

Oil Sands Transition – Disruption Risk

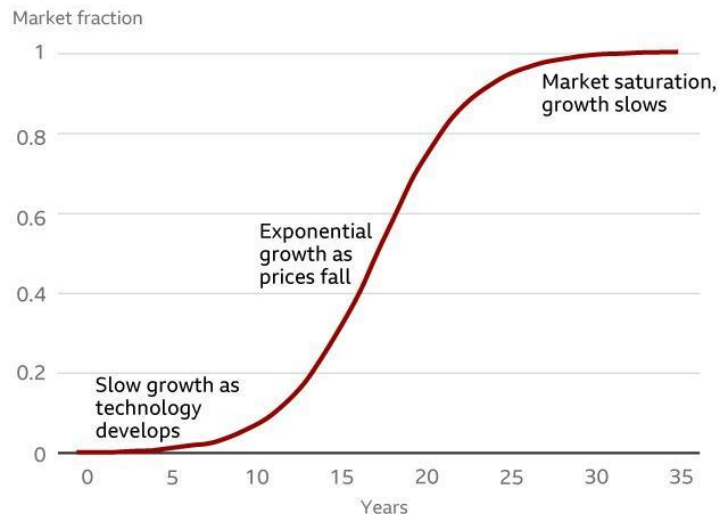
Electrification of the Transportation Sector

The global energy transition driven by rapidly progressing technological shifts to low or zero emitting energy technologies is progressing at a pace much faster than predicted. This past year's price shocks are [accelerating the clean energy transition](#) and is creating a disruption force that will [dramatically affect the O&G sector](#).

With most disruptions, technology adoption and market penetration do not follow a linear path. Historically technology uptake follows an S-curve progression (figure 1) with early adoption, rapid growth, maturity, and plateau (widespread adoption). To date, electric vehicle (EV) growth rates are consistent with S-curve shaped dynamics with the early adoption phase nearly complete and [movement towards the rapid growth phase starting to take place](#).

Figure 1: S Curve Dynamics

New products and the S-Curve



Source: Arkieva

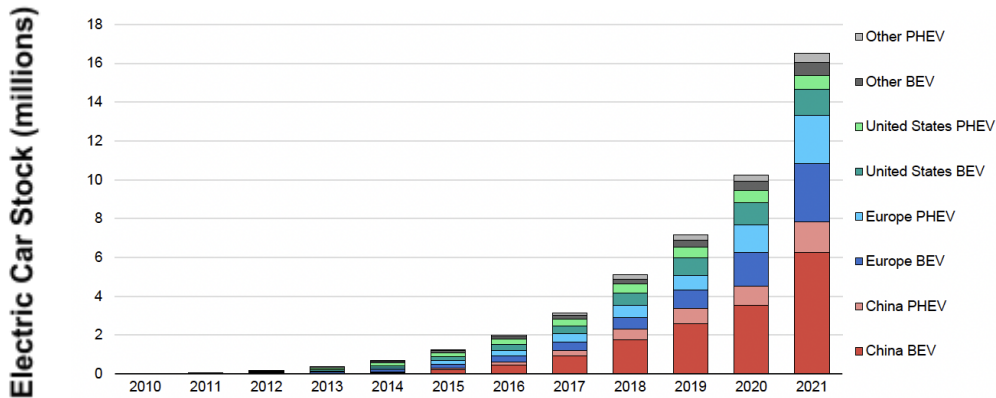


Credit: [Arkieva/BBC](#)

The pace of acceleration along the S curve will be influenced by a number of factors including carbon policy dynamics and the speed at which EVs are able to reach cost parity with internal combustion engine (ICE) vehicles. On the latter point, it is EVs as the new technology that will dictate the speed of change driven by its current competitive advantages of lower operating costs and step change energy efficiency, and ever decreasing purchase prices. We're already seeing a [steep decline in battery pricing](#) and as battery prices decline a drop in EV prices will follow, serving to narrow the cost parity gap. The vehicle market is being turned upside down with the combination of countries implementing EV supporting carbon policies (EV incentives, ICE bans, national EV targets, etc.) and new entrants in the

marketplace capturing an ever-increasing share of new vehicle sales. As shown in figure 2, below, the race is now on for original equipment manufacturers (OEMs) to increase their EV stock and gain and/or retain market share in a market dominated by EVs.

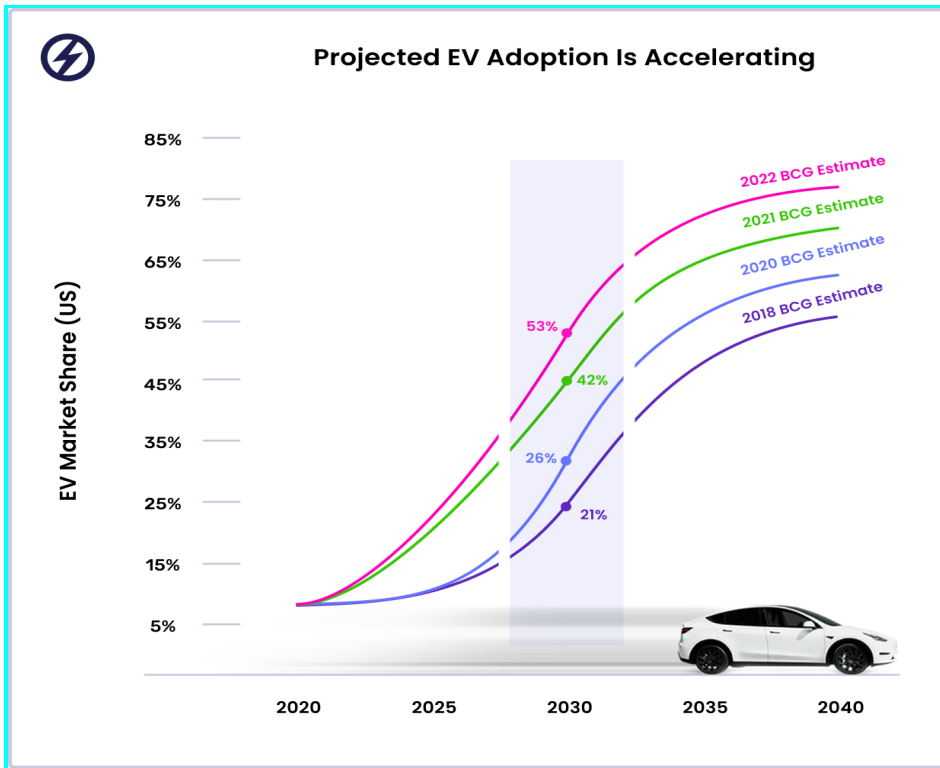
Figure 2: Global Electric Car Stock (2010-2021)



Source: International Energy Agency (2021), Global EV Outlook 2022

EV cost declines, increasing EV options and complementary policy implementation are moving at pace. Taken together, this will result in significant implications for ICE vehicles with EV sales continuing to outperform even the most optimistic expectations. In the US, for example, the Boston Consulting Group (BCG) now project EV sales to reach 53% of the market in 2030. As shown in Figure 3, below, these projections more than doubled over the past four years growing from an estimated 21% in 2018 to 53% in 2022 fomenting the view that the disruption is already occurring.

Figure 3: Projected EV Adoption

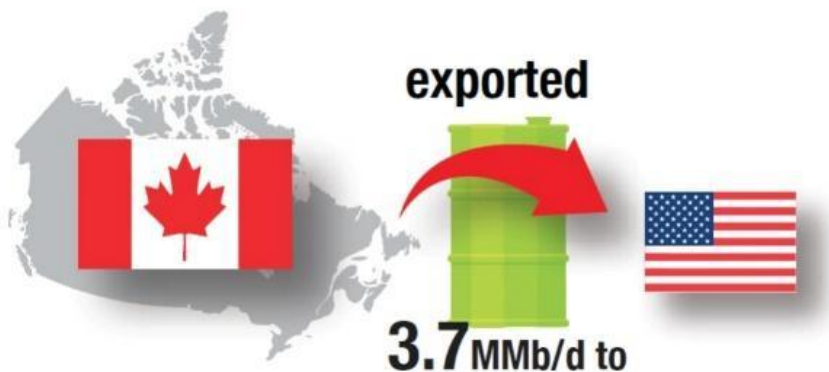


Source: Recurrent Auto

Impacts of Electrification to Canadian Oilsands

Approximately 3.7 MMb/d of crude oil is exported to the United States from Canada (figure 4). This represents roughly 80% of Canadian production being exported to the US (rather than being used domestically) making Canada uniquely exposed to any changes to American demand for retail gasoline. This risk exposure will increase as the electrification of the American transportation sector continues to erode demand.

Figure 4: Canadian Crude Oil Exports



Source: NRCan 2022-23 Factbook

From an end user standpoint, EV adoption will have a profound effect on actually achieving national net zero commitments as it will drive down transportation sector emissions (the O&G sector's scope 3 emissions). Scope 3 emissions reductions, due to a decrease in demand for transportation fuels, creates an existential risk and inherent conflict for producers with national net zero targets. To this end, an O&G company that simply limits net zero ambitions to scope 1 & 2 emissions is ignoring the impact decreased fuel consumption and, in turn, reductions in scope 3 emissions will have on its bottom line. This, in effect, sets-up an existential crisis for the oil and gas sector – demand erosion will support reductions in scope 3 emissions, putting ambitious national net zero targets within reach, but it will also mean a shrinking market for oil and, ultimately, a misalignment of interests. There are only two options for a path forward: Maintenance of the existing strategy which erodes financial performance and continues to create political risk or a re-evaluation of business strategy to address this existential risk.