

Department of Electrical and
Computer Engineering

Seminar

LINE ROALD

Date: April 22, 2025

Time: 3:00 - 4:15 p.m.

Location: Shaffer 3



Carbon-sensitive electric loads and their impacts on emissions

Abstract: An increasing number of electric loads can be characterized as "carbon-sensitive", meaning that they are willing to adapt their real-time electricity use in response to the current carbon intensity of the grid. Examples of carbon-sensitive consumers include hyperscale computing companies, who want to publicly demonstrate their commitment to clean energy, and hydrogen producers, who are incentivized by tax credits or valuable "green" classifications. Individual consumers, often on flat electricity tariffs, simply want to contribute to a cleaner planet. While there is a lot of interest in "doing the right thing" to reduce the carbon footprint of our electricity use, there is concerningly little understanding of what the "right" action for end consumers actually is. We will discuss our analysis of common carbon emission metrics and demonstrate their sometimes counterintuitive and counterproductive impacts on grid emissions. We will then discuss some more holistic approaches to allow loads to expose carbon preferences to the grid.

Bio: Line Roald is an Associate Professor in the Department of Electrical and Computer Engineering at University of Wisconsin—Madison. She received her Ph.D. degree in Electrical Engineering (2016) from ETH Zurich, Switzerland, and was a postdoctoral research fellow at Los Alamos National Laboratory. She is the recipient of an NSF CAREER award, the Vilas Early Career Investigator Award and several best paper awards and is part of the National Academies Roundtable on Climate Change and AI. Her research interests center around modeling and optimization of energy systems, with a particular focus on managing uncertainty and risk from extreme weather and renewable energy variability.