Future growth projections for electric vehicles vary dramatically, but all reflect real opportunities for fundamentals-focused investors surveying the links in supply and production chains.

"In the past year, the view that the internal combustion engine's days are numbered as it is superseded by the mass rollout of electric vehicles has become increasingly mainstream," Morgan Stanley analysts note in a recent report. "But when this transition will play out and how it will impact the car makers and their supply chain remains open to debate."

That's an important caveat for investors piling into companies and whole sectors expected to benefit from the shift, which at this point is being driven partly by regulatory fiat and government subsidies. China's pushing hybrid and battery electric vehicle (EV) penetration targets starting in 2018, while
France and the U.K. say they’re planning to ban diesel and gasoline engines by 2040 to slam the brakes on nitrogen dioxide pollution and hit reduced carbon dioxide emission targets. Conventional automakers are introducing more EV, plug-in hybrid electric vehicles (PHEV) and assorted variants into their model line-ups. Given their end-market size and participation in the supply chain, emerging markets could benefit significantly from the transition.

Pure EVs, which are currently projected to account for more than four-fifths of future "zero emission vehicles," aren’t forecast to be cost-competitive with internal combustion engines (ICE) for several years. On a component costs basis, Morgan Stanley figures that could happen by 2025, though on a total ownership cost basis that includes running costs, "the gap could close much sooner—our estimates suggest it is already surprisingly small today."

But in a three-part series of reports, BCA Research found the costs of owning an EV remain significantly higher than an ICE vehicle, even with subsidies. Breaking down the costs of Chevy’s Bolt and comparing it to its equivalent ICE Sonic model in the U.S., and doing the same with its ICE Astra model in Europe, where taxes drive up fuel costs sharply, the Bolt’s unsubsidized costs over 100,000 miles range from roughly $13,000 to over $18,000 more than its ICE models. Even with subsidies, the Bolt costs around $6,000 to nearly $14,000 more. Even if electricity for charging were free, ownership costs over 100,000 miles would still favor Chevy’s two ICE variants, BCA found.

BCA noted that GM is estimated to lose $9,000 with every bolt it sells. That jibes with a comment from Fiat-Chrysler CEO Sergio Marchionne three years ago, when he told an audience at the Brookings Institution in Washington D.C. that if any present were thinking of buying a 500e (EV), "I hope you don’t, because every time I sell one it costs me $14,000." That’s also why he had previously described making them on a large scale "industrial masochism." The mass-market challenge may be evident in Tesla’s negative bottom line, although it’s prioritizing growth today for returns tomorrow. Estimates peg its free cash flow turning positive in 2019.

Anticipated technology improvements and reductions in battery pack costs—the key expense drag for EVs versus ICE vehicles—could be what’s been catapulting Tesla’s share price this year. Tesla, it’s worth noting, doesn’t benefit from the economies of scale that integrated auto makers using sundry components across their model lines enjoy. Nonetheless, if it’s a technology company as much as an industrial automaker, the future arc of the battery pack cost curve will be crucial for it and other automakers really pursuing a profitable EV future. The market potential is huge.

Bloomberg New Energy Finance (BNEF) said it "expects electric cars to outsell gasoline and diesel models by 2040, reflecting a rapid decline in the cost of lithium-ion battery units that store power for the vehicles." It’s projecting 530 million EVs by then, constituting a third of global vehicles on the road. The Organization of Petroleum Exporting Countries forecasts less than half that number, while the oil majors are projecting even fewer.

Whatever the number, ultimately, return on invested capital matters for shareholder returns. So while investors may hear about a "25% of all cars EV" goal by 2025 and review the broad ranges of projections for EVs in the years ahead, they should think about which companies may benefit both in the near term and farther down the road. It’s important to look under hood of the projections and question the assumptions on which they’re based.
Can lithium-ion battery costs come down if supply and price dynamics of two primary elements—namely nickel and cobalt—are moving in the opposite direction? As for the needed, massive charging infrastructure build-out for EVs, will copper be there as its consumption in China, which absorbs half the world’s supply of the red metal, continues to grow 4% a year while ore grades decline and current industry capex is aimed more at maintenance than expansion? Apart from recycling copper, exploration and production capex could rebound, in which case investors will have to look at which miners have proven to be good stewards of capital, to the benefit of minority shareholders.

How about the battery makers? Will the Chinese, Japanese and Korean manufacturers competing against each other and Tesla see their material input costs rise as competitive pricing pressures intensify? Some analysts make comparisons between battery costs and the collapse in the pricing of solar panels over the last 20 years, even though silicon is far more abundant than cobalt and the quality nickel needed for improved energy density. Given technology developments, maybe it will turn out to be a plausible comparison.

Morgan Stanley notes that not far down the road silicon carbide (SiC)-based semiconductors should improve EV powertrain efficiency, extending range 20%, cutting re-charging times by the same amount and ultimately reducing EV component costs. "Efficiency savings should offset higher chip costs," it points out. Tesla already uses SiC chips, while Toyota is employing both conventional insulated gate bipolar transistor (IGBT) and SiC chips in its new Prius development line, Morgan Stanley adds.

Will the impact of battery degradation and the resulting accelerated depreciation costs turn off mass-market consumers? New battery packs may be needed after eight years or 100,000 miles or so, judging by the current warranties offered by Chevy and Tesla. But if they cost perhaps one to two-fifths of the original expense of the now depreciated vehicle, will replacement be worth it? Quite possibly: it will depend on future density and cost improvements in both battery and transistor powertrain architecture.

The investment opportunities in the auto sector are real. Thornburg’s investment team is exploring them across the supply and production chain, and carefully picking its spots. We believe there are excellent opportunities, particularly in those companies with a track record of good returns on invested capital. The odds of successfully capitalizing on them will be better with an in-depth understanding of the individual miners, the dynamics of EV battery architecture and the competitive pressures facing their manufacturers. Understanding EV penetration growth trends will also help, as well as appreciating consumer considerations, including travel range anxiety, EV depreciation costs, re-charge times and infrastructure availability.

The opportunities are there, although investors shouldn’t bank on a smooth ride. Stock charts don’t usually go straight up and to the right. But bottom-up investors should be better positioned to negotiate the curves ahead.

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