

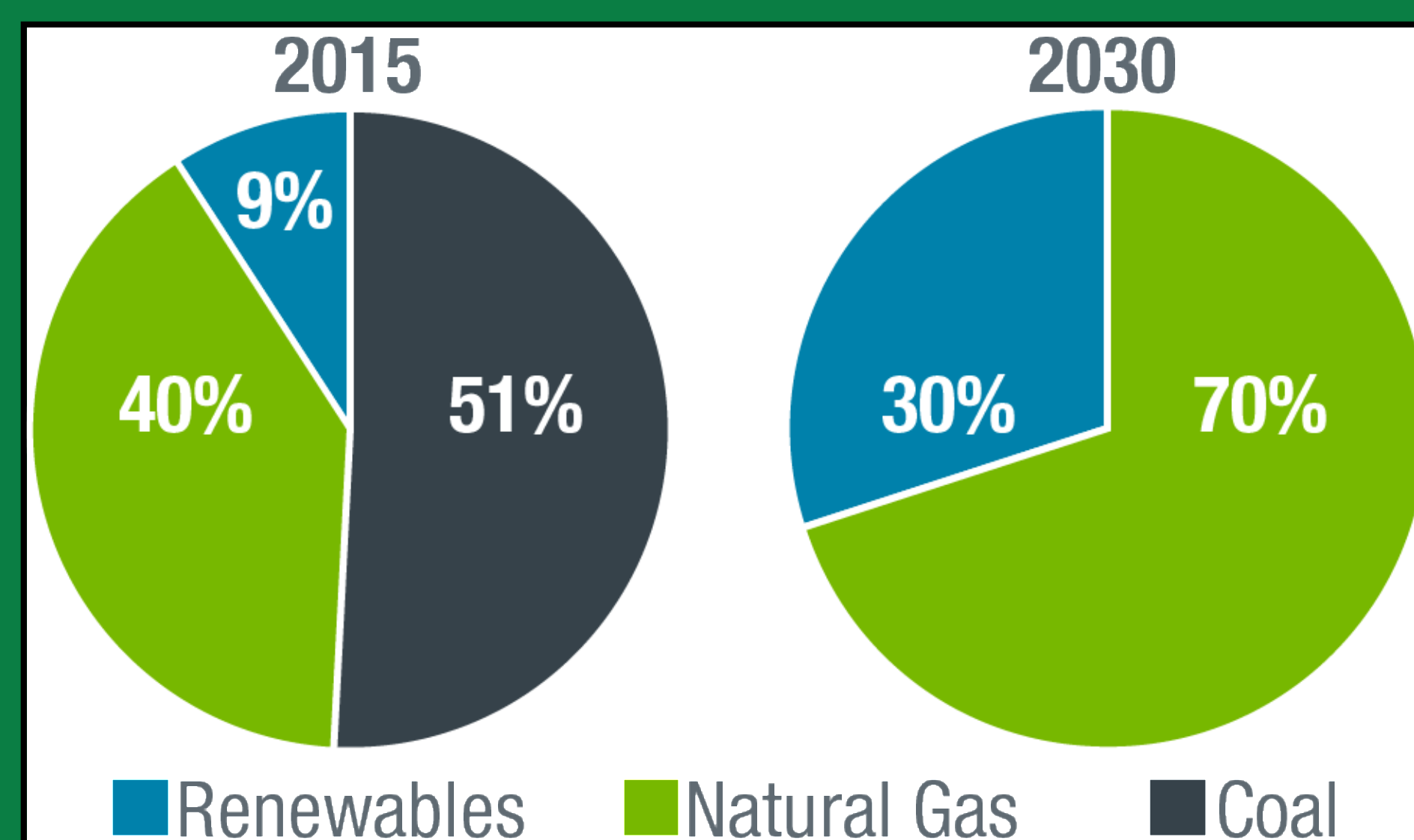
Market Design for Increased Wind Generation

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BACKGROUND

Mitigating environmental emissions that contribute to climate change is one of the world's most urgent issues, and economists have an important role to play in designing policy responses. Policy initiatives to increase the penetration of renewable generation have resulted in both challenges and opportunities in electricity markets worldwide.

Many concerns facing electricity markets stem from the intermittency of renewable generation, which produces electricity only when the wind blows or the sun shines. Difficulties include designing incentives for entry of renewable generation, while at the same time ensuring system reliability through the availability of fossil fuel (natural gas) capacity.



Source: AESO.ca

PROJECT OVERVIEW

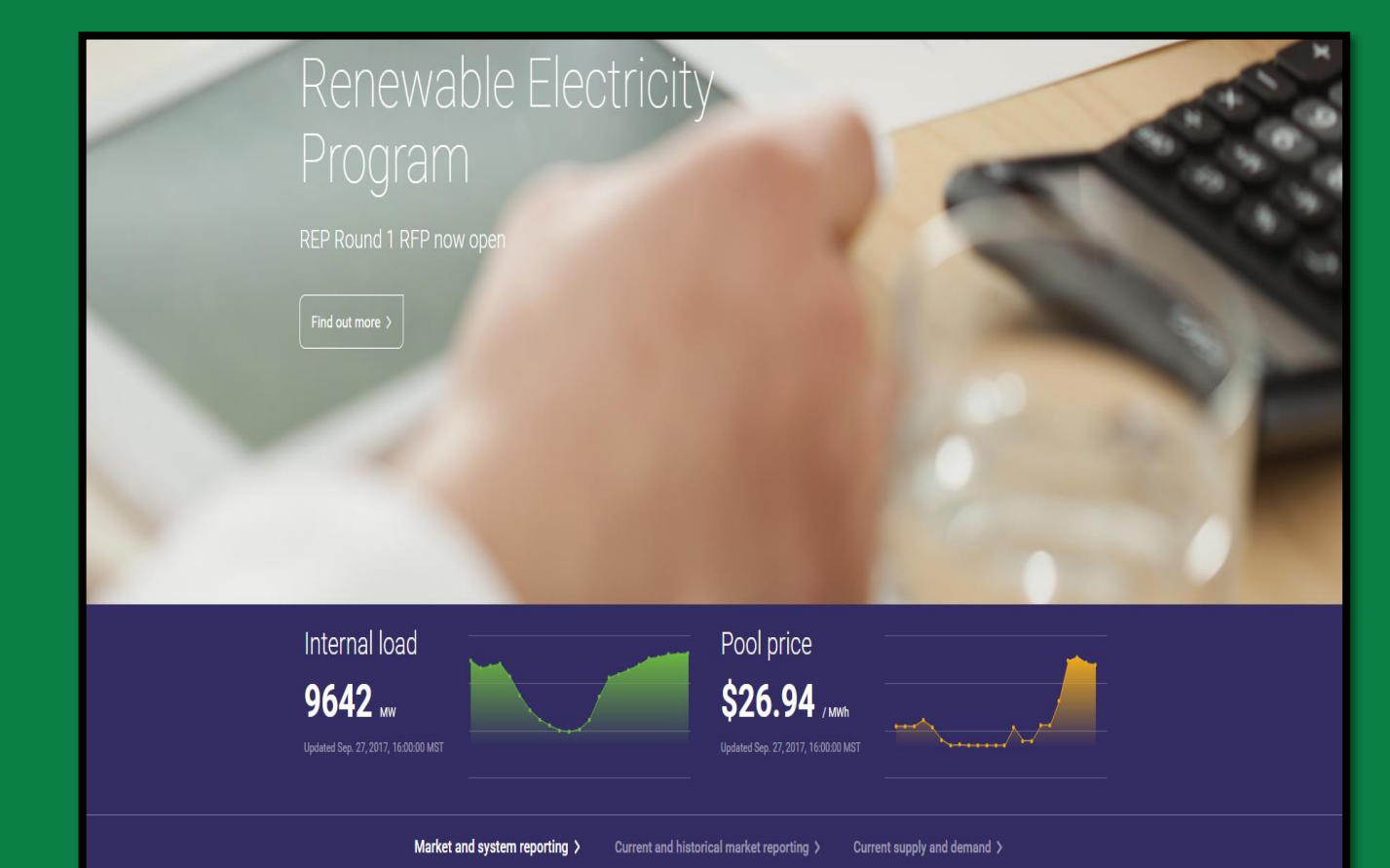
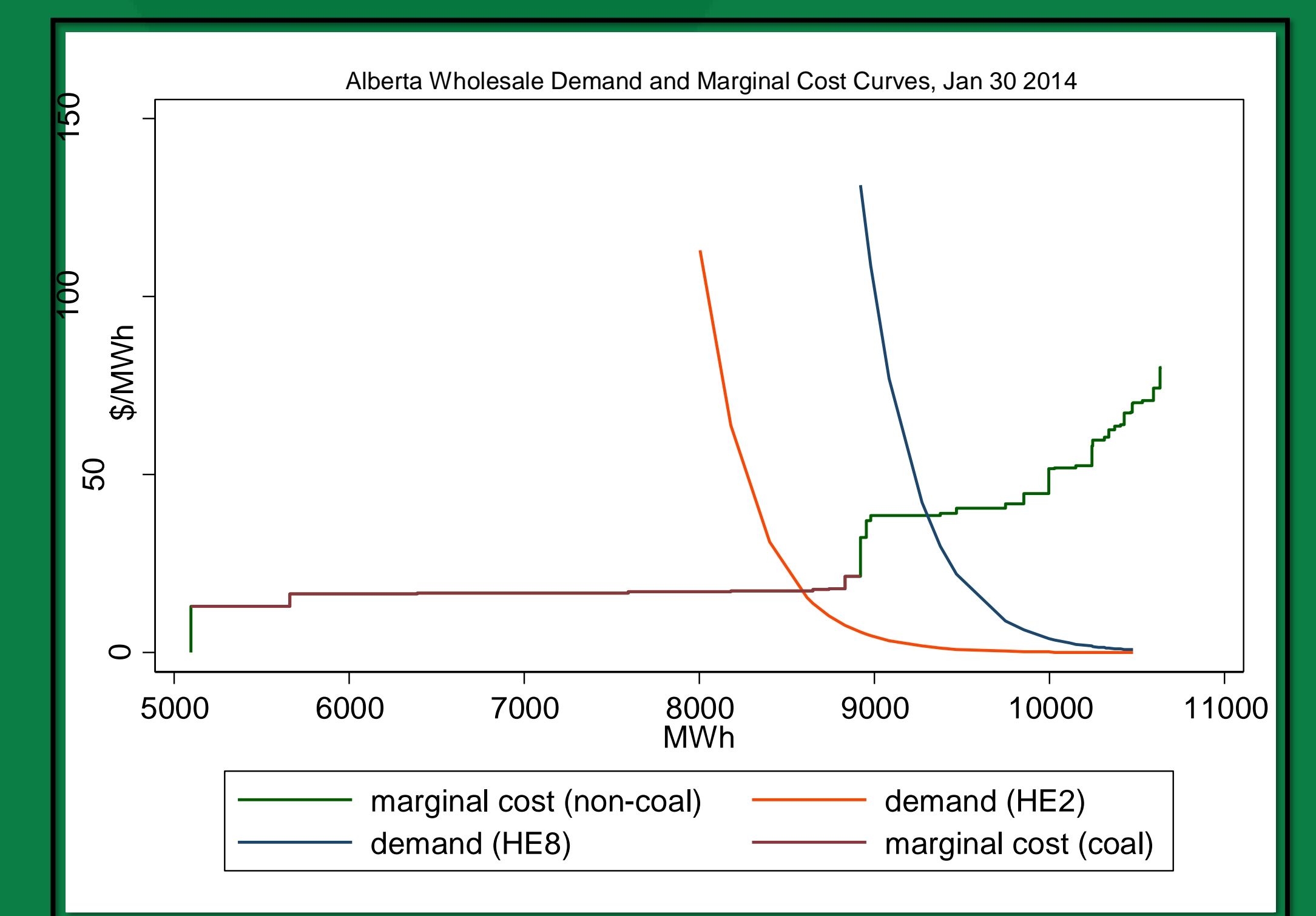
This project will address challenges to market design and rules presented by the expansion of wind generation capacity. In this project we will be simulating and analyzing the short-run impacts of expanded wind generation on market outcomes in Alberta, including prices and emissions.

This analysis will compare and contrast different potential policy responses to expanded wind generation. We will also be developing methodology for the simulation and analysis of long-run effects (including investment) of wind expansion, taking into account market power, congestion and forward transactions. Our research is expected to contribute to the design of markets to facilitate wind integration in many jurisdictions.



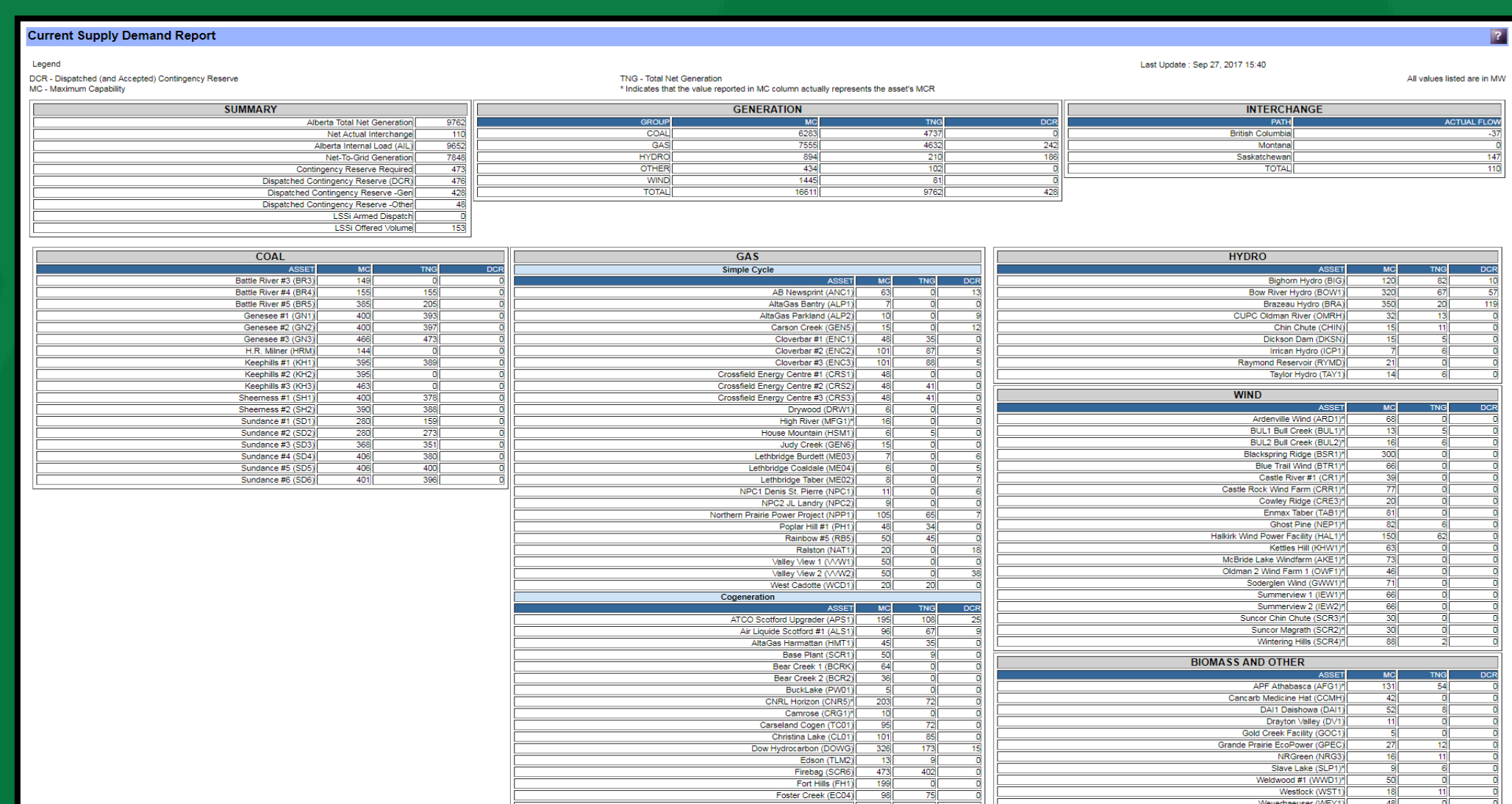
EXPECTED OUTCOMES

We anticipate publishing multiple articles throughout the grant period on the short and long run implications of expanded wind capacity. The first papers on short run implications will be circulated and submitted for publication within the first two years of the granting period. Papers on methodology for simulating long run implications are expected to be circulated and submitted before the end of the granting period..



SHORT-TERM OBJECTIVES

The short-term research objective of this research project will be simulation and analysis of the short-run impacts of expanded wind generation on market outcomes, including prices and emissions. This analysis will compare and contrast different policy responses to expanded wind generation..



THEME OVERVIEW

Wind

Wind has powered human societies for centuries, milling grain, pumping water, and driving ships around the globe. In recent years, maturing technologies have enabled the same resource to generate electricity, and contribute significantly to the energy needs of numerous countries. However, the challenges of harnessing wind remain: it is an ever-changing force, and its cycles often do not align with our demands. Effectively integrating wind into our grids and markets requires both technologies and an economic system that can accommodate these variations in supply. Understanding the special challenges of harnessing wind power in the Canadian north will be a specific priority.

EXTERNAL PARTNERS

Our project will rely on data to be obtained from the Market Surveillance Administrator and the Alberta Electric System Operator.

We are pursuing research partnerships with Canadian government agencies such as the Alberta Market Surveillance Administrator, Alberta Electric System Operator, and the Alberta Department of Energy.

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