UNIVERSITY of HOUSTON | ENGINEERING

Department of Industrial Engineering

Tuesday, April 28th, 2020

12:00 PM

Defense held online via Zoom

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Ph.D. Dissertation Defense

Advisor: Dr. Gino J. Lim

"Designing Smart Ports by Integrating Sustainable Infrastructure and Economic Incentives"

Abstract

High performing ports are implementing smart technologies to better manage operations meeting new challenges in maintaining safe, secure, and energy efficient facilities that mitigate environmental impacts. In response to the existing problems, ports are adopting technology-based solutions, as well as new approaches to port operations planning and management. Implementation of such solutions to mitigate recent problems is known to be switching to smart ports. The proposed research attempts to conceptualize and define smart ports and enable them through the integration of sustainable infrastructure such as microgrids and onshore power supply as well as gaining benefit from the economic incentives. We attempt to develop a framework for a smart port and a quantitative metric, Smart Port Index, that ports can use to improve their resiliency and sustainability. Moreover, we propose a systematic framework for evaluating the benefits of microgrid and onshore power supply integration for industrial ports. A two-stage stochastic mixed-integer model was developed to evaluate the effectiveness of the proposed approach under operation uncertainties. For the economic incentives, we analyzed the process in which a regulatory authority defines incentive and tax policies to motivate one or more ports in the region to initiate green efforts. This work aims to model the behavior of both the regulatory authority and ports by a multi-objective bilevel programming model.

Zoom link: https://uofh.zoom.us/j/92583395297

Meeting ID: 925 8339 5297