



Electric Vehicle Grid Interaction Exploration

Cooperative Research and Development Final Report

CRADA Number: CRD-11-431

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In accordance with Requirements set forth in Article XI.A(3) of the CRADA document, this document is the final CRADA report, including a list of Subject Inventions, to be forwarded to the Office of Science and Technical Information as part of the commitment to the public to demonstrate results of federally funded research.

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CRADA Title: Electric Vehicle Grid interaction Exploration

Parties to the Agreement: Xcel Energy

Joint Work Statement Funding Table showing DOE commitment:

Estimated Costs	NREL Shared Resources
Year 1	\$ 00.00
Year 2	\$ 00.00
Year 3	\$ 00.00
TOTALS	\$ 00.00

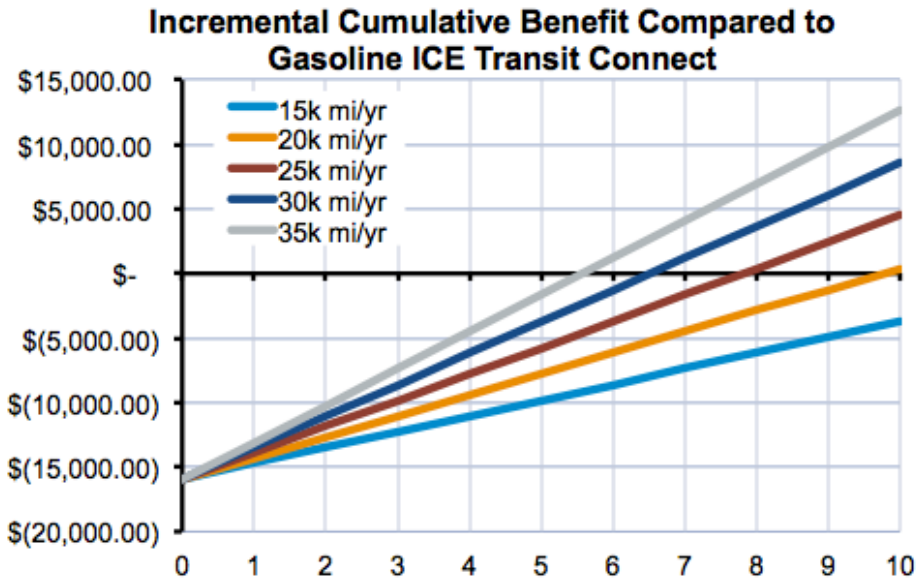
Abstract of CRADA work:

Under this agreement NREL plans to collect, analyze, and share with Xcel Energy data regarding the driving and charging performance of plug-in electric vehicles. NREL will research activities critical to energy storage, electric propulsion, and the emerging issues surrounding the integration of vehicles into the current and future grid. It will provide NREL with access to one of the first all-electric vehicles available in the market as part of NREL's Advanced Technology Vehicle Fleet (ATVF).

Summary of Research Results:

Metrics	City	Highway	
Total Energy Required	4.6	3.74	kWh
Maximum Battery Output	112.2	109.1	kW
Fuel Economy	2.58	2.62	mi/kWh
Regenerative Braking Energy	14%	6%	of net energy consumed (kWh)
Regenerative Braking Power	12%	16%	of max motor power (kW)

Charger Efficiency ~89%



Subject Inventions Listing:

n/a

Report Date:

6/27/12

Responsible Technical Contact at Alliance/NREL:

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