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Metagenomics for Greener Production and Extraction of Hydrocarbon Energy: Creating Opportunities for Enhanced Recovery with Reduced Environmental Impact

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| Status | Approved |
| Competition | Applied Genomics in Bioproducts or Crops |
| Sector | Environment |
| Genome Centre | Genome Alberta |
| Project Leader | Gerrit Voordouw, University of Calgary |

Project Description

Canada recognizes the necessity to transition global energy production towards renewable resources. But until the technologies exist to make it economically feasible to do so, Canada's oil, gas and coal must be extracted in the most environmentally friendly way possible. This project is designed to minimize the environmental impact of oil sands production, by decreasing its use of water and emission of greenhouse gases and by enhancing the extraction of clean burning gas from coal beds.

We will develop a database to describe and harness the genetic potential of the microorganisms, genes and biological processes that exist naturally in microbial communities in our oil sands and coal beds. By identifying the genes, bioprocesses and bacteria in the old sands and coal beds, we will improve our understanding of how methane in hydrocarbon resources is generated and identify the enzymes involved in the natural cracking of hydrocarbons that produce methane and carbon dioxide.

We will use these organic bioprocesses to decrease the water used and land lost in mining operations and manage the methane emissions from tailings ponds. The publicly accessible knowledge generated by this project will also help other researchers harness the power of the processes present in Canada's deep biosphere to resolve other important research questions. In addition to the database, this project will also create publicly accessible genetic and microbial tools that scientists can use to create greener energy and feedstock production.

By designing new biotechnologies that decrease the energy and water required currently for oil sands extraction and by enhancing methane production from coal beds this project will help to ensure that both Canada and the world's current energy requirements are met with the smallest environmental impact possible. The accomplishment of this aim will help Canada's energy production become an environmentally sustainable enterprise.