

# TOOL H: ELECTRIC VEHICLE CHARGING STATIONS AND SOLAR APPLICATIONS



Increasing fuel prices, concerns about energy security, and air quality improvement goals have spurred an interest in pairing automotive technology with renewable energy sources. Plug-in electric vehicles (PEVs) offer this opportunity.

As the automotive capital, Michigan has a high interest in PEVs. A 2012 study by Pike Research showed that Michigan is ranked 7th in the nation in PEV adoption. In addition, numerous automotive suppliers that develop PEV charging stations and advanced vehicle battery technology are calling Michigan home. However, as Michigan residents take to the adoption PEVs, our state's energy sources remain primarily imported and emissions producing, which negates many of the benefits that PEVs have to offer.

To help move away from imported energy and capitalize on the clean mobility potential that PEVs provide, charging stations can be coupled with a renewable energy source. The following case studies provide two successful examples of a renewable energy/charging station application in Michigan.

## **Western Michigan University**

In an effort to green its fleet, Western Michigan University (WMU) purchased five electric vans, a hybrid-hydraulic bucket truck, and a 50-kilowatt (kW) photovoltaic (PV) array with 15 charging stations in 2012. WMU's purchase was made possible through a grant by the U.S. Department of Energy's Clean Cities program.

The PV system at WMU consists of 18 adjustable arrays that are each made up of 12 230-Watt panels (totaling 50 kW). The PV system converts the sun's energy into electricity and sends this electricity to the WMU electric grid. WMU receives this energy and provides electricity to the vehicle charging stations 24 hours a day.

The University's electric vehicles currently operate on WMU's campus and wherever the University conducts business. To date, the vehicles have traveled 31,631 miles total. The solar panels generate enough energy each day, on average, to fully charge approximately 11 Chevrolet Volts, 7 Nissan Leafs, or 6 Azure Ford Battery Electric Transit Connects. The 15 WMU charging stations are available for any electric vehicle owner to use.

To learn more, visit: <http://www.wmich.edu/sustainability/projects/electric-vehicles>

## **Lansing Board of Water and Light**

In April 2013, the Lansing Board of Water and Light (LBWL) installed a solar carport as a demonstration project to study charging electric vehicles via a solar array. The carport consists of a 5-kW grid-tied solar array with two publicly available electric vehicle charging stations. The carport, located at the riverside City Market, is a modular aluminum structure designed to be waterproof and fully wind, snow and seismic code compliant. The project was funded through the U.S. Department of Energy.

**As the  
electrical  
grid in  
Michigan  
becomes  
cleaner, so  
will the  
miles driven  
by a PEV.**

LBWL will study the data from the project after a year of use to determine if the PV system produces enough electricity to offset the electricity consumed by the PEVs using the parking spaces.

To learn more, contact Tim Rowden at [tjr@lbwl.com](mailto:tjr@lbwl.com).

## **USEFUL LINKS AND FURTHER READING**

**Plug-in Ready Michigan: An Electric Vehicle Preparedness Plan**

<http://cec-mi.org/plugin>

**Plug-in Electric Vehicle Handbook for Consumers, DOE Clean Cities**

<http://www.afdc.energy.gov/pdfs/51226.pdf>

**Plug-in Electric Vehicle Handbook for Electrical Contractors, DOE Clean Cities**

<http://www.afdc.energy.gov/pdfs/51228.pdf>