



# DELIVER

Energy More Intelligently

BUILDINGS | CARBON CAPTURE AND STORAGE | FUEL CELLS | NUCLEAR | POLICY | **PLANNING**  
RENEWABLES | SMART GRID | STORAGE | SUSTAINABLE MOBILITY | SUSTAINABILITY ANALYSES



## SMART CHARGERS AMP UP ELECTRIC VEHICLE RESEARCH

### Roydon Fraser & 21 WISE Faculty Members

In April, Waterloo became the first Canadian university to install smart charging infrastructure for electric vehicles (EVs). That's good news for anyone on campus who wants to charge up for free. It's even better news for the 21 WISE faculty whose research focuses on EVs.

Unlike regular chargers, these units optimize charging patterns based on demand levels and time-of-use electricity costs. They also collect a wealth of detailed data to help investigators shed light on critical issues of grid management and next generation EV design.

For example, how do different charging behaviours affect battery performance? Will the growing popularity of EVs stress the electrical grid? Could EV batteries sell power back to the grid during peak demand periods?

What is the difference between a level II and a level III charger? Time required for charging is the key differentiator. This is important for consumers. Typically, a level II charger (max 7.2 KW capacity) can be used for overnight charging at home. The level III charger can deliver up to 50 kW for full charge between 20 minutes to an hour.

The units come with PowerLimiting option, making it possible to remotely control how much power they deliver. At UW, researchers will also have access to 20 kW Tesla Wall Connector that can be enabled as a smart charger with additional metering.

The capability to collect a large amount of data through telematic devices provides a significant boost to UW researchers in support of an ongoing Drive4Data program at WISE. The existing program involves 10 EVs and the data collected reflect "real-life" usage: length of trip, drive cycles and status of battery charge under hot and cold conditions.

The installation of the smart chargers will allow a large number of vehicles to be included in the D4D program. Data mining and analytics will support the next generation of modelling tools and algorithms.

**Lead Researcher:** Prof. [Roydon Fraser](#) + WISE Team of 21 Faculty