Student Research Poster Competition

Abstract Submission

Researcher: Mir Sultan

Research Title: Renewable Energy Storage Systems for Nova Scotia: A Comparative Analysis and Feasibility Study

School: Dalhousie University

Program: Master of Resource & Environmental Management (MREM)

Research Advisor: Dr. Michelle Adams

Submission Category: Clean Tech Innovation

Contact Information: Email – mir.sultan@dal.ca | Phone: 902-580-6339

Energy storage solutions (ESS) are technologies used to store energy when there is a large supply and fill energy demands when required. These technologies are expanding across the world, and now in Nova Scotia. They will help lower power costs in the province, reduce the risk of power outages, and help expand renewable energy development. This research conducted a comparative analysis to better evaluate these technologies to investigate which one is the best alternative to adopt. This analysis compares these technologies from an economic, topographical/physical condition requirement, technical efficiency, and environmental perspective. Studies suggest that each of these technologies has both advantages and disadvantages. It is recommended to adopt all three of these technologies to make the most out of their benefits. The environmental impacts associated with lithium-ion batteries can be reduced by expanding direct lithium extraction (DLE) research and projects. The environmental and economic costs, as well as the various physical requirements, of pumped hydro storage, can be worked through by reusing abandoned dams and deep mines. Flywheel technology has strong potential as an ESS but there is a need for expansion of research and development regarding this technology. By expanding upon the advantages of these technologies and working through the disadvantages associated with them, Nova Scotia can lower its power costs, reduce risks of power outages, and achieve its sustainable development goals.