The Fast Approaching Threat to the Energy Sector

David Arpin
Portfolio Manager
Mackenzie Canadian Growth Team

Han Tacoma
Investment Director
Equities

Key Takeaways

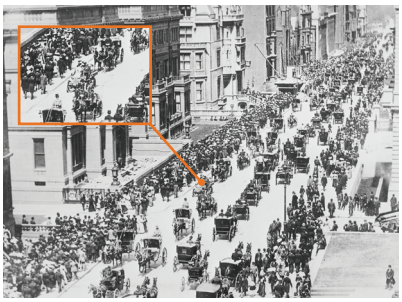
- Electric vehicle (EV) development is following an S-curve which continues to advance the expected change from internal combustion engine vehicles to EVs. While the precise timing of the transition is unclear, the Mackenzie Canadian Growth Team is concerned about its structural impact on the energy sector. As a result, we are limiting exposure to the energy sector.
- Battery costs and maximum driving range are the primary barriers stopping the full change-over from vehicles with internal combustion engines to electric automobiles. At the current rate of advance, the shift is happening more quickly than anticipated.

Our world is powered by fossil fuels. Everything from our homes to our cars and all other forms of transportation. Passenger or personal mobility-related fuel consumption accounted for 61% of total world transportation energy consumption in 2012, and 44% was used for personal light-duty vehicles.[1] We are physically and mentally anchored to the economic system built around the petroleum complex. However, innovation has revolutionized society in the past. Railroads, telephones, aircraft, computers and the internet were all transformational innovations. Now, electric vehicles (EVs) are threatening to change the energy paradigm in a very big way.

We have seen EVs on the road – Tesla cars come to mind – and it is clear that they are more than just a fad. However, the thought that EVs are going to become the predominant form of automobile transportation still feels like it is in our distant future.

But is the future closer than we think?

The photograph below on the left is of Fifth Avenue in New York in 1900, and the orange box highlights the lone car in a swarm of horse-drawn carriages. The picture on the right shows Fifth Avenue in 1913 only now there is one horse-drawn carriage (highlighted) surrounded by automobiles. This example illustrates how a complete transition in urban transportation occurred in less than 15 years.



Source: US National Archives

Source: George Grantham Bain Collection

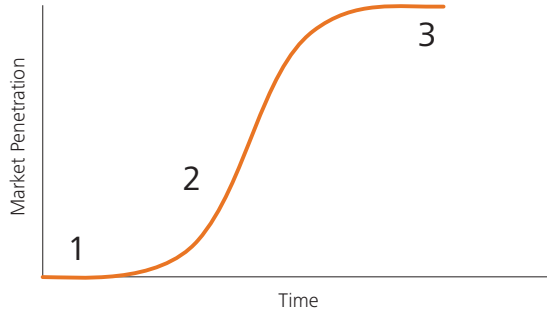
[1] https://www.eia.gov/outlooks/ieo/transportation.php

Mainstream analysts often get technology projections wrong because they make linear forecasts. This approach can underestimate the true adoption rate of innovative products. When you look back through time, you see that innovation actually follows what is known as an S-curve. The S-curve is a measure of the speed of adoption of innovation.

The S-curve works like this:

1. Technology evolves slowly in the beginning.
2. Eventually, there is a breakthrough, or a tipping point, that rapidly improves the technology evolution.
3. Market is saturated/fully penetrated.

The S-curve of Innovation Adoption



There are many recent examples of innovative new technologies that disrupted industries faster than executives could respond. Think of how Kodak and Blockbuster were disrupted by smart phones and Netflix. When a new technology becomes better and cheaper than the status quo, a rapid transition can occur.

An example is cited in this excerpt from a New York Times article in 2006: "The end of picture-tube TV's is accelerating faster than a lot of us expected," said Randy Waynick, a senior vice president for Sony Electronics.[2] In 2007, after many years of improvement, flat screen TVs finally reached price parity with CRT TVs (tube-based television). In March 2008, Sony stopped producing CRTs as they proclaimed a booming flat-screen TV market.

So when will EVs replace internal combustion engine (ICE) vehicles? Most importantly, as an investor, when does this shift begin to impact the energy industry, one of Canada's largest economic sectors? Questions such as these have been discussed in our presentations over the past year.

In our view, EVs are likely to have a materially negative impact on oil demand over time, which would be a significant headwind for oil prices. It seems highly unlikely that EVs will achieve a significant enough level of adoption to impact oil demand before 2020. Conversely, by 2030, EV adoption is expected to be fairly broad, as price and performance are expected to be superior to ICE vehicles.

From an investment perspective, this puts the EV change-over into the grey zone: it's too far out to have an immediate impact but it is close enough and significant enough to require vigilance and factor into our valuation models.

The price and maximum driving range of batteries are the primary considerations consumers will weigh when making the decision between electric and ICE vehicles. When an EV costs the same as an ICE vehicle and has a similar range, the change-over should occur rapidly. Since EVs are both cheaper to maintain – picture a battery attached to an electric motor, compared to hundreds of parts in a conventional automobile – and cheaper to fuel, EVs will become cheaper to own even before their sticker prices fall below those of ICE vehicles.

The combination of a steady fall in battery prices coupled with an improvement in battery performance is driving EV prices down. Battery packs still cost more than ICE engines, making them uncompetitive for mass market cars. This is why EVs started at the luxury end of the market, where the engine makes up a much smaller part of the cost of the car. This is beginning to change. Tesla released their model 3 on July 9, 2017 and it is said to have a 345-kilometre range for US$35,000. A procession of new models from all of the major manufacturers is scheduled to roll out by 2020, providing varying driving distances. As batteries continue to improve, EV and ICE costs are expected to be similar by 2021-2023, with EVs being noticeably cheaper three to five years later. The future is starting to happen now.

EVs are in the S-curve of adoption, driven by the evolution of battery technology. Scale and technology improvements, in conjunction, lead to better prices and increased driving range. This then attracts more buyers. This is a feedback loop that could quickly lead to manufacturers stopping the production of ICE vehicles. In other words, just as Sony stopped producing tube televisions in 2007 and switched

[2] "Picture Tubes are Fading into the Past", Erica A. Taub, The New York Times, August 7, 2006

all production to flat screen TVs, eventually auto manufacturers will stop producing ICE vehicles as they compete for booming demand for EVs. Incidentally, on July 6, 2017, Volvo announced that, starting in 2019, all of its new cars will have an electric motor. Volvo's transition marks a new line in the sand for the auto industry.

We believe the adoption of EVs will slip past the tipping point sometime between 2020 and 2030. We see this as a structural issue for the energy sector. From an investment perspective, a longer term, structural lower band for oil prices reduces the long-term terminal value of oil companies. In addition, it increases the importance of companies having low-cost production, the capability to reduce costs further through technological innovation, and a strong balance sheet. Companies that are expected to generate significant free cash flow in the near term (when the range of oil prices is likely higher) are lower risk than companies with further out cash flows.

We leverage applied economics to steer clear of areas that exhibit structural issues. Forecasting the timing of a structural change and the timing of market reaction is, in our view, impossible to do with any precision, so we don't do it. We simply look to avoid these areas to earn more by losing less.

As a consequence, given that the Mackenzie Canadian Growth Team has identified what we believe is a long-term structural issue for oil prices, we are not giving our portfolios meaningful exposures to the energy sector.

Learn more about Mackenzie Canadian Growth Team from your financial advisor.

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