Major media predictions for Lithium ion battery cell production fail to add up.

written by Jack Lifton | October 28, 2021

Notwithstanding the actions and beliefs of current Western politicians and their economist "advisors," I firmly believe that there is no such thing as the free lunch that masquerades as modern monetary theory. Believing that they can create by fiat whatever capital they need, politicians, worldwide, are encouraging a monstrous use (waste) of real world capital, without creating wealth to balance it, to meet clearly impossible goals related to what is commonly called stopping "climate change."

Here's a perfect example of my thesis:

The Washington (D.C.) Post, the largest circulation newspaper in the Capital City of the United States, recently re-published the table below, which itself was (recently) published by a well-known business data and analysis group:

The above table, which may (greatly) influence the actions of the government of the USA does not reflect any realistic future supply of lithium anywhere, including China.

It is a recurring theme that the only determinant of the supply of lithium ion batteries is the ***capacity*** of the factories that

are built to manufacture them. This is not only untrue, it is also trivially and patently untrue, and can be so seen by anyone who bothers to look at the historical data covering the current and future estimated, and realistic, production of new lithium based fine chemicals for battery cathodes. It is the availability of lithium, primarily, that will determine the capacity of lithium ion battery production. Let's look at how many BEVs, battery-powered electric vehicles, could be made if all of the projected factory capacity in the bar graph above were built:

A 100 kWh lithium ion battery requires at least 16 kg of lithium, measured as metal. 100 kWh is the capacity of the average battery in a Tesla across all of that company's models. One million Tesla size and Tesla range vehicles will therefore require 16,000,000 kg of lithium, measured as metal, for their batteries. This is 16,000 mt, or 20% of all the new lithium mined, globally, in 2020.

1 gigawatthour equals 1 million kilowatt hours, so a battery factory's capacity, in Tesla size and weight vehicles is 10,000 vehicles per gigawatt hour of capacity. China today, therefore, already has the capacity to manufacture batteries annually for 554 x 10,000 = 5, 540,000 BEVs, the size and weight of an average Tesla. China's projected capacity in the chart above for 2030 would be 2,869 x 10,000 = 28, 690,000 E-vehicles. This alone would require the use of nearly 6 times as much lithium as is mined annually in the world, today. Note also that China today already has enough lithium ion battery capacity to require all of the lithium currently mined, annually, in the world if it were all to be used to manufacture 100 kWh capacity batteries.

Yet, we are told that China today only has 82% of the world's existing battery capacity! We know that China today already controls 60% of the lithium mined, refined, and processed into

battery chemicals, so even if China utilized all the newly produced lithium it owns this year just for batteries it could only produce enough batteries for about 2,750,000 Tesla size vehicles.

I listed lithium as a rare metal in my first, 2007, ranking of global metals production. My criterion for "rare" was annual production of less than 20,000 mt. Information-challenged experts say that since global production of lithium has multiplied by a factor of 6 in just 14 years it should be possible to multiply that production by 6 more times in the next 9 years. If you know nothing about the distribution of lithium "deposits," the types (hard rock, brine, and clay) of those deposits, the grades (lithium content) of the *accessible* deposits, the life time of the mines to be developed from those deposits, the costs of developing deposits into mines, the operating costs of any such mines, and the maximum price the market will pay for the mine output when it goes into production, then you can make information-challenged predictions such as shown in the chart above.

Lithium carbonate, a precursor chemical form of lithium for battery cathode manufacturing, was quoted last week at USD$40,000/mt. Lithium, itself, constitutes just 16% of the composition of lithium carbonate by weight. This means that the value of the lithium in lithium carbonate is around USD$250,000 per tonne. A Tesla sized lithium ion battery requires 100 kg of lithium carbonate equivalent, so that the battery manufacturer today would have USD$4,000 invested just for his cost of lithium carbonate for one 100 kWh battery. The USD$40,000 price for one ton of lithium carbonate makes the PEAs, Preliminary Economic Estimates, for developing deposits into mines attractive for lower grade deposits, but it sends shockwaves into the finance departments of OEM automotive companies.

Chile’s SQM says that its cost of producing one kg of lithium carbonate is USD$3,400, so it is now in hog heaven. SQM, by the way, s 23% owned by China’s largest lithium miner, Tianqi.

My opinion is that the world’s OEM automotive manufacturers have committed the bulk of their capital for the next five years to changing over to battery electric power trains for their vehicles. There is little or no capital available remaining for the development of internal combustion engines or power trains. Thus we are now seeing in production the final developments of such power trains.

It is likely that peak annual production of lithium will occur in this decade. Lithium miners expect to double their output by 2025, but just maintaining that level (200,000 tpa of lithium, measured as metal) will depend on the grades, lifetimes, and prices available at the mine, even if some governments are willing or able to subsidize some costs!

It will not be possible to multiply the production of and continue to produce lithium at 6 times the level of 2019.

The result will be that only a certain percentage of new vehicle production will be able to use lithium ion battery based powertrains. This number looks to be about 10%, or less [remember that there are other large uses of lithium ion batteries, such as personal computers, mobile phones, and stationary power storage systems] of an annualized production of 100,000,000 motor vehicles per year.

After 2025 those OEM automotive companies that cannot sustain the production and sale of enough internal combustion engine powered vehicles to balance their allowable percentage production of battery powered vehicles will go out of business. The allowable percentage of their production as battery powered vehicles will depend on their access to battery raw materials,

primarily lithium.

My Western candidates for extinction are General Motors and Ford. My candidates for survival are Daimler-Benz, VW, Toyota, and Hyundai, all of which are showing more awareness of the battery materials' supply chain problems than any of the other non-Chinese OEMs.

Lithium producers, if they can manage costs, have a bright future for the next decade and beyond.

Internal combustion engine-powered cars will never be wholly replaced by lithium-ion battery-powered electric cars. Such a replacement across the board would require global energy poverty, and as more and more people realize that, the politicians will finally understand the folly of their current obsession.

The battery production capacity forecast shown in the chart listed above that inspired this discussion is ridiculous.