

APS1012 Final Report

APS 1012 - Managing Business Innovation and Transformational Change

Team 5: Future Energy Transformation in Canada, China and the U.S.

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1.0 Executive Summary

Canada has committed to achieving net-zero greenhouse gas (GHG) emissions by 2050 and to reducing its emissions by 40-45% below 2005 levels by 2030. This commitment has been made in light of the United Nations Climate Change Conference (COP26) in Glasgow, Scotland in 2021[1]. As one of the world's largest emitters of greenhouse gasses per capita [2], ranked 14th in 2021, Canada's commitment to net-zero emissions is crucial in the global effort to mitigate the effects of climate change. However, this commitment presents significant challenges between the net-zero goal and the economic development, as energy production, consumption, and transportation are major sources of GHG emissions.

To address these challenges, the goal of this report is to provide a holistic analysis and recommendations to reshape the clean energy profile to achieve net-zero goals for three countries - Canada, the United States, and China. The analysis included their current energy profiles from different angles, ranging from energy production/consumption by sectors and energy sources, electricity generation methods, GHG emissions by sectors, and safety regulations and policies in the energy industry, combined with their technical constraints and limitations. The report also identified three case studies on these three countries during the energy transitions. More specifically, Canada is implementing a Coal-phase out project to eliminate the coal-fired electricity generation units; China is heavily investing in wind power generation as part of its national fourteenth five-year plan; Energy innovations are impacting the United States from policy evolution, energy trends and technology innovations.

The followings highlighted the main points and key findings from the current energy profiles for each country:

- All three countries has common pattern in energy consumption, where heavy industries and transportation had the highest energy demand
- China and the States were heavily relying in fossil fuel energy sources (coal, natural gas) due to its larger energy demands and population, while hydropower is dominated in Canada's electricity generations (60%)
- In terms of GHG emission, electricity is the leading sector in terms of GHG emitter while oil/gas is the largest sector in Canada

Throughout three case studies, the report also found the common patterns to achieve the net-zero goal more effectively and efficiently, with the following recommendations:

- The government shall implement energy policies to lead the energy transition, through incentive programs, financial supports, and regulations, cooperation with all stakeholders
- The governments and energy producers shall take the advantages of geographical features to implement the electricity generation reformation accordingly
- Encouraging to new technology advancement (Carbon Capture, Fission and Hydrogen cells) to replace the traditional energy source in long term