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C.F.
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UNIVERSITY OF SOUTHERN CALIFORNIA

“Creation of a New Industry: Lithium Extraction in the Imperial Valley”

The Imperial Valley in Southern California sits atop a rift produced by two separating tectonic plates. The mantle is thin, generating geothermal hotspots at the southern end of the Salton Sea. As a result, there is robust hydrothermal power production in the area. The hot brines are brought up and flashed with the steam used to drive turbines. The remaining brine is pumped back into the aquifer. Hydrothermal power production has a small environmental footprint and offers an advantage over solar and wind of not being intermittent. // Recently the brines used in power production, which contain 20% solids, have been considered as a source for lithium to be used in the manufacture of batteries. This process involves separating lithium ions, a minor component, from other cations in the brine. After extracting the lithium and using the thermal energy to produce electricity, the brines will be pumped back into the aquifer which provides a much smaller environmental footprint than many current lithium extraction technologies. Estimates suggest the brines in the Imperial Valley could provide 30% of the world's needed lithium for the next 30 years. Combined power and lithium production with largely shared capital costs bring the projects into economic viability.

Lithium mining by direct extraction is an industry in its infancy. In this talk, I will describe steps being taken to make the Imperial Valley a major supplier of lithium and suggest implications of this industry for chemical engineers.

IN JANUARY OF 2023, after 12 years, Zukoski stepped down from being Provost at two institutions: the University at Buffalo and the University of Southern California. As Provost, Zukoski—a great believer in the transformative impact of higher education—was a champion of pedagogical innovations and multidisciplinary research. Prior to these appointments, Zukoski spent three years in Singapore working in the Agency for Science Technology and Research, 6 years at Vice Chancellor of Research and eight years as the Head of the Department of Chemical and Biomolecular Engineering at the University of Illinois. It was at Illinois that Zukoski built his teaching and research career where he studied nanoparticle formation mechanisms and the rheology of suspensions. For his work, Zukoski has been received a number of teaching and research awards among which was being named one of the Hundred Chemical Engineers of the Modern Era by the American Institute of Chemical Engineers. He was elected to the National Academy of Engineering in 2007.