Testimony of W. Robert Kang
Chief Executive Officer
Blue Whale Materials LLC

Before the
U.S. Senate Committee on Energy and Natural Resources

September 17, 2019

Introduction

Chairman Murkowski, Ranking Member Manchin, honored Committee Members, thank you for the opportunity to appear before you today to discuss the sourcing and use of minerals needed for li-ion batteries, a rapidly growing sector that is leading the electrification of transportation and energy storage for a variety of applications. My name is Robert Kang, and I am CEO of Blue Whale Materials LLC, a leading lithium-ion battery recycling company in the United States.

Market for Minerals Needed for Li-Ion Batteries

The advances in energy storage and the advent of the li-ion battery are fueling a new technology revolution – in our consumer products, the automotive industry, energy storage, grid management, and the internet of things. As we sit here today, I suspect every one of the people in this room is carrying a li-ion battery powered device (preferably on silent) and news is coming out almost daily about new commitments from auto manufacturers to move to electric vehicle production powered by li-ion battery technology. The question is no longer if, but when those li-ion batteries will become the dominant energy storage devices in the world.

Behind the growth of li-ion batteries lies a battle for the materials critical to their production. Demand for cobalt, nickel, lithium, and graphite is projected to rise dramatically to meet the future demand for li-ion batteries. As other witnesess before this Committee have testified, the U.S. has fallen behind in the global race to secure access to these critical minerals including cobalt and lithium. China has established a near-stranglehold on the cobalt market, refining an estimated 70 percent of the world's cobalt chemical products. Further, most cobalt is mined in the Democratic Republic of Congo, a weak state in which the mining industry has had difficulty keeping children and other laborers from hazardous "artisanal mining" — i.e., mining and washing the ore by hand. The DRC is projected to supply nearly 70 percent of the world's cobalt for the foreseeable future. China also produces over half of the world's refined lithium and its dominance is expected to continue.

As a result of these supply constraints and the increased projected demand for these minerals, manufacturers of li-ion batteries and products reliant on li-ion batteries, such as smartphones and electric vehicles, are seeking new and alternative sources of these minerals at earlier points in the supply chain.

Li-Ion Battery Recycling Is A Solution

The li-ion battery recycling industry provides one answer to meet the demand for U.S. sources of critical minerals. We are sitting on a goldmine of discarded phones and gadgets with spent li-ion batteries in our desk drawers and junk heaps waiting to be recycled. The electric vehicles that will soon proliferate will have batteries with valuable minerals in need of recycling. And we will need to ensure that the batteries we do collect in the U.S. are recycled here, so we do not lose control of this feedstock of critical minerals. Investment in the li-ion recycling industry will create manufacturing jobs here in the U.S. and solve important safety problems associated with transportation and improper dispossal of potentially volatile spent li-ion batteries. We applaud the Committee for including recycling provisions in the American Mineral Security Act in an effort to turn the country's current deficit in recycling into an advantage.

The li-ion recycling industry operates in three categories. First, collectors gather spent batteries from consumers, industrial sites, and manfuacturers. Those collectors may be electronic waste collectors or entities focused specifically on batteries and often provide a role in sorting batteries into different chemistries for further recycling. Next, processors take those sorted batteries and discharge them (to eliminate the risk of thermal events) and then process them to create intermediate metal products. Processing methods range from very crude shredding to a more sophisticated process that isolates the higher value metals such as cobalt and nickel and produces a more concentrated intermediate product. The most efficient processors can recycle close to 98% of the constituent metals in a li-ion battery. Finally, processors sell the intermediate metal material to refiners that produce pure metal to battery precursor manufacturers to be used in new li-ion batteries.

Improving the Li-Ion Battery Recycling Ecosystem

As this Committee considers measures to strengthen access to critical minerals in the United States, a number of measures could help spur the U.S. li-ion recycling industry to provide a reliable and sustainable source of cobalt, nickel and lithium for U.S. manufacturers.

First, we need to collect far more of the batteries we currently throw out. While the United States is one of the world's largest consumers of li-ion batteries, it's estimated that fewer than one in 20 is returned for recycling — significantly less than the 40 percent collected in Europe, where collection infrastructure is more established. Battery manufacturers fund the leading collector of batteries in the U.S., the non-profit Call2Recycle, but more can be done to change consumer recycling behavior and create a stronger infrastructure for li-ion battery collection. New programs are needed to deal with the volume of electric vehicle and large format li-ion batteries that will be coming off line in the near future.

Secondly, we need to expand the United States' capacity to process batteries. Today we ship most of our collected li-ion batteries for recycling to South Korea, Europe, or China. Increasing U.S. processing capacity will allow U.S. customers to control the flow of these metals earlier in the supply chain.

Lastly, we should encourage refining capabilities in the U.S. to produce cobalt and nickel from spent li-ion batteries. A market for those recovered metals will support investments to strengthen the entire li-ion battery industry in the U.S., including active cathode material manufacturing, precursor manufacturing and cell manufacturing that requires these metals. Those industries are currently established in Asia and expanding in Europe.

Recommended Steps to Encourage Investments in U.S. Recycling

The U.S. government has already taken some positive steps to secure access to these minerals. The Trump administration's Executive Order to "Ensure Secure and Reliable Supplies of Critical Minerals" and the follow on work by the administration have been productive. In January, the Department of Energy announced a Lithium-Ion Battery Recycling Prize and the establishment of an associated Battery Recycling R&D Center aimed at recycling and reclaiming critical materials like cobalt and lithium. And this Committee's work on the American Mineral Security Act is a positive move in the right direction.

There are significant opportunities for innovation with the individual states, which can and should explore policies to increase recycling of li-ion batteries. California and Maryland are seeking policy proposals for effective li-ion battery recycling that have the potential to serve as models for national adoption. We are encouraged by the progress these initiatives might offer, but funding these programs is an obstacle for many states. We recommend this Committee consider federal matching funds for state programs or investments in collection, processing and refining projects to spur li-ion battery recycling here in the U.S.

In addition, we encourage this Committee to consider other creative ways to spur investment in this sector. The Opportunity Zone tax credit has been effective at generating investment in specific geographic zones, and we recommend a similar approach that targets specific industries, including collection, processing and refining of li-ion batteries. Such investments will not only provide access to critical minerals here in the U.S., but will create manufacturing jobs, solve important safety concerns, and help support a more developed li-ion battery industry in the United States.

Conclusion

If the U.S. is going to lead the next generation of technology transformation brought by the advent of the li-ion battery, we must have access to a reliable and sustainable source of these critical materials. Recycling is one solution to this challenge and the policy of this government should be designed to stimulate the industry.

Thank you very much for your time today. I look forward to answering your questions.