



University of Delaware/NRG Vehicle-to-Grid Resource

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MRC session on DER

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- Many cars at several locations in Delaware Municipal Electric Corporation
- Market access: PJM demand response framework
- Aggregation to form a single resource
- Providing regulating reserve
- Load reduced w/ power in and out of car batteries
- Cars used for driving as well as service in wholesale power markets
- World's 1st grid revenue for V2G

Balance of Power

The numbers behind the University of Delaware program using cars as a money-making reserve for the electric grid

Cars used	23 (19 all-electric Mini E's, 3 modified Scion xB's, 1 experimental Honda Accord plug-in hybrid)
What they do	Store or discharge electricity according to grid needs
Special equipment needed	Control board, \$200-\$300 per car
Power of car batteries	12 kilowatts per vehicle*
Minimum capacity needed for a grid "bank"	100 kilowatts/9 cars
Time connected to grid	24/7 except when being driven
Average daily driving time	About an hour per car
Monthly revenue per car from grid operator	About \$150
Monthly electricity cost/car	About \$40
Monthly profit	About \$110 per car/\$2,500 total

*For Minis and Scions. Honda power not disclosed.

Source: University of Delaware

The Wall Street Journal