



**Frequently Asked Questions (FAQ) with Jack Lifton, Advisor,
Physical & Chemical Engineer
*One World Lithium***



1. How does One World Lithium, (“OWL”), the company, define itself today – as a mining company or a developer of low-cost lithium separation technologies?

This speaks to the capability of [One World Lithium](#)'s technology to vertically integrate the production of battery-grade lithium carbonate directly from brines in a single reactor. As a mining company, we remain focused on prospective properties of merit that may contain recoverable lithium at commercial scale, from a wide range of concentrations. We are able to vertically integrate such a deposit into the company to include the highest value-added form of that commodity by focusing on an advanced direct lithium extraction (DLE) process for the extraction and separation of lithium from natural brines, directly generating lithium carbonate.

Hence, the answer to question 1 is both – we will focus on developing properties as assets that fuel our ability to offer low-cost lithium separation and direct production of battery grade lithium carbonate.

2. Tell us about direct lithium extraction (DLE) technologies and why it's now getting so much attention from investors?

“It's such a game changer. There are huge opportunities,” U.S. Energy Secretary Jennifer Granholm told an energy conference in April 2022 about DLE.

Lithium is the ‘driving’ force behind electric vehicles, but the industry is not able to keep pace with demand. In February 2022, the Biden administration [announced](#) plans to invest \$2.9 billion to strengthen the battery supply chain and the production of advanced

batteries. New technologies that will expand the sources of the supply of lithium must fill the gap.

As [reported](#) by *The Wall Street Journal*, new lithium extraction technologies are attracting attention as these “methods “could help increase supplies, while attracting investors for their potential to speed up production and reduce the environmental impact compared with most current lithium-extraction methods, are, so, far unproven at commercial scale.”

How is DLE defined? The National Renewable Energy Laboratory (NREL) [states](#): “DLE technologies can be broadly grouped into three main categories: absorption using porous materials that enable lithium bonding, ion exchange, and solvent extraction. Scaling up any of these techniques to full production capability remains a challenging task. For example, developing a solid material that bonds with just lithium is a huge challenge in geothermal brine that contains many minerals and metals. Successful DLE implementation will depend on expanding innovation and creating new technologies.”

3. As someone who knows more about the sector than anyone and who is a discerning critic in the technical metals sector, what was the catalyst for you to join OWL as a consultant and technical advisor?

I was familiar with the technology that OWL has licensed from the US Dept of Energy, but not as it has been newly applied to the selective separation of lithium carbonates from brines. Once I saw the data and procedures patented by the US DoE, I was astonished by the simplicity, applicability, low cost, and end-product purity achieved.

4. What is OWL’s role with the US Department of Energy and how did this come about?

In March 2022, OWL [announced](#) the signing a licensing agreement with the US Department of Energy’s National Energy Technology Laboratory division for a patent developed by the NETL for selectively recovering lithium from solutions of mixed metallic ions.

The DOE patent is an advanced direct lithium extraction (DLE) process for the extraction of lithium from natural brines, rapidly generating a pure lithium carbonate.

The method uses unique carbon dioxide injection mixing techniques to quantitatively precipitate lithium carbonate from brines. This process requires no solvent, electrodes, membranes, or sorbents, but only uses carbon dioxide which can be sourced from industrial waste or exhaust gas streams or, even, ambient air. It significantly reduces capital and operation costs, process time, energy requirements, and, paradoxically, overall carbon dioxide emissions.

The process is fully deployable and operational at the brine source, eliminating the need to evaporate the brines and/or transportation of brine concentrates to a chemical processing facility to form and purify lithium carbonate. Deployment of this technology will reduce dependence on foreign lithium sources.

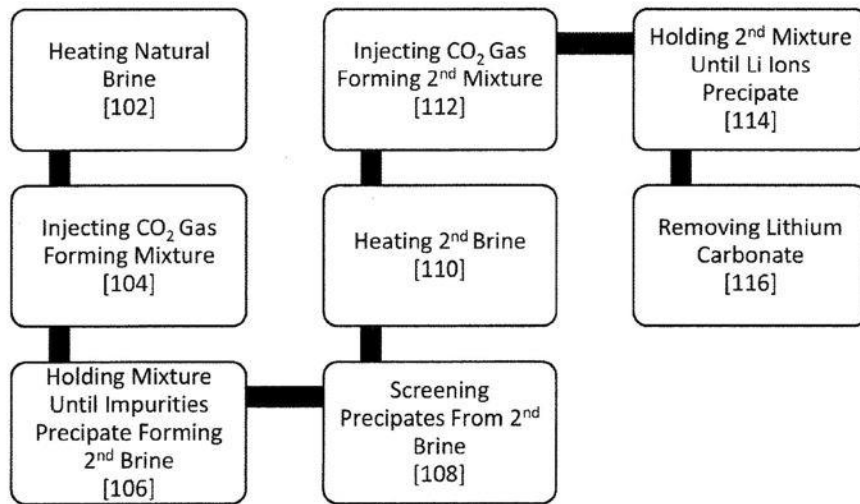


5. How is OWL’s DLE technology different than what is being developed by competitors?

By way of background, lithium extraction processes use a lot of water — approximately 500,000 gallons per metric ton of lithium produced. Mining can consume the majority of a region’s water, which negatively impacts the community and reduces the number of locations that are feasible. Lithium extraction technologies also have the potential for toxic chemicals to leak from the evaporation pools, or membrane filters, into the water supply. This includes hydrochloric acid, which may be created in the processing of lithium, and waste products that are filtered out of the brine.

While traditional extraction methods yield about 40% to 50% of the lithium present in a mined or brine resource, processes using DLE can extract 75% to 90%.

As *The Wall Street Journal* [reported](#) “many DLE technologies that work well in the laboratory often run into trouble in the field. Many of the technologies would likely still require large amounts of water and power to run the devices on a large scale.”



One World Lithium Inc.’s option agreement with the US Department of Energy and its National Energy Technology Laboratories (NETL) is focused on the potential to profitably separate high purity lithium carbonate from a brine. The DOE patent is an advanced direct lithium extraction (DLE) process for the extraction of lithium from natural brines, rapidly generating a pure lithium carbonate.

The method uses a unique multi-step high pressure/temperature application of carbon dioxide injection-mixing to ultimately directly and selectively precipitate lithium carbonate from brines. One World’s DLE technology competes favorably vs. competitors as:

- The process requires no solvent, electrodes, membrane, or sorbents and only uses carbon dioxide which can be sourced commercially or from industrial waste streams or ambient air.
- It significantly reduces capital and operation costs, process time, energy requirements, and, paradoxically, overall carbon dioxide emissions.
- The process is fully operational at the brine source, eliminating transportation of brine derived solids to a chemical processing facility to form pure lithium carbonate. Deployment of this technology will reduce dependence on foreign lithium sources.

6. What are some overall lithium industry trends?

- Global EV sales doubled in February 2022. ([Inside EVs](#), April 6, 2022)
- Spot price of one metric ton of lithium carbonate (LCE) has risen from \$6,750 in September 2000 to \$61,00 USD on April 29, 2022. ([Argus](#), May 4th 2022)
- There will be 12 million EV and HEV sold in 2030 of which 70% will be HEV (J.P. Morgan, January 20, 2020)
- By 2025, Automakers will have spent \$365 billion USD building EV and HEV production facilities. (Bloomberg Energy Finance, 2018)

7. Tell us about your distinguished career and how you created the “technology metals” term?

I began my career in 1962 as a physical chemist specializing in the ultra-purification of rare metals and their chemical compounds and alloys for use in the solid-state electronics and energy storage industries.

I coined the now widely-used term “technology metals” in 2007 to describe those metals whose electronic properties enable the miniaturization of electronic technologies.

I also serve as the Editor-in-Chief for [InvestorIntel.com](#), a capital market source celebrating its 21st year in business, and as a Director of InvestorIntel Corp. Since my “retirement” in 1999, I have become, a consultant, author, and lecturer on the market fundamentals of technology metals. “Technology metals” is a category term now in wide use. These include copper, the rare earths, the platinum group metals, the steel alloy metals, lithium, cobalt, graphite and most of the rare critical metals and materials necessary for our health, safety, and technologies, both consumer and military.

I serve on several technical advisory boards in the mining and metal refining sector and was also a founding co-principal of Technology Metals Research, LLC. My consulting is done through Jack Lifton, LLC, a consultancy founded in 1999 upon retirement as the CEO of an OEM automotive supply company specializing in the process chemistry of engineered materials and in metals trading.



Jack Lifton LLC advises governmental agencies, both at home and abroad, on metals industries supply chain issues and engages in extensive due diligence on mining, refining, and the fabrication of metals for financial institutions globally.

I am a member of numerous professional societies and a frequent speaker at both professional and industry events on both the markets for technology metals and materials, and on the use of new and newly applied technologies for the extraction, refining and fabrication of rare metals and materials.

I recently incorporated and serve as Director of the Industrial Policy Institute, which advises governments on the development and implementation of national industrial policies for the management of critical metals and materials.

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Forward-Looking Information: This FAQ may include forward looking information within the meaning of Canadian securities legislation. Forward looking information is based on certain key expectations and assumptions made by the management of the OWL, including any statements regarding beliefs, plans, expectations or intentions regarding the future, including, but not limited to: the intention of OWL to proceed with the advancement of lithium properties and the DOE's new critical separation technology. Although OWL believes that the expectations and assumptions on which such forward looking information is based are reasonable, undue reliance should not be placed on the forward-looking information because OWL can give no assurance that they will prove to be correct. Forward looking statements contained in this FAQ are made as of the date of this FAQe. OWL disclaims any intent or obligation to update publicly any forward-looking information, whether as a result of new information, future events or results or otherwise, other than as required by applicable securities laws. There can be no assurance that such in new separation technologies; and (v) other risks outside the direct control of OWL. The novel strain of coronavirus, COVID-19 statements will prove to be accurate and actual results and future events could differ materially .Accordingly, important factors that could cause actual results to differ materially from the Company's expectations including, but not limited to: (I) OWL's inability to execute its business plan and raise the required financing; (II) OWL's inability to prove-up and commercialize the NETL patent and separation technology; (III) risks and market fluctuations common to the mining industry and lithium sector in particular. The reader is cautioned that assumptions used in the preparation of any forward-looking information may prove to be incorrect and is advised not to place undue reliance on any forward-looking information contained in this FAQ.