Should Electric Vehicles Be Outlawed?

By prevailing standards in many sectors of today's American society, electric vehicles (EVs) would be outlawed, given a different perspective. California, New York and Washington state are among three states which have outlawed the sale of anything but EVs starting in 2035. By their logic, putting aside their current paradigm, EVs would be outlawed immediately, pending reconsideration no sooner than 2033. We at Paradigm-Results does not subscribe to these positions. It does however like informed debate and detests when man is illegitimately imposed upon. Viewing things through a different paradigm has been central to our success. Based upon the preponderance of media bias on the subject of renewable energy, which can be accurately described as a paradigm fixed toward a predetermined outcome, the following is offered. And we hope by doing so, we can play some small part in what is being advised in Ephesians 4: "…Endeavoring to keep the unity of the Spirit…There is one body, and one Spirit, even as ye are called in one hope of your calling. One God and Father of all…" Facts cited for this piece are mostly from the podcast series called President's Daily Brief by Bryan Dean Wright.

The Consumer Economics of an EV

Because the most economically efficient means of production and distribution devised by mankind so far has been the free marketplace, where quality of life for the consumer, which includes economic health, drives the marketplace, we start with the economics from the consumer's viewpoint.

1. **Initial price:** KBB (Kelly Blue Book) says the average EV price is $66k, while its gas equivalent is $43k. Cheaper models largely due to less efficient batteries and reduced range. A Federal tax credit of up to $7,500 is available on EVs. (The IRS places some restrictions such as only on those EV sedans <$55k and SUVs <$80k. And their batteries must be >40% made in America which most are not.) So, the EV carries a roughly 65% cost premium, and in some cases has your neighbor who also pays taxes to subsidize another's vehicle choice.
2. **Maintenance Costs:** EV maintenance cost is less, about $300/year.
3. **Repair Costs:** The average repair is $4,041, 27% more than a traditional vehicle. This cost premium is largely due to premium cost of materials of the parts themselves. Labor costs also are 30% higher.
4. **Insurance Costs:** 15% more for an EV.
5. **Time to Charge and Associated Charging Enablement Costs:** Five variables which lead to the charge time being anywhere from five days to two hours.

- Power source or the charger which is inside the car. This will be either a Level 1, 2 or 3 type.
    i. Level 1 uses the standard 110 home outlet. A Tesla using this today would require four days.
    ii. A Level 2 requires 8-12 hours. This will require several thousand dollars invested with an electrician to do the upgrade needed at your home.
    iii. Level 3 requires 30-60 minutes. Fewer than 5,000 such charging stations in US today vs 115,000 gas stations today. Not viable for a home.
- Maximum charge rate: Controlled by your specific car by in large. For example, a Tesla can take advantage of a Level 3 station but other more affordable EVs may only support Level 1 or 2.
- Weather: Cold weather makes charging time longer. Heat causes longer charging times, as well as negatively impacting battery efficiency.
- Batteries should not go below a 20% charge or above an 80% charge.
- Many incidental but impactful variables to charge time: Length of power cord; air conditioning or heater usage levels while operating the vehicle as such usage can greatly impact battery life; average distance and speed of your driving.

The Environmental Economics

The “environmentalist”, not to be confused with the “preservationist”, argues EVs are needed for their attributes of being clean, green and renewable. So here’s a quick look at two fundamentals of EVs.

1. Electricity production
2. Electricity storage, the battery

Electricity Production

Only two are noted herein, windfarms and solar panels, fully recognizing other means in R&D.

Windfarms:

- The three parts of a windfarm tower: the tower, blades and necel. The towers and necel require traditional resources such as steel for the towers which are made by plants running on nuclear, coal or petrol factories. And petrol-based

lubricants for the necel. The blades themselves have a lifespan of about 10 years. The blades in use today have no known means of recycling. So today they are being buried. And burial is largely limited to a few locations in the country which maybe just coincidentally are home of those economically weaker than most.) Also noteworthy is for many of the planned offshore windfarms, the GE produced blades are so large they require specialized ships, of which none exist today as American flagged. So the costs and availability will be astronomical and not quick.

- We're as US citizens are not allowed, as of this writing, to know how many birds or sea life such as whales are being killed today due to windfarm exploration and production at land and sea.
- Global Stilling, an acknowledged phenomenon of reducing winds, is currently not being factored into economic analysis of most windfarm projects.
- Wind farms produce significant noise and are ugly by most standards but those people next to them today or imminently so have no choice. Unless you are fortunate enough to have powerful politicians as neighbors to help you with the NIMBY (Not In My Back Yard) initiative.

Solar Panels:

- Polysilicon is a central component, which is made via a dangerous process which requires tremendous energy. Which is why virtually all are made in China as they use their cheap energy (coal), made cheaper by virtually no environmental governors. China also uses slave labor for production of the panels, humans called Uighurs and other mostly Muslim ethnic groups. (US Federal laws intended to limit use of Uighurs labor have been largely sidestepped by virtue of US politics and by China's changes in shipping routes.)
- Industry experts have predicted it would take 10-20 years for the US to build the supply chain needed for producing its own solar panels.
- Upon the solar panel's usable lifecycle, 10-15 years due to many warranty statements, most end up in local landfills, leaching toxic chemicals to groundwaters. CA for example has no recycling laws regarding solar panels. Millions of panels across the US today are due to retire soon and there are virtually zero recycling standards in place to deal with them. (AZ has a recycling center but it's unknown if the stuff getting buried is done so in a lined facility.)

Electricity Storage i.e. Batteries

1. **Making of the battery**
    i. Mining
    ii. Refining
    iii. Assembly
2. **Battery lifespan and its recycling**

Mining: The US does not have the mineral capacity to meet today's need or those in the coming decades. There is significant geo-political dangers given the lack of mining assets.

- The average vehicle today requires 75lb of copper and manganese. The average EV requires 200-500lb of lithium, nickel, cobalt, manganese, and graphite. Today there are 1.4 billion cars in use today, globally. The level of mining required to achieve even a small portion of petrol vehicle replacement dwarfs known resources.
- Lithium, nickel and cobalt are the primary minerals needed.
    - Lithium: America has the 4th largest reserves in the world. Yet only one mine today in NV but every effort to open other mines are under attack due to their environmental impacts. S. America and Australia are miners with the balance likely in S. America, but the pathway is anything but clear due to huge water requirements of a mine, as well as its polluting byproducts.
    - Cobalt: China and Africa (the Congo) have a lock on this mineral, with Africa producing 70% of today's worldwide production. The artisanal mines elsewhere in the world are open pit mines with low outputs, physically dangerous to miners and high toxic byproduct output. There's a profound dependance on minors, some as young as six, being used as the laborers.
    - Nickel: Indonesia produces 25% of the world's nickel. And Indonesia is looking to create a nickel cartel, with US allies not part of the cartel. Similar to the NIMBE phenomenon of windfarms, the US Interior Secretary Deb Hanland walled off much of Minnesota's Superior National Forest from mining of nickel, cobalt and copper.
- All mining is done with heavy machinery that run on diesel.
- Transportation of minerals to refining plans done by rail which is powered by diesel.

- Toxic dust or runoff is typically associated with a mining process, typically at levels exceeding mining done in support of petrol-driven vehicles.

Refining:

- The US does not have, similar to the mining, the refining capacity to meet today's need or those in the coming decades.
- Refining requires huge amounts of energy, for example the need to heat material to 1800 degrees F, which is done via traditional and cheap supplies of energy, typically coal. Which is why China does 80% of the world's refining. In the US, theirs is virtually zero such refining. Exceptions would be in TX and the south where there's ample and cheap oil and nuclear power available. As of 2/2023, these facilities do not exist and assuming they would get approved, are years away from production.

Physical Assembly of the Battery Components:

Today, China does 80% of global lithium battery assembly. Panasonic and LG have announced their investigating such plants in the US due to recent Federal laws. Given that there's no vertical integration here, the economic and supply chain realities of cost efficient and available batteries by virtue of US-based assembly by some appear to not be economically viable.

Battery Lifespan & Recycling:

- Variables include where it operated, as hot or cold climates reduce lifespan. Level of humidity also negatively impacts lifespan.
- Recycling: Today, only 5% of worldwide lithium-Ion batteries are recycled. And of all such batteries, only half of the materials can be recycled. The energy requirements to recycle is similar to initial production, which requires very high amounts of energy to produce heat, today only feasible via petroleum or nuclear sources.
- Landfills growing and becoming quite dangerous: Recognizing that most lithium-ion batteries end up here, recognizing each vehicle has 500 pounds of battery, it quickly becomes apparent there's a huge problem brewing on this subject. This impacts ground water but also due to battery's tendency to explode and burn, the chemicals expelled are quite dangerous such as hydrochloric acid as well as substantial, which is why dealing with such threats is hugely expensive and risky as landfills across the country are starting to learn.

The Geo-Political Risks

It's no secret that untold mothers and fathers have had their government return sons and daughters to them in caskets or with maimed bodies due to the US protecting oil reserves in foreign lands. The geo-political risks going forward are arguably far graver than what they have been and are for a petrol-chemical centered energy economy. And a strong US economy is arguably the best way to fast-track technology development to make viable more robust alternate sources of energy for our future.