GOING UNDERGROUND: CO_2 STORAGE IN AQUIFERS AND OTHER FORMATIONS

Yuri Leonenko

It's an attractive idea: take the carbon dioxide (CO_2) emissions responsible for climate change and put them underground where they can't do any damage.

Industrial scale CO_2 storage projects, now operational or in design, provide strong empirical support for the view that CO_2 storage can be implemented safely and at acceptable cost. Nevertheless, significant uncertainties remain regarding the risks, cost and availability of underground storage at the scales necessary for this technology to play a significant role in managing global emissions.

Until now, geologic storage technology was driven by density contrasts. This allows for possible CO_2 flow upwards and leaks through high permeability zones or abandoned wells, representing a major technical obstacle for implementation. Yuri Leonenko and his colleagues from University of Calgary and Harvard University are developing new enhancements which will eliminate the risk of CO_2 leakage to the surface. Among them are aggressive engineering methods including acceleration of CO_2 dissolution in target aquifers (ex-situ dissolution) and surface (in-situ) dissolution which aims to dissolve CO_2 into water on the ground before it is injected underground.

These methods of active engineering will, first, reduce the risk of leakage and second, will dramatically increase the range of underground formations available for storage.

Partners: Natural Science and Engineering Research Council of Canada, Alberta Department of Energy, Carbon Management Canada