

Permitting for Direct Lithium Extinction (DLE)

How can Nevada prepare for an increase in development of DLE projects while ensuring sustainability for water, wildlife, and people?

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Direct Lithium Extraction (DLE)

- Traditionally, lithium is produced two ways: hard rock mining, and brine evaporation.
- DLE is a class of technologies which aim to directly remove lithium from brines, without fully evaporating the water off.
- Uses physical, chemical or electrical processes or combination.
- Many pilots around the world, including at least one in Nevada, but zero operational commercial-scale DLE projects exist.

DLE and water

- DLE targets mineral-laden brines which underlie playas (dry lake beds) across the desert southwest.
- General technology is to pump brine, extract the lithium, and then reinject the spent brine into the aquifer.
- Some proposed DLE projects would consume fresh groundwater.
- Ratio of water consumption to total pumping varies significantly.
- Major question which needs answering: what is the connection between brine and freshwater aquifers?

DLE's promise

- DLE may have a lower environmental footprint than other forms of lithium production.
 - No significant earth-moving or open pits.
 - Far less water consumption than evaporation projects.
 - Land footprint is dramatically smaller.
- DLE may be a rapid way to increase lithium production in Nevada while limiting environmental impacts compared to other lithium production methods.

DLE in Nevada

- 38 proposed brine projects in Nevada – all assumed to be DLE.
- Inferred from placer mining claims on playas.
- All projects are on playas.
- Most are in Esmeralda, Nye, Mineral Counties; also Churchill, Washoe, Clark and others.
- 1 pilot project operational in Clayton Valley (Esmeralda)

The Problem

- There is no regulatory framework in place for DLE.
 - DLE projects are fundamentally different than mines – they aren't mines.
 - Mining regulatory frameworks are inapplicable to the unique challenges and uncertainties inherent in permitting DLE projects.
- There is regulatory uncertainty about DLE.
 - Project delays; high investment risk; slowed investment curve.
- Numerous contested water rights cases in Clayton Valley & elsewhere.
- This emerging technology could become a dominant player in the lithium market, and Nevada is not ready.

Regulatory Gaps: Non-Consumptive Use

- DLE pumping and reinjection is a non-consumptive use of groundwater which could nonetheless alter availability of surface water or groundwater resources.
 - Groundwater pumping at high volumes may alter aquifer dynamics and pressure & temperature gradients. This may affect surface expression of groundwater.
 - Geothermal energy is a corollary, and is known to sometimes dry up adjacent surface water features.
- The big question: **how will non-consumptive groundwater pumping and reinjection at high volumes affect availability of surface water resources and groundwater levels?**
 - How will this pumping and reinjection affect senior water rights?
 - Highly context dependent.

Regulatory Gaps: Non-Consumptive Use

- Nevada has no established statutory framework for regulating non-consumptive groundwater pumping and reinjection.
- This type of water use is fundamentally different than an appropriation of groundwater resources as in our current statutory framework.
- This type of water use is also fundamentally different than Nevada's water appropriation framework for mining purposes.
- Non-consumptive pumping and reinjection for DLE needs its own regulatory regime.

Other Regulatory Gaps for DLE

- Reclamation standards are fundamentally different than open-pit mining.
- Solid waste stream disposal is of unique concern because of the high levels of minerals; may need a new regulatory regime.
- Is brine evaporation still considered a beneficial use of water if DLE is an alternative technology that does not require permanently removing groundwater from aquifers?

Possible Next Steps

- A study:
 - Establish a committee and fund a study to investigate appropriate regulatory changes to accommodate the incoming rush of DLE permitting.
 - Provide recommendations prior to 2027 legislative session.
- Or a bill:
 - Dive right in with regulatory changes in the 2025 session.
 - Will require extensive legwork and leadership between now and then to get policy that works and has consensus in a short amount of time.
- Either way:
 - Stakeholder outreach with Tribes, industry, local communities, conservation groups, scientists, other interested parties.