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EV does it

Electric vehicle (EV) adoption could profoundly change our lives and the way we invest. But the details of how, when, and where remain a work in progress.

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As investors, we're fine with being uncertain about the future because it's part of our job to focus intently on what we don't know. In this spirit, a recent internal meeting of Wellington investors, representing an eclectic range of asset classes and industry coverage (like metals and mining, automobiles, energy and power utilities), discussed and debated several scenarios. Comparing ideas and challenging assumptions is always worthwhile and, like electric vehicles (EVs) themselves, this is a work in progress. So with that said, here's what we're thinking:

Adoption curves are closer to a tipping point

EVs are not a fad which can be permanently derailed by insurmountable technology or supply issues. Major global automobile manufacturers are committed to a surge of new makes and models in the next three years. Volkswagen, for example, is targeting 20% – 25% of total sales to be from EVs by 2025.¹ Right now, debating whether this will be an S-curve or linear adoption rate is as important as acknowledging directionality and keeping open-minded about different scenarios.

The price is almost right

Regardless of government subsidies and incentives, the pricing sweet spot for mass-market adoption needs to be less than US\$30,000 per unit. In this range, the gap closes between cost-conscious and having a conscience. The quantitative arguments for a lower "total cost of ownership" (TCO) are then seen as a pleasant bonus, hopefully pacifying a driver's anxiety of being stranded in the middle of somewhere without a charging station.

Range anxiety is curable

Given the nature of most inner-city or point-to-point driving, concerns about charging stations and charging times are solvable over time. Whether power grids are up to the task is a gut check. A station with 20 fast-charging units (capable of powering up a vehicle in less than 10 minutes) could demand as much as six megawatts of power, which is as much as a typical small town requires during a similar period. In terms of finding places to juice up, EVs may be a classic *if we buy them, they will build them* scenario. Who "they" are is another question, although some combination of government and private-sector funding seems plausible.

Yes, there are other challenges

Current EV batteries require cobalt, of which the world seems short for now. Newer batteries may dramatically reduce or even eliminate this need, but getting better also requires batteries to last longer — and technology breakthroughs are not there yet. Although US\$30,000 per unit pricing works in developed markets, this is still a luxury item in massive markets like India and China. Government intervention (which is partly happening in China) seems necessary. Modelling out when a consumer doesn't feel threatened by the imminent arrival of something better and cheaper is a delicate balance: betting on the wrong EV is much more expensive than choosing Betamax over VHS. With 1 billion vehicles in the world rising to 1.7 billion by 2040,² we need to respect the sheer magnitude of this enormous and unprecedented shift. The critical takeaway is that consumers will only respond decisively to superior alternatives when the bottom-line facts are decisively clear.

EVs are worth it

EVs are not an upgrade to existing technology, like some new app. They are a game changer with the potential to completely disrupt a system based on fossil fuels that's been dominating personal transportation for over 100 years. With road gasoline and road diesel (used in trucks and buses) representing over 40% of total global oil demand,³ EVs could be the most disruptive innovation since, well, internal combustion engines. Towards the end of our meeting, the conversation turned to peak oil and how governments will need to replace fuel tax revenues (although it's worth noting that oil demand is not materially impacted even under the most optimistic scenarios until after 2025). And, while reducing carbon emissions is an urgent concern for civilisation, energy crises also remain in recent memory. These motivations put our original discussion about adoption rates and teething problems in the right perspective.

¹Volkswagen Group Investor Presentation as at 02 July 2018 | ²Ward's Auto, 2018 | ³US Energy Information Administration *International Energy Outlook 2016*



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