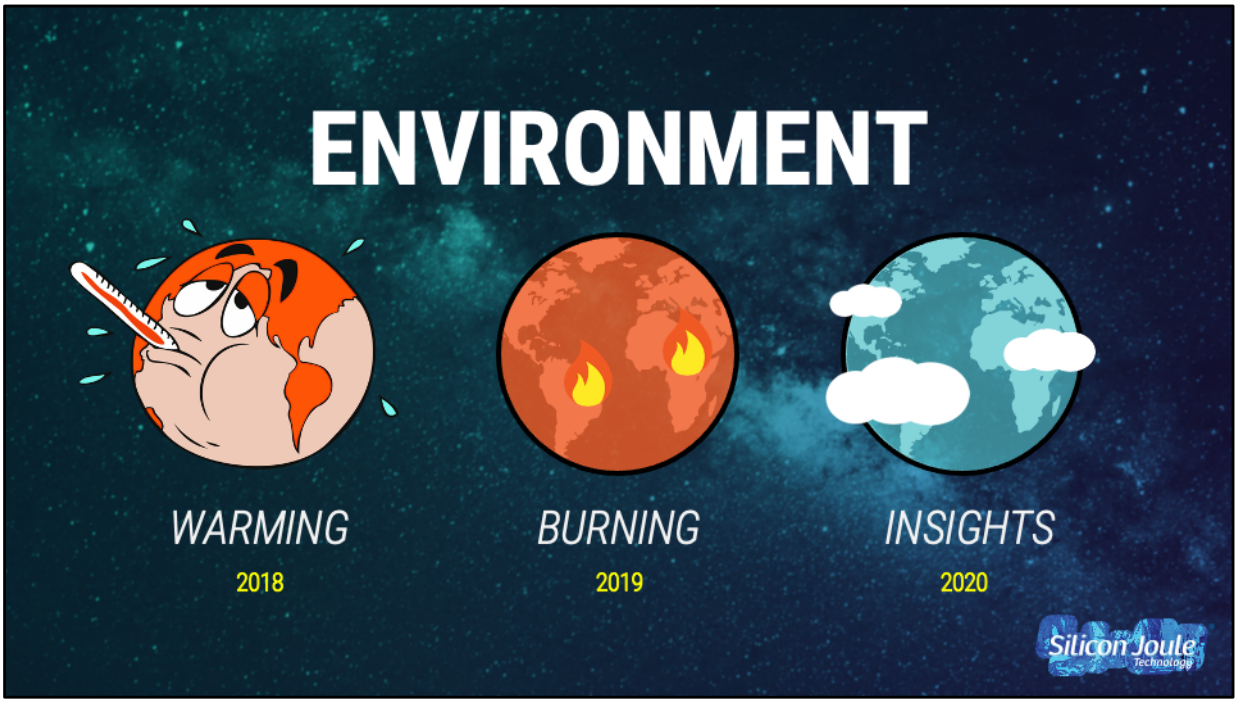
Today I will present a five-year forecast for batteries in transportation applications. This is based on a comprehensive model with hundreds of assumptions based on the best input I could glean from many across our industry.

The real variance in the forecast is being driven by the pace and mix of electrification across vehicle platforms. The electrification trends are compelling and confusing. Are we dealing with an evolution or revolution in vehicle platforms, and what are the consequences for battery demand?

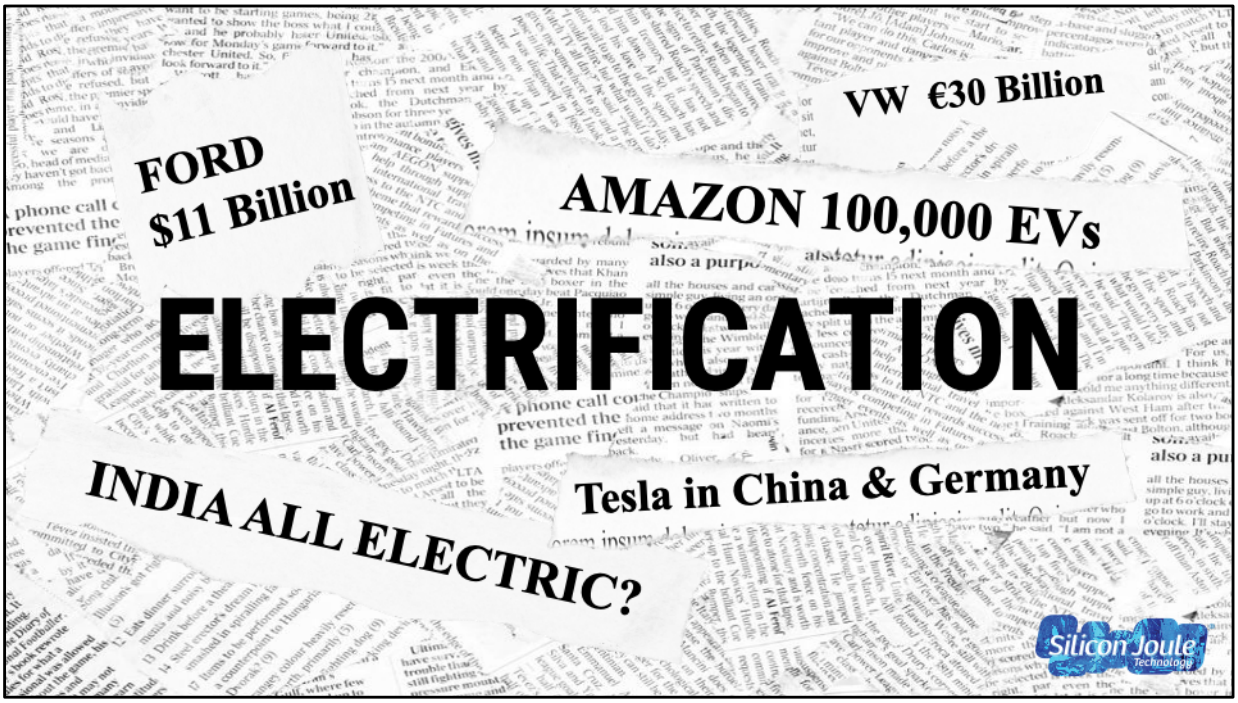
By sharing insights and assumptions by market, I want to help you reach conclusions on where to adapt and invest in your businesses.



Let's start with the environment. In 2018 we talked about the policies influencing transportation in response to global warming. Well, 2019 was hotter than ever, and fires in Australia, California and Brazil have raised sensitivity to another level.

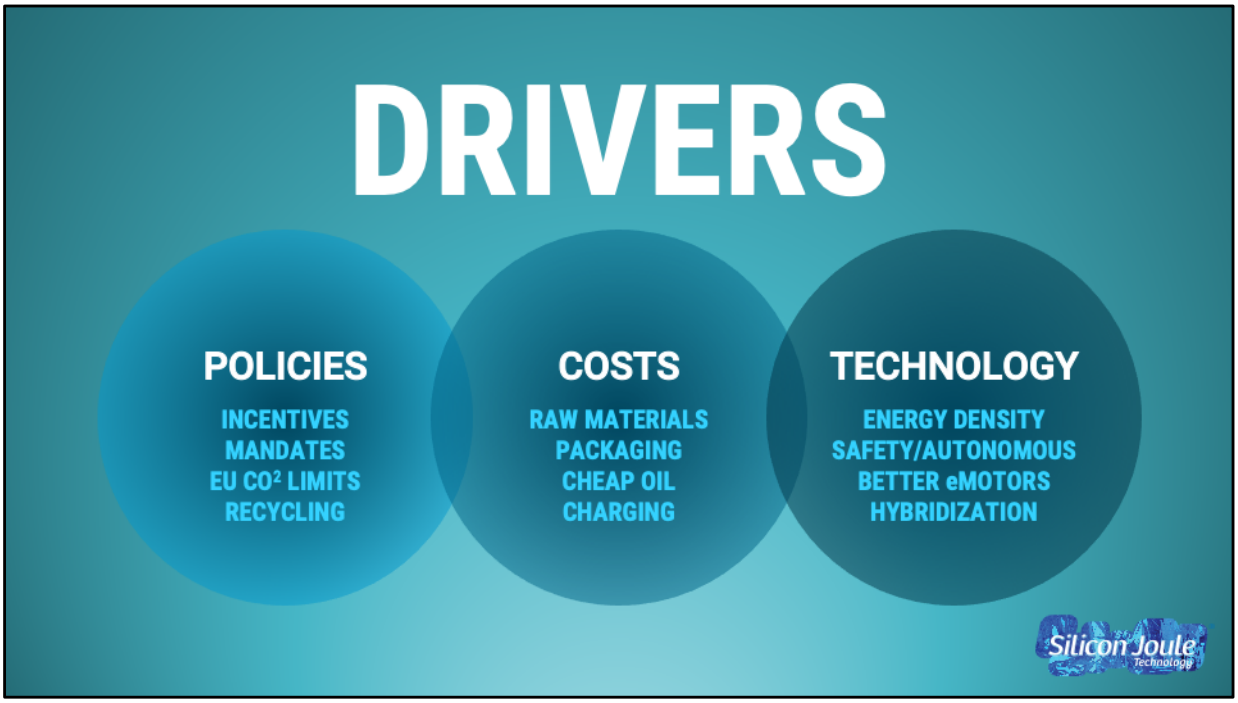
However, let's recognize some progress in that global CO2 emissions in 2019 did not increase, at least for one year, according to the IEA. The were reductions in Japan, the EU and the US due to the transition to cleaner electricity production from natural gas and nuclear power vs. coal, and more solar and wind generation. And these reductions offset the CO2 emission increases in China and India. A lot more effort is needed to reverse the cumulative increase we have seen across recent decades.

In 2020 we have witnessed the virtual shutdown of industry and normal life for weeks in many countries, yet this has offered all some special insights. There is much cleaner air over many cities worldwide. So the impact of people and industry on our planet is irrefutable, and this impact is visible to hundreds of millions of people in a personal way. It may help us all adapt more readily with better practices and policies helped by better batteries to actually reduce CO2 and other emissions.



So, how are vehicles going to change, and what is the impact on battery demand?

Reading the headlines from VW or Tesla you could surmise that the whole world is going EV, or you can be confused when you read China leads in EVs, and India plans to go all electric, while both countries are still building new coal burning electricity plants.

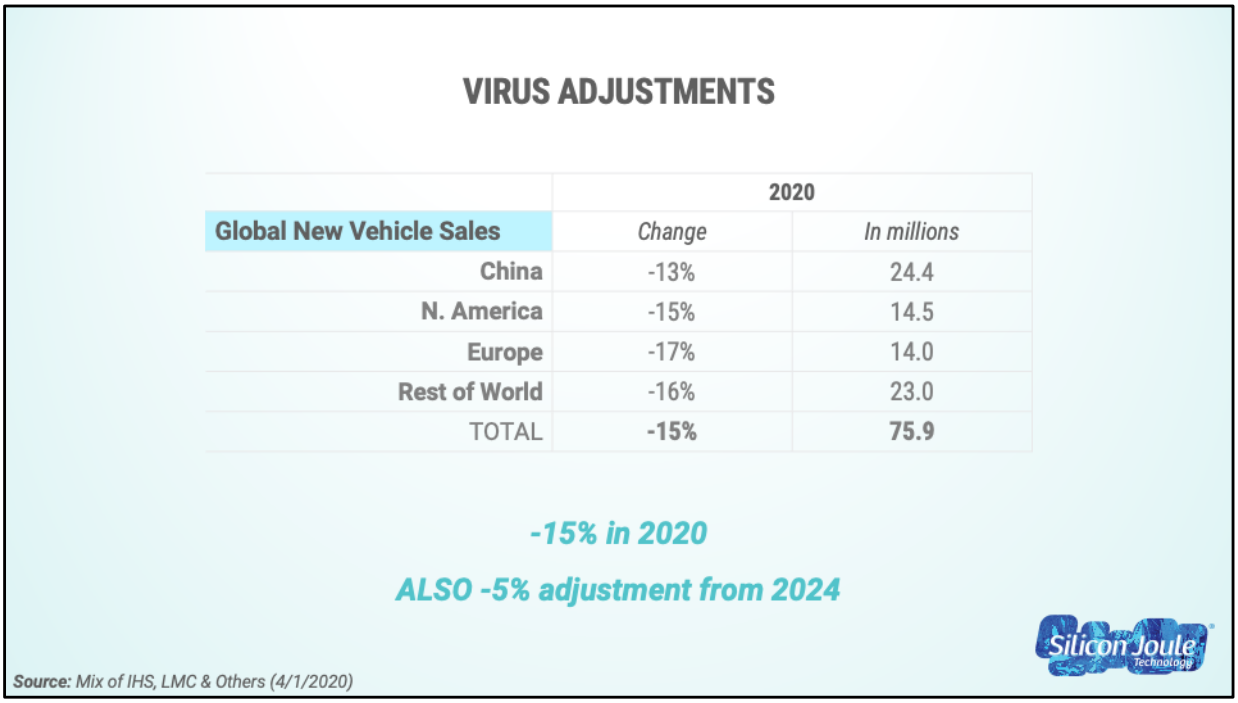


Evaluating three interacting drivers, I believe, give us a basis to assess the outlook for electrification both globally, and in a particular country.

Government policies, be it mandates, incentives, even urban bans on IC engines have a huge impact on companies with multi-year product developments.

Total costs for alternative vehicles including EVs, hybrids, plus fuel costs and charging systems are big factors for over 80% of car buyers.

And technology developments like better eMotors and batteries, autonomous driving and safety issues are also influencing the electrification mix of vehicles. The questions now are which product platforms will develop best, and how many of what kind of batteries do they need.



Our worlds have been disrupted by the virus, so here is a best effort at adjusting the demand for new vehicles in 2020. The notable forecasters like LMC, IHS and others have cut their forecasts for new vehicle sales in 2020 as of early April by an average of 15% from 2019, assuming China starts recovering in April from their 43% sales decline in Q1, and that the US and Europe return to some normal activity by Summer.

Some are speculating working from home, and business travel trends will change because of our collective experience during these shutdowns. Considering this, I have reduced the forecast 2024 new car sales and battery demand by 5% from the forecasts given to me, as some changes appear likely in work practices and business travel.

However, there is also a perspective that social distancing will have at least some offsetting impact where individuals may opt for more personal transportation vs. UBER and public buses and other urban transport where risk of some contagion is higher.

COMMODITY ASSUMPTIONS

Source: CRU Commodities

RECOVERY?

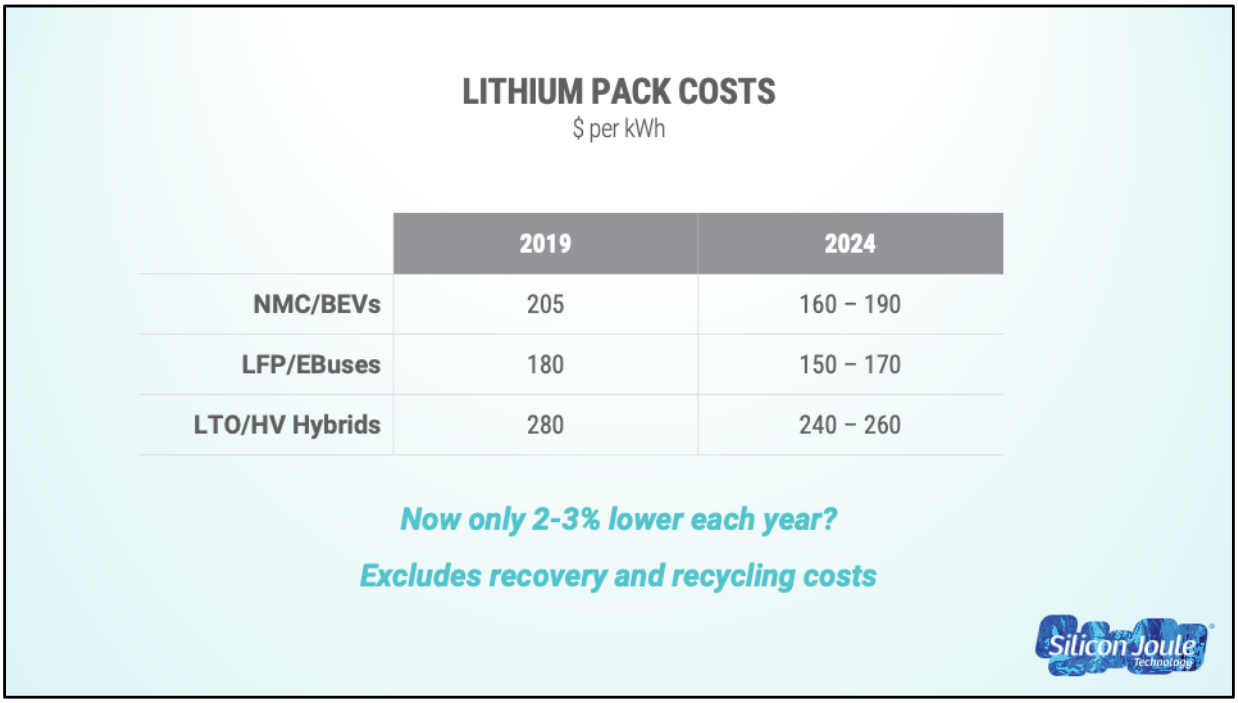
In $/ton	2019	2020	Δ	2024	CHANGE 2019-2024
Lead	2,000	1,750	*-10%*	2,100	+5%
Lithium[1]	11,200	8,124	-27%	10,700	-4%
Oil (Brent)/barrel	64.20	42.00	*-38%*	75.00	**???**
Cobalt[2]	37,038	35,274	*-5%*	50,706	+37%
Nickel	13,936	14,250	*+2%*	18,000	+29%

1 Lithium carbonate
2 Cobalt is 98.8%

Silicon Joule Technologies

Total costs for batteries and vehicles starts with assumptions on relevant metal costs, and of course also fuel costs. Demand for all metals and oil collapsed this March, leading to lower price forecasts for at least 2020. These assumptions are from CRU Commodities, estimating Lead and Lithium falling even further after big declines in 2019.

The collapse in oil prices from both the virus induced demand decline, and higher global production has made forecasting oil pretty difficult. Though today's (4/16) price is $32, CRU has recently forecast a $42 average for Brent crude in 2020 and has not yet revised the $75 forecast for 2024. If the fuel costs are sustained at these $30 or below levels (for Brent crude), how will consumers shift in their interest in EVs, hybrids and other choices?



Lithium battery cost estimates are obviously important in deriving global battery demand. Here are the assumptions included in the model, presented as battery pack costs by popular lithium battery type by application.

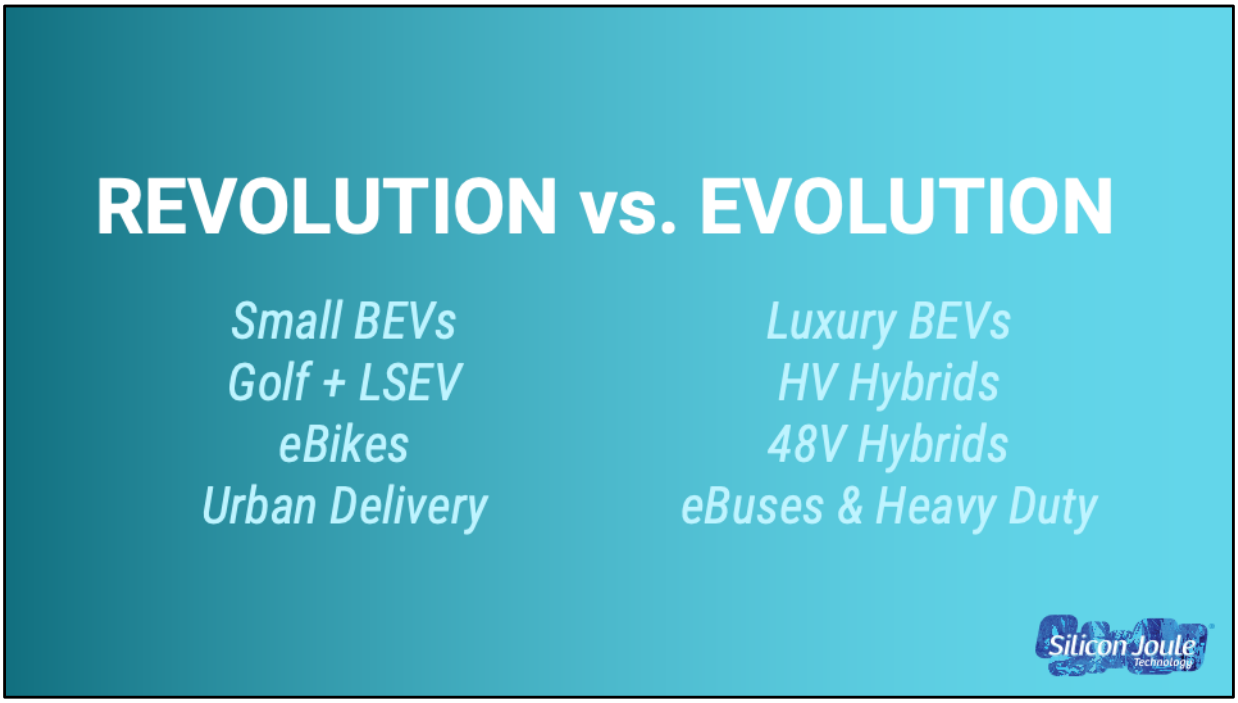
After the steep declines over the last two decades, the further cost reduction is estimated in the 2-3% annually through 2024.

I would highlight a recent shift in demand for LFP designs. LFP, or iron phosphate batteries, were often ignored by many due to the lower energy density. Multiple Chinese producers like BYD and CATL have touted their progress with LFP in so-called CTP or cell-to-pack innovation to push up energy density through innovative cell and system designs. Part of the CTP improvements is claimed possible by the lower safety risk with LFP vs other lithium types.

I acknowledge there are many different and lower forecasts for lithium battery costs, and the US DOE goal is less than $100/kWh. However, I believe these are reasonable numbers at the battery PACK level, where you have to consider protection systems including controllers, cooling and structure.

Here are profiles of two new battery packs, the BLADE LFP from BYD, and GM's new Ultium NMC pack. Material science improvements at the cell level will continue, yet much of the current focus for costs and safety reflect changes or improvements in form factor, connections and packaging to efficiently fit across multiple vehicle platforms.

A similar improvement from packaging and architecture can also be seen in emerging advanced lead batteries. And shown is a lead based battery with a Silicon bi-pole structure, which features further significant improvements in power, energy, weight, life and higher voltage blocks.



We all understand shifts to electrification across transportation are underway, yet I believe it helps to segregate those apps now likely to change quickly in the market.

And I believe we are all trying to guess how this pandemic will further change our world and industry.

Before we get to the numbers, here is my quick summary on the key markets with significant battery impact. I believe the small EVs, plus Low Speed EVs (LSEV), eBikes and Urban delivery vehicles will go through REVOLUTIONARY market shifts. Surely, there will be differences by continent, yet the signs for real change are in the market already.

By contrast, impressive Luxury EVs get even better acceleration and features each year, yet costing $100,000 or more means they will only capture a niche market.

VW has made a huge bet on its new compact all electric ID.3 series launching this year. And Tesla's Model 3, now also from the new Shanghai plant, and soon a German site, may represent nearly 90% of their total vehicles, along with the similar sized small SUV, Model Y. Yet these are still $35,000 to $60,000 vehicles.

With costs roughly 1/5 or less of the VW and Tesla options are what I would call the Urban Micros, such as the Baojun e100 in China, available for about $7,000. And Baojun is JV with GM. These are cheap and functional. There is another range emerging from Europe's Renault and Fiat, and also Mercedes has relaunched their SMART brand as all-electric range. By later this decade, Uber's fleet may pick you up without a driver in Lyon or Los Angeles in some version of these small vehicles, further revolutionizing URBAN transport.

High voltage hybrids may not get the press, yet they just keep improving, reducing costs and emissions through real efficiency gains, without limiting range, or having to get more electricity produced somewhere else with that consequential impact on emissions.

Toyota still leads in this space, and its efficient and sporty new RAV4 complements their Prius offering. Yet Honda, Hyundai and Ford are right behind, and this fleet of vehicles now delivers 40 to 55 miles per gallon.

With gas prices at $1.75 per gallon in early April in the US, this means you could drive the 800 miles from New York to Chicago for a fuel cost of about $30 with one of these gas sipping solutions, also with less than half the emissions of just a few years ago.

The so-called Mild hybrids with 48 volt systems are now increasing on all continents. BMW is releasing a new range, Fiat Chrysler in the US has expanded the use across its popular Jeep Wrangler range, and in China, Changan and others offer multiple 48V models.

By 2024, these hybrids with increasing functionality and power, described as levels P0, P1 and P2, are expected to be the LARGEST range of electrified vehicles with over 22 million or about 1/4 of all new light vehicles.

These designs reduce emissions helping car makers with compliance, and helps users by reducing fuel costs without higher vehicle purchase costs. Part of the brilliance of these simple solutions beyond low costs to implement, is that better batteries help deliver the acceleration and total performance with even smaller, lighter engines.

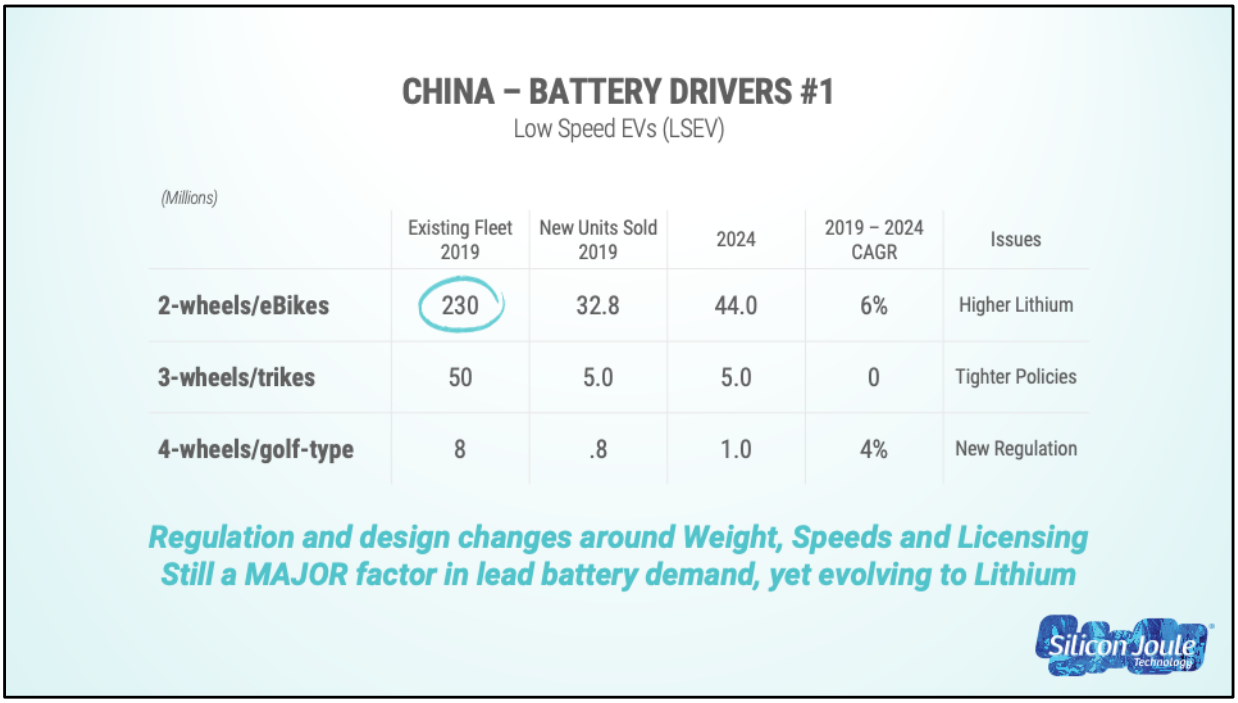
Low Speed EVs (LSEV) is a broad category with varying vehicles and functions worldwide. Yet, they are very important battery markets with similarities in range, system voltages, motors and battery needs. They range from what might be EASY applications to more challenging ones, and astute battery marketers are paying very close attention to these markets and their changes.

Consider the golf cart market in North America, of which over half the demand is in reasonably warm, at least not Wintry or seasonal markets. This has proven to be an EASY application for golf cart maker E-Z-GO to lead in conversion to smaller lithium battery packs. The range needed is less than 12 miles a day, always back to the same good chargers with stable electricity supply, claiming reduced maintenance and energy savings. Unless innovative new lead based solutions arrive, over 50% of the OE market in North America market may include lithium batteries by 2024.

The eRickshaw market in India is surely more difficult for battery makers due to intense cost pressure in this application, and inconsistent charging which can kill even the best batteries. Yet this market is growing quickly to deliver people and goods, and better battery solutions are needed. Alternatives will surely be offered by innovative makers of lithium and lead batteries.

Let's now focus on the largest LSEV market by far, China, and at this juncture I should thank Dong Li of Leoch and some of his team who have provided much of this data and insight.

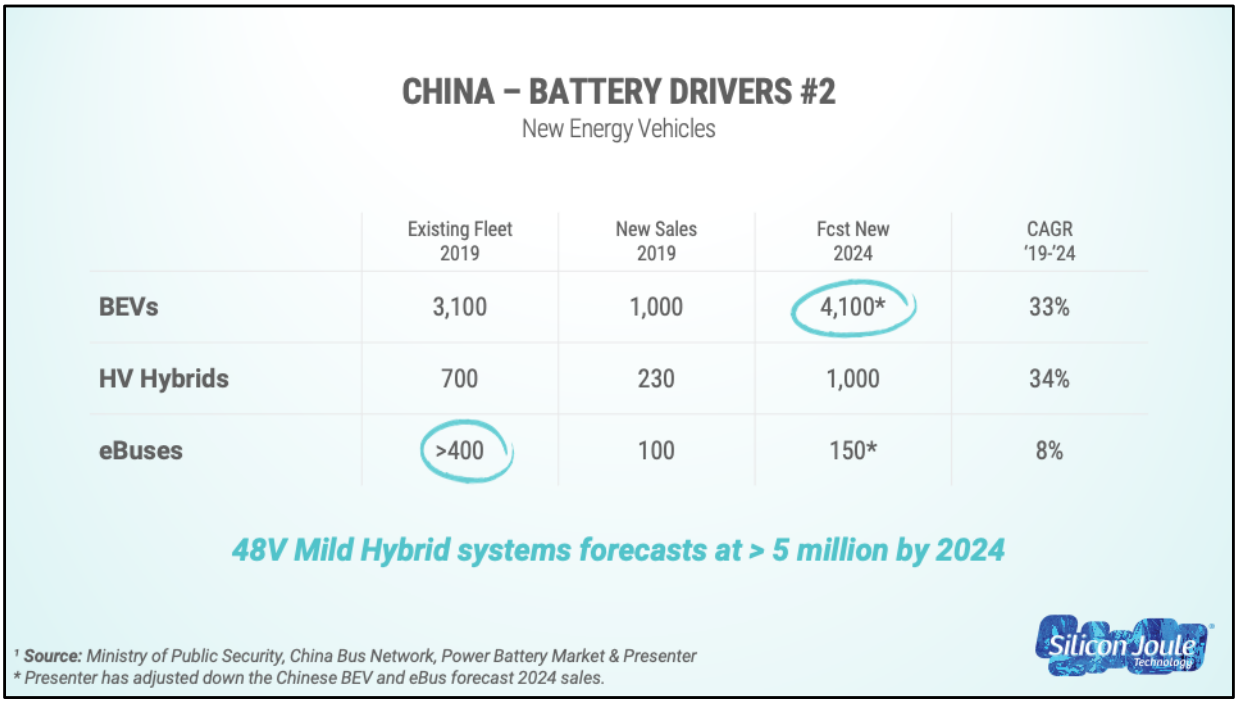
How about a $420 electric Moped, recently introduced. Both practical and very cheap. Many young people do not want the cost of owning a car in Hong Kong, Paris, New York, and elsewhere given that the cost of parking a car for a month, can exceed the total purchase price of this Moped.



China's LSEV market is split into 2, 3 and 4 wheel options, starting with the huge eBike market, which would include these MOPEDS, and emerging electric motorcycles. New rules on licensing, weights, speeds and road access means changes in this market, yet overall it is still expected to grow, possibly 6% per year in vehicles, with ever more innovative and cost effective options.

Today, new eBikes have lithium batteries less than 15% of the time, due to cost. Huw Roberts' CHR Metals group has surveyed recent trends noting a shift to smaller, lighter, yet still lead batteries, down to 12Ah, to adapt to the regulations. Yet many new vehicles for China and export are featuring lithium packs, where the design and performance options will likely translate to a much higher share for lithium by 2024 for new vehicles.

The demand for 3 and 4 wheel LSEVs in China are forecast as flat across the next 5 years due to tighter policies and licensing across urban centers. Further regulation changes could again shift the demand for these options which are easy to buy and drive for personal use or work.



Moving to larger vehicles, China's market for electrified light vehicles and eBuses make it the largest market for battery consumption. The light vehicle market has been led by BYD, BAIC, and now joined by Tesla's new local Model 3 production.

The pure EV (BEV) market is expected to increase by at least 4X to 4.1 million vehicles by 2024 to represent ONE HALF of all new electric light vehicles worldwide, benefitting also from incentives that have recently been extended for two years.

As mentioned earlier, 48 volt systems from Changan and others are also dramatically expanding in China, and will likely represent the highest share of new Chinese vehicles at over 5 million by 2024.

eBuses continue to represent a very large battery application due to the nearly 200 kWh packs in over 400,000 buses in operation across China. The significant and rapid eBus adoption in China, which represents over 95% of the eBuses operating in the world offers a clear example of the potential impact of policies.

The rest of the world's Urban bus fleet is slowly evolving to electric as issues including city budgets, ridership levels, and now possibly social distancing, limit purchases to mostly pilot programs of 10 to 50 buses at a time.

URBAN DELIVERY – UPS STUDY

MOTIVATORS

- Sustainability goals
- Lower cost of ownership
- Financial incentives
- Policy changes

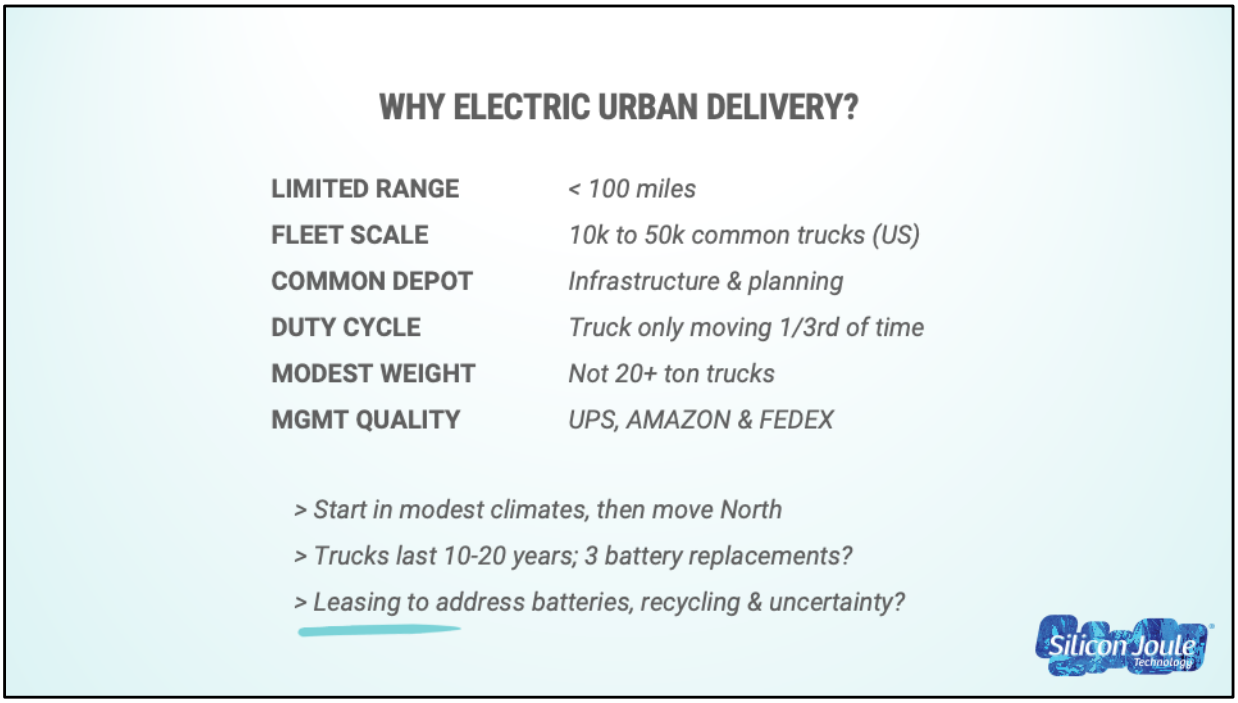
BARRIERS

- Limited product availability
- High purchase price
- Inadequate facility charging

Silicon Joule Technologies

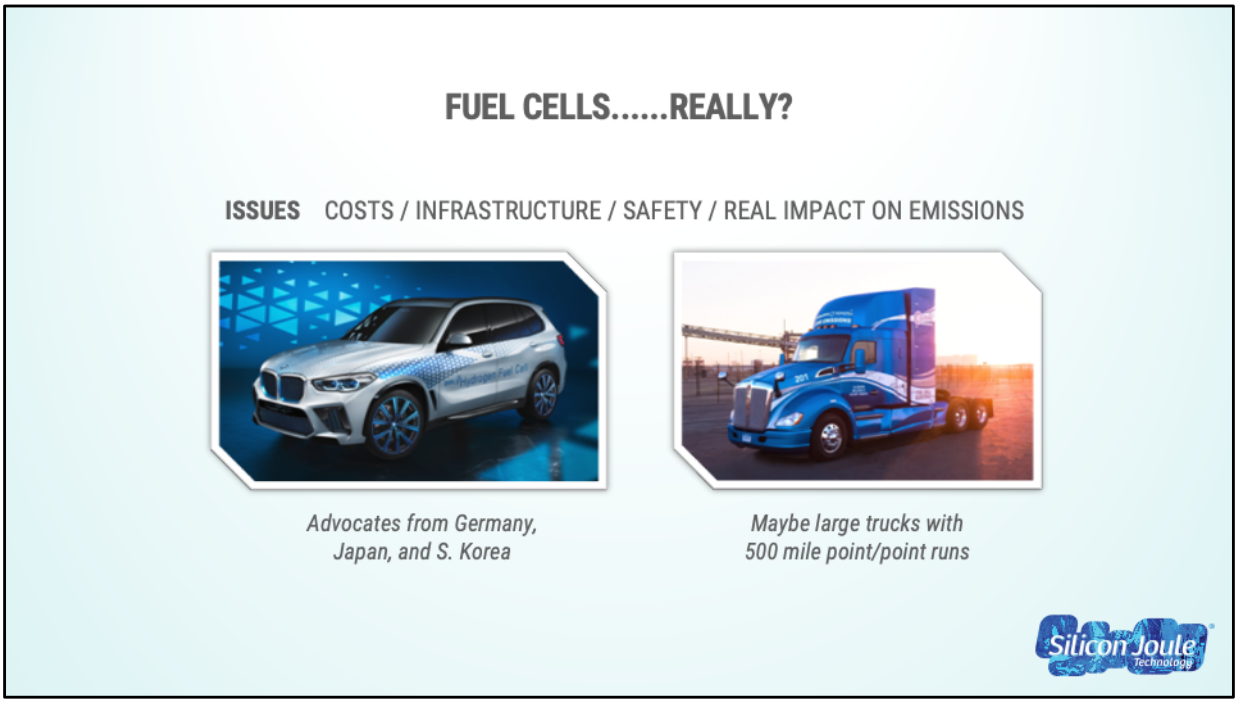
Urban delivery is one application, I believe ripe for a revolution to electric trucks this decade.

UPS commissioned a study with the highlights of pluses and barriers noted on the slide, and they have evaluation programs underway in Europe and the US. Yet UPS's legendary reputation for efficiency means high expectations for reliability and real total costs before fuller adoption.



My confidence in real change in this sector is based on the standard duty cycle and range of vehicle fleets, across tens of thousands standard vehicles returning each day to the same depot by very disciplined management at UPS, Fedex, Alibaba and Amazon.

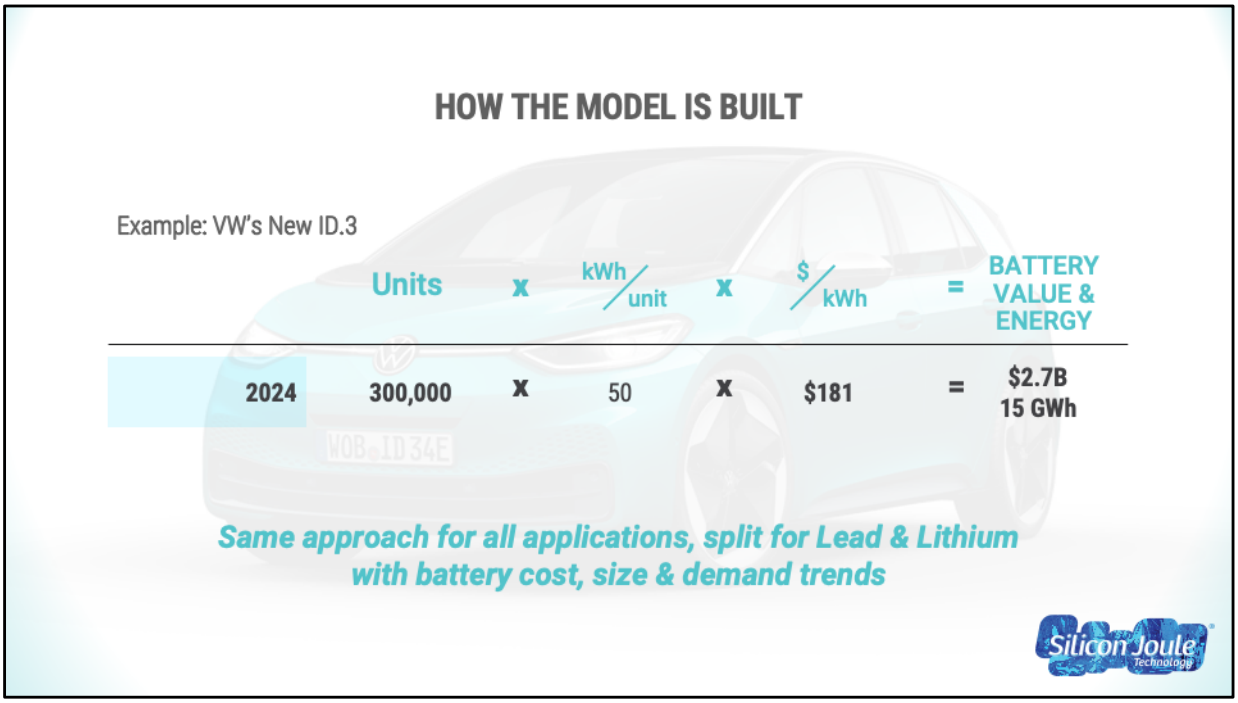
My guess is these companies will demand even better performance, life, cost, plus end-of-life recycling for the ePlatforms than seen today, or push the risks to the suppliers by leasing initially. Yes, this is much tougher application than golf carts, but the similarities in fixed range, a large fleet of standard vehicles, etc, has me believing many of these markets, starting in nicer climates, are going electric.



Fuel cells have been part of the conversation for future CLEAN transportation for over 40 years, and select Japanese, Korean and German car makers have small numbers of new fuel cell vehicles operating in their home countries and California.

Regardless real progress on costs, the infrastructure and lack of true energy efficiency by comparisons to alternatives for light fuel cell vehicles suggests a low probability for any wide adoption, especially considering the progress of battery based electrified vehicles.

However, large trucks with daily runs of over 500 miles from inter-modal centers to warehouses where infrastructure can be shared across hundreds of vehicles may prove a more competitive entry than very large, heavy battery packs required for truck concepts from Tesla and others.



Moving on to the forecast now, the model is built by estimating the number of vehicles by application, shown here as example is VW's new ID.3 range just being launched. They offer 3 different battery packs for range, which may average 50 kWhs, and at a forecast cost of $181 per kWh by 2024, extending to a $2.7 billion value across the 15GWhs of energy required from the batteries for an estimated 300,000 cars per year by 2024.

This same approach is then estimated for all transportation applications split for lead and lithium battery use and the shift in battery sizes and value across the next five years. It is a reasonable and comprehensive approach, yet obviously many assumptions could turn out differently.

MORE AND BIGGER BATTERIES

	NEW LIGHT VEHICLES In millions			Battery size in kWh[1]	
	2019	2024	Change	2019 Average	2024 Range
BEV	2.2	8.2	3.7x	49.0	20 – 100+
HV Hybrid	3.5	9.2	2.6x	3.5	2.0 – 12.0
48V Hybrid	2.4	21.9	9x	.4	.3 – 2.0
	8.1	39.3			

About 50% of New Light Vehicles by 2024
[1] Excluding required 12V batteries

Silicon Joule Technology

One common theme across applications is MORE and BIGGER batteries. The forecast assumes about 50% of new light vehicles will be electrified by 2024, including pure electric models plus high voltage and 48 volt system hybrids. China and Europe are expected to lead in the pure electric vehicle adoption, yet the 48 volt systems deployed globally are expected to the be the largest category increasing about 9X from 2019 to 22 million vehicles by 2024.

Beyond the average battery size estimate for each platform shown for 2019, also is range of battery capacity in kilowatt hours by 2024, based on the plans we know about from car makers. On average, the batteries are getting bigger. Also, most of the electrified vehicles have a separate SAFETY or SLI battery behind their new systems to assure safe steering, braking and other functions. Tesla however is working to delete this 2nd battery system.

GLOBAL TRANSPORTATION BATTERY FORECAST

	2019	2024	CAGR	KEYS
TOTAL $ Billions	76	178	19%	Higher Lithium share
GWh	835	1,369	11%	More and bigger batteries
SECTORS $ in Billions				
SLI w/ stop-start	33	39	3.5%	More AGM+EFB, 7% Lithium
Electrified Total	43	136	26%	Lithium is 88%
Lithium	30	122	32%	BEVs, PHEVs eBuses
Lead	13	14	2%	LSEVs, eBikes & 48Volt

Silicon Joule Technology

The total battery demand is forecast to increase from $76 Billion in 2019 at an average rate of 19% in value to more than double to $178 Billion by 2024 for all transportation applications.

The energy content expands at an average 11% annual rate to nearly 1400 giga watt hours per year for new vehicles by 2024. The higher value increase reflects the major electrification driven growth of lithium batteries in the overall mix. On a kWh basis lithium batteries are still likely to cost at least 3 times the cost of lead batteries per kilowatt hour.

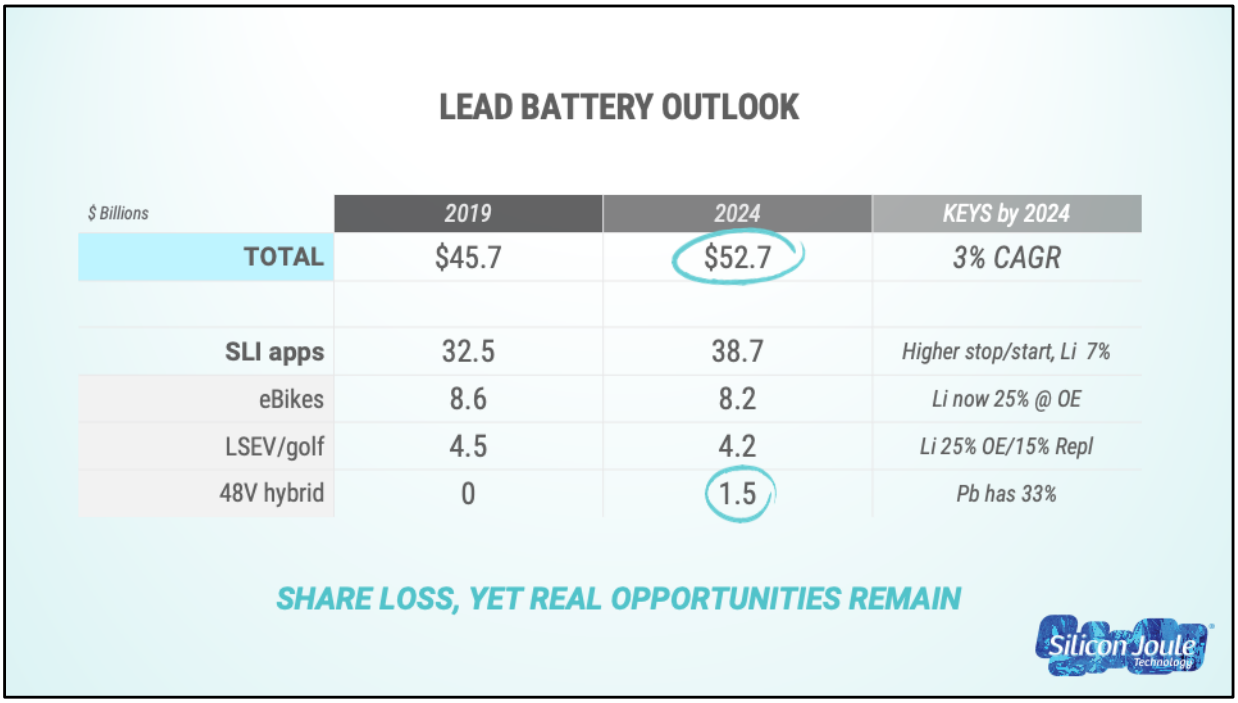
Within the broad SLI sector, including stop/start, the market value is still growing due to the major shift to stop/start batteries needed for replacement. Lithium batteries however are forecast to represent 7% of the SLI market by value by 2024 including a slice of almost all vehicle platforms.

It is no surprise that lithium batteries represent most of the electrified vehicle applications by 2024, estimated within our model at 88% or $122 Billion.

Virus or no virus, this represents tremendous industry growth.

The progress of Lithium batteries has dramatically raised the profile of our industry, and truly created tremendous opportunities for makers of better batteries, including better advanced lead batteries.

The market share of lead batteries will decline, yet makers of the most advanced lead batteries may find market opportunities in the hundreds of millions or more across the transportation industry.



Here is a closer look at a baseline forecast by sector for lead-based batteries.

The total market for transportation lead based batteries is forecast to grow 3% annually, benefitting from the improved mix of AGM and EFB stop/start batteries across the large replacement market, plus the integration of bi-polar batteries in the fast growing 48 volt system platforms. These two factors offsets the share reduction and shift to lithium batteries in eBikes, plus some LSEV and SLI applications.

LIGHT VEHICLE BATTERIES[1]

In millions of units

	2019	2024	CAGR%
Replacement Market [2]			
North America	78	83	1.3
EU + UK	58	61	1.0
China	65	83	5.0
Rest of World	221	229	0.7
New Vehicles/Worldwide	90	96	1.3
TOTALS	512	552	1.5%

[1] Includes SLI, STOP/START & Auxiliary, excludes Commercial, Marine, Utility etc.
[2] From BCI, manufacturer, and presenter estimates

Many prefer to think about battery demand in UNITS, so here is a look at transportation battery units, not counting the EV and Hybrid (HV and 48 volt) and LSEV propulsion batteries. So, this shows the forecast for global demand of new and replacement batteries for the SLI type applications for light vehicles, excluding commercial, marine, motorcycle batteries, etc.

Due to very large battery replacement market, and slow growth of new vehicles, the percentage changes are not significant to 2024, showing 1.5% compound growth to 552 million light vehicle batteries.

NORTH AMERICAN SLI SHIPMENTS

Batteries in millions

	2018	2019	Vs. 2018	CAGR	2024	2019 AGM%
Auto OE	16.4	15.6	-4	1.9%	17.1	25%
Auto Repl.	80.0	77.9	+2	1.3%	83.0	5%
Heavy Duty	13.8	13.6	-1	3.4%	16.0	4%
Motorcycle	5.6	4.8	-14	1.5%	5.2	38%
Utility	7.1	6.6	-7	1.0%	7.4	NA
Marine	7.2	7.0	-3	1.0%	7.5	4%
Deep Cycle[1]	6.0	6.2	+5	0%	5.9	NA

[1] DeepCycle includes Golf, Lifting & Renewable applications

Source: BCI

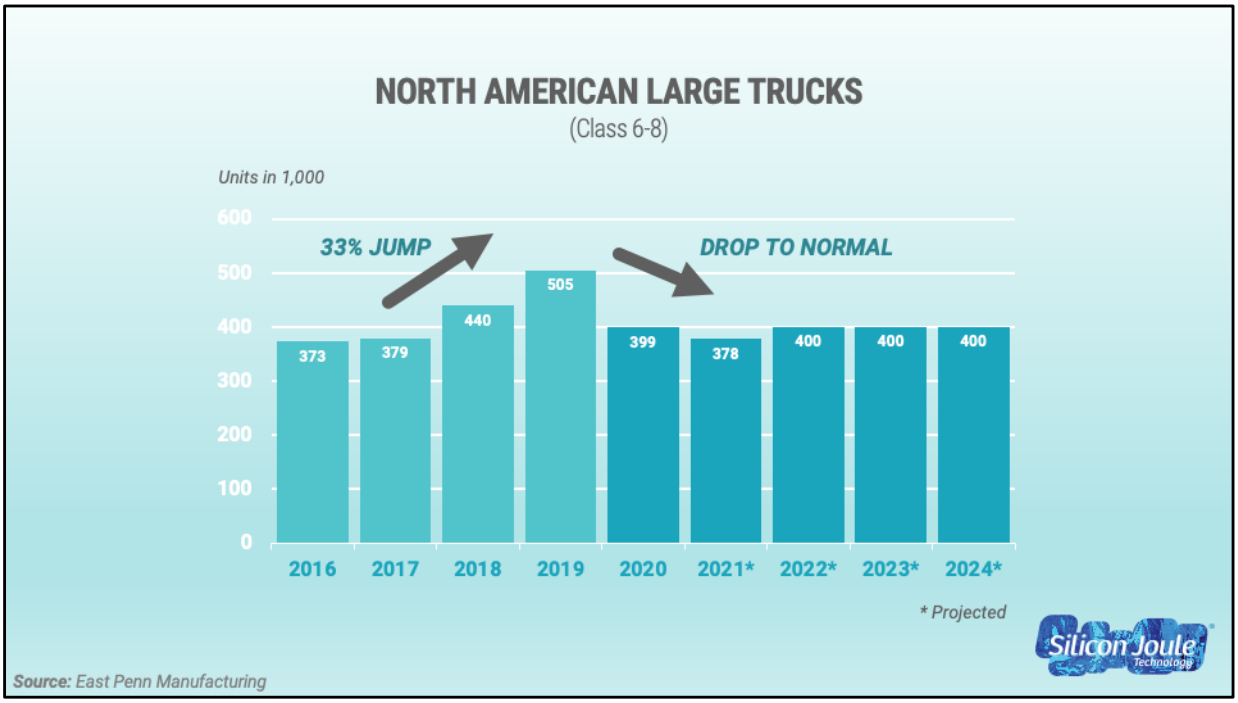
There is detailed information available on the North American market from the BCI, so I will share here the data and forecast by product grouping from 2019 to 2024, based on judgements from people at East Penn, Exide Technologies, Crown Battery and others.

Critical for battery makers is the prospect growth for AGM batteries. The high performing AGM batteries were in about one quarter of all new light vehicles sold in North America in 2019, and could represent over 20% of all light vehicle OE and replacement batteries combined by 2024.

These batteries, along with continuously improving Enhanced Flooded batteries have provided real value to car makers and consumers for fuel savings and emission reduction, and also providing battery makers with a real product mix improvement.

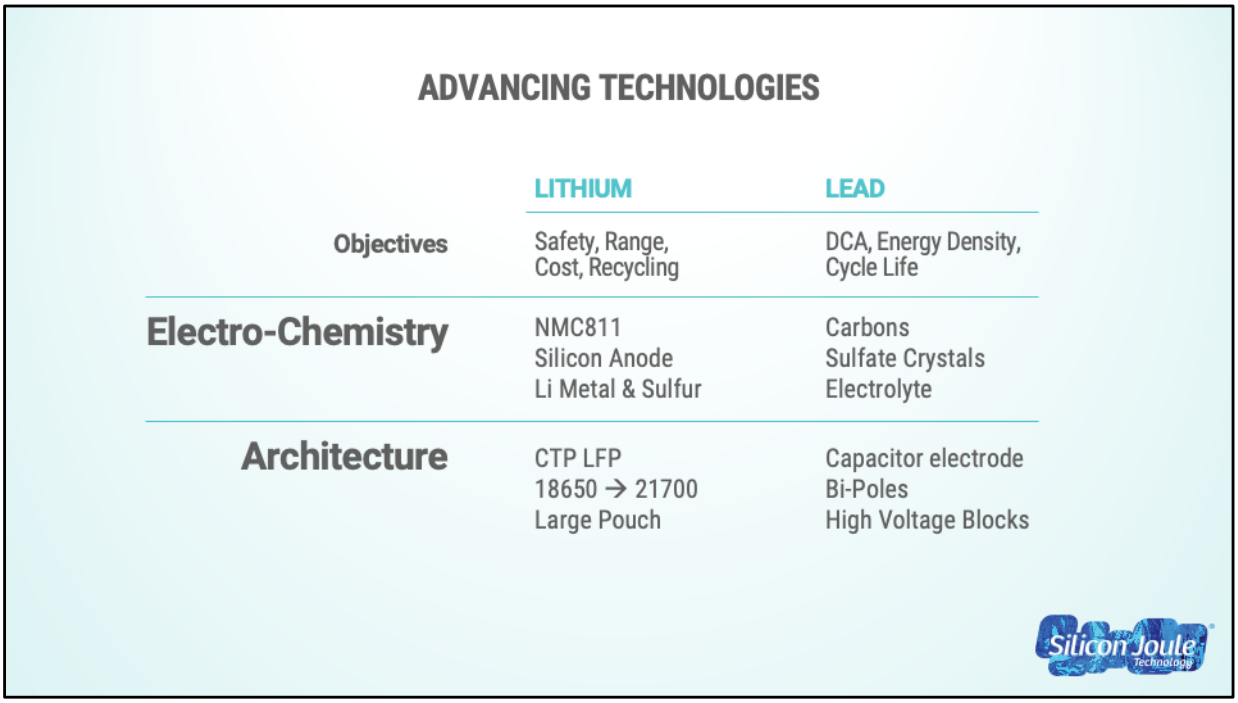
One special category, Deep Cycle, still is showing good growth, yet this reflects, per John Connell of Crown Battery demand not only for golf carts, but also lifting equipment and the growing renewable power applications.

Before leaving North America, this Winter was a big bust for battery makers there, as there simply was not any sustained extreme cold, as is common across much of the continent. Gary Taylor of Exide Technologies explained the point of sale detail from the top retailers in the US showed battery sales off over 20% in January alone. And February and March did not improve, leading to inventory adjustments and reduced production this Spring in North America.



Here is some insight to the major change in the demand for large trucks in North America as provided by East Penn Manufacturing. Emission requirements, economic and eBusiness growth all contributed to a dramatic one-third boost to large truck sales from 2017 to 2019, according to Tim Lawlor from East Penn. The forecast shows demand settling back to the more normal 400,000 large trucks per year after this surge.

Similar to other sectors, more and better batteries to cope with the Idle-off requirements, cycling and higher heat exposure has led the best companies to offer continuously higher performing batteries in the common group 31 size.

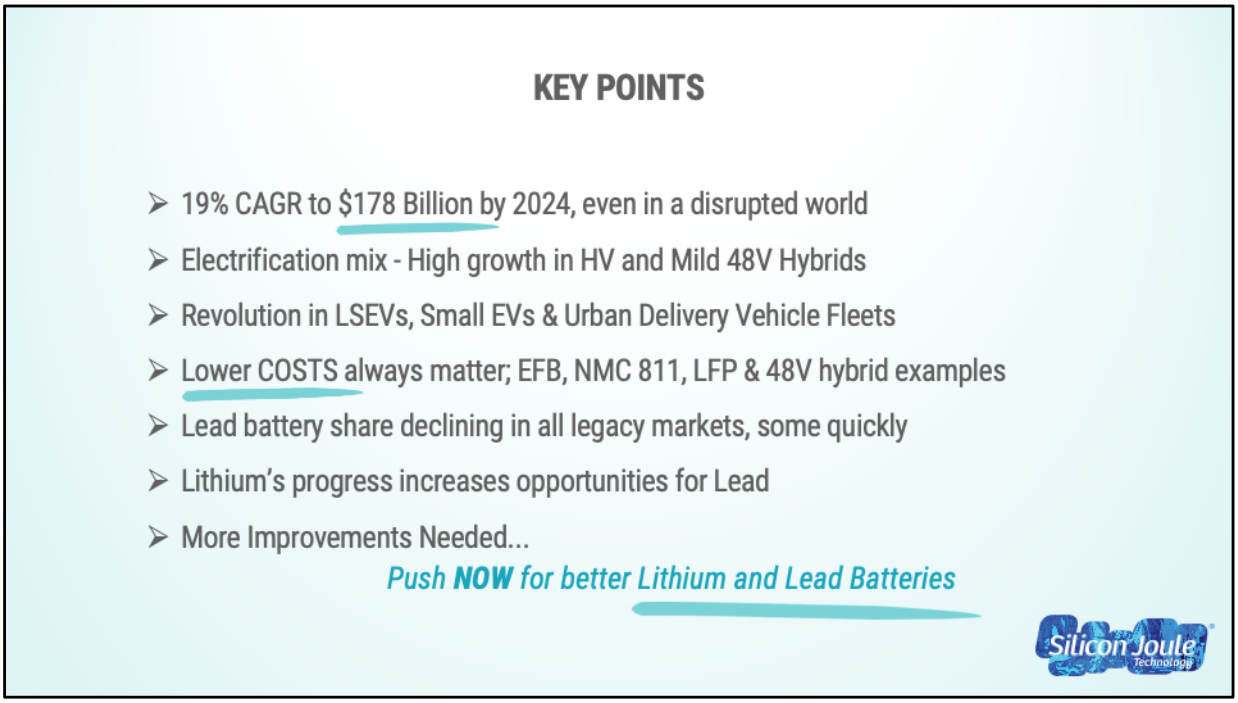


Battery technology advancements will continue to influence the mix and pace of electrification across transportation platforms.

For lithium, thousands of engineers and literally billions of dollars are focused to improve safety, cost and vehicle range. And In Belgium, S Korea, Germany, China, and now the US, including at Argonne National Labs, there are efforts to develop safe end-of-life recycling for lithium batteries. Though technically feasible, this is still complicated and expensive due to a wide range of complex chemical mixes in diverse lithium battery designs.

For lead batteries, advancements are accelerating thanks partially to the collaborative efforts of the global CBI initiative (Consortium for Battery Innovation) and in the US, the efforts of the Lead Battery Science Research Program, in conjunction with the Argonne National Lab.

For lead batteries both electro-chemistry developments within the active material, and architecture changes, including bi-polar batteries offer the promise of at 3X performance improvements while retaining the low cost and unique attribute of nearly 100% recycling and reuse, which is a perfect example for sustainable products for our planet.

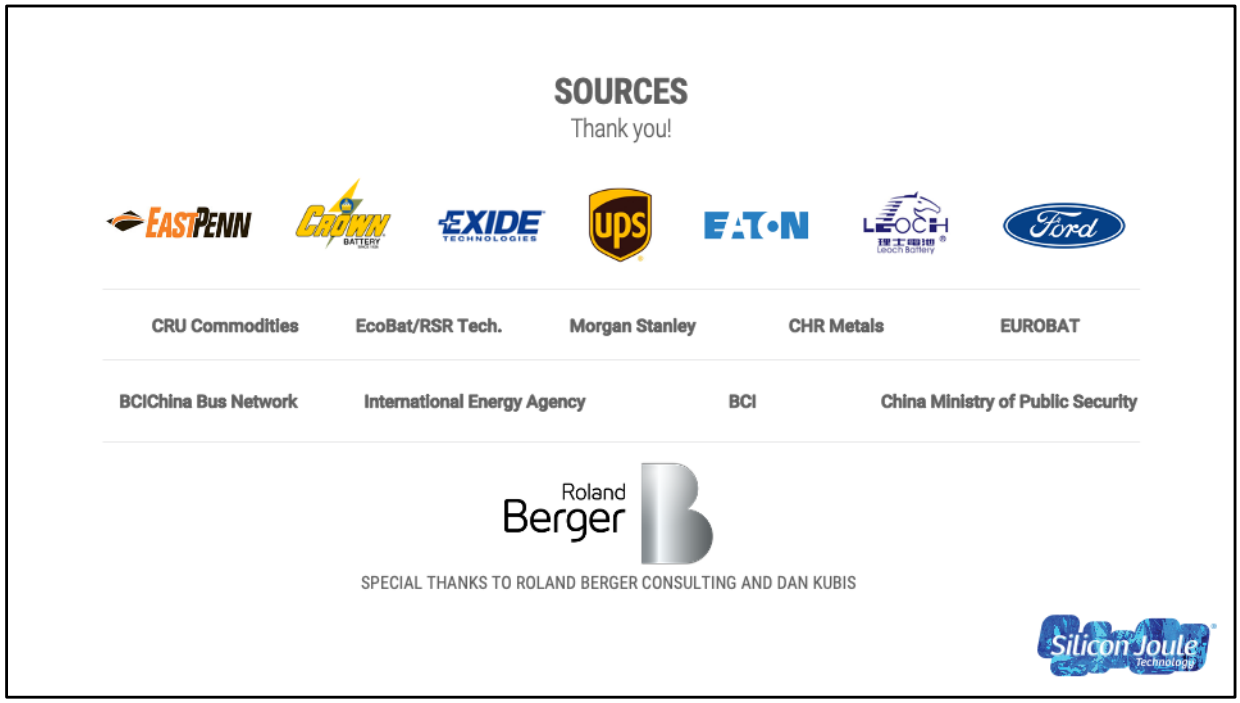


Our economies will return to some NEW Normal, and ever more efficient and electrified vehicles will help our environment. And this means batteries will continue with very high growth to $178 Billion globally by 2024 as EVs along with high voltage and mild hybrids are forecast to reach half the new vehicles sold.

I would stress that we are constantly reminded that COSTS really matter in transportation and batteries. Examples of this include the progress of EFB batteries in Europe, and initiatives like NMC811, LFP's new CTP technology and the dynamic growth of 48 volt systems. And further savings may re-shape the growth curves we have forecast. And this is before we digest the real impact of potentially much lower sustained oil prices.

Many from the lead battery industry look at the lithium battery developments as a threat, and it surely can be depending the positioning and response of their companies. However, more than a threat I would repeat that lithium batteries have dramatically raised the prospect uses of batteries across the world so much in need of more efficient use of cleaner energy not just for transportation, yet also numerous industrial and renewable linked applications.

For the health of our planet and ever more efficient transportation, we need further improvements quickly in both lithium and lead-based batteries, and the potential is there to deliver them. I wish you success in your product and investment decisions.



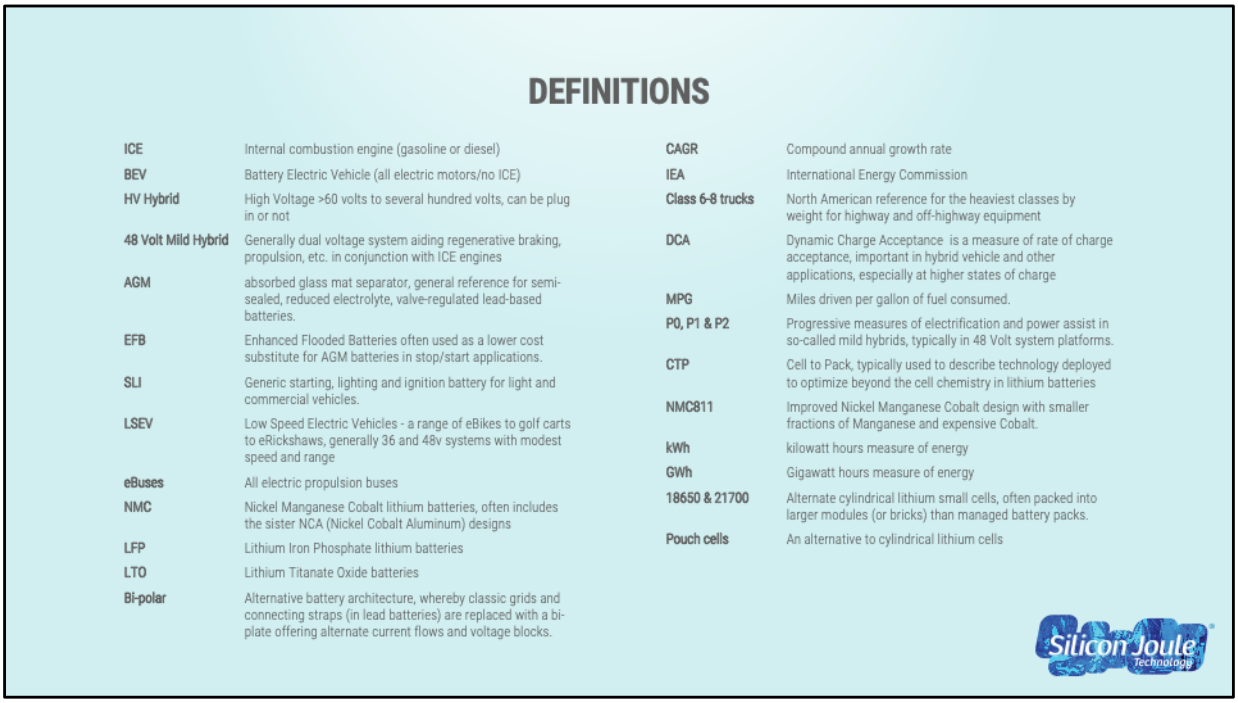
A special thank you to the list of companies and associations that have taken the time to help me shape this forecast and briefing.

CONTACT

Ray Kubis
Chairman, Gridtential Energy LLC
ray.kubis@gridtential.com

John Barton
CEO, Gridtential Energy LLC
john.barton@gridtential.com

gridtential.com



ICE	Internal combustion engine (gasoline or diesel)
BEV	Battery Electric Vehicle (all electric motors/no ICE)
HV Hybrid	High Voltage >60 volts to several hundred volts, can be plug in or not
48 Volt Mild Hybrid	Generally dual voltage system aiding regenerative braking, propulsion, etc. in conjunction with ICE engines
AGM	Absorbed Glass Mat separator, general reference for semi-sealed, reduced electrolyte. valve-regulated lead-based batteries.
EFB	Enhanced Flooded Batteries often used as a lower cost substitute for AGM batteries in stop/start applications.
SLI	Generic starting, lighting and ignition battery for light and commercial vehicles.
LSEV	Low Speed Electric Vehicles - a range of eBikes to golf carts to eRickshaws, generally 36 and 48v systems with modest speed and range
eBuses	All electric propulsion buses
NMC	Nickel Manganese Cobalt lithium batteries, often includes the sister NCA (Nickel Cobalt Aluminum) designs
LFP	Lithium Iron Phosphate lithium batteries
LTO	Lithium Titanate Oxide batteries
Bi-polar	Alternative battery architecture, classic grids and connecting straps (in lead batteries) are replaced with a bi-plate offering alternate current flows and voltage blocks.
CAGR	Compound annual growth rate
IEA	International Energy Commission
Class 6-8 trucks	North American reference for the heaviest classes by weight for highway and off - highway equipment
DCA	Dynamic Charge Acceptance is a measure of rate of charge acceptance, important in hybrid vehicle and other applications, especially at higher states of charge
MPG	Miles driven per gallon of fuel consumed.
P0, P1 & P2	Progressive measures of electrification and power assist in “mild hybrids”, typically in 48 Volt system platforms.
CTP	Cell to Pack, used to describe technology deployed to optimize beyond the cell chemistry in lithium batteries
NMC811	Improved Nickel Manganese Cobalt design with smaller fractions of Manganese and expensive Cobalt.
KWh	kilowatt hours measure of energy
GWh	Gigawatt hours measure of energy
18650 & 21700	Alternate cylindrical lithium small cells, often packed into larger modules (or bricks) than managed battery packs.
Pouch cells	An alternative to cylindrical lithium cells