significant threat to human health, but workplace charging infrastructure investments by some healthcare industry leaders are helping employees adopt PEVs, reduce GHG emissions, and improve global health.

Climate Change and Health

The healthcare sector is the second highest commercial energy user in the United States, behind the food service industry, accounting for 10% of U.S. GHG emissions in 2013.² Climate change plays a significant role in global health; it increases temperature-related death and illness, air quality and respiratory illness, extreme weather events, vector-borne diseases (such as malaria, West Nile fever or Lyme disease), water-related illness, and impacts food safety, nutrition, and distribution and mental health and well-being.³ The U.S. Global Change Research Program, a federally mandated program consisting of 13 federal agencies, attributes the human health effects of climate change to both the changing severity and frequency of health problems already affected by climate (e.g., higher numbers of deaths attributed to malaria in areas where malaria already occurred) and to creating unprecedented health problems where they have not previously occurred (e.g., new incidences of malaria in areas where malaria had not previously been found).⁴ Given these concerns, it is easy to understand why the healthcare community is interested and invested in GHG reduction efforts.

Climate Change and Healthcare

Employee vehicle GHG emissions from commuting are categorized as Scope 3 emissions under the World Resources Institute and World Business Council of Sustainable Development's [Greenhouse Gas Protocol](#), which sets the global standard for how to measure, manage, and report GHG emissions. Scope 3 emissions include indirect emissions such as the

Climate Change Impact on Health

Between 2030 and 2050, climate change is expected to cause an estimated 250,000 additional deaths per year globally as a result of malnutrition, malaria, diarrhea, and heat stress.³

Direct global damage costs to health are estimated to be between \$2 and \$4 billion dollars per year by 2030.³

Climate change impacts are disproportionately felt by vulnerable populations, including low-income individuals and families, immigrants, children and pregnant women, the elderly, and persons with disabilities.²

¹Transportation Energy Data Book, Edition 24, Oak Ridge National Laboratory, 2016, cta.ornl.gov/data/index.shtml.

²Environmental Impacts of the U.S. Health Care System and Effects on Public Health, Eckelman, 2016, journals.plos.org/plosone/article?id=10.1371/journal.pone.0157014.

³Climate Change and Health, World Health Organization, 2016, who.int/mediacentre/factsheets/fs266/en/.

⁴The Impacts of Climate Change on Human Health in the United States: A Scientific Assessment, U.S. Global Change Research Program, 2016, health2016.globalchange.gov.

extraction and production of purchased materials and fuels, transport-related activities in vehicles not owned by the reporting entity, outsourced activities, and other upstream and downstream emissions. Employee PEV charging can help an organization control Scope 3 emissions, achieve carbon neutrality, and be recognized and awarded under a number of sustainability reporting programs, including [*LEED*](#), [*Green Globes*](#), and [*ENERGY STAR*](#).

As the largest integrated health system in Illinois, [*Advocate Health Care*](#) understands the direct link between its sustainability efforts, the health of the environment, and the health of the patients it serves. With ten PEV charging stations at four different locations, Advocate Health Care is working to decrease its GHG emissions and empower its employees to make environmentally friendly commuting choices. PEV charging is only a part of Advocate's larger, award winning sustainability program, whose energy reduction efforts between 2008 and 2015 have avoided the release of more than 203,895 metric tons of carbon dioxide emissions.⁵

Creating Positive Change in Local Communities

Healthcare companies are often recognized for making contributions to the health of their local communities. Efforts to reduce vehicle emissions through workplace charging offer a complementary opportunity to improve the lives and health of their employees, patients, and neighbors.

Community Consequences

Poor local air quality may increase the incidence and severity of health problems associated with pollution exposure, including higher rates of asthma onset and aggravation, cardiovascular disease, impaired lung development in children, pre-term and low-birthweight infants, childhood leukemia, and premature death.⁶ According to the World Health Organization (WHO), 7 million premature deaths in 2012—one in eight global deaths—occurred from air pollution exposure; WHO has identified air pollution as the largest environmental health risk.⁷ Domestically, the American Lung Association's State of the Air report estimates that more than half of Americans (166 million people) live in counties with unhealthy levels of ozone, particle pollution, or both.⁸

Community Solutions

Direct internal combustion engine vehicle emissions are released through the tailpipe and contribute to smog, haze, and other local air quality issues. PEVs emit zero direct emissions. Plug-in hybrid electric vehicles (PHEVs) produce zero tailpipe emissions in all-electric mode and usually have less direct emissions than comparable conventional vehicles when using their internal combustion engines. These emissions reductions are particularly important for hospitals, as air quality issues are location specific, and reducing the tailpipe emissions of commuting employees, patients, and guests directly results in better local air quality.

The Cost of Pollution

A study by Rand Health, a non-profit research institution, found that between 2005 and 2007, nearly 30,000 emergency-room visits and hospital admissions in California could have been avoided if federal clean-air standards, the national minimum air quality requirements, had been met.⁹

These visits resulted in a hospital care cost of approximately \$193 million.

Hospital spending can be substantially reduced through reductions in air pollution.

⁵Highlighting 2015 Accomplishments, Advocate Health Care, 2015, advocatehealth.com/highlighting-2015-accomplishments.

⁶U.S. Environmental Protection Agency, epa.gov/pm-pollution.

⁷7 million premature deaths annually linked to air pollution, World Health Organization, 2014, who.int/mediacentre/news/releases/2014/air-pollution/en/

⁸State of the Air, American Lung Association, 2016, lung.org/our-initiatives/healthy-air/sota/.

⁹The Impact of Air Quality on Hospital Spending, Romley et al, 2010, rand.org/pubs/technical_reports/TR777.html.

The Valley Hospital is located in Bergen County, New Jersey, a county that has not met federal ozone standards from 2012-2016 nor federal particulate matter standards from 2009-2012.¹⁰ The hospital has installed five PEV charging stations for staff use; in addition to improving local air quality, the chargers complement The Valley Hospital's broader sustainability goals of reducing their carbon footprint, conserving energy, reducing waste, and sourcing food locally. The Valley Hospital believes that the healthcare mantra "Do no harm" extends not only to patients and staff, but to the community and environment as well, and they have proudly committed to offering PEV charging in support of that vision..

Demonstrating Corporate Leadership

Providing PEV charging stations for employee use is a strong and visible sign of a hospital or healthcare organization's commitment to sustainability, the environment, and public health. PEV charging stations indicate an organization's adoption of new technologies, as well as their long term planning capabilities.

Supporting Employees

Workplaces where employees are regularly parked for long shifts, such as hospitals, are particularly well suited for workplace charging. With the addition of workplace charging, PEV-driving employees can nearly double their vehicles' all-electric daily commuting range, and the added convenience of PEV charging can be a positive factor in a competitive talent market. PEV charging signals both workplace culture and commitment to employee welfare for prospective hires.

Tufts Health Plan, a regional health plan in New Hampshire, Rhode Island, and Massachusetts, offers three dual Level 2 charging stations for employee use. With more than 3,000 employees, 85% of which drive to work with an average one-way commute of 25 miles, Tufts Health Plan is working in a variety of ways to minimize the environmental impact of its commuters. Efforts include offering carpooling assistance, bicycle parking, and a monthly employee incentive of \$100 if they choose not to drive to work. With high utilization of its existing charging stations, Tufts Health Plan is looking forward to installing an additional station in the fall of 2016.

Creating a Workplace Charging Program

As healthcare employees often work long shifts, Level 1, 120 volt charging may be a cost-effective solution for PEV-driving employees. *The University of Maryland Baltimore Washington Medical Center* has had success with Level 1 PEV charging stations, located in employee-only parking garages. Offering Level 1 charging allows them to efficiently meet the employee's charging needs.

Level 2 charging and DC Fast Charging are often utilized to meet employee, patient, and visitor needs.

For more information about charging technology, program creation, and charging management, see the Workplace Charging Challenge's [online resources](#) or contact the Challenge at workplacecharging@ee.doe.gov.

Supporting the Mission

More than half of all hospitals are non-profit organizations, driven by their healthcare mission rather than financial gain.¹¹ Unsurprisingly, healthcare organizations' missions are often tied to improving and protecting public health, and PEV charging stations are an opportunity to "walk the walk." With the ever-present demand for cutting edge facilities, employees, patients, and visitors are visibly reminded of an organization's leadership as soon as they park their vehicle.

¹⁰Green Book Nonattainment Areas, U.S. Environmental Protection Agency, 2016, epa.gov/airquality/greenbook/index.html.

¹¹Fast Facts on U.S. Hospitals, American Hospital Association, 2016, aha.org/research/rc/stat-studies/fast-facts.shtml.

Providence Health & Services, the third-largest not-for-profit health system in the United States, has a mission of compassionate service and a core value of stewardship, setting a goal to care wisely for people, resources, and the earth. As part of fulfilling this mission, Providence offers 33 PEV charging stations across hospitals and business campuses in Oregon, and has received strong positive reactions from employees. With high demand and favorable feedback, Providence is working to complete a sustainability strategic plan that will consider expanding PEV charging throughout its service territory.

Setting the Stage for Greater Industry Adoption

Advocate Health Care, The Valley Hospital, Tufts Health Plan, and Providence Health & Services are leaders in the healthcare industry, but they are also valuable partners in the Workplace Charging Challenge. Their efforts have helped demonstrate the global, local, and corporate benefits of investing in workplace charging, while paving the way for their peers to make similar investments in encouraging greater PEV adoption.

By joining the U.S. Department of Energy's Workplace Charging Challenge, healthcare companies can connect with experts to learn more about starting a workplace charging program. Partners also gain access to valuable resources and benefit from the lessons learned by healthcare industry partners, as well as hundreds of other companies (see back cover for more on becoming a partner).

U.S. Department of Energy's Workplace Charging Challenge

[EV Everywhere](#) is a Clean Energy Grand Challenge to enable plug-in electric vehicles (PEVs) that are as affordable and convenient for the American family as gasoline-powered vehicles by 2022. To help accomplish this goal, the Workplace Charging Challenge encourages America's employers in all sectors of the economy to provide PEV charging access at their worksites.

The Workplace Charging Challenge provides resources, tools, and technical assistance to implement and manage workplace charging programs, and Challenge partners are nationally recognized for their sustainability efforts. For more information on workplace charging or becoming a partner, contact the Challenge at workplacecharging@ee.doe.gov. For more information on EV Everywhere, contact EV-Everywhere@ee.doe.gov.



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