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Dear New Energy and Materials experts,

This note is an exercise in helping us stay ESG compliant while on the zoom cocktail circuit. It should also arm us with the bragging rights to a better, greener group of names that, like Tesla, will seamlessly transform the planet's prospects and create zillionaires of even the unluckiest investor.

We've come some way from the British led auto revolution in 1884. Thomas Parker just couldn't get the M6 project past the Commons credit committee so his e-auto credentials (image 1) were quickly forgotten. London streetlighting was the greater beneficiary of his talents.



His science legacy could claim some competitive credit for the land speed record first exceeding 100kph in 1899. That was achieved by the '*Jamais Contente*', a stylish creation (image 2) from those plucky all-conquering Belgians. The turn of the century saw many electric vehicles on American roads and of the 33,842 cars registered in 1900, 38% were electric. One of Ford's early EV's used a model T frame but alas, history had different plans for both Edison and Ford.

For those who you who kept the 500 shares (you'll own 2,500 post the '4-1 split') I put you into at the June 2010 Tesla IPO, you'll now be able to indulge in a proper mid-life crisis with the new 212 mph soft-top version electric **Genovation GXE** (image 3 above) **and** have \$250k left over for the next *can't lose situation of the decade*.

More about that later.

2020 : the Runners and Riders ...

What was largely a pricey distraction for the five big auto groups has become an existential re-branding and re-tooling challenge. The momentum looks irreversible and for the moment, affordability is no barrier to mass adoption. Students of first mover advantage will point to one clear winner in the last decade but the next phase looks less straightforward. That's unless your broker

keeps telling you Tesla remains the only EV opportunity on the planet. An essay might start with a view on the main car makers but we quickly discover that established brands, competitors and assorted upstarts haven't been asleep. There is a significant parallel universe in China and Korea - a new generation of Western educated anode/cathode PhD's have returned with a good grasp of how to make the main science platforms perform commercially.

The next thought might be *what else* and *where else*. Hollywood had *robo taxis* courtesy of Arnie (and Paul Verhoeven) back in 1990 so let's include a few of the more recent arrivals. A lot of privately held stuff in the matrix below but expect a slew of operators to jump on the SPAC market in the next year or so once the test phase has some data to placate the regulators. Proper fall-asleep auto-pilot software is possibly closer than we think but the commercial reality suggests we'll be spared *robo-mal-function* anxiety for the remainder of this decade.

The original Uber is still a worthwhile exercise in software magic but, along with rideshare partner/rival Lyft, it's unclear whether there's still a globally scalable entity to chase. Too many nimble regional players are lining up to offer a branded alternative – some are more wedded than UBER to the old fashioned idea of full employment.

Flight and Storage - let's just randomly lump two more ginormous subcomponent groups together, these are as connected or as distinct as you like. Ultimately they all need the right kind of anode/cathode/electrolyte to create their own story and those forces are being shaped by huge wagers from Silicon Valley/Seoul and Cambridge. And umpteen labs like Heriot Watt. Unlimited internet winnings from 5 super techs have spawned a new playbook where traditionally dull consumer things can be transformed into a higher power – 'stuff' capable of educating, enriching and embracing all citizens for the greater good. Your fridge and your TV will be able to message you when they get lonely and your EV auto pilot will start to handle their emotional needs. Let's assume the internet remains a work in progress transcending the virtual reality groundhog day we just dreamt. Virtual contact and virtual backgrounds will improve with the iPhone 15 but monotony, repetition and the threat of madness won't disappear – bring on the proper vaccine solution to COVID 19 asap.

Glance at the matrix below (preferably on your desktop) and you'll get the gist of this conundrum. It can be techy-as a-service clever but it could also be a diesel engine backing up a fuel cell. It can be a half a trillion dollar bet but it can also be an early stage \$150mm story. Old style utilities may surprise us because they start with scale – a few solar stories also look more interesting. New giga storage plants to combat windless, sunless conditions are being planned across the planet. Add a point to your green credentials if you already knew what **MPL** stood for.

approx values as at sept 1st

Category	Corporate	symbol	share price(US\$)	\$mm mkt cap	NOTES
electric vehicles	Tesla	TSLA	498	464,339	newly split wonderstock with the batteries as a service tag line. Another \$5bn share offering announced this week.
electric vehicles	BYD	BYD 1211	10.1	31,690	A Warren Buffet approved investment : like most of them, doubled from march lows
electric vehicles	Nio	NIO	20	23,490	A proper challenger, extensive commentary available. Another stock offering of 75mm ADS underway. Read about the Mobileye robotaxis.
electric vehicles	Li Auto	LI	20	19,500	IPO on July 30th : reached the Goldman price target overnight. 30,000 vehicles this year. Has a gasoline powered generator on board.
electric vehicles	Nissan	7201	418	17,000	Looks a tiny market cap but carries a \$65bn debt load - maybe that won't matter in a world of negative rates.
electric vehicles	Nikola	NKLA	40.5	14,900	Yet to deliver first product into market : the Badger pick up truck.
electric vehicles	Xpeng Motors	XPEV	20	14,420	ipo of NYSE ADRs on Aug 27th : raised \$1.5bn from 99.7mm ADS at \$15.00.
electric vehicles	Fisker Karma	SPAQ	13	3,600	SPAC process initiated : Spartan Energy Acquisition (\$10 PIPE backed by Apollo - NYSE APO) SPAQ 2.9bn deal agreed July 13th.
electric vehicles	Workhorse Group	WKHS	17	1760	Last mile commercial delivery vehicles : in 'partnership' with UPS, USPS, DHL, Fed Ex, Ryder and so on. EV pickup license to Lordstown
electric vehicles	Lordstown Motors	DPHC	17.83	1600	SPAC process initiated: Diamond Peak Holdings. Placeholder ticker symbol RIDE
electric vehicles	Kandi	KNDI	6.55	369	China based vehicle developer, cars, trikes, buggies : not much of a website - but closer look suggested. Models K23 and K27 ! Q4 deliveries in US ?
electric vehicles	Velodyne Lidar	GRAF	21.23	318	pro forma SPAC data : Ford (and Baidu) backed Velodyne/Graf Industrial \$1.6bn purchase deal ? Glazer Capital declared an interest
electric vehicles	Electrameccanica	SOLO	2.71	180	Vancouver spivs : Solo (single seat 3 wheeler), Tofino and the roadster : see pres document. Low grade, imperfect back story, mixed history ...
electric vehicles	Canoo	CNOO	~	~	SPAC process initiated : plans a listing through Hennessey Capital Acquisition HCAC
electric vehicles	eMining AG Battery	private	~	~	Swiss E-truck developer : retro fit of 45 tonne Komatsu trucks : partnership between Kuhn Schweiz AG and Lithium Storage GmbH
electric vehicles	Arrival	private	~	~	UK based unicorn with 800 staff started in 2015. \$100mm of backing from Hyundai and Kia. 2021 opening of Bicster manufacturing site, buses an trucks.
electric vehicles	Ellen E-Ferry	private	~	~	2019 EU funded ferry, 4.3MWh power - operates the 22 mile route between the islands of Ærø and Als in Southern Denmark.
electric vehicles	CT&T	private	~	~	Korean manufacturer, well known for golf buggies.
autonomous software	Yandex	YNDX	68.23	23,886	Russian internet services giant - first self driving cars revealed back in Feb 18. Yandex taxi jv with Uber may list next year.
autonomous software	Luminar	LADR	~	~	SPAC process initiated : backed by Peter Thiel and Volvo. Gores Metropoulos (GMHIU) is the blank check buyer. Austin Russell, founder.
autonomous software	Waymo	private	~	~	Google's offering has driven 20 million miles without a significant accident. Just raised another \$750mm privately, \$3bn to date..
autonomous software	Rivian	private	~	~	Founded 2009. Raised \$6bn over past 18 months, recent \$2.5bn from Soros, Coatue, Fidelity, Amazon Blackrock et al.
autonomous software	GM Cruise LLC	private	~	~	Founded 2013 by Kyle Vogt and Dan Kan. San Fran based, self drive focus. 1800 employees
autonomous software	Zoox	private	~	~	Foster City California, 900 employees. Acquired by Amazon for only \$1.2bn in June this year. Was valued at \$3.2bn back in mid 2018.
autonomous software	Argo AI	private	~	~	Founded 2016 : 1000 employees in Pittsburgh, two main shareholders : Ford and Volkswagen, \$3.6bn invested to date. Focusing at the 'shared fleets ' mkt.
autonomous software	Drive.ai	private	~	~	a cautionary tale to reminding us that talent and large cheque books aren't enough. Saved by Apple acquiring it at the eleventh hour last year.
Delivery/ride sharing	Uber	UBER	32	57,490	The original unicorn ... pandemic challenges - still burning \$700mm a quarter. Uber Eats is the second UBER says CEO Dara Khosrowshahi. Watch this space.
Delivery/ride sharing	Lyft	LYFT	29.7	9,270	Like UBER, still wrestling with the 'employees vs contractors' debate. Both may need a franchise model in certain states.
battery powered flight	Zero Avia	private	~	~	Val Miftakhov CEO/founder
battery powered flight	Pipistrel Velis Electro	private	~	~	Slovenian plane maker, intended for training. EASA certified
battery powered flight	Lilium	private	~	~	air taxi market : Toyota, Tencent, Baillie Gifford backed, \$375mm to date
battery powered flight	Joby	private	~	~	\$590mm round closed Jan 2020 led by Toyota
batteries/energy storage	Nextera Energy	NEE	280	102,000	Fully integrated utility - increasing focus on off grid solutions in Florida and California.
batteries/energy storage	Vistra Energy	VST	19	9400	Moss landing storage facility California/merged with Dynegy/24,500MWh generation from gas, coal, nuke.
batteries/energy storage	EcoPro BM Co	247540 Kosdaq	130	2,701	Korean battery technology - key supplier to Samsung (lithium-ion cathodes) High nickel content cathode materials.
batteries/energy storage	Blink Charging Co	BLNK	7.3	222	Founded 2009, 23000 charging stations, Apple recently agreed to geo-locate them on its mapping software (iOS 14)
batteries/energy storage	Gore Energy Storage plc	GSF	100	125	UK listed 100mm fund
batteries/energy storage	Leclanche	SWX:LECN	0.65	105	lost 83mm Swiss CHF last year : reorganised via a deal with privately held Eneris group
batteries/energy storage	A-Pro : Aproele	private	~	~	Rechargeable battery equipment. Korean IPO scheduled for Oct 2020
Lithium upstream	Ganfeng Lithium	HK:1772	39.15	7,500	Major lithium producer and processor, partnered with LAC Lithium Americas.
Lithium upstream	SQM Soquimich	NYSE : SQM	27.6	3,780	Still a major force in upstream lithium but supply/demand chatter remains mixed. Quality outfit - long term LCE demand works in their favour.
Lithium upstream	Livent	LTHM	8	1,240	The FMC spin off is yet to look like a growth stock. \$510mm sales this year, underwhelming margins but volume expectations likely to improve.
Lithium upstream	Lithium Americas	TSE :LAC	7	750	jv with Gangfeng on Cauchari-Olaroz in Argentina - construction underway. Process testing facility in Reno, lithium sulphate.
specialty materials	Umicore	UMI	42.75	10300	Belgian : fuel cell catalysts. Hoboken recycling plant. \$3.4bn vs. \$1.5bn debt
specialty materials	Johnson Matthey	JMAT	2750	5500	NMC : best performing cathode materials for lithium batteries (\$14bn 'revenue' line, but reports only \$4.2bn in 'sales')
specialty materials	Materion	MTRN	58.72	1109	beryllium alloys, engineered materials
fuel cells technology	Ballard Power	BLDP	17.37	4060	Heavy Duty fuel cells leader : 17 year high last week on hopes of shifting subsidy picture.
fuel cells technology	Plug Power	PLUG	12.98	4900	Hydrogen cell fuel systems. 12 year high in spite of Citron research. Acquired United Hydrogen & Giner ELX last quarter. WalMart and Amazon key customers.
fuel cells technology	Cummins Engine	CMI	208	30590	A senior engineering fellow with a consistently strong long term record. Quality operator. Cyclical, yes, but full of hidden fuel cell value.
MPL solar	Solar Edge	SEDG	221	11000	MPLPE (Module level power Electronics) dominance. Power optimizer, solar inverter, monitoring of pv arrays. Res and commercial arms.
MPL solar	Enphase	ENPH	77	9730	Rapid growth : microinverter business DC to AC : Cloud platform to monitor generation, dist, efficiency and storage. Residential customer focus
MPL solar	First Solar	FSLR	77	8120	PV solar modules: manufacturing leadership position, project development business struggling. Financially stable but little momentum.

CONCLUSION.

Yes, let's reach one (or two) once you've digested the above randomised selection of potential angles to chase

The next great Tesla style returns will evolve with a breakthrough in energy storage. Yes, that transformational thing, some variant of the solid state 811 battery would be our bet on the next great leap forward. That solution will be just as dramatic as the impact of the internet's revolution on our shopping, communication and entertainment. Utility scale off-grid storage remains some ways off and, like the internet, it won't be an overnight extinction event for the incumbents. If the current crop of mega-techs can maintain their privileged capital positions alongside happy citizens and limited social unrest, perhaps the great shrinking list of public companies we're witnessing, will extend the duration of these lopsided returns. 7322 listed US companies in 1996 became 3671 at the end of last year. Apple's market capitalization exceeded that of the entire FTSE 100 this week. Just another galactic statistic to contemplate – imagine when there's only 1500 listed US companies left in 2045 - Apple, Alphabet, Amazon, Facebook and Microsoft could be 50% of the S&P 500. Stock selection will be so much easier.

It will be gripping to see how the Scottish Mortgage top 10 evolves at Baillie Gifford. The mighty **NIO** is creeping towards those ranks and readers should take a look at their shiny alternatives to Tesla. The author is a fan and shareholder, full disclosure. Metal fashions make gold a more immediate story perhaps - its \$650bn cumulative corporate footprint dwarfs lithium and will make better headlines in a 70's style real rates collapse. We'll return to precious metals next time but, assuming that a greener world is a real priority, even lukewarm growth will require these 50+ names above to plan for element number 3. It's an abundant commodity but extraction and packaging into commercial volumes of LCE will occur in a market of multiple major buyers. That will be a boon for off-takers as well proprietors of long life hi-grade assets. Whether the investment focus should be brine or pegmatites, hydroxide or carbonate, upstream or downstream, it may not matter. In the meantime, the author is long **LAC**. Pricing still reflects some oversupply but key macro 10 year supply/demand numbers are improving. Both Bloomberg NEF and McKinsey's raw data give us some confidence – keep us posted on PFS stage ideas you might propose we alert to a wider audience. Construction risks at LAC, yes, but a very decent asset which the Ganfeng people will ensure reaches production. As always, do more homework around the specifics here.

Answers and questions always welcome. And again, shout if these notes are not for you or shouldn't have found their way to your inbox. Equally feel free to forward the piece to as many enemies as you feel deserve such unworthy trash.

Stay good humoured, stay safe and do keep us posted if there are untold stories of interest in your midst – we can never have too many properly investable ideas. The renewables supply chain lacks the glamour of global tech but if Zoom's valuation (NYSE : ZM) is the new normal at a mere 115x sales, the more ESG-savvy miners have everything to play for.

Best wishes all,

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