MARKET REVIEW & OUTLOOK

Harmony Capital Advisors

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EV Economics Irrefutable

Switching economics have been amplified by the oil price spike, and we don't see a clear resolution. The Iran conflict will lead to a higher risk premium, or a de facto toll, for passage through the Strait of Hormuz; either way, EV-switching economics will be further supported. The environmental aspect of EVs now comes for free.

In fact, we see the current energy crisis as the last gasp of the fuel economy. The next energy crisis will be more about electrons, driven by AI and data centers, with EVs linking oil and electricity markets, forcing a modernization that will prefer smaller power projects closer to demand and without fuel.

In a Resource Crisis...

We favor comparative self-sufficiency. Long supply chains have led to interconnected fates relative to inflation. This will lead to slower growth for all, except those with a comparative advantage. South America has the resources to power its future and comparatively better growth than many regions, providing a double cushion to global challenges.

Resources, growth, liquid markets. Only one region has all three.

Go for Renewables

The recent surge in oil prices has put the global economy on edge, with negative impacts reverberating through our daily lives. Even with a rapid conclusion to the current military conflict, prices will be higher than previously – either via an explicit toll through the Strait of Hormuz, or absent that, an elevated risk premium (discounting the probability that this happens again, as it is now a proven tool with large financial consequences).

Interestingly, this comes at a time after Electric Vehicles (EVs) have passed their tipping point. Growth in EV sales has been tremendous, with the fleet now accounting for over 5% of total miles driven globally, triple what it was just three years ago[1]. As a reminder, oil has averaged $80/bbl for the past five years. At the time of this writing, we are well over $110/bbl[2].

The argument for using electrons over molecules is now irrefutably economically sound. Even before we layer in all the relevant environmental costs and challenges, EVs are now simultaneously supporting sustainability and profitability. A convenience only tempered by the burgeoning surge in demand for electricity from Artificial Intelligence (AI) and other technologies.

The demand for electricity is clear; the supply is a little less so.

Fools for Fuel

Petroleum is an amazing molecule that has lifted civilization with warmth, transportation, and so many incredible materials, from plastics to nylon and rubber. The amount of energy derived from just a small amount of oil is incredible…however, for all practical purposes, it is a finite commodity and should be managed accordingly. Despite its diverse potential and depleted resources, we still blow up (ignite) over 2/3rds of production for fuel and heat[3].

With petroleum products used as transportation fuel, they drive prices higher across the entire economy through shipping costs. From food to clothing to machinery and beyond, prices are driven higher as those goods transit global trade for manufacturing and final consumption.

Prices have trended higher for decades, leading to inflation across the global economy as production has become increasingly complex and remote from major markets. The challenge is that oil-derived transportation fuel has become ubiquitous worldwide, exposing us all to higher prices. And the more widely a commodity is used, the more likely it will be used for political purposes. Fuel has become risky.

Volatility is Costly

While fuel prices have climbed steadily, geopolitical risks occasionally lead to significant volatility that can be costly to the economy. The current military action in the Middle East is reminding us of that with sharply higher oil prices working their way through global supply chains. We are hopeful that the conflict ends soon, but are worried that the complex situation will not be easily resolved (and has possibly planted seeds for yet another generation of discontent with Western culture).

We fully expect a tax or toll to be levied on oil trade through the Strait of Hormuz, as the only means of truly “securing” safe transit. If no tolling agreement is reached, we expect market participants to price a higher level of risk with little to no certainty of safe passage.

Fuel-Free Switching Economics

Previously, humans did not have many options for transportation other than fuel. The result was a separation from petroleum markets and from electricity, which we used for all our non-transportation needs. We had no choice but to pay elevated fuel prices anytime there was a military conflict or supply chain issue, as new EVs were too expensive or scarce.

EV growth is now significant, accelerating off a larger base, and creating a transportation-induced energy demand link between oil and electricity markets.

Breaking down the economics of switching from Internal Combustion Engines (ICEs) to EVs explains the motivation for this dynamic. We calculated the total cost per mile for both EVs and ICEs (Exhibit 1 below) by comparing their initial purchase price, cost of ownership (maintenance), vehicle life (mileage), power efficiency, and fuel costs.

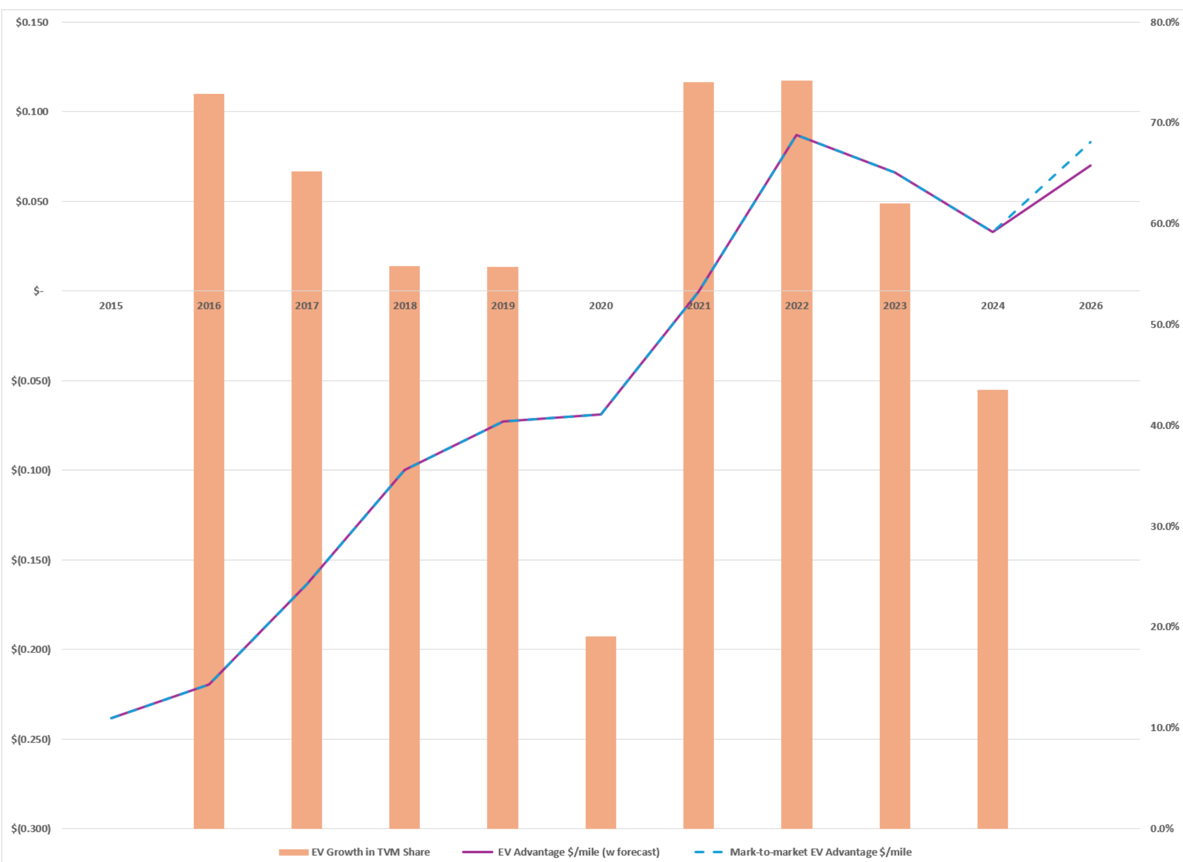
Exhibit 1 - EV vs ICE Cost per Mile (Harmony Capital EV Switching Model)

Year	Segment	ICE Fuel Type	ICE MPG	EV mi/kWh	Lifetime Miles (k)	ICE Price (k)	EV Price (k)	ICE Lifetime Maint (k)	EV Lifetime Maint (k)	ICE Fuel Price Used ($/gal)	EV Electricity Price Used ($/kWh)	Total $/mile (ICE)	Total $/mile (EV)	EV Advantage $/mile
2024	Passenger Cars	Gasoline	32.0	4.0	175	$ 30	$ 45	$ 11.0	$ 6.5	$ 3.50	$ 0.18	$ 0.34	$ 0.34	**$ 0.00**
2024	SUVs / Crossovers	Gasoline	27.0	3.0	175	$ 40	$ 55	$ 12.5	$ 8.0	$ 3.50	$ 0.18	$ 0.43	$ 0.42	**$ 0.01**
2024	Pickup Trucks (Light Duty)	Gasoline	20.0	2.2	215	$ 50	$ 70	$ 15.0	$ 9.5	$ 3.50	$ 0.18	$ 0.48	$ 0.45	**$ 0.03**
2024	Commercial Vans	Diesel	16.0	2.0	250	$ 50	$ 65	$ 20.0	$ 11.5	$ 3.90	$ 0.18	$ 0.52	$ 0.40	**$ 0.13**
2024	Medium-Duty Trucks	Diesel	8.0	1.2	325	$ 95	$ 185	$ 37.5	$ 22.5	$ 3.90	$ 0.18	$ 0.90	$ 0.79	**$ 0.11**
2024	Heavy-Duty Trucks (Class 8)	Diesel	6.0	0.7	800	$ 170	$ 375	$ 150.0	$ 90.0	$ 3.90	$ 0.18	$ 1.05	$ 0.84	**$ 0.21**
2024	Buses	Diesel	5.0	0.9	375	$ 300	$ 600	$ 100.0	$ 55.0	$ 3.90	$ 0.18	$ 1.85	$ 1.95	**$ (0.10)**
2024	**Weighted / Total**	**Mixed**	**25.2**	**3.0**	**244.7**	**$ 55.4**	**$ 95.8**	**$ 26.8**	**$ 16.1**	**$ 3.58**	**$ 0.18**	**$ 0.50**	**$ 0.47**	**$ 0.03**

Initially, EV demand was purely environmentally driven, as economics favored ICEs. In Exhibit 2 below, you can see a time series chart of EV Cost Advantage per mile plotted against Growth of EV Share in Total Vehicle Miles (TVM). The technology was still new and costly, and oil was cheap.

However, the economic gap has narrowed steadily, if not for a setback from the large drop in oil prices related to the COVID pandemic ($70/bbl down to $20/bbl) and the more recent Trump administration ($80/bbl down to $60/bbl) supporting fuel economics. Aside from these brief moments, we can see that EV switching has been quite robust, with gains in Share of Total Vehicle Miles (globally) ranging between 50-70% annually (albeit from a small base).

Exhibit 2 – EV vs ICE Cost per Mile Time-Series



Looking ahead, we forecast an EV advantage of $0.07/mile relative to ICE vehicles ($4.25 gasoline, $0.18/kWh) for 2026, which assumes a normalization of oil prices but still keeps us at the accelerated switching levels we saw earlier this decade[4]. If we simply market-to-market our forecast using today's energy prices (continuation of conflict), the EV advantage would by 18% higher, potentially creating the largest switching incentive we have ever seen[4].

The incentives are becoming permanent as EV economics are racing well ahead of fuel. Not to mention, the EV market is more mature, and we now have a bevy of choices, from practical to luxurious. Freeing yourself from fuel has never been simultaneously so economically, environmentally, and stylistically satisfying!

We suspect that we have entered a higher and more permanent phase of switching.

Is AI Solving, or Ruining Everthing?

The only weakness in the argument for EVs, and it's a big one, is the generation and storage of electricity. We have experience with this already, with cloud computing kicking off the datacenter revolution, later fueled by crypto-mining, and now being blown wide open by AI demand intensity. This is all on top of staggering EV growth that is now scaled enough to be a considerable factor.

The grid in the United States and many other countries was already due for modernization, compounded by inadequate generation capacity. The recent step change in demand has the entire power sector looking at all sorts of growth investments. The challenge is that traditional generation requires large projects with equally large bureaucracy. Not to mention the cost and risk of fuel.

This may ultimately change the way the entire power market operates, as smaller, fuel-free generation projects are much easier to bring online and can be located closer to demand sources. This favors more immediate solutions, such as renewable energy projects or even off-grid options like community power projects and batteries.

Consumers are sensitive to large price swings, hence the shift from fuel to EVs, and we will see the same dynamic play out in generation as power prices climb. **Independent solutions like solar panels and batteries will certainly be in favor, as will a variety of renewable energy projects that don't entail the costs and infrastructure dynamics associated with fuel.**

Head to South America

The challenges posed by the current Iran conflict, as we have discussed, are punishing economies around the world, since most of them import fuel. Whether developing or mature, energy inflation is hugely problematic as it stymies growth.

Looking globally, we favor economies that have comparably higher growth and a degree of resource efficiency to cushion this dynamic on both fronts. European economies are experiencing lower growth and major importers of fuel, while Asia is a little better on both metrics, particularly growth, but it still has fuel challenges.

North America has developed some fuel independence but has slower mature growth. Africa may actually be the most interesting from a growth and resource perspective, but the depth of financial markets isn't sufficient yet. In fact, there is only one region globally that has resource sufficiency, growth, and liquid quality investable markets: South America.

Growth

Primarily driven by Brazil and Argentina, population growth is well above the global average. These economies have been rapidly growing and maturing over the past few decades, but are still expected to experience significant population growth. We expect this to continue as there remains plenty of room to reach more mature global standards of living for these large economies, even if population growth slows.

Many industries are developing rapidly, benefiting from the examples set by global companies leading across sectors from technology to resources. This development will continue unhindered, compared to the rest of the world, as they avoid costly imports in favor of domestic resources.

Resource Sufficiency

South America has a few areas with a burgeoning energy industry; however, the bulk comes from Brazil's enormous reserves and the pending production of crude oil. While this part of the world has not grown as rapidly as regions in Asia, its comparative fuel advantage is starting to have an impact.

Higher oil prices are hurting the profitability of many companies worldwide, particularly in developed economies and most of Asia, which import fuel. South America's resource advantage, through Brazil's oil, will become a powerful economic driver of profitability and growth.

We absolutely favor renewables over fuel; however, developing, building, and deploying these resources requires a healthy economy, which is still heavily dependent on fuel. South America has the comparative advantage of using its resources to propel itself forward, but hopefully, it will learn to embrace renewables for all the reasons highlighted earlier.

Outlook

Crystal balls are always fuzzy during large-scale military conflicts. The market's resilience has been impressive but also worrisome. The full humanitarian and financial costs of this conflict are still not fully appreciated by the market, as elevated energy costs and potentially extended military activity in the region remain unknown and are growing. We see reasons to be optimistic but are concerned that market volatility will continue.

Even with a rapid end to the military conflict with Iran, the Strait of Hormuz will now exact an explicit toll for transit, or an elevated risk premium, given the uncertainty of safe passage. As we have discussed, this is problematic for all oil-importing countries, most of which are in the developed world.

On the positive side of the ledger, we see inadvertent benefits from tariffs and energy spikes that favor sustainable investments, and we also expect productivity gains from AI. At the moment, AI productivity looks a bit more like people losing jobs; however, this is a transitory dynamic that will settle. A workface enabled by AI is far superior to one it replaces (or AI alone); we just have to get through the messy transition.

The inadvertent impact of tariffs and energy spikes comes from a sharp, explicit financial incentive to reduce supply chains, improve efficiency, or eliminate fuels. Previously, the impetus was for environmental considerations, which remain, but will now be boosted by clear economic arguments. **We continue to heavily favor investments in Renewable Energy.**

Looking geographically, we favor the Americas- North for relative stability (the most mature market), and South for better growth and muted inflation (resource self-sufficiency).

Footnotes and Sources

References

1- EV Switching Model, Historical Time Series; Bloomberg Data Services, Harmony Capital Advisors
2- Price of Oil; Bloomberg Data Services, Harmony Capital Advisors
3- End-use Consumption Data; U.S. Energy Information Administration (March 2026)
4- EV Switching Model, Historical Time Series; Bloomberg Data Services, Harmony Capital Advisors

Exhibits

1- EV vs ICE Cost per Mile; Harmony Capital EV Switching Model, 2024 dataset with Harmony Capital forecasts
2- EV vs ICE Cost per Mile Time-Series; Harmony Capital EV Switching Model, 2024 dataset with Harmony Capital forecasts (gasoline $4.25-4.50/gallon; diesel $4.65-4.90/gasllon; electricity $0.19/kwh)

*Harmony Capital EV Switching Model (Sources and Disclosures)

I. Government and Intergovernmental Data Sources
U.S. Department of Energy. *Transportation Energy Data Book.* Oak Ridge National Laboratory.
https://tedb.ornl.gov/
Provides comprehensive data on vehicle lifetimes, fleet characteristics, and energy consumption across transportation modes.
U.S. Environmental Protection Agency. *Automotive Trends Report*.
https://www.epa.gov/automotive-trends
Primary source for fleet-average fuel economy (MPG) by vehicle class and historical efficiency trends.
U.S. Energy Information Administration. *Petroleum and Electricity Data*.
https://www.eia.gov/
Source for gasoline, diesel, and electricity price benchmarks used in cost modeling.
International Energy Agency. *Global EV Outlook; Data and Statistics*.
https://www.iea.org/data-and-statistics
Provides global electric vehicle adoption data, efficiency benchmarks, and transport energy demand trends.
Organisation for Economic Co-operation and Development. *International Transport Forum (ITF) Statistics*.
https://www.itf-oecd.org/
Used for global transport activity metrics including passenger-kilometers and freight tonne-kilometers.
United Nations Conference on Trade and Development. *Transport and Trade Statistics*.
https://unctad.org/
Supplementary data for freight movement and global logistics trends.

II. Research Institutions and Policy Analysis
National Renewable Energy Laboratory. *Total Cost of Ownership and Electrification Studies*.
https://www.nrel.gov/
Provides lifecycle cost modeling, EV efficiency data, and system-level electrification analysis.
International Council on Clean Transportation. *Road Transport Efficiency Studies*.
https://theicct.org/
Source for comparative efficiency analysis across light-, medium-, and heavy-duty vehicle segments.
American Transportation Research Institute. *An Analysis of the Operational Costs of Trucking*.
https://truckingresearch.org/
Key reference for cost-per-mile, maintenance, and fuel cost breakdowns in commercial trucking.

III. Industry and Market Research
BloombergNEF. *Electric Vehicle Outlook; Battery Price Survey*.
https://about.bnef.com/
Used for EV cost curves, battery economics, and long-term electrification trends.

International Energy Agency.
https://www.iea.org/data-and-statistics/data-tools/global-ev-data-explorer
Provides detailed time-series data on EV stock, sales, and energy consumption.

IV. Automotive Market and Consumer Data
Kelley Blue Book.
https://www.kbb.com/
Primary benchmark for vehicle pricing across segments.
Edmunds.
https://www.edmunds.com/
Used for real-world fuel economy and electric efficiency comparisons.
Consumer Reports.
https://www.consumerreports.org/
Provides maintenance cost estimates and reliability metrics across vehicle classes.

V. Methodological Notes and Derived Data
Certain variables used in this analysis are not directly observable in a single dataset and are therefore constructed using multiple sources:
Global Miles Driven by Segment
Estimated using a combination of passenger-kilometer and freight tonne-kilometer data (OECD/ITF), fleet composition data (IEA), and utilization assumptions. These figures represent modeled approximations.
Energy Normalization
Internal combustion engine (ICE) efficiency is converted to energy-equivalent terms using 33.7 kWh per gallon of gasoline, consistent with DOE and EPA standards.
Total Cost per Mile Framework
The analytical framework follows a levelized-cost approach:
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\text{Total Cost per Mile} = \frac{\text{Capital Cost} + \text{Maintenance Cost} + \text{Fuel/Energy Cost}}{\text{Lifetime Miles}}
$$
This structure is directly analogous to the Levelized Cost of Energy (LCOE) methodology used in power sector analysis.
Fuel and Electricity Pricing Assumptions
Baseline assumptions are anchored to U.S. averages reported by the EIA and are held constant in real terms for modeling purposes.

VI. Disclosure Statement
Where direct global, segment-specific mileage data was unavailable, estimates were derived from a synthesis of transport activity, fleet composition, and utilization datasets. These derived values are intended to provide directional accuracy for comparative analysis and should be interpreted as modeled estimates rather than directly observed measurements.

Disclosures

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