

Electric vehicles (EV) – more than just Tesla

When asked to name a brand of electric vehicle most people will shout Tesla, similarly to the way most people attach the name Garmin to any GPS device. But there are already hundreds of different electric vehicle models and types cruising the world's road infrastructure. These range from the car as we know it to trucks, buses, and 2/3-wheelers. The substantial growth expected in the electric vehicle market will have a huge impact on the battery market, amongst other products and by-products (think computer chips). The current use of lithium-ion batteries is minuscule relative to future demand.



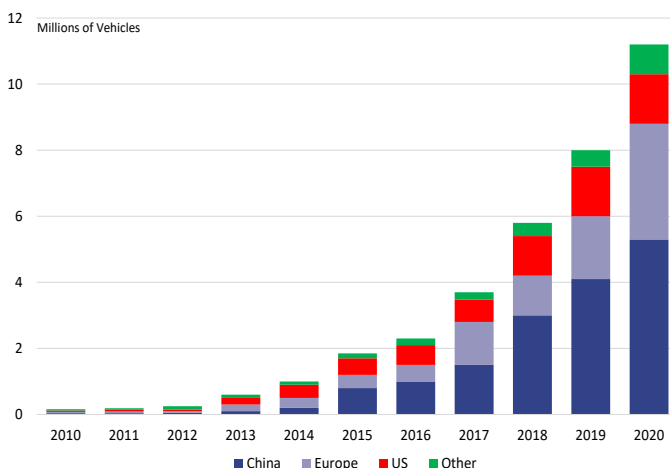
**Willie
Pelser**

The first name that springs to mind when people talk about electric vehicles (EV) is Elon Musk's Tesla. However, as this article will highlight, the EV market is more than just one electric car. Heavy-duty vehicles, 2- and 3-wheelers, trucks and buses have also grown in leaps and bounds. Most established manufacturers (of the traditional combustion engine such as Mercedes Benz, Audi, Nissan, if not

perhaps all of them) are already producing electric models. In addition, there are lots of new start-up manufacturers that only manufacture electric models. The purpose of this article is for informative purposes and not to predict who (which manufacturer) or what (energy source) will be the winner in the long run.

Who remembers the song about 9 million bicycles in

GLOBAL EV MARKET GROWTH



There are a lot of electric vehicles on Chinese roads, but Europe is catching up quickly.

SPEED READ

- Katie Melua sang about 9 million bicycles in Beijing. Globally, there were more than 11 million electric vehicles on roads in 2020!
- Of the world's top 20 vehicle manufacturers which represented about 90% of all new car registrations in 2020, 18 have stated plans to widen their portfolio of available models.
- Demand for electric vehicles is not only a consumer phenomenon. The private sector's requirement to comply with zero-emission standards have amplified announcements to accelerate the change to electric fleets.
- The production capacity of lithium-ion automotive batteries is currently around 300 GWh. Over the next 10 years, it is estimated that the requirement will rise to 3 TWh

Beijing? (Sung by Katie Melua). Well, there were more than 11 million electric cars on the world's roads at the end of 2020, with 3 million of these registered in 2020 alone. The graph shows the regional spread of these new engines. For the first time, Europe led the pack with 1.4 million new registrations last year, followed by China and the US at 1.2 million and 295,000 respectively. Cumulatively though, China remains the largest global EV market.

As shown in the chart, the EV market is thriving and it's not just a niche industry with Tesla at the top. There are multiple EV companies in China, the EU, the US and Japan that are now - or will soon be - producing quality EVs. While global EV registrations increased by more than 40% in 2020, EVs were still less than 5% of new cars sold, highlighting substantial room for further adoption. Electric bus and truck registrations also expanded in major markets,

reaching global stocks of 600,000 and 31,000 respectively. The global electric vehicle market was valued at \$162 billion in 2019 and is projected to reach \$803 billion by 2027, implying a compound annual growth rate (CAGR) of 22.6% over that period. Asia-Pacific was the highest revenue contributor, accounting for \$85 billion in 2019, and is estimated to reach \$358 billion by 2027, a CAGR of 20.1%. North America is estimated to reach \$194 billion by 2027, a significant CAGR of 27.5%.

Vehicle manufacturers continue to announce increasingly ambitious electrification plans, driven mainly by increasing stringent legislation. For example, the EU has announced ambitious goals that prohibit the sale of new combustion engines after 2035. That's just 14 years away! Of the world's top 20 vehicle manufacturers which represented around 90% of all new car registrations in 2020, 18 have stated plans to widen their portfolio of models and to rapidly scale up the production of light-duty (the passenger car) electric vehicles. The model availability of electric heavy-duty vehicles is also broadening, with four major truck manufacturers indicating an all-electric future. In addition, there is the self-drive element of electric vehicles. But that is another story on its own.

I am going to use Ford's latest announcement as an example of the growth in the EV market. Ford's recent announcement (September 28th) concerning electric vehicles (EVs) was surely expected (after GM's multi-million strategy investment two months ago), but its level of detail, namely the creation of four factories in the United States with two battery plants to be installed in Kentucky, all as part of an \$11.4 billion venture, is unprecedented for an internal combustion engine automaker.

This investment, which is the largest

ever in Ford's history of auto production complexes, as well as General Motors' multi-million strategic investment aimed at securing local and low-cost EV battery metal, means a lot for the EV market but even more so for the lithium ecosystem.

FUTURE USE OF ELECTRIC VEHICLES BY LARGE COMPANIES

Company	Operating area	Announced	Target / actions
Amazon	Global	2020	Orders 100 000 BEV light-commercial vehicles from start-up company Rivian. Amazon aims to be net-zero emissions by 2040.
Anheuser-Busch	United States	2019	Orders up to 800 hydrogen fuel cell Nikola heavy-duty trucks.
DHL Group	Global	2019	Delivery of mail and parcels by EVs in the medium term and net-zero emissions logistics by 2050.
FedEx	Global	2018	Transition to an all zero-emission vehicle fleet and carbon neutral operations by 2040.
H2 Mobility Association	Switzerland	2019	19 of Switzerland's largest retailers invest in Hyundai hydrogen trucking services that will deploy up to 1 600 heavy-duty zero-emission trucks.
Ingka Group (IKEA)	Global	2018	Zero-emission deliveries in leading cities by 2020 and in all cities by 2025.
Japan Post	Japan	2019	Electrify 1 200 mail and parcel delivery vans by 2021 and net-zero emissions logistics by 2050.
JD	China	2017	Replace entire vehicle fleet (> 10 000) with New Energy Vehicles by 2022.
SF Express	China	2018	Launch nearly 10 000 BEV logistics vehicles.
Suning	China	2018	Independent retailer's Qingcheng Plan will deploy 5 000 new energy logistics vehicles.
UPS	North America	2019	Order 10 000 BEV light-commercial vehicles with potential for a second order.
Various companies	Multinational	2018	Walmart, Pepsi, Anheuser-Busch, FedEx, Sysco and other large multinational corporations pre-order 2 000 Tesla Semi models within six months of truck's debut.
Walmart	United States	2020	Electrify the whole vehicle fleet by 2040.

Vehicle fleets by companies such as couriers could all be electric in future

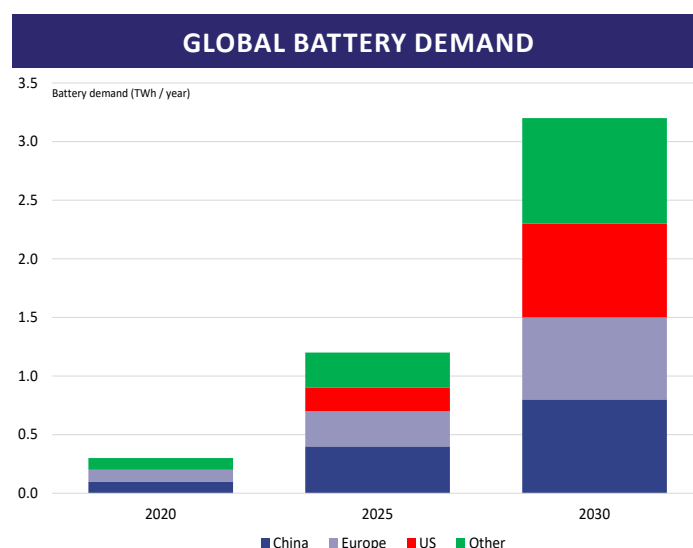
A research report by the International Energy Agency shows that under existing policies and plans by EV manufacturers there could potentially be 145 million electric vehicles across all models (except 2/3 wheelers) by 2030; accounting for 7% of the global fleet. However, as we are all aware, ESG is the new talk in town and climate change goals can have an even larger impact on the outcome of future EV developments. One of the Agency's scenarios, called the Sustainable Development Scenario, forecasts 230 million EVs, representing a 12% market share compared to the base scenario of 7%.

Demand for electric vehicles is not only a consumer phenomenon. The private sector's need to comply with zero-emission legislation and the desire to improve ESG ratings have amplified announcements by companies operating vehicle fleets. The table above highlights some of the bigger global companies targets and actions relating to electric vehicle usage. As a South African trying to move with the times, your first question (quite rightly) might be where you can charge your vehicle? We are not alone on this issue. The top five barriers to the adoption of electric vehicles from a global perspective are:

Reason	Barrier to Adoption
Lack of charging	67%
Lack of appropriate EV type	64%
Cost	58%
Operational issues (charging time)	54%
Uncertain policy landscape	28%

The implications of electric mobility will be widespread into various spheres, resources and economies. For example, the global production capacity of lithium-ion automotive batteries stands at roughly 300 GWh, yet production was only 160 GWh. However, according to the various studies and reports, demand will increase to more than 3 TWh over the coming decade with the biggest demand from China. Globally it is estimated that 85% of this demand will come from light-duty vehicles and the like. The chart below shows the projected demand by region.

Another impact of the "EV account" is on its share of electricity consumption. I was surprised to read that electricity demand from EVs accounts for only about 1% of current total electricity consumption worldwide. A statistic that caught my eye was that the global EV fleet consumed more than 80TWh of electricity in 2020 - which equates to today's total electricity demand in Belgium. Considering the growth numbers for electric vehicles over the next decade, it is somewhat surprising that EVs will only account



Demand for lithium-ion batteries is expected to rise to more than 3 TWh over the next 10 years, yet the corresponding electricity requirement is expected to only rise to just over 2% of global electricity final consumption.

for about 2% of total electricity consumption. Despite the small percentage of electricity consumption, the expanding EV fleet does have a positive spin-off. Believe it or not, the growing number of electric vehicles vs combustion engines enhances energy security by reducing oil use which today accounts for around 90% of total consumption in the transport sector. Predictions are that the EV fleet will by 2030 displace over 3 million barrels of oil per day of diesel and gasoline. To put the number in perspective, Germany consumed around 2 million barrels per day of oil products in 2018.

The question from investors is always how does one invest in both EVs and the downstream industries? The opportunities are almost endless. One option is via listed car manufacturers as even conventional carmakers are adding electric vehicles to their offering, or the likes of Tesla and other lesser known entities. However, technology has changed a lot. Scanning through a few international exchange-traded funds that focus on EV and lithium battery developments highlighted that even companies such as Microsoft and Alphabet (from Google stable) form part of their constituents. Others, and the list is by no means exhaustive, are companies like Honeywell, General Electric, Albemarle Corp, Billiton, Glencore and chip makers like Samsung and NVIDIA.

In summary, the electric vehicle and everything associated with it has already shown exponential growth in terms of cars being produced and sold. As was highlighted earlier, the development of battery technology is also not to be sneezed at. One wonders (and this was written during a period of load shedding) how long it will be before SA embraces this new technology, if at all? One certainly feels that we have a number of hurdles to overcome before we can embrace this exciting future.



Topic: **2022: a brighter year?**

Natal Midlands

Date:	2nd of December 2021
Venue:	Oasis Conference Centre, 72 Main Road, Howick
Morning Time:	10am for 10.30am
Evening Time:	5.30pm for 6pm

Johannesburg

Date:	13th January 2022
Venue:	Rosebank Union Church, Cnr William Nichol and St Andrews Road, Hurlingham
Time:	7am for 7.30am

Now that we have moved back to Level 1, we are delighted to once again be able to host clients at our Insight Seminars. We will hold our next seminar in December, which will focus on the outlook for 2022 and the key themes that we expect to unfold. For those based in the Midlands, please note the change of venue. The presentation will be followed by drinks and snacks. Seating is limited and subject to regulation, so please ensure that you book. RSVP: Clare Mitchell on clarem@hhgroup.co.za.



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