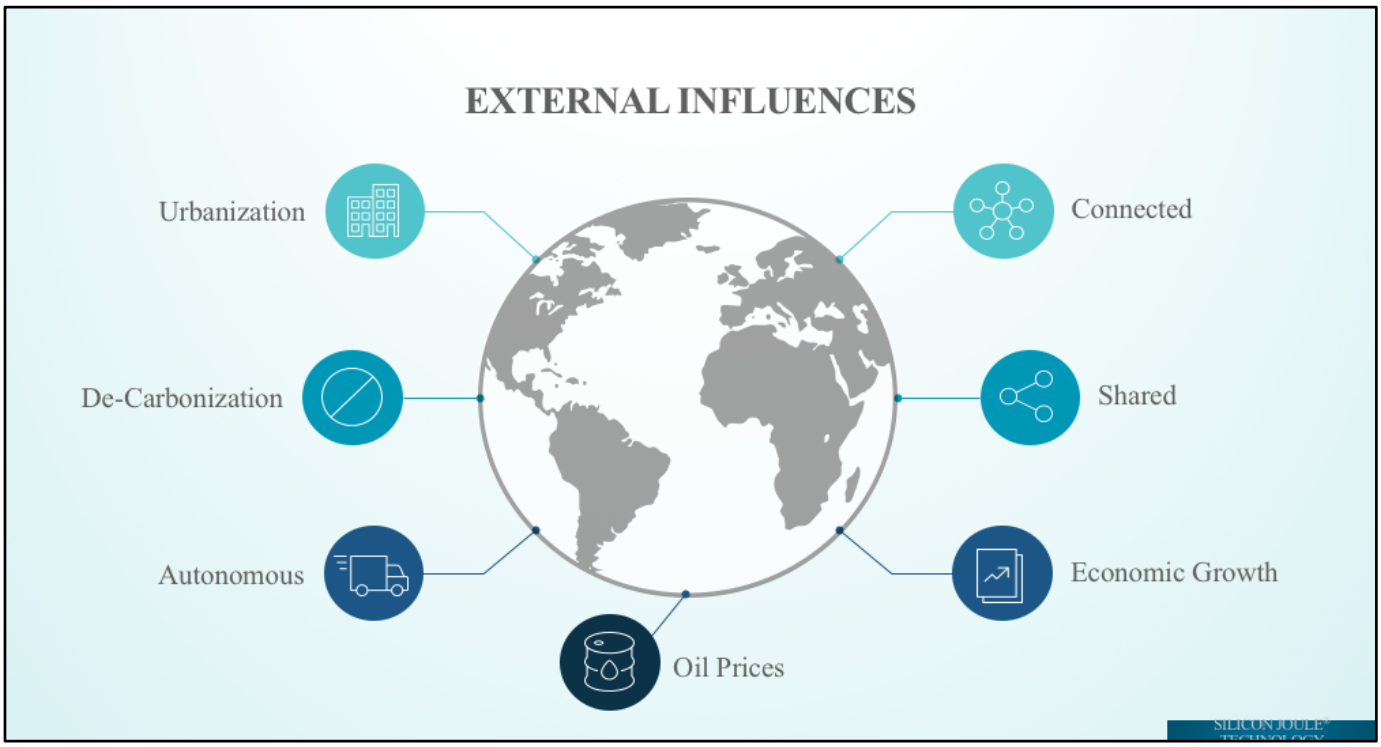
PLAN is to share a forecast of annual battery demand in value and energy content for the next five years worldwide for all modes of transportation.

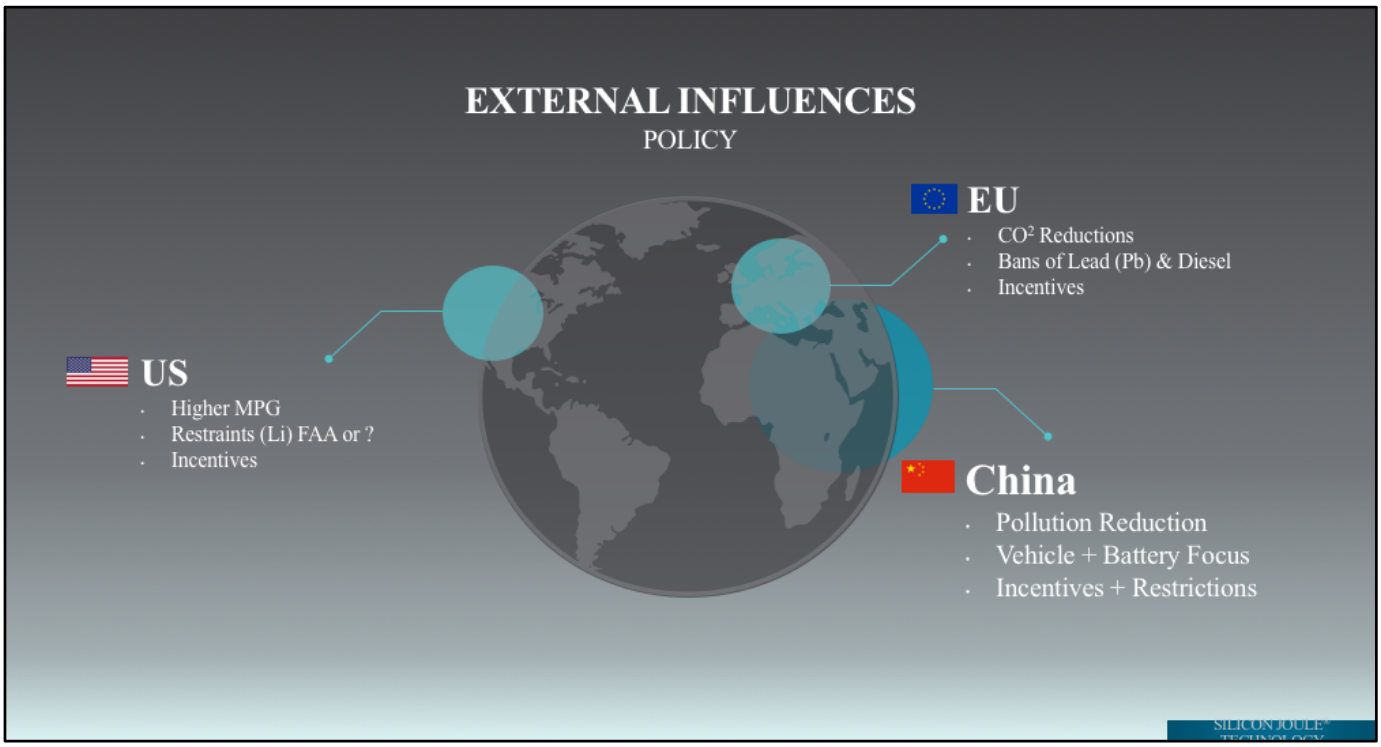
This is ambitious with so many variables to consider, but my GOAL is to be BROADLY - not precisely - correct. I will also give you an additional framework, including a model copy, to make your own forecast based on your market insights for the benefit of your business.



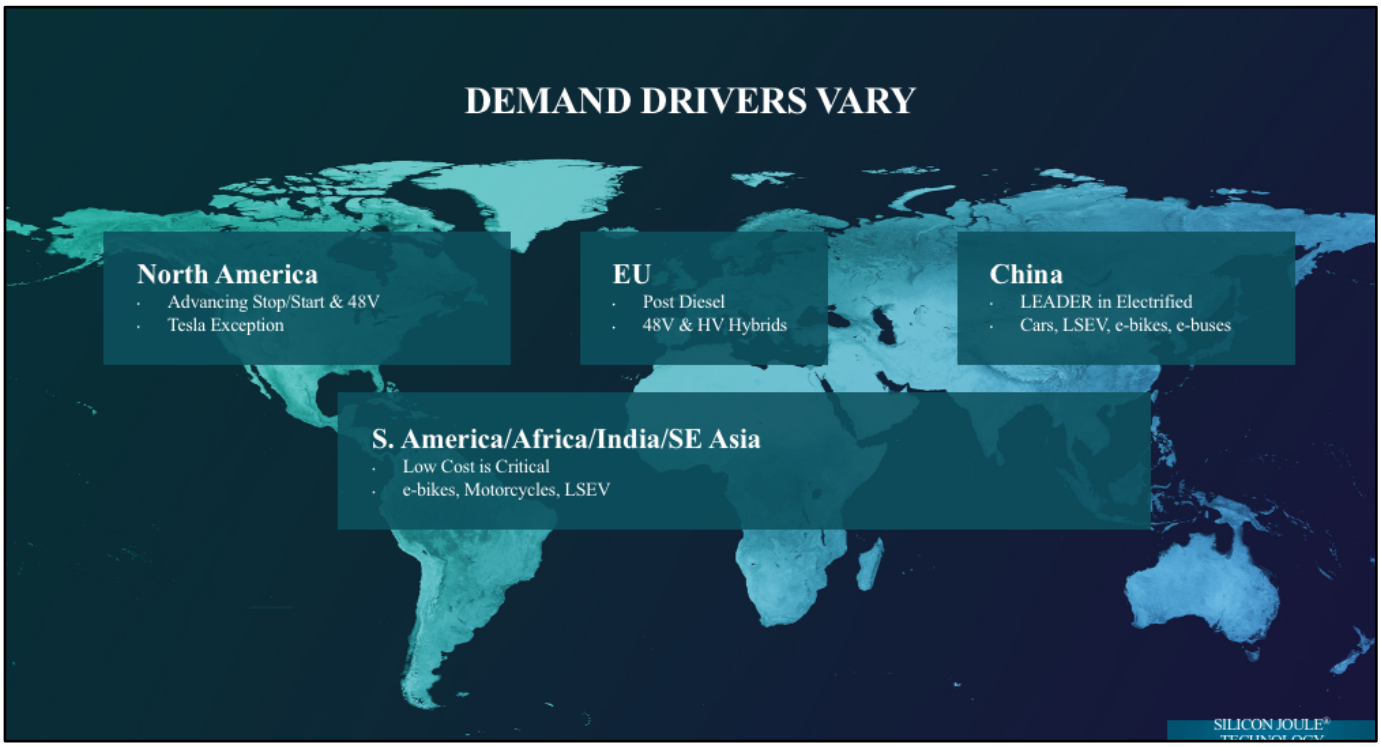
Clearly, there are more factors than five years ago shaping the growth of the transportation industry, including shared, connected and autonomous vehicles, along with the influences of urbanization, de-carbonization, oil prices and economic growth rates.

Though I might like traveling the rural roads in Illinois, Italy and India, the cities worldwide are getting bigger and denser. Urbanization may be the largest factor influencing how many people will move in what type of vehicles in the future.

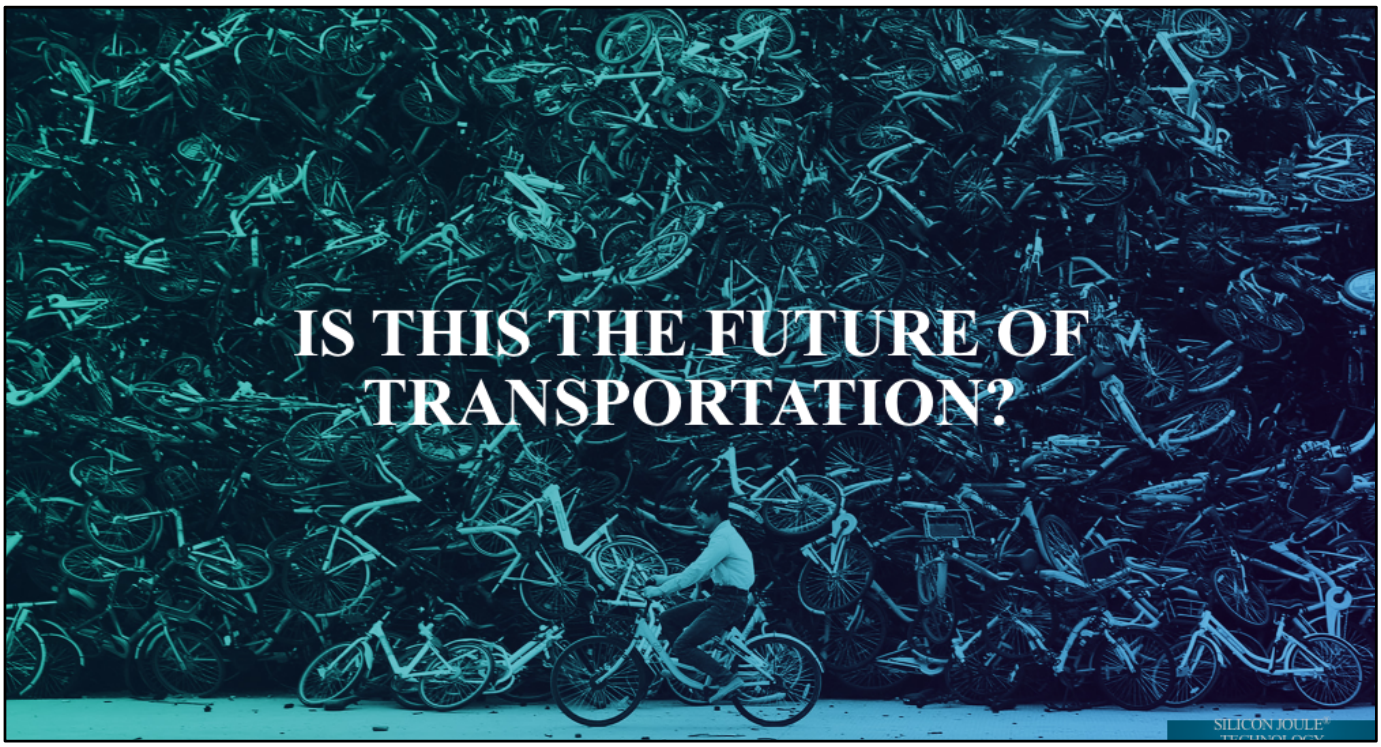
Other than recreational boats, personal cars may be the best example of a widely owned and expensive asset which is utilized on average less than 5% of the available hours for most owners. This supports the opportunity for the shared economy with UBER, LYFT and JUMP.



Public policy has always impacted transportation, yet policy is changing from all three of the major economies. Today, I believe this brief has to start with China. Beyond pollution reduction, China has made localized "New Energy Vehicle" production and battery capability a national priority, with policies including incentives and restrictions. Policies will continue to evolve, yet the officials are clear in their intent, and I would say, prospect success, to position China's transportation and battery industries as global leaders. The EU has continued its pressure for CO2 reduction, and the diesel emission problems have accelerated the transition to cleaner and electrified vehicles, including the efficient 48V platforms that are coming. High voltage hybrids and Pure EVs continue to expand where policy and incentives support them. Yet it is unlikely that other European countries will follow the extreme support found in Norway, where nearly one-third of new vehicles sold are electrified. And for batteries, the continued exemption in the EU to the End of Life vehicle ban on lead batteries cannot be taken for granted. This policy lacks common sense when you contrast nearly 100% recycling and reuse of lead batteries to what is happening with the whole range of lithium batteries today in Europe at the end of their life. With some of the world's lowest fuel costs, the conversion to more efficient vehicles in the US has been partially offset by high sales growth of the larger SUVs and pickup trucks. Aggressive miles per gallon mandates are now being eased, acknowledging the shifts in consumer preferences.

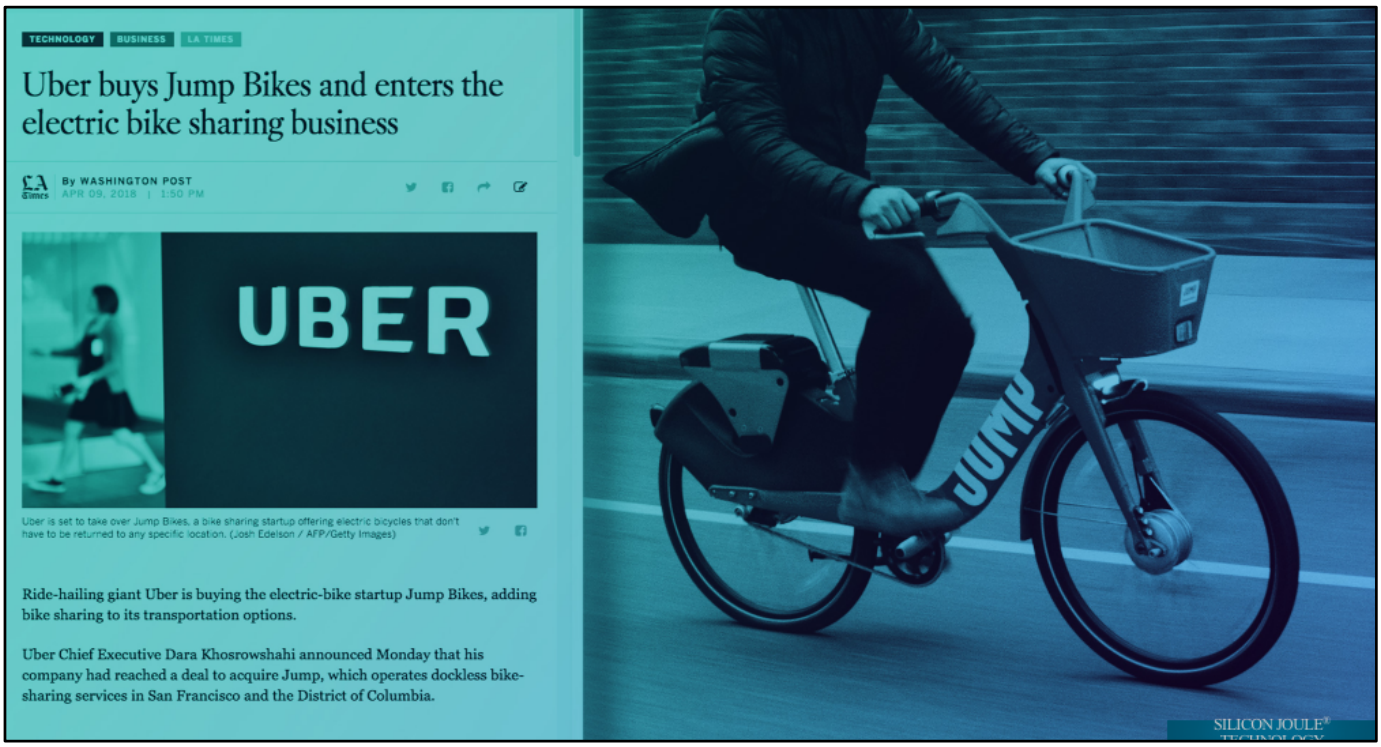


Other factors driving demand also vary regionally with total costs and marketing shaping adoption rates of new vehicle platforms. In the US, stop-start systems continue to progress, even if behind the rates of the EU, and Tesla's good marketing and engineering has led to lots of orders, even if Tesla's progress in production rates and costs has been challenging. China's evolution with e-bikes, e-buses, Low Speed EVs, and electric cars from the likes of Geely, BYD, BAIC, Marshall and others is having a major impact on local battery suppliers of both advanced lead and lithium batteries. The recent policy enacted to repurpose reduced capacity lithium batteries from buses and cars to telecom towers over lead batteries is another example of China's commitment to support New Energy Vehicles and batteries. I have grouped India, SE Asia, Africa and South America together because these regions demand lower cost vehicles for adoption, and also they face extra challenges for charging. As a result, I expect the efficient low cost hybrids to progress most in these regions over pure EV cars. Also, low cost motorcycles, e-bikes, low speed EVs, and e-rickshaws continue to grow quickly.

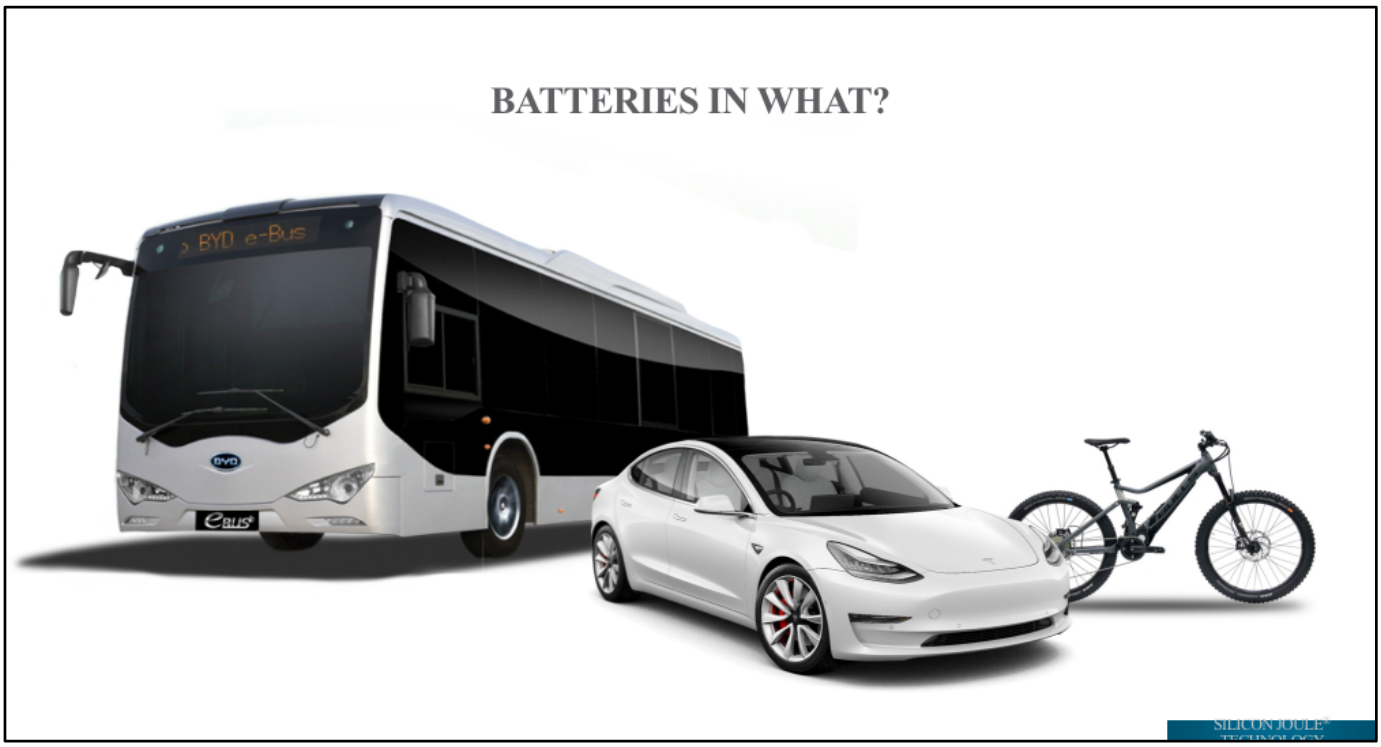


Is this the future of transportation in urban centers where traffic, costs, parking, and climate warming concerns have younger people less likely to buy vehicles than generations before them?

This picture of a single rider passing a dumped collection of shared, dock-less bicycles in China does not seem like a winner for the communities or the providing companies. US cities are also sorting out how to manage this phenomenon, yet surely each convenient bike ride might have been a car or bus ride without this service.



Before discounting dock-less shared bikes impact on transportation or batteries, last month UBER announced the acquisition of JUMP, reportedly for over $100m. JUMP's e-bikes need a charging dock, but they allow an option to leave its bike anywhere for a $7 drop-charge, which may support a more credible model for investors and communities, and still more growth for battery makers.



Though much focus is on light vehicles like Tesla, let me clarify the range of vehicles in this battery forecast. Included are buses, cars, and bikes with all ranges of battery capacity.

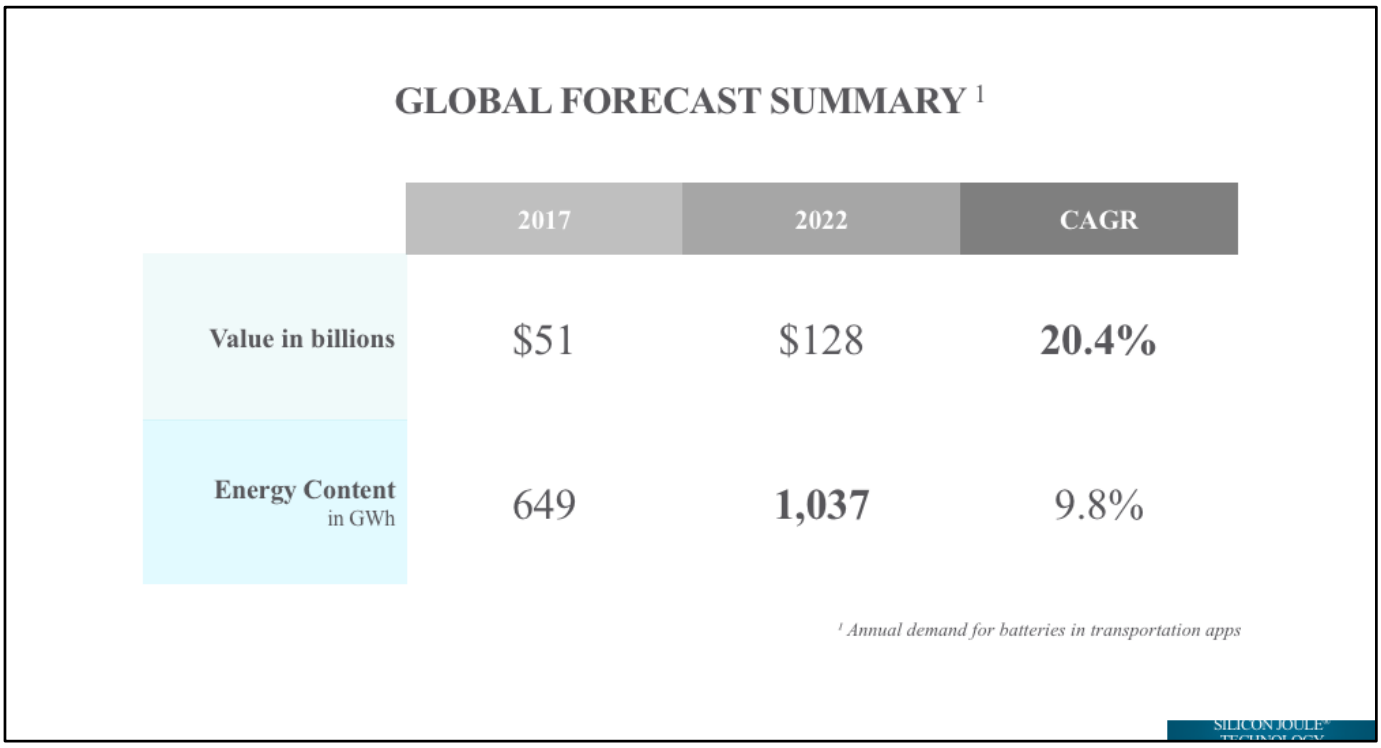
BATTERIES ALSO IN…

Also included are commercial vehicles such as long haul delivery and local FEDEX and postal delivery trucks and even garbage trucks.

LOW SPEED EV - LSEV

Marshell Electric Vehicles

Low Speed EVs (LSEV) may be a new term to some. Think of these as electric carts on a golf course or in airports, factories, or even on the road in many local US communities. Yet the fastest growing fleet of LSEV vehicles is in China, where urban centers and sprawling factories feature people movers or special purpose vehicles for police, sanitation workers, and others.



The forecast has 20%+ compound annual growth in the value of batteries to $128 billion by 2022. This is a growth rate most industries can only dream of. It is a wonderful challenge for all of us. In energy content terms, I have estimated the growth rate of 10% annually to 2022, when over 1 terawatt-hour of energy content in batteries is forecasted to be supplied. At a high level, the biggest reason for the greater value increase vs. energy content is the high growth of more capable, harder working lead and lithium batteries in vehicles with stop/start and in a diverse range of hybrid vehicle applications. Again, most industries work hard to have the opportunity to upgrade to a premium, higher value solution like what we see in front of us in the battery industry. Also, there is the growth of the pure EV vehicles with lithium batteries aiding the lift in value for energy content provided.

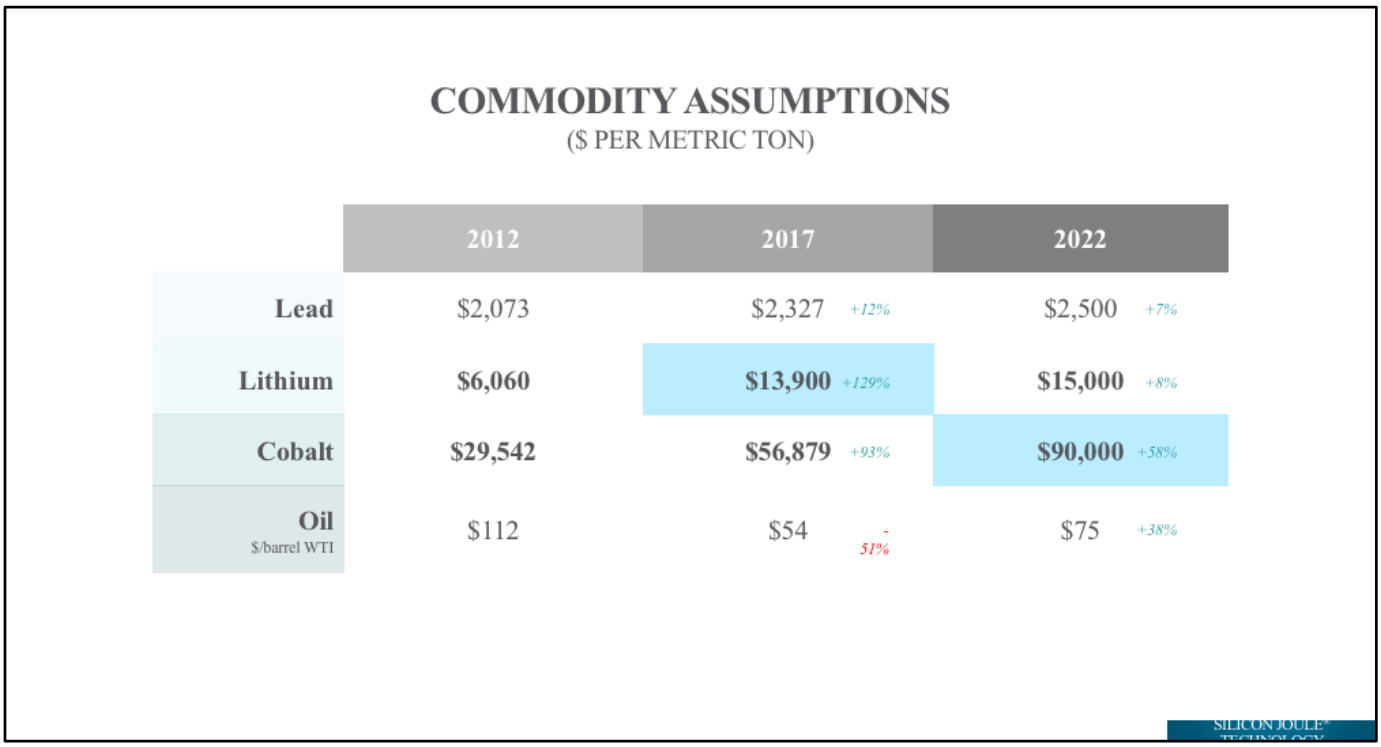
MODEL CONSTRUCT

	Units (batteries or vehicles)	x	kWh / unit	x	$ / kWh		
EXAMPLE: LV-SLI Worldwide							
2017	500m	x	.84 kWh	x	$55 per kWh	=	$23B/420 GWh
***CAGR** to 2022*	*2%*		*1%*		*3%*		
2022	552m	x	.88	x	$64	=	$32B/487 GWh

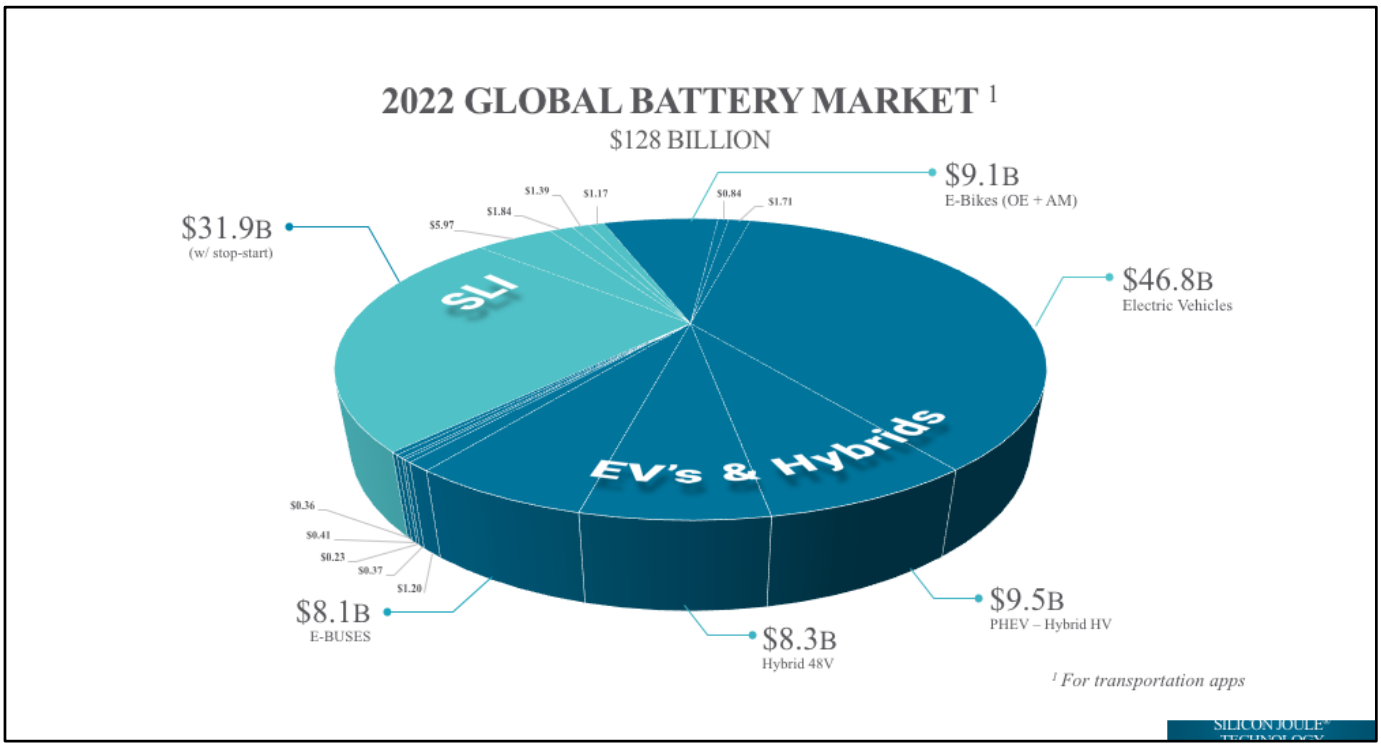
... same approach for e-bikes to e-buses including how much Lithium vs Lead

Let me explain how the forecast was built, and as I offered at the start, a copy of the details of the model and forecast is attached to the distributed version of this presentation. Along with my son Dan Kubis, we built a model combining battery quantities, their average energy content in kWh and the average cost per kWh worldwide. Shown here is an example for the light vehicle SLI batteries worldwide going from 500 million to 552 million by 2022, while the average energy content and value grows each year to reach about $32B by 2022. And we did this for each category from e-bikes to big trucks, including estimates for lithium product sales in each category.

Much of the data came from diverse associations, like the Battery Council International, bus and truck associations, and other sources like EV-World, investor analyst reports, CRU, and public company reports. Then I met or talked with key people from these leading industry companies where we discussed the diverse assumptions. I take full responsibility for the forecast, however it was shaped by many inputs. There were often very different views on growth prospects and technology changes across lead and lithium batteries and vehicles.

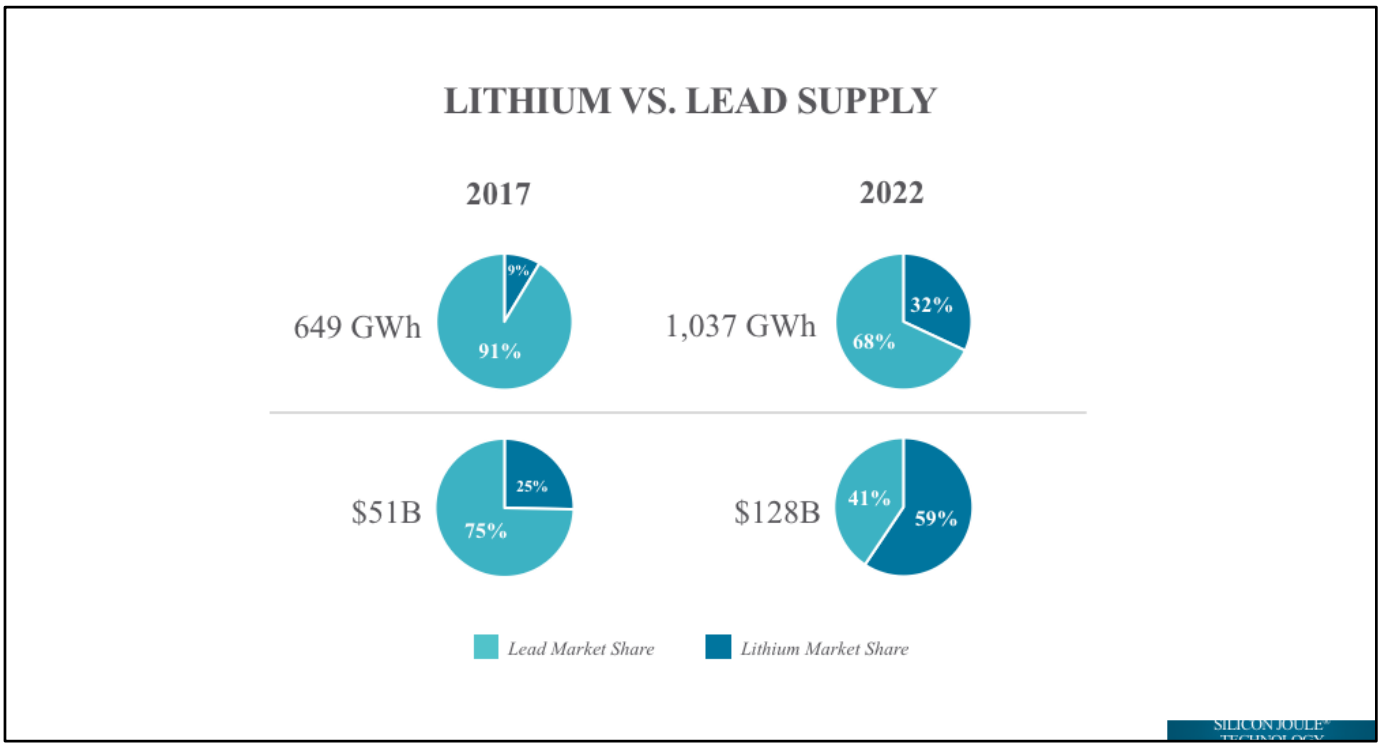


Oil price levels and battery raw material costs can have a tremendous impact on forecast growth rates of certain vehicle and battery technologies. You might listen to one of the many subject experts on each of these commodities, but these are the assumptions I have used in our forecasts for batteries, with a look back and forward five years. With recycled lead supplies filling well over half the global supply, lead prices are assumed to increase modestly across five years, while demand is growing about 2% per year for the metal. After listening to the battery companies and some analysis supported by John Wirtz, my conclusion is the total amount of lead per 12V battery on average will be similar to today in the SLI types. The broader adoption of thinner, punched grids worldwide is taking about 1 kilo of lead out of the conducting material in batteries, while it is being offset by extra paste for added Watt hours to service the stop/start function. Lithium and cobalt prices have doubled from 2012 to 2017, and forecasts vary regarding their supply and prices. I have assumed lithium material costs increasing only slightly due to supply increases, yet you can find forecasts that the price will increase or decrease by 50% from the nearly $14,000/ton averaged in 2017. Cobalt is more complicated due the largest supply coming from the “not so” Democratic Republic of the Congo. The price last month was already $95,000/ton. However, suppliers are pushing to mine more, and engineers are working hard to fine ways to reduce the amount of cobalt in lithium cells without decreasing the performance. Fuel costs can obviously shift consumer preferences for energy saving vehicles. Oil prices came down by 50% from 2012 to 2017 primarily due to higher US supply, which has reached 10M barrels of oil production per day, and my working assumption is $75/barrel in 2022.



Before the details, let's look at one image to capture the shift in the value of the sectors in the dramatically growing market for transportation batteries. By 2022, over two-thirds of the batteries in value are in electrified vehicles ranging from Pure EVs to hybrids to e-bikes, e-buses and Low Speed EVs.

The SLI market, including those with stop/start capability has expanded significantly to $32 Billion, yet its share of the growing market is clearly smaller.



This image shows the shift in lithium vs. lead portions of the expanded market, with about one-third of the one terrawatt-hour of energy content produced annually by 2022 would be lithium types, representing 59% of the total market value. Such a scale shift from 2017 could support even wider differences in R&D and other improvement programs for advanced lithium vs. advanced lead batteries.

These comparisons exclude small consumer batteries and large industrial types.

MODEL EXCERPTS

…for mostly Lead Batteries

		2017	2022	CAGR	Lithium Share 2022 OE ONLY
Light Vehicles[1]	*Volume(MM)*	602	685	2.6	5%
	Value($B)	$29	$40	7.1%	
	Stop/Start Share of LV OE	*28%*	*76%*		*8%*
e-Bikes & Motorcycles	*Vehicles Volume(MM)*	133	146	2.0%	15
	Value($B)	$8	$11	5.2%	
LSEV's & Golf-type	*Vehicles Volume(MM)*	3.5	5.7	10.2%	10%
	Value($B)	$1.5	$2.6	11.6	

[1] *Includes Commercial, Marine, Utility, & Auxiliary*

Now going behind the summary data, let's break out some of the key sectors. Shown here are the segments that are almost all lead-based batteries today, the growth assumptions, and the assumed share of lithium batteries at the OE level by 2022. The volume of light vehicle batteries is forecast to grow by 2.6% with the global economy, and also the assumption that every electrified vehicle has an auxiliary battery, just as we see today. Stop/start technology continues to rollout with notable further growth in China and the US following the lead in the EU to reach 76% of the new vehicles sold in 2022. I have also assumed 8% of the new stop/start batteries will be lithium. For E-bikes and motorcycles, the 5%+ forecast growth for the value of batteries reflects a higher assumed lithium battery penetration across the next 5 years to 15% of the OE supply by 2022. The smaller material cost penalty of lithium batteries inherent in smaller batteries is assumed to support quicker adaptation, along with the flexible form factor with lithium. Double digit compound growth for LSEV and golf type vehicles is based on broader adoption in China and other Asian countries. Low single digit growth golf-type in the US is supported by a huge number of retirees, some buying golf type vehicles for their second or only family vehicle, as explained by John Connell of Crown Battery.

MODEL EXCERPTS – ELECTRIFIED LV OE SALES

VEHICLE PLATFORMS	2017	2022	SHARE LITHIUM
BEV – Pure EV	0.8	5.1	100%
PHEV– High Voltage	0.4	3.2	100%
Hybrid 48V	0.0	11.0	50%
Total	1.2	19.3	
Global LV Sales	105	118	
	1%	16%	

Vehicles in millions

1 of 6 new vehicles "electrified" by 2022

Pure EV sales get most of the press, yet combined with Plug-in Hybrid vehicles they represented only 1.2 million or about 1% of new vehicles sold worldwide in 2017. With the efforts in China, plus from Tesla, Nissan and others, pure EVs are forecast to increase six-fold to 5.1 million new vehicles per year by 2022, followed by slightly higher growth in high voltage hybrid EV sales to 3.2 million vehicles. Nearly all of these are assumed to be with lithium batteries.

Hybrid 48V systems, with their simplicity and lower costs, are forecast for the highest growth, reaching 11 million vehicles led by Europe and China by 2022. Included is a forecast that has 50% supplied each by lithium and lead battery systems. There are car companies and engineers who also believe these will be mostly lithium or mostly lead batteries. Technology advances, safety and costs will likely sort this out.

Combining these three vehicle platforms, electrified sales may represent 19 million, or one out of every six of the 118 million vehicles sold in 2022 worldwide.

REAL SAVINGS TO SOCIETY

	FUEL SAVINGS	OE VEHICLES BY 2022 *in millions*	COMMENTS
Stop/Start	5-8%	80	*Simple & Brilliant*
48V Hybrids	15%	11	*Low Cost Systems*
HV-PHEV	25%	3	*Works, but High Cost*
Full EV	0-100%	5	*Niche adoption*
TOTAL		99	*84% of new sales*

The contribution of better battery designs alongside the best vehicle system developers is presenting huge savings of fuel for society. Whether the objective was to save money and/or reduce emissions and global warming, the scale of fuel use efficiency and reduction is tremendous. These estimates shown by vehicle technology platform are from vehicle electronic system providers and carmakers, and the huge benefit seems to be lost due to the focus on pure EVs. The adoption of stop/start systems alone is forecast to reach 76% or 80 million of the new vehicles expected to be sold in 2022. At even 5% savings in fuel the reduction in carbon emissions is really impressive.

Low cost 48V systems, with propulsion assist and regeneration, may create 15% fuel savings. The higher cost, high voltage systems may save as much as 25% fuel vs. previous systems. My own test drive last month of one of the new Ford's hybrids confirmed this potential.

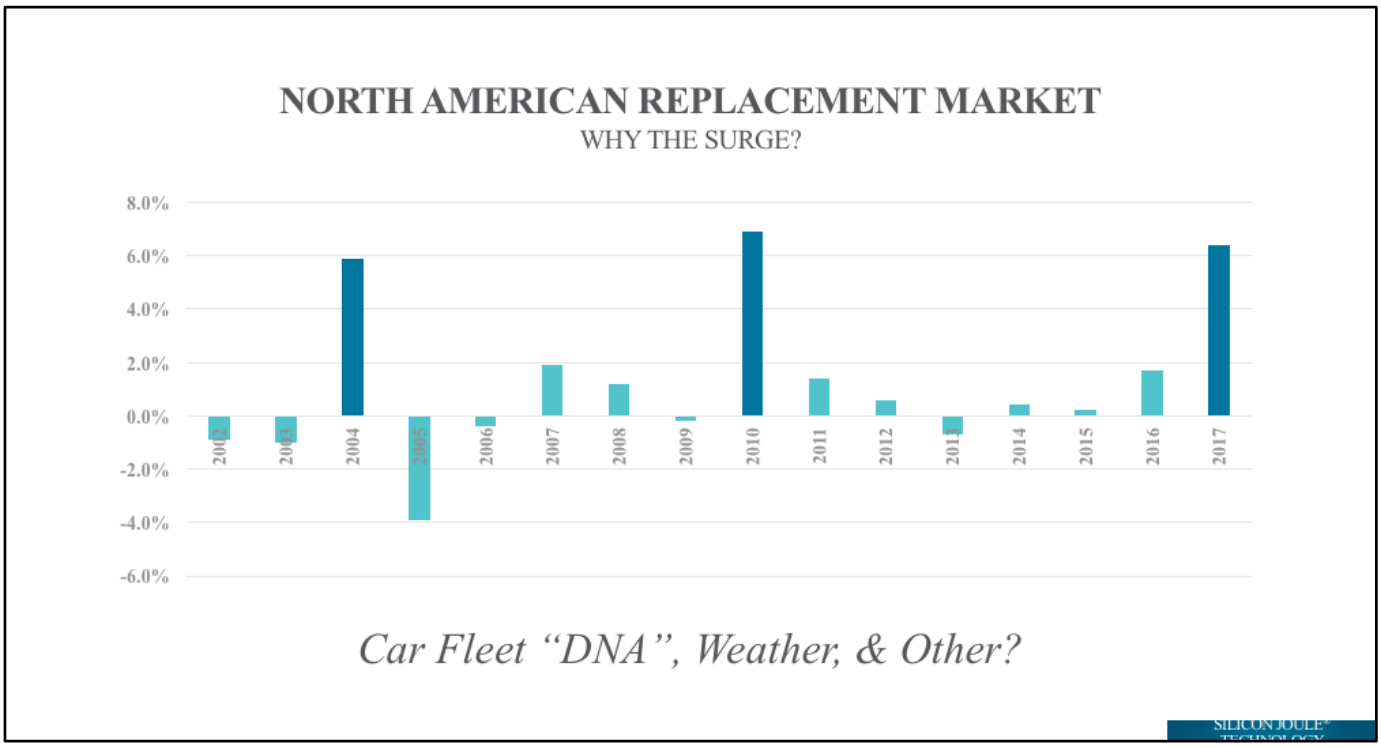
Full EVs are finding their place in society, yet they need creation of the electricity in another place, then distribution, plus charging stations, and grid changes to support high voltage, fast charging. The EVs do reduce oil use and local, and prospectively total energy emissions. Yet, I believe it makes sense to distinguish the true efficiency gains from hybrid systems vs pure EV systems in assessing the real economics and societal benefits of the vehicles.

MODEL EXCERPTS

Commercial, Buses, and Large Trucks

	kWh/vehicle		
	EV	Hybrid	COMMENTS
Local Delivery	120	30	*Huge FEDEX & Amazon opportunity*
Buses	160	40	*China >95% in 2017*
Large Trucks & Equipment	200	60	*Many hybrid systems evolving*

Though Tesla has promised big pure EV trucks for long distance delivery in a few years, the biggest opportunity in my opinion is from hybrid systems and EVs in urban delivery trucks, like FEDEX or postal trucks, where the vehicles are very often sitting in traffic, or in front of a home, while their drivers are dropping off boxes. Battery system needs range from about 30kWh in hybrid systems, and possibly 120kWh or more in those pure Evs. Pure EV buses and other large equipment and trucks (classes 6, 7 and 8 in the North America) require a lot of stored energy, generally 160 to 200+ kWh. China has over 95% or 250,000+ of world's operating pure EV buses as of 2017. The New Energy Vehicle policy in China is best exemplified by the 15,000-bus fleet in Shenzhen, which is expected to be all-electric by this month with the batteries coming from BYD, CATL and others. Outside of China, center city, modest range bus routes with fast charging may progress in sales development also in Western Markets, however the high energy requirements have me believing growth will be higher for urban bus alternatives with hybrid solutions and/or natural gas. Wrightspeed has designed a novel approach to address large vehicle energy needs. Their electric powertrain combines a quiet turbine in front of very hard working lithium titanate 60kWh battery packs to deliver significant maintenance and fuel cost savings.



Let me focus on the North American Market for SLI batteries briefly, where the total market exceeds 130 million batteries each year with over three quarters of them in the replacement market for cars, trucks, boats, etc. Given the strong demand for the last 15 months, I discussed the reasons for the growth with the suppliers.

Dale Gospodarek with JCI reasons the biggest driver is the vehicle fleet DNA, meaning the profile or age of the vehicles, which are in the sweet spot for replacement. This makes a lot of sense when you analyze previous OE car sales trends. Gary Taylor from Exide explained from a chart like this that putting aside some credible explanations around coincidental weather and inventory shifts in distribution, we can at least see the high growth happens about every six or seven years, with interim periods of only small changes of down 1% to +1.5%.

NORTH AMERICAN SLI SHIPMENTS

	2012	CAGR	2017	CAGR	2022
Auto Repl.	71.9	2.1%	79.7	2.0%	88.0
Auto OE	14.7	2.8%	16.9	1.0%	17.8
Heavy Duty	12.9	0.5%	13.2	2.0%	14.6
Powersport	5.4	-1.5%	5.0	1.5%	5.4
Utility	7.4	0.5%	7.6	0.5%	7.8
Marine	6.6	2.0%	7.3	0.5%	7.5
Golf	5.7	0.3%	5.8	1.5%	6.3

Batteries in millions

Building from the trends and OE sales analysis, replacement automotive batteries are forecast to expand about 2%/yr to 88 million by 2022, with the OE growth rate moderating from the recent higher growth to 1% per year.

For commercial batteries, Tim Lawlor of East Penn Mfg. explained the multiple dynamics supporting higher growth for the larger batteries for trucking from e-commerce trends, and continually tighter engine emission and other regulations.

Let's cover some of key attributes and issues which will influence these forecasts for lithium and lead batteries. Improving lithium batteries with high energy density, lightweight, long life and improved safety/quality has enabled many vehicle applications. Yet, many future safety incidents will inevitably occur, and efforts to reduce and manage them will be just one of the challenges for the industry. Also, managing huge capital investments, tricky global supply chains and development of a credible recycling scheme will be required for sustained high growth.

On the lead battery side, the unique high power density and low cost are attractive. Legacy practices from battery recycling in some countries, combined with anti-lead sentiment from lead use in other products in the past in gas, paint and water pipes still has to be managed. However, the real sustainability facts, unlike any other widely used product of nearly 100% post-use recovery, recycling and reuse needs to be told and sold to regulators everywhere for the benefit of consumers and our planet. How well these matters are handled for lead and lithium batteries will surely impact forecasts for many years ahead.

GLOBAL CAPACITY & INVESTMENTS

	2017	2022	Factory Cost	
Pb[1]	>600 GWh	>700 GWh	$300 Million	15 GWh 15M /yr
Li[1]	>150 GWh	>350 GWh	$3 Billion	25 GWh

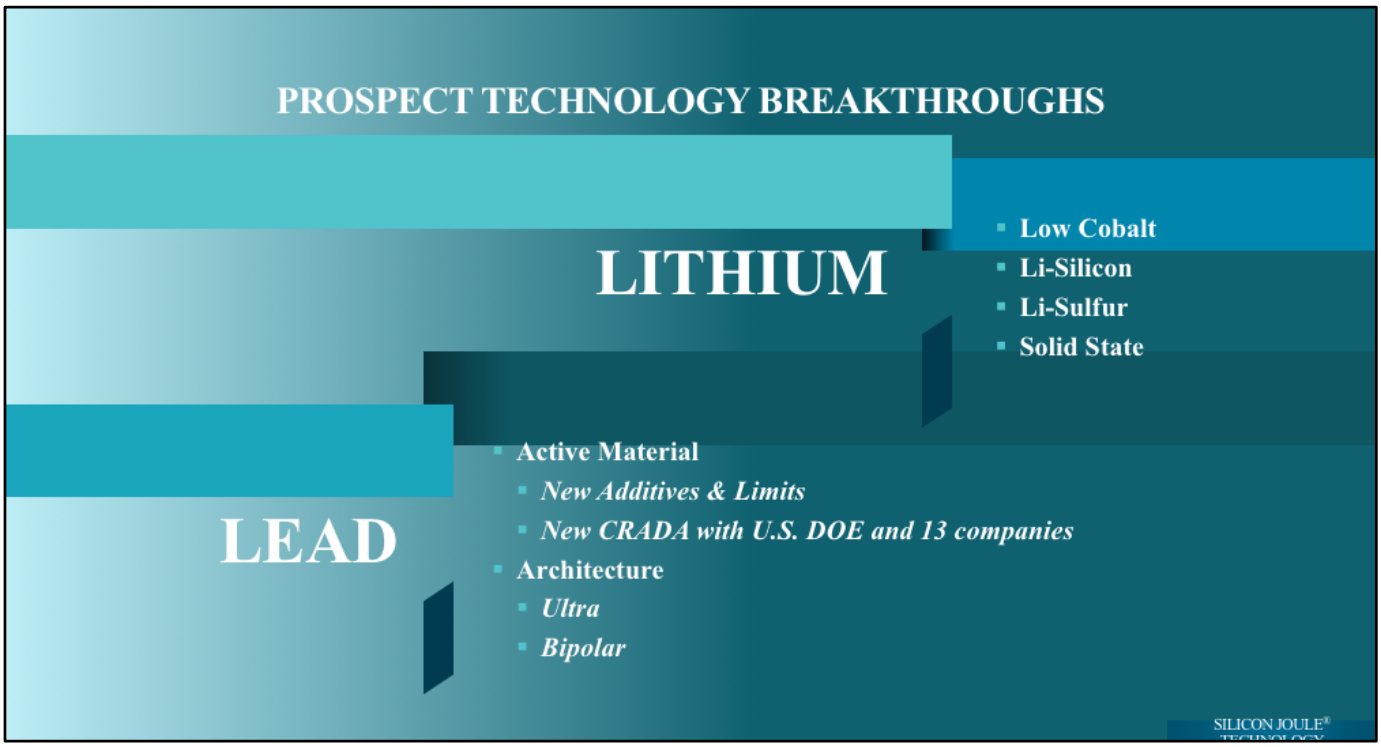
Li: CATL, BYD, LG Chem, Samsung, & Panasonic/Tesla
Pb: Adaptability of Capacity to Stop/Start & 48V hybrid

[1] Excludes industrial & consumer capacity

Capacity requirements and the investments will be studied carefully to respond to the forecast high battery demand growth. There is an estimated 600 GWh of capacity for lead batteries worldwide today for transport applications, and another 100 GWh is forecast to be required by 2022. A reasonable investment for a factory to produce 15 million high quality SLI type batteries a year or 15 GWh of annual capacity means an initial investment of about $300 million. This includes a growing share of the higher performing stop/start batteries.

For lithium, the public company reports from Tesla to South Korea and China's leading producers vary, yet a reasonable average appears to be about a $3 Billion investment for a factor with 25 GWh of annual capacity. To reach the required 350 GWhs needed by 2022, this means combined added investments of about $24 Billion by lithium makers.

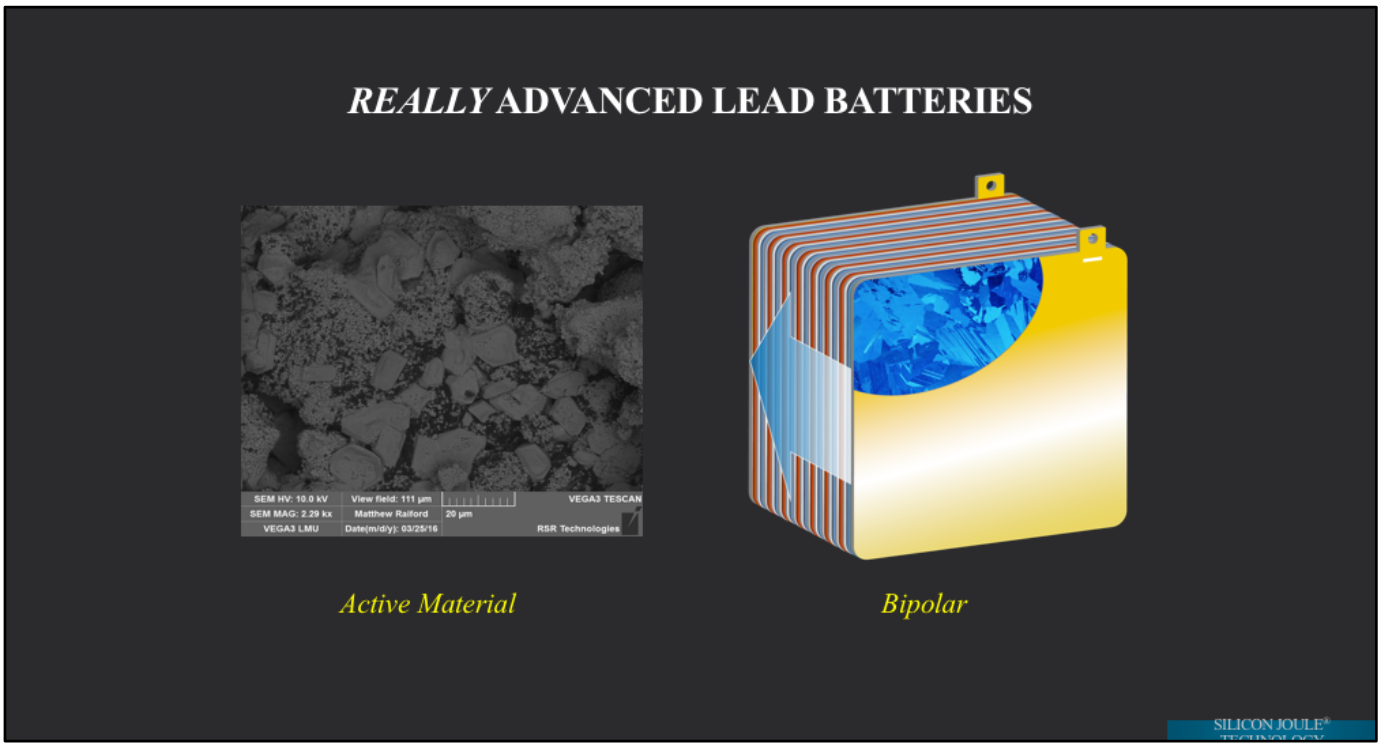
The big five global producers, including CATL from China, who is planning an IPO soon to help fund their expansions, certainly will keep financiers and project managers busy.



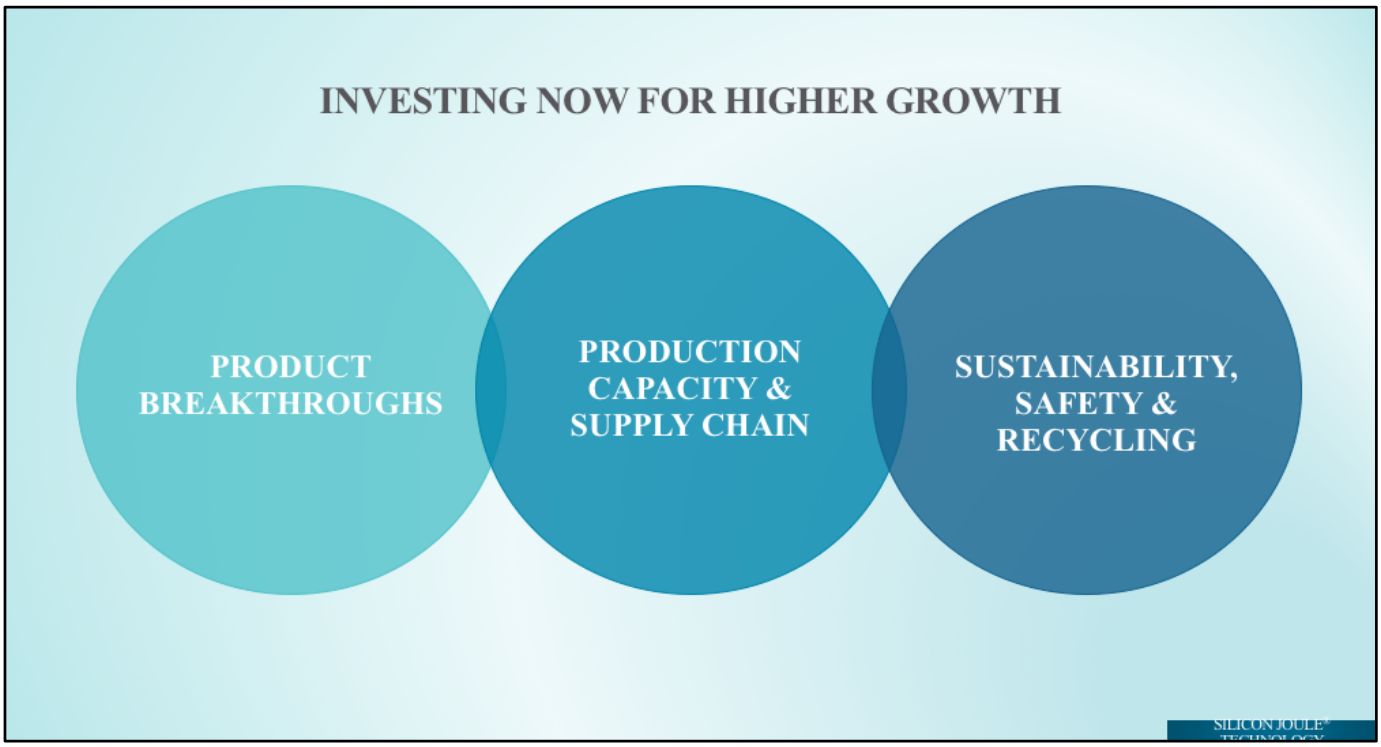
Technology progress for batteries is seemingly hyped weekly somewhere in the world. It is difficult to distinguish what is credible at what product cost by when to deliver real products to demanding customers in critical applications.

Summarized here is how I simplify the top claimed or potential battery breakthroughs that may deliver real benefits to customers. In lithium, the technology to improve costs by reducing cobalt or to increase performance with Li-silicon or Li-sulfur is being pursued aggressively. And many report progress with solid-state designs to improve safety.

For lead batteries, the experts say it is the fundamental active material improvement and/or the architecture itself of the battery to create real step-change performance improvements to rival or exceed lithium in many applications.



In the US, 13 of the leading battery and lead producers are combining to fund a cooperative (CRADA) project with the US Dept. of Energy and US National Labs to study how to improve the core material science around lead sulphate crystals in the active material. This could be with recipes including new additives or material limits. Shown on the left is a picture magnified 2300X from RSR Technologies showing the lead sulphate crystals. The goal, as I understand it from Tim Ellis, is to keep the crystals very small through life to dramatically improve charge acceptance and extend the repeatability, or so-called cycle life. On the right is an image of a bi-polar battery, which offers a real chance complement the work on active materials, and to provide a clear path to much lighter and higher voltage batteries cost effectively with this architecture.



I think we can agree the tremendous growth opportunities for batteries in transportation are being shaped by strong societal and policy shifts across the world.

This makes decisions by our battery industry leaders more difficult, yet potentially extremely rewarding if they can execute and capture a share of the growth.

Companies are making some very big decisions, stepping forward aggressively or waiting for others to sort it out in R&D, safety and recycling. However, those that act early and execute well, usually enjoy the most profitable results.

I wish you the best success in your choices.

Transportation Batteries to 2022

		2017														2022												
		Units (MM)	kWh / unit	Lithium Share (%)	Lithium $/kWh	Lead Share[1] (%)	Lead $/kWh	$/kWh	GWh	Li Share(GWh)	Lead Share(GWh)	Market Size ($B)	Li Market Share($B)	Lead Market Share($B)	Assumed Unit CAGR	Asssumed kWh/unit CAGR	Units (MM)	kWh / unit	Lithium Share (%)	Lithium $/kWh	Lead Share[1] (%)	Lead $/kWh	$/kWh	GWh	Li Share(GWh)	Lead Share(GWh)	Market Size ($B)	Li Market Share($B)	Lead Market Share($B)
SLI[2]																													
	1. Light Vehicles (w/ stop-start)	500.00	0.84	0.00%	$ 300.00	100%	$ 55.00	$ 55	420.0	0.0	420.0	$ 23.10	$ -	$ 23.10	2.0%	1.0%	552.04	0.88	1%	$ 200.00	99%	$ 64.00	65	487.4	4.9	482.5	$ 31.85	$ 0.97	$ 30.88
	2. Commercial (w/ bus, farm, etc.)	60.00	1.2	0.00%	$ 300.00	100%	$ 60.00	$ 60	72.0	0.0	72.0	$ 4.32	$ -	$ 4.32	3.0%	0.0%	69.56	1.20	1%	$ 225.00	99%	$ 70.00	72	83.5	0.8	82.6	$ 5.97	$ 0.19	$ 5.78
	3. Powersports (w/ motorcycles)	57.60	0.168	2.00%	$ 400.00	98%	$ 150.00	$ 155	9.7	0.2	9.5	$ 1.50	$ 0.08	$ 1.42	2.0%	0.0%	63.60	0.17	5%	$ 400.00	95%	$ 160.00	172	10.7	0.5	10.2	$ 1.84	$ 0.21	$ 1.62
	4. Marine & Utility	40.00	0.6	0.00%	$ 300.00	100%	$ 50.00	$ 50	24.0	0.0	24.0	$ 1.20	$ -	$ 1.20	1.0%	0.0%	42.04	0.60	2%	$ 300.00	98%	$ 50.00	55	25.2	0.5	24.7	$ 1.39	$ 0.15	$ 1.24
	5. Auxiliary[3]	2.00	0.48	0.00%	$ 300.00	100%	$ 100.00	$ 100	1.0	0.0	1.0	$ 0.10	$ -	$ 0.10	60.0%	0.0%	20.97	0.48	5%	$ 300.00	95%	$ 107.00	117	10.1	0.5	9.6	$ 1.17	$ 0.15	$ 1.02
	SLI Total								***525.7***	***0.2***	***525.5***	***$ 30.12***												***616.8***	***7.3***	***609.6***	***$ 41.05***	***$ 1.53***	***$ 39.52***
Hybrid & EV's[2]																													
	6. E-Bikes (OE + AM)	75.00	0.7	5.00%	$ 275.00	95%	$ 125.00	$ 133	52.5	2.6	49.9	$ 6.96	$ 0.72	$ 6.23	2.0%	2.0%	82.81	0.77	10%	$ 275.00	90%	$ 127.00	142	64.0	6.4	57.6	$ 9.07	$ 1.76	$ 7.31
	7. E-Golf Carts (OE + AM)	1.50	5	0.00%	$ 203.00	100%	$ 90.00	$ 90	7.5	0.0	7.5	$ 0.68	$ -	$ 0.68	2.0%	0.0%	1.66	5.00	5%	$ 203.00	95%	$ 96.00	101	8.3	0.4	7.9	$ 0.84	$ 0.08	$ 0.76
	8. Low Speed EV-China + Dev Mkts (OE + AM)	2.00	5	0.00%	$ -	100%	$ 80.00	$ 80	10.0	0.0	10.0	$ 0.80	$ -	$ 0.80	15.0%	0.0%	4.02	5.00	3%	$ 183.00	97%	$ 82.00	85	20.1	0.6	19.5	$ 1.71	$ 0.11	$ 1.60
	9. Light Vehicles(EV) - OE Only[4]																												
	BEV-Electric Vehicles	0.80	45	100.00%	$ 225.00	0%	$ -	$ 225	36.0	36.0	0.0	$ 8.10	$ 8.10	$ -	45.0%	0.0%	5.13	45.00	100%	$ 203.00	0%	$ -	203	230.8	230.8	0.0	$ 46.84	$ 46.84	$ -
	PHEV-Hybrid HV	0.42	9	100.00%	$ 300.00	0%	$ -	$ 300	3.8	3.8	0.0	$ 1.13	$ 1.13	$ -	50.0%	0.0%	3.19	9.00	100%	$ 331.00	0%	$ -	331	28.7	28.7	0.0	$ 9.50	$ 9.50	$ -
	Hybrid 48V	0.01	2	0.00%	$ 271.00	100%	$ 300.00	$ 300	0.0	0.0	0.0	$ 0.01	$ -	$ 0.01	100.0%	0.0%	11.00	2.00	50%	$ 500.00	50%	$ 250.00	375	22.0	11.0	11.0	$ 8.25	$ 5.50	$ 2.75
	10. Bus[3] (OE + AM)																												
	Electric Vehicles	0.08	160	98.00%	$ 203.00	2%	$ 90.00	$ 201	12.0	11.8	0.2	$ 2.41	$ 2.39	$ 0.02	27.0%	0.0%	0.25	160.00	100%	$ 203.00	0%	$ -	203	39.6	39.6	0.0	$ 8.05	$ 8.05	$ -
	Hybrid	0.00	40	98.00%	$ 700.00	2%	$ 250.00	$ 691	0.0	0.0	0.0	$ -	$ -	$ -	27.0%	0.0%	0.05	40.00	100%	$ 600.00	0%	$ -	600	2.0	2.0	0.0	$ 1.20	$ 1.20	$ -
	11. Delivery Vehicles(Class 6 +) (OE only)																												
	Electric Vehicles	0.01	120	100.00%	$ 225.00	0%	$ 90.00	$ 225	1.2	1.2	0.0	$ 0.27	$ 0.27	$ -	9.0%	0.0%	0.02	120.00	100%	$ 203.00	0%	$ -	203	1.8	1.8	0.0	$ 0.37	$ 0.37	$ -
	Hybrid	0.01	30	100.00%	$ 400.00	0%	$ 250.00	$ 400	0.3	0.3	0.0	$ 0.12	$ 0.12	$ -	9.0%	0.0%	0.02	30.00	95%	$ 500.00	5%	$ 250.00	488	0.5	0.4	0.0	$ 0.23	$ 0.22	$ 0.01
	12. Big Trucks & Equipment(Class 7-9)																												
	Electric Vehicles	0.00	200	100.00%	$ 250.00	0%	$ 90.00	$ 250	0.0	0.0	0.0	$ 0.01	$ 0.01	$ -	2.0%	0.0%	0.01	200.00	100%	$ 203.00	0%	$ -	203	2.0	2.0	0.0	$ 0.41	$ 0.41	$ -
	Hybrid	0.00	60	100.00%	$ 700.00	0%	$ 250.00	$ 700	0.0	0.0	0.0	$ 0.00	$ 0.00	$ -	2.0%	0.0%	0.01	60.00	100%	$ 600.00	0%	$ -	600	0.6	0.6	0.0	$ 0.36	$ 0.36	$ -
	Hybrid and EV'sTotal								***123***	***56***	***68***	***$ 20.48***												***420***	***324***	***96***	***$ 86.83***	***$ 74.41***	***$ 12.43***
Total Market									**649**	**56**	**593**	**$ 50.60**	**$ 12.82**	**$ 37.88**										**1,037**			**$ 127.88**		
	Light VehicleS Sold	105															118												
	% share "electrified"	1.2%															16.4%												

[1]Units are batteries for SLI portion and auxiliary batteries

[2]Units are vehicles from Hybrids + EV position (eg, golfcarts, buses, e-bikes, ...)

[3]EV Buses different, need to factor in replacement market across period due to high penetration already in China with LFP designs)

[4]Replacement market by 2022 just starting to mature(other than Prius), so not material to include here.

[5]2022 numbers inlcude Hybrid and EV applicatioons