

The future of energy, the path to de-carbonization and the implications for Canada **Enbridge Research in Action Seminar Series**

Written by: Ryley Bolton P.Eng., Haskayne School of Business MBA Candidate 2020

Seminar Review

The Speaker

Ethan Zindler is Head of Americas at Bloomberg New Energy Finance (BNEF). He has an MBA from Columbia Business School and a BA from Georgetown University. Prior to joining BNEF, he worked in news reporting, editing and web production. He also spent time in the Clinton White House Office of National Service.

The Message

The seminar focused on the changes happening in the power sector, how batteries are impacting the energy industry and how these changes relate to climate change.

The power sector is changing. Investment in renewable energy and additional consumer choice is making people think differently about energy. Investment in renewable energy has been consistent the last five year with approximately one third of a trillion dollars added in new investment each year. Investment is coming from a variety of sources including the oil and gas industry and financial institutions. China is driving most of the investment in the solar industry. Traditional financial intuitions such as pension funds are starting to invest in the sector largely because renewable energy is no longer considered alternative energy. New builds in the renewable energy sector now outpace new builds of all other types of energy. As a result, cost for these technologies are going down and efficiency is going up. As costs continue to decrease demand for renewables is only going to increase. Renewables are becoming the most financially responsibly choice for adding or replacing energy capacity to a grid.

The other thing that is impacting the energy industry is the consumer. Consumers have a lot more choice when it comes to energy and as a result they are thinking about it differently. An example of this is, in areas of the world where energy from a grid is high-priced there has been a significant amount of residential photovoltaic systems installed. It is not just that individual consumers are thinking differently, corporations are also changing how they buy and use energy. More corporations are choosing green power, especially a lot of tech companies. These companies are securing power purchase agreements and using them to build wind and solar to power their facilities.

The price of lithium ion batteries has decreased 80 per cent since 2010. As battery prices continue to decrease and fuel prices increase, demand for electrical vehicles (EVs) and electric buses (E-Buses) is expected to dramatically increase. This shift from fuel burning vehicles to EVs is going to be disruptive to the fuel industry. BP and Shell are two companies that expect consumers to shift to EVs and have started investing in the industry in preparation for the disruption. China has invested heavily in E-Bus market and

represents 99 per cent of the world's demand for E-Buses. This increased use of E-Buses in China has already had an impact on the diesel industry as demand in China is down 10 per cent.

Batteries also offer exciting opportunities to manage an energy grid. Batteries can be integrated into a grid to handle instantaneous spikes in demand. Batteries have a digital response and have the ability to handle a surge in demand quicker compared to the traditional oil and gas methods. In terms of mass renewable energy storage, batteries are probably not the world's best options. Pumped hydro or other similar technologies are a better option for large energy storage.

Considering all the developments happening in energy generation, are they enough to avoid a 2-degree Celsius increase in the world's climate? BNEF has some of the most optimistic emission predictions that are public however they still predict that CO2 emissions produced per year will essentially be neutral between now and 2050. BNEF did adjust for countries that have signed environmental policy agreements and have taken steps to implement them in their emissions estimates. Therefore, if a 2-degree state is to be avoided more dramatic steps need to be taken by either government or industry.

Overall perspective and conclusion

The kick-off to this year's Enbridge Research in Action Seminar Series was a very informative and engaging morning. Ethan Zindler did an excellent job of presenting information that was relevant to the Calgary crowd. The majority of his talk focused on the power sector and how the developments in renewable energy will affect the power sector. There were several slides and graphics focused specifically on the Canadian energy industry. The seminar provided excellent insight to the changes of the power sector through consumer choice and renewable energy investment. BNEF predictions for battery prices presents an interesting future for their use in power grids and the demand for electric vehicles. Finally, Zindler related all of this development to the effect it is having on climate change and provided an unbiased assessment of where the world stands. This discussion provided attendees with a lot of valuable new information about development and trends in the energy industry. People left the event contemplating the future of the industry, whether the industry is doing enough to combat climate change and what will be the next breakthrough technology that could completely reshape the industry.