REIS
RENEWABLE ENERGY & ISLAND SUSTAINABILITY

College of ENGINEERING
UNIVERSITY OF HAWAI'I AT MĀNOA

CEE691/EE699/ME691 Seminars in Renewable Energy and Island Sustainability (REIS)

Estimating the Opportunity for Residential Load-Shifting in Hawaii: An Analysis of Proposed Time-of-Use Rates

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Location: Holmes Hall 247, Date: Thursday, October 20, 2016, Time: 4:30 – 5:30 pm

About the speaker: Makena Coffman is an Associate Professor of Urban and Regional Planning at the University of Hawaii at Manoa. She teaches graduate courses in urban economics, environmental planning and policy. Her research interests include greenhouse gas mitigation, energy policy and alternative transportation strategies. She holds a B.A. in International Relations from Stanford University and a Ph.D. in Economics from the University of Hawaii at Manoa. She is a Research Fellow with the University of Hawaii Economic Research Organization.

Abstract

Hawaii's largest electric utility, Hawaiian Electric Company (HECO) and its subsidiaries recently proposed a Time of Use (TOU) pricing scheme for residential rates. Using a simulation model of consumer electricity demand coupled with historic residential electricity load data, we estimate the magnitude of load-shifting potential as a result of proposed rates. Using estimates from the literature as well as a more bottom-up approach to characterizing typical household appliance usage, we develop three scenarios to characterize consumer responsiveness to HECO's proposed TOU rates. For simplicity, our results assume that all residential customers follow the new rate schedule, and thus our results serve as an upper-bound for actual impacts. We find in our scenario based on the most common literature estimates that the proposed TOU rates could lead to a 10% reduction for on-peak electricity usage by participating residential consumers, and increase daytime and nighttime consumption by 9% and 8%, respectively. The reduction in daytime and nighttime rates results in an overall net increase in electricity demand, by about 3%. Because residential electricity demand is about a quarter of overall electricity usage in Hawaii, we find there is a 1% increase in daytime and nighttime demand and similar decline in on-peak loads.