



Pacific Institute *for the*  
Mathematical Sciences

# PIMS LUNCHBOX LECTURE

## HAMIDREZA ZAREIPOUR

6 April, 2016

12:00 pm

Downtown Campus, University of Calgary



### OPTIMAL STRATEGIC SIZING OF ENERGY STORAGE FACILITIES IN RESTRUCTURED ELECTRICITY MARKETS

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In this seminar we will discuss a new model for strategic investment model for a merchant energy storage facility. The facility's actions impact market-clearing outcomes, and thus it is a price-maker facility.

We consider the uncertainties associated with other generation units offering strategies and future load levels in the proposed model. The strategic investment decisions include the sizes of charging device, discharging device, and energy reservoir. The proposed model is a stochastic bi-level optimization problem where planning and operation decisions of the energy storage facility are made in the upper level, and market clearing is modeled in the lower level under different operating conditions. To make the proposed model computationally tractable, an iterative solution technique based on Benders' decomposition is implemented. This provides a master problem and a set of subproblems for each scenario. Each subproblem is recast as a Mathematical Programs with Equilibrium Constraints (MPEC). Numerical results based on real-life market data from Alberta's electricity market will be provided.

#### WEBSITE & REGISTRATION:

[www.pims.math.ca/industrial-event/160406-pllhz](http://www.pims.math.ca/industrial-event/160406-pllhz)  
(A light lunch will be provided. Please RSVP)

