



a story about
LITHIUM

We begin at the big bang, when lithium was first created; it's also created when stars explode and hit particles in space, which eventually crash into Earth. Upon arrival, lithium has two landing options, land and water. When landing on land, it bonds with other elements to form rocks, or pegmatites, that are crushed and electrolyzed to extract the lithium through gravitation. When landing in water, lithium has two options, either evaporate and fall from rain, or sink and travel through underwater-ways to reach the planet's salt-flats, where it's pumped out of the ground and evaporated in the sun over a period of up to two years and yields a thick and oily brine.

In 2017, the world's lithium resources were at about 47 million tonnes and most of it came from three mines, two in Chile and one in Australia. 55% of the resources are located in South America's 'lithium triangle', an area of salt-flats connecting Chile, Argentina and Bolivia. This goes without mentioning that since 2010, Afghanistan is reported to have untapped lithium resources as large as 9 million tonnes, but for an unknown reason, official surveys don't count them in;

so it's hard to know how much lithium there actually is in the world; data-sets fluctuate, companies lie, governments don't share, while new methods of mining are being developed, making production more efficient and allowing for new possible deposits to be explored, but by who?

In light of "the lithium rush", mining companies are placing themselves all over the world, wanting to dig up and pump out the planet's lithium. As they extend their arms across the globe, these giants are usually based in countries faraway from the actual mines. These companies hold the majority of the planet's lithium production and it's important to know them because they can control the lithium supply and secretly align high prices among them. Knowing about them is also important because they are examples of 21st century colonialists, who usually end up destroying just as much as what they originally set out to build.

For example, Argentina's part of 'the lithium triangle' is largely owned by the North American companies 'Albemarle' and 'Minera Exar'. Yes, the local land-owners have the right to their land, but as a poor region without a

formal process of negotiations with mining companies, locals are easily over-matched and end up agreeing to something they didn't plan for. While some claim that the companies are making fools of them by not caring for basic needs of the communities are left unattended, others are grateful for the lithium industry putting food on the dinner table. This situation has destroyed not only local communities and families, but a spiritual connection to the Incan goddess of the Earth, which is revered by many indigenous people. They also fear that their off-the-land lifestyle is in danger as a result of the mining industry using too much water, which puts the local soil at the risk of calcifying and would kill local flora and fauna. While scientists are divided and uncertain about the environmental effects of lithium mining, it is undisputed that lithium refining depends on massive amounts of water. A ton of lithium generally requires as much as 2 million liters of water and a lithium-brine plant may pump water at a rate of 7.5 million liters per day or more.

Would 2019 also be the year when Bolivia's and Afghanistan's local communities feel the lithium industry's presence? Hard to say, the industry is still very young and its future is unclear. From the countries with lithium reserves, only Australia and (somewhat) Chile and Argentina are friendly to the United States; Bolivia is unfriendly and has partnered with China. Meanwhile Afghanistan is also unfriendly to the United States and will probably also side with China on their untouched lithium. In fact, China has already established connections and infrastructure copper mining in the past. So, if Bolivia and Afghanistan have the world's largest accumulations of lithium, and both are unfriendly to the United States, and have both secured connections with China for the future, is it possible that China will lead the future OLEC? Could it be that the United States invade Bolivia and (again) Afghanistan for their lithium? Could this actually be the reason for WW3? Only time will tell, until and if that future comes, it's best to focus on the present and understand why lithium is so sought after – batteries.

The first lithium battery was invented by 'Exxon' in 1971; till this day, they make a profit of about 10% from each lithium-ion battery that is sold globally. This is due to them claiming several patents regarding a plastic part which separates the anode from the cathode and is crucial for the battery's functionality. Though profits weren't coming in until 1991, when 'Sony' invented the first lithium-ion battery for commercial use. From then on, it has become a critical factor for humanity's future plans.

35% of all lithium goes to battery production, the demand keeps rising and while it is in fact the essence of the battery, a very small amount of lithium is actually needed to create a one. A smartphone battery has 3 grams of lithium in it, a laptop battery has 28 grams, and a typical electric car holds almost 20 kilos. As the lightest metal in the periodic table, it has a very high energy density. The size advantage means not only that batteries can be smaller but also that they can charge more quickly. It really is the perfect component for storing energy. 'Deutsche Bank' predicts that lithium use for battery production will double from 35% to 70% in 2025. Is it safe to say that lithium-ion batteries are here to stay? What

does that mean for the rest of lithium's applications? And what does that mean for us a species on this planet?

One of lithium's more mysterious and effective applications is a mood-stabilizing drug. The beginning of the 20th century was a time when lithiated products (products containing lithium) were very popular. Lithium in the form of table salt was prescribed to patients, while soft drinks such as '7up' were sold at stores to the general public; but after reports of people over-dosing and dying from too much salt in 1949, lithiated products were banned from consumer access. Also in 1949, Australian psychiatrist John Cade rediscovered the usefulness of lithium in treating mania. He soon succeeded in one of the first applications of a drug to treat mental illness. By 1960, mood stabilizers were announced as a major class of psychiatric drugs, and by 1970, lithium had become the standard treatment for not only mania, but depression too, making it extremely useful for bi-polar disorder as it decreases the risk of suicide. This benefit is not seen with any other medication and it's mysterious to science because it can't explain how it

precisely works. Beyond that, there is much evidence to suggest that lithium intake may either reduce or increase the development of dementia and Alzheimer's disease; the correct dosage is hard to figure out as patients have different social, economic and cultural backgrounds, next to biology.

Lithium is sadly not a big contributor to the \$70 billion psychiatric drug industry; and as it stands in 2018, lithium's distribution to this application is at roughly 1%, which is a massive drop from 9% in 2008; and with the current trend of abolishing research on psychiatric drugs; lithium, as a proven method of treatment suicide, is in danger. Will pharmaceutical companies secretly align high prices and blame it on the battery industry's massive demand? Will they ignore lithium's usefulness and simply stop all production? Hard to say, but one thing is for sure, many people will be deeply affected, and soon.

Thanks to the smartphone, we can take the internet everywhere we go. We're always connected, never more than a tap away from viewing another webpage or sending

another text message. And while some say that this hyper-connectedness is good, one has to wonder, is it really? As evidence suggests, depression and bi-polarity are a troubling part about technology, as it can worsen symptoms in people who spend a lot of time on their devices. It's not surprising though, once you realize that they can ruin sleep habits and affect us in other ways mentally. According to Jean M Twenge's latest book 'iGen', which studies teenage behavior since the millennium; 2007's 'iPhone' release, and 2012's massive smartphone ownership, shifted teenage behavior to a point in which teens are hanging out together less, having less sex, and getting less sleep. The only thing that seems to be increasing is their loneliness; and while teens who spend 3 hours or more a day on their devices are 35% more likely to consider suicide, over the past decade, homicide rates have dropped among teens, while suicide rates rised.

By now it should be clear to see how lithium is a key component in modern society, and it's unfortunate to realize that younger generations are in a situation of "a snake biting

its own tail". Lithium is a unique element which is both the problem-starter and the solution-maker, as it gives rise to batteries that power the machines which feed our addictions and mental disorders, while it also allows for the ones who are affected by its wrong-doings, to repair themselves through the use of mood-stabilizing drugs. Though as it seems, a future where lithium for medication seems either for the rich, or non-existent, which seems illogical because the more batteries we make, the more drugs we would ultimately need, but will we be able to get them? If predictions are right, and the battery sector will double by 2025, would that mean that lithium's distribution for drugs would be halved? Would that mean double the depression, bi-polarity and suicide among the younger generation? Perhaps, but for now, it's best to focus on awareness and the way in which lithium is viewed. Its image must be changed from a dangerous and scary drug, into a necessary remedy for humanity's near-future addictions and disorders.

May your batteries be full, and your moods, stable.

