THE FUTURE OF US OIL & RISE OF ELECTRIC VEHICLES

KEY POINTS

- US oil consumption may have peaked as demand for light-duty electric vehicles increases.
- Examining shifting consumer preferences around oil and renewable technological advances at a macro level helps our understanding of the future of oil and the rise of electric vehicles.
- Fisher Investments (FI) is cognizant and monitors this long-term key ESG related theme for potential opportunities and associated risks.

LONG-TERM TREND: DECLINING FUTURE US DEMAND OF OIL

The future of oil demand has always been a popular topic among ESG investors. However with falling oil demand during the COVID-19 pandemic and lockdowns, other investors have also begun to see this as a precursor to what oil producers will have to navigate as the world consumes less oil. This paper seeks to explore this key ESG related theme from a top down, global perspective.

In the US, the US Energy Information Administration (EIA) projects oil consumption will steadily decline in the next 5, 10, and 15 years. (Exhibit 1)

Exhibit 1: US Oil Consumption Estimates

Forecast Date	US Oil Consumption Change		
	+5yr	+10yr	+15yr
2016	3.1%	1.7%	0.3%
2017	1.5%	-1.8%	-4.1%
2018	-1.9%	-4.8%	-5.9%
2019	-3.2%	-5.8%	-7.3%
2020	-2.9%	-4.2%	-4.5%

Source: EIA, as of December 2019.

While we think EIA's projections may be too far into the future with too much speculation to be actionable for investors in the next 12-18 months, FI is cognizant and does monitor the longer-term trends. We understand that the world is slowly transitioning away from oil and our investment process accounts for the various risk factors that may impact businesses by a potentially declining demand for oil. (Exhibit 2)

Exhibit 2: Examples of Long-Term Risk Factors

Long-Term Transitional Risk (+18 months)
Shifting Consumer Preferences
Shifting Supply Resources
Renewable Technological Advances

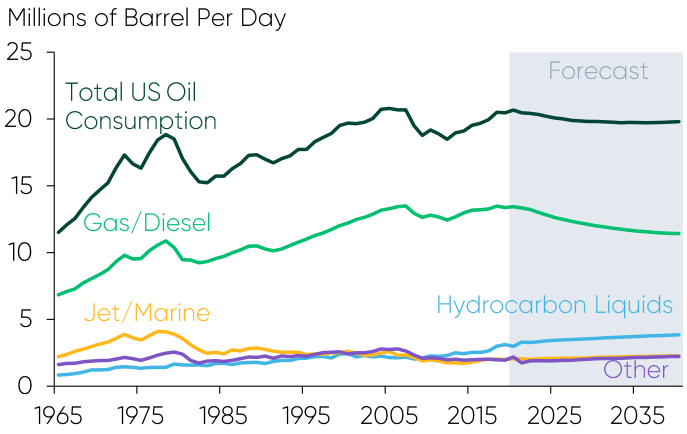
Source: Fisher Investments Research.

HOW HAS US OIL CONSUMPTION CHANGED SINCE 1965?

In order to manoeuvre through the ever-changing oil markets, our research objective is to identify the mechanisms which drive past oil consumption as well as the cause of the weakness in future projections. Quantifying the underlying source of decline helps our understanding of why shifting consumer oil preferences have changed, how oil supply might evolve in the future, and the role that public policy and renewable technological advances might play in further change.

A historical report published by the EIA suggests that US oil consumption may have peaked in 2005. As shown in Exhibit 3, consumption rose steadily from 1984 through the early 2000s but then slowly levelled off. Likewise, the future projections for oil have steadily fallen. The decline in oil consumption is estimated to roughly be 1 million barrels lower per day in 2040. When we examine further the components of oil consumption by end-uses, the weakness seems to be from gas/diesel consumption.

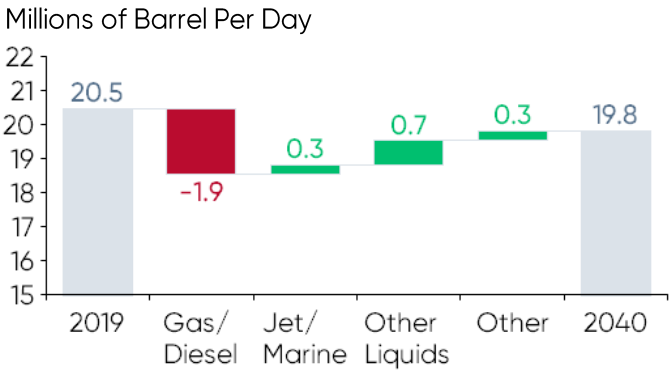
Exhibit 3: US Oil Consumption History & Estimates by End Uses



Source: EIA, as of December 2019.

Compared to other end uses of oil, gas/diesel contraction accounts for roughly 2 million barrel per day through 2040. (Exhibit 4) Some investors assume that perhaps past recessions have shifted the structural demand of oil far from its equilibrium but this could not have affected long-term demand in the next one/two decades and one would expect gas/diesel consumption to quickly rebound to historical norms as the economy recovers. Instead, the downward trend for oil consumption persisted.

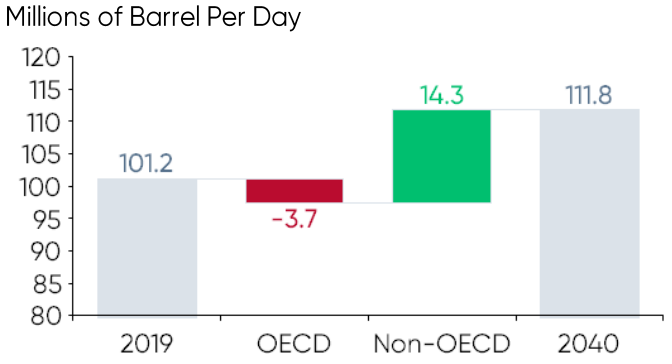
Exhibit 4: Gas/Diesel Consumption Declines Drives US 2040 Forecast Declines



Source: EIA, as of December 2019. Other liquids mostly Ethane and cooking/heating fuels Propane, Butane.

Outside the US, there is also a consistent forecast for demand weakness in other OECD countries. (Exhibit 5) However, it should be noted that non-OECD countries do not seem to follow this downward trend as EM demand and consumption is expected to grow (+14.3 millions of barrels per day).

Exhibit 5: EIA Forecast Oil Demand Weakness in the US and OECD Countries

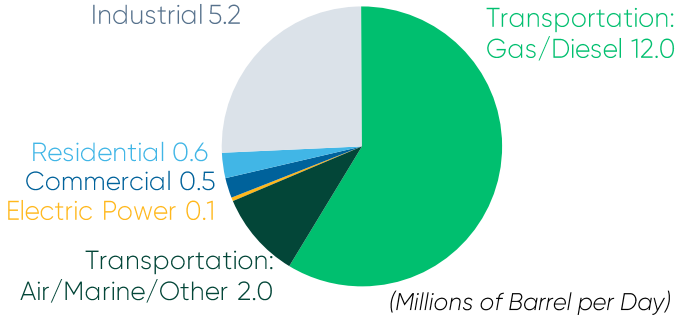


Source: EIA, as of December 2019.

LOWER US OIL CONSUMPTION DRIVEN BY TRANSPORTATION SECTOR

At the centre of this topic is the transportation sector – the leading sector with the majority of oil consumed in gas/diesel. (Exhibit 6) Globally, gasoline is used as a source of fuel to move people, especially by light-duty vehicles. Whereas, diesel is used to move goods by heavy-duty trucks.

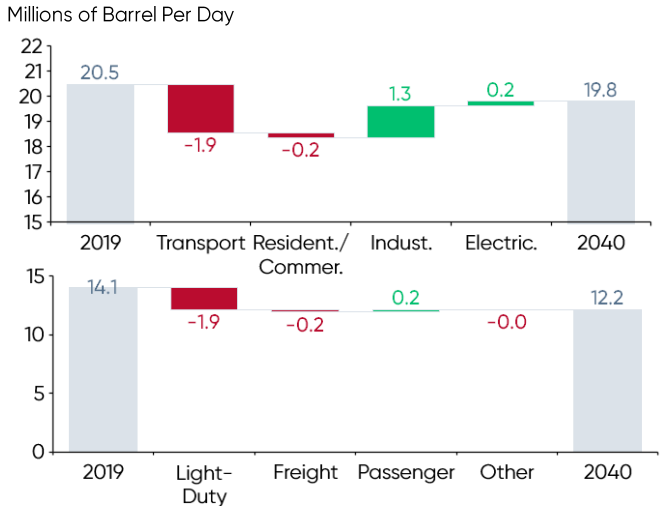
Exhibit 6: Oil Consumption by Sector



Source: EIA, as of December 2019.

Historically, as economic growth raises standards of living, the demand for global transportation also increases. More recently, however, the transportation sector has driven most of the declines with the majority of the weakness coming from light-duty vehicles. (Exhibit 7) Therefore, we believe in order to understand the trajectory of oil demand, investors must comprehend the long-term factors that influence the transportation industry.

Exhibit 7: Transportation & Light-Duty Vehicle Consumption Declines Drives 2040 US Forecast Declines



Source: EIA, as of December 2019.

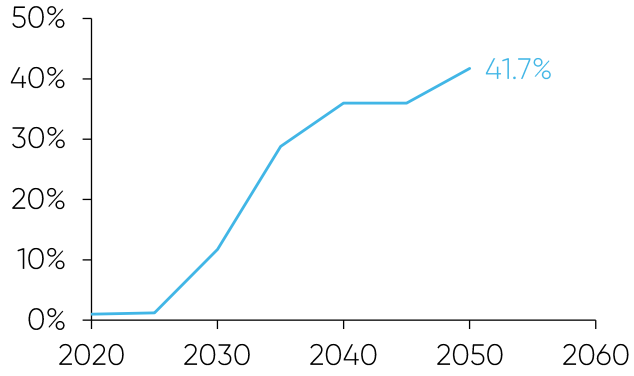
MONITORING GLOBAL VEHICLE STANDARDS ARE AMONG THE MOST IMPORTANT COMPONENTS OF UNDERSTANDING THE FUTURE DEMAND FOR OIL

RISE OF THE ELECTRIC VEHICLE (EV)

It is unsurprising to us that light-duty vehicles are driving most of the forecasted oil consumption declines for the transportation sector. Globally, businesses, policy makers and the media have continually focused their attention on the use of light-duty EVs as a replacement mode of transportation with the intent to reduce greenhouse gas emissions. It is much easier to electrify a light-duty car than a heavy-duty truck, where there is a cost-benefit trade off from installing large and expensive batteries. Electrifying heavy trucks may potentially reduce cargo carrying capacity due to weight limits on roads. It is also more challenging to electrify airplanes than cars.

From a top-down perspective, some countries have announced either mandatory or voluntary vehicle standards to phase out the sale of fully internal combustion engines (ICE) vehicles (gas/diesel fuelled cars) in order to accelerate the adoption of hybrids & EVs. By 2050, we estimate that these ICE bans will affect 41.7% of global vehicle sales. (Exhibit 8) Since macro policies have large effects on fuel consumption, monitoring global vehicle standards are among the most important components of understanding the future demand of oil.

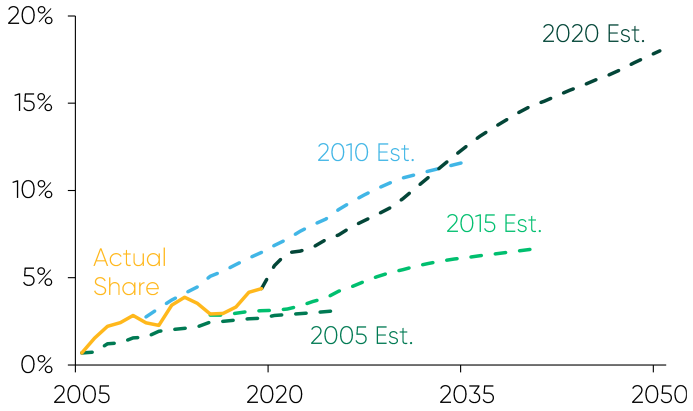
Exhibit 8: ICE Bans as % of Global New Vehicle Sales



Source: Fisher Investments Research based on country-level ICE bans announced.

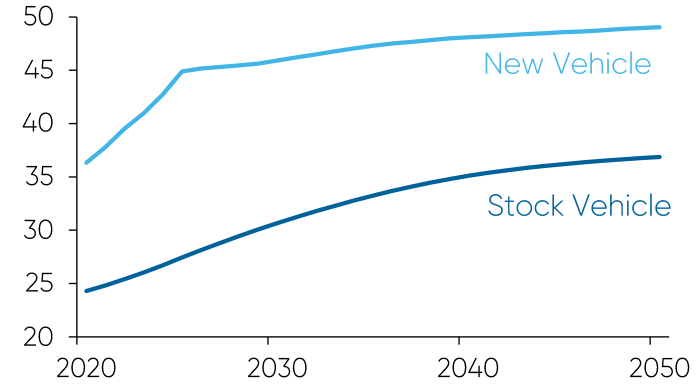
Notably in the US, demand for EV and Hybrid vehicles as a percent of total vehicles sales has outpaced some EIA's projections. (Exhibit 9) Additionally, rising fuel efficiency in new vehicles has also contributed to the decline of oil consumption within the transportation sector. (Exhibit 10)

Exhibit 9: EV & Hybrid Vehicles as % of US Total Vehicles Sales



Source: EIA & Department of Energy Transportation Energy Data Book, as of December 2019. Dotted lines represents projections made at different points in time.

Exhibit 10: Average Miles per Gallon of Vehicles



Source: EIA, as of December 2019. Stock Vehicle is a car that has been built without modification.

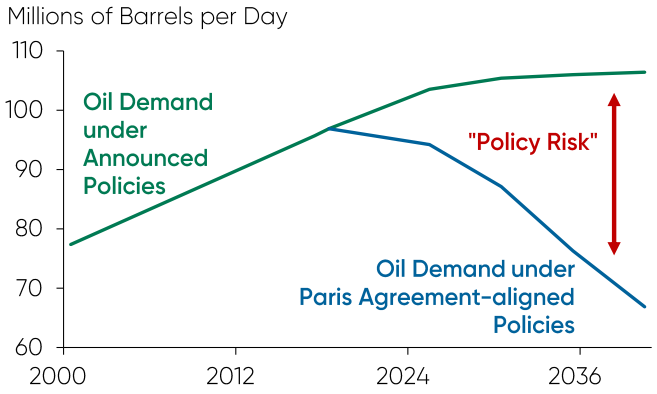
POTENTIAL OPPORTUNITIES & RISKS AS THE MARKET CHANGES FOR EV

With projections of a potential decline in oil demand coming from the transportation sector and a concurrent rise of EV adoption, there are opportunities we would consider within our portfolio. For example, companies with revenue exposure to the hybrid/EV industry can be found across many sectors including Consumer Discretionary, Industrials, Materials, Information Technology and Energy.

Additionally, some companies have dedicated R&D to green technologies. One aspect of a company profiles that may be attractive is identifying companies with a higher percentage of low-carbon patents in progress as they may be better positioned to reap benefits of this shift in oil demand.

While some of these opportunities may be worthwhile to explore, there are associated risks involved. For example, the International Energy Agency's (IEA) oil demand projections have some underlying issues that we are monitoring closely. Exhibit 11 shows their current oil demand forecast is based on "announced policies" which may be at risk from major policy transformation focused on climate change such as the "Paris Agreement-aligned" compliant policies. Similar to IEA's projections, other estimates may be also too far into the future with much speculation.

Exhibit 11: IEA Global Oil Demand 2019 Outlook



Source: IEA, as of December 2019.

CONCLUSION

As we look forward, the outlook for oil demand and EVs will likely continue to evolve on social, political and economic fronts. FI's dynamic and flexible investment process allows our research group to broadly study and monitor this key ESG related topic. We believe maintaining a top-down, global perspective of long-term trends will help identify future growth opportunities.

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