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Alternative Energy Industry Commodity Options for Western Canada include Critical Minerals.

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Introduction

As alternative energy industry commodity options, such as critical minerals helium, lithium, and cobalt, are at the forefront of energy diversification, western Canada provinces can lead that charge. Alternative energy in western Canada is not only complementary to the oil and gas sector but could also provide an economic boost to the regions that have seen reduced activity and have a workforce that can adapt to these alternative resources.

Currently, the top producing countries of helium include the United States, Qatar, Algeria, and Russia. Top producing countries of lithium include Australia, Chile, China, and Argentina. Cobalt's top producing countries include Democratic Republic of Congo, Russia, Australia, and the Philippines. With many top producing countries at higher risk for geopolitical issues, Canada's reduced risk makes it an ideal location for alternative energy industry commodity investment.

Helium

Helium is a key commodity with increasing global demand specifically in the tech sector. Though most helium being produced today comes from natural gas fields, not all helium is created equal… production of helium carried in nitrogen is preferred over that carried in methane or CO2 as the carbon emissions are dramatically less leading to a smaller environmental footprint. Helium traps are commonly found near crystalline basement source rocks that contain uranium and thorium with an overlaying effective seal such as evaporites to prevent the migration of the small helium molecules.

Varying regions through western Canada contain helium in various carriers. Natural gas producers seeking to diversify can add helium-capturing equipment to their current operations. Recent work has shown that traps in southern Saskatchewan contain the preferred nitrogen-carried helium deposits high grading it as an ideal exploration area. Currently, in Saskatchewan, there are 82 helium licensed wells with 2 gas processing plants and 7 batteries currently operated by predominately helium companies. Though in its infancy, there is nitrogen-carried helium exploration taking place in Alberta and Saskatchewan.

There are also logistical challenges when it comes to the storage and distribution of helium due to the high cost of liquefaction and the relatively small number of facilities with this capability and the cost factor for transportation.

Lithium

Demand for lithium is expected to grow with the increasing need for energy storage solutions along with the growth seen in the electric vehicle industry. Unlike other critical minerals, lithium is in abundance worldwide with no concerns of a shortage. Adding lithium production to the western Canadian portfolio equates to the diversification being chased by the "energy industry".

Lithium in western Canada can be removed as a secondary product of oil and gas by extracting the commodity from the brine solution collected during production. Often the lithium-rich brine is looked at as industrial waste with a cost associated with its disposal. Aside from lithium production from oil and gas extraction, geothermal lithium can be produced to not only generate electricity but yield lithium. Potential formation water containing lithium can be found from the Cambrian to the Triassic with a high concentration of lithium-brine found in the Devonian Formation in Alberta. With the abundance of abandoned wells in Alberta, there is an opportunity to repurpose existing well locations and infrastructure to diversify the oil and gas industry.

Cobalt

With cobalt mining currently taking place in eastern Canada, most western provinces and territories only show prospective locations with the exception of Manitoba which noted cobalt production in 2020. Western Canadian prospects such as the Fortune Minerals' NICO project, a cobalt-gold-bismuth-copper project in the Northwest Territories, have been approved for development since 2014 but have had regulatory hurdles to complete prior to development.
Recent news from Fortune Minerals stated plans for the purchase of former steel fabrication plants in Alberta for the refining of their products, these plants are ideal refining locations as there is infrastructure in these regions that provide a means of transport for the export of the refined product. Though Alberta is not a region with cobalt deposits, its in-place infrastructure makes it an ideal hub for transport to markets thus diversifying the oil and gas dependency in the region.

Technical Analysis

IHS Markit ULC (IHSM) specializes in technical subsurface analysis; our team has designed and interpreted numerous well tests for helium wells for various operators here in Canada. General principles of flow in porous media and gas reservoir engineering apply to any gas well test, including a helium well. A properly designed flow and buildup test on a helium well can establish reservoir characteristics, well deliverability and provide information about the size of the reservoir. The drainage area investigated during the buildup test can point to the minimum gas volume in place, which can be used to generate longer-term deliverability forecasts with sufficient certainty. Time-tested well test analysis methods work remarkably well for single-phase gas and are the primary evaluation tool for helium asset appraisal and development.

Results, Observations, Conclusions

With the increased demand for alternative energy industry commodity sources, western Canada could fill a void being seen in the helium and cobalt markets and assert itself as a region for energy diversification with lithium. As exploration for helium continues in Saskatchewan and Alberta a technical understanding of the reservoir could assist operators in future development and

production of their resources. If the western provinces can overcome regulatory hurdles there is an opportunity for alternative energy development across the region.

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