

Project Information Form

Project Title:	Quantifying Real-World Hybrid Electric Vehicle Energy-Emissions Relationships for Improved Modeling of Hot-Spots in Future Electrified Vehicle Fleets
University:	University of Vermont
Principal Investigator:	Britt A. Holmén
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Funding Source(s) and Amounts Provided (by each agency or organization):	U.S. Department of Transportation (USDOT) - \$39,422 University of Vermont (UVM) - \$39,422
Total Project Cost:	\$78,844
Agency ID or Contract Number:	USDOT 69A3551747114 UVM-DOT-513
Start and End Dates:	February 15, 2019 - February 14, 2020
Brief Description of Research Project:	<p>Given anticipated significant increases in the proportion of electric drive vehicles (EDVs), including Hybrid Electric Vehicles (HEVs), Plug-In Hybrid Electric Vehicles (PHEVs), and Battery Electric Vehicles (BEVs) in the passenger and heavy-duty vehicle fleet to achieve a more sustainable transportation system, it is critical that we have reliable models of HEV and PHEV tailpipe emissions behavior during real-world operation of these vehicles. The proposed research addresses a lack of real-world data on the detailed behavior of HEV technology in response to real driving conditions (road conditions and weather). The University of Vermont Transportation Air Quality Laboratory (UVM TAQLab) previously collected a unique dataset of HEV emissions and vehicle operating parameters during on-road driving through all seasons. The proposed study aims to develop quantitative understanding of the relationships between hybrid system energy management and emissions for a HEV passenger car. Specifically, the study will fill two knowledge gaps: (1) the detailed effects of environmental conditions (ambient temperature changes) and road characteristics (road grade and average link speed), on the HEV electric motor/battery-Internal Combustion Engines (ICE) “power split” during real-world driving; and (2) how this “power split” affects the magnitude and spatial distribution of exhaust particle emissions from HEVs. Ultimately, the researchers will develop a quantitative understanding of the factors relating instantaneous energy use to ultrafine particle tailpipe emissions.</p>
Describe Implementation of Research Outcomes (or why	



National Center
for Sustainable
Transportation

not implemented): Place any photos here	
Impacts/Benefits of Implementation (actual, not anticipated):	
Web Links <ul style="list-style-type: none">• Reports• Project website	https://ncst.ucdavis.edu/project/hev-energy-emissions-relationships/