



**University
of Victoria**

Graduate Studies

Notice of the Final Oral Examination
for the Degree of Master of Applied Science

of

McKENZIE FOWLER

B.Sc.E (University of Massachusetts Lowell, 2016)

**“Implications of Distributed Solar PV on the Flexibility of
Hydro-Dominant Power Systems”**

Department of Mechanical Engineering

Friday, December 7, 2018
10:00 A.M.
Engineering Office Wing
Room 106

Supervisory Committee:

Dr. Andrew Rowe, Department of Mechanical Engineering, University of Victoria (Co-Supervisor)
Dr. Peter Wild, Department of Mechanical Engineering, UVic (Co-Supervisor)
Dr. Bryson Robertson, Department of Mechanical Engineering, UVic (Member)

External Examiner:

Dr. Madeline McPherson, Department of Civil Engineering, UVic

Chair of Oral Examination:

Dr. Sasha Kovacs, Theatre Department, UVic

Dr. David Capson, Dean, Faculty of Graduate Studies

Abstract

Solar photovoltaic power generation will play a dominant role as jurisdictions around the world move toward a future decarbonized economy. For decarbonised power systems that rely on variable renewable generation, flexibility will be one of the most valued services needed by the greater electricity system. This thesis presents the modelling approach and results of a production cost model of British Columbia to examine the implications of large penetrations of rooftop solar PV on the electricity system. This modeling approach focuses on accurate modelling representations of hydro system flexibility, with differentiation made between storage hydro and run-of-river hydro assets. Current literature gives little attention to the accurate representation of hydro-dominant system flexibility as it is often assumed to be almost completely flexible.