Exploring radio frequency energy to dry potash and other minerals

This IMII project explored a potentially novel approach to drying mineral products with radio frequency (RF) energy from a clean tech inverter developed by Acceleware (www.acceleware.com). The concept could see a commercial solution with the capability to reduce facility emissions when compared t0 technology currently used in the minerals industry. This project is a first step in validating the effectiveness of using radio frequency (RF) energy as an effective potash or uranium drying solution with lower capital and operating cost than alternative technologies while also providing much lower GHG emissions levels.

The objective of this Phase I Study was to complete the first stage in the testing and development process of a RF heat drying solution. This stage was intended to validate that RF energy can dry potash ore to the level desired. Various simulations were done using electromagnetic dryers as the method to implement the concept. The dryers were of 2 different sizes: a scaled test/proof of concept dryer, processing 100 kilograms of potash product per hour and a potentially commercial scale dryer, processing 150 tonnes of potash per hour.

The results of this stage provided Acceleware and IMII with the inputs needed to design the small-scale test system in the next stage and then complete a series of simple mineral product heating tests. The simulation work and design of second stage apparatus would involve additional simulations and design iterations to refine both the design and simulations.

The assessments and studies conducted as part of Phase I showed that there is enough potential for this concept to be scaled up that it is worth considering additional simulations and design iterations to refine the initial simulations. The simulations undertaken as part of Phase I showed that radio frequency (RF) can potentially dry mineral ore to desired levels. These initial results have identified potential pathways that additional studies are being considered.

The analysis suggests that EM heating technology could be used effectively to dry moist potash and anticipate a reduction in energy input by 33 – 50%.

Proponent: *Acceleware*
Project Duration: February to August 2023
Project Cost: **$25,000**
IMII Contribution: $25,000

INTERNATIONAL MINERALS INNOVATION INSTITUTE

IMII is a non-profit organization jointly funded by industry and government and is committed to developing and implementing innovative education, training, research and development partnerships for supporting a world-class minerals industry. **www.imii.ca**