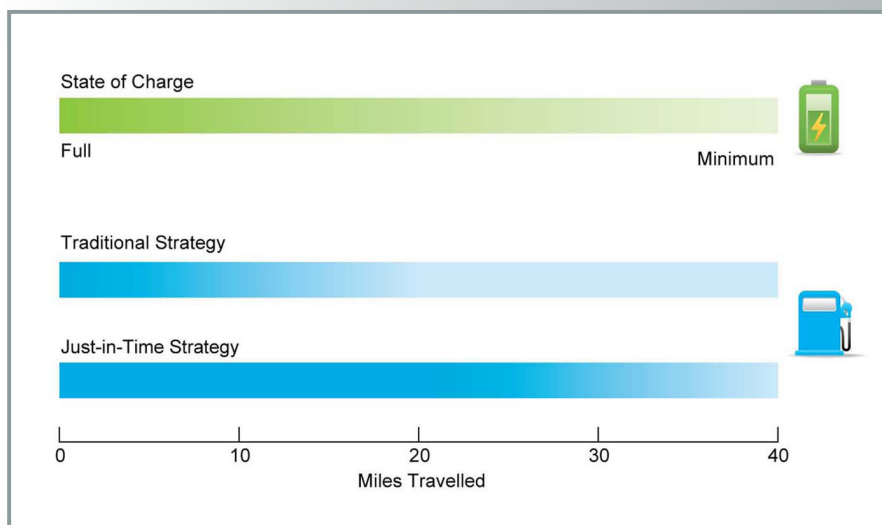


# Self-Learning Controller for Plug-in Hybrid Vehicles Learns Recharge Stations for Optimal Battery Charge

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## Technology Summary

Researchers at ORNL invented a robust self-learning controller for plug-in hybrid electric vehicles (PHEVs). This device improves PHEV performance and fuel efficiency by maintaining as high a state of battery charge as possible, given the location of area charging stations. The invention is especially useful for improving performance over time, because the more PHEV drivers avoid depleting their energy storage devices, the longer the effective lifetime of their batteries.

The invention contains a computer configured to receive data inputs such as a recharging sources and locations; it can then provide outputs such as the battery's optimal state of charge. The controller, using a sensor and modified GPS, can detect when the PHEV is connected to a recharging source and stores the location of that charging station. Over time, the invention can calculate the estimated state of charge needed to reach a recorded charging station from any location.

Alternative versions of this invention can also continuously calculate a battery's state of charge at any point along any route, even without knowing the route in advance. All versions of the ORNL technology are configured to use the maximum amount of battery-stored energy before the vehicle reaches the charging station. This minimizes the amount of fossil fuel consumed and decreases emissions.

## Advantages

- Maintains the battery at a higher state of charge for best performance and longer life
- Maintains the battery at a close-to-optimal state of charge control at any point along any route
- Maintains high battery power reserves for full vehicle performance while operating under heavy load (such as climbing in mountains for many miles at high speed)
- Depletes batteries to the lowest recommended state of charge just as the hybrid vehicle reaches the charging station, allowing optimal recharging

## Potential Applications

- Plug-in hybrid electric vehicles

## Patent

Robert C. DeVault, *Self Learning Control Method for Plug-in Hybrid Vehicles*, U.S. Provisional Patent Application 60/943,328, filed June 12, 2007.

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