

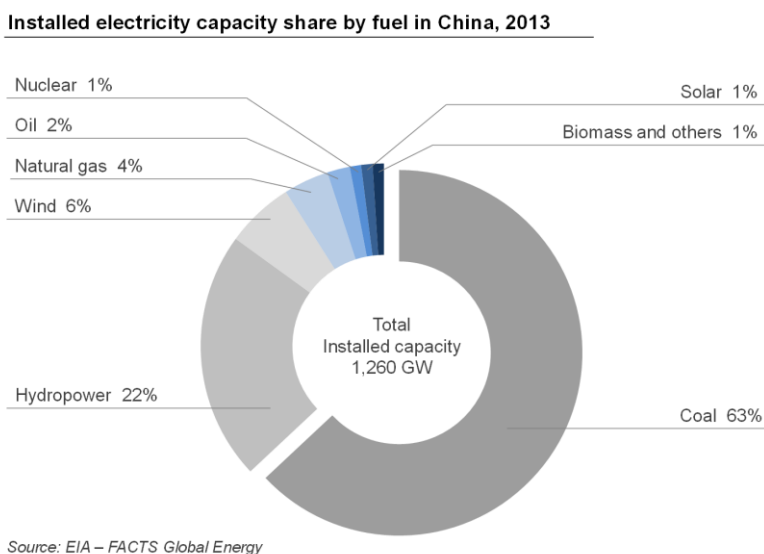
Electric vehicles: Could green become the new gold?

Global warming is not the new story; however, it has never been the hot enough topic to create dramatic shift or changes that enable new behavior or big impact on climate change mitigation. The story of global warming has progressed in the past few years from conjecture, to suspicion, to cold, hard fact. We now know for certain that in every inhabited continent on Earth, year by year and decade by decade, the world's temperature is rising.

One sector that has received so much attention on the climate change table is transport, since this sector contributes to approximately a quarter of global greenhouse emission and it is by far the second fastest growing producer after power generation sector¹. Three-quarters of all transport emission comes from road vehicles, most climate activists have then tried to promote car-free campaign but the success rate of permanent adopter is still low. This is not a surprise especially in most emerging countries where public transports are not yet well-connected and owning car could define lifestyle, trading off convenience with being green traveller might not worth. The coming of electric vehicles (EVs), especially in passenger segment, is then considered as a solution for transport emission crisis. However, there are still many doubts about EVs and their market.

Can EVs really bring the cleaner world?

EVs have been painted as green products by amplifying only its image when being on the road: no smoke, no pollution, low noise, and no need for dirty energy such oil. However, in case the view is shifted backward along the chain to where the seemingly clean electricity coming from, it could be another story. The source of electricity generation is various depending on in which part of the world you are. In most developing countries, where access to high technology is limited and cost of clean energy like wind or solar is too high, the dirty conventional source such as coal is inevitable choice. For example, despite facing serious environmental problems, coal is major source of electricity production in China due to its low cost and abundance. In 2013, more than half of China's coal by weight was used in electricity generation and roughly 30% was used in industrial applications².



¹ Walker, G., & King, D. (2008). *The hot topic: How to tackle global warming and still keep the lights on*. London: Bloombury publishing

² Scotiabank. (May 2015). Energy Briefing: China. *Global Economics*

Although some electricity is generated from coal, it does not mean that driving EV is not cleaner than gasoline car. This should be considered case by case; for instance, the average greenhouse gas emission per kilometer driven from gasoline car is roughly 9% higher than that emitted from electric car (coal power source) in the U.S.³, while driving fuel-efficiency car would be better choice to save the world in other developing countries where pollution restriction and control of power plant are still closed to non-existence. Therefore, talking about the capability of EVs in bringing the cleaner planet is not straightforward. It is dependent on many matters, including country policy, standard and regulation, source of power, type and efficiency of vehicle, and also consumer/user behavior.

Could EVs succeed in establishing market and become mainstream?

EVs are not new in technology. Tracking back to the automotive industry, the plug-in vehicles thrived around the beginning of the 20th century, but their footing has never been set as they were beaten by combustion engine vehicles. Previously, EVs market for passenger cars is hardly established due to limit of both demand and supply. Recently, some big players in automotive industry such as Nissan Leaf and GM Voltz along with new comers, e.g. Tesla, have jumped in the battlefield, resulting to more availability of plug-in EVs. However, the market does not boom as expected, evidenced from unmet sales target of some EVs producers.

The Electric Vehicle Initiative (EVI), a multi-government policy forum dedicated to accelerating the introduction and adoption of electric vehicles worldwide, set the goal of total EVs on the road at approximately 20 million units by 2020, is this number possible while the current EVs sales⁴ could not reach even 4% of the target? Also, the market is also concentrated mostly in developed countries such as the U.S. and Japan who account more than half the global EVs sales in 2014.

The answer will depend on many factors. Looking at the bright side, total cost of driving EVs (excluding the price of vehicles) could be less than gasoline cars, from the reduction cost of energy (electricity VS gasoline), less maintenance, less noise, zero tailpipe emissions, and lower carbon footprint in some locations. On the other hand, there are still some downsides, which mainly are related to price, infrastructure, and consumer behavior. The issue of price engages with both high purchasing cost of vehicles compared to other economy engine cars, and cost of frequently replacing battery. The latter one has been gradually improved as it can be seen that cost per range of battery has been dropping almost 160% over the past two decades⁵, thanks to the shift of battery component from lead-acid to nickel-metal hydride to lithium-ion, and this cost is even anticipated to be lower due to increase in economy of scale. Like fuel engine cars, EVs need energy filled up to continue the ride; however, the presence of charging station is still limited comparing to that of gasoline station. This is one of major obstacle that prohibits users from driving EVs. If the use of some EVs has to be constrained only in area where charging station is available, why driver should choose EVs in case they can pick only one choice of vehicle possession? Therefore, the pace of EVs adoption can be accelerated only in the countries where the infrastructure is ready. Moreover, with amount of time consumed for charging, it could cause inconvenience for users and unfit with some lifestyles. Given for example of condominium habitant in big cities of China who might have limited electricity charging points in the parking lot, which was not designed for plug-in vehicles in the first place. All in all, we have seen lot of development in the market; however, neither all type of passenger EVs and nor every part in the world will have this market established very soon.

³ World Economic Forum. (2013). *Energy Vision 2013 - Energy Transition: Past and Future*. Geneva

⁴ Global EVs sales as of January 2015 was approximately 740,000 units, source: www.cleantechnica.com

⁵ World Economic Forum. (2013). *Energy Vision 2013 - Energy Transition: Past and Future*. Geneva

What could be the plausible opportunities in EVs market?

This final question is focusing on what should the stakeholders do once this technology gets its footing. This should begin with targeting the right segment for each type of EVs. To structure the analysis, this topic is divided into market segment based on EV type as follows:

- a) Pure battery passenger EVs – EVs that solely run on energy supplied by battery, e.g. REVA, BMW Mini-E, and etc. This type of EVs would be easily promoted among city drive, downsized for local use. Target customer should be urban driver who is educated and have environmental-conscious mind along with fuel efficiency awareness. It would also be labeled as the second car of the family, which already has bigger car for intercity travel. The price range should not be much higher from economic combustion engine cars.
- b) Plug-in hybrid EVs (PHEVs) – EVs that also have an internal combustion engine, which energy source can be switched between battery and gasoline engine e.g. Toyota Prius, Chevy Volt, Ford Fusion, and etc. This EVs type has less limitation in distance and quite similar driving system with the conventional cars, thus it could target at all age groups living in both city and suburban areas. However, this segment has tendency to compete with other green technology vehicles such as hydrogen FCVs for larger light-duty cars and small to medium-duty trucks. The price range should be comparable to middle to high segment of conventional engine combustion cars
- c) High-performance EVs (HPEVs) – an upgraded type or sporty type PHEVs or battery electric vehicles with top speeds exceeding 100 mph and driving range exceeding 100 miles, e.g. Tesla and etc. The target customer is hi-end type who also has environmental concern, but also needs a peace of mind. Therefore, the marketing campaign should be heavily focused on safety and reliability of engine and power supply. This price range could be high, but still not that much as luxury cars.
- d) Micro-mobility EVs – small and compact type of EVs, which normally have less than four wheels, e.g. scooter, segway, and etc. The vehicle is mainly for individual use and not the sharing type. Target customer can be teenager or early-career employee who is still unable to afford car and need flexibility to mobilize in the city.

Besides, the coming of EVs market will not bring the opportunities only for the producers and marketers, but also for other service providers. For example, the EVs market will not be limited only for personal, but also for commercial use such as rental service. In order to complete the jigsaw in strengthen foothold of EVs market, other services and platform should be integrated. Starting from the conventional service such transport operators who should adapt themselves to the new business interface such as providing car-pool service alongside and installing GPS and digital tracker. In addition, to easing payment for EVs rent, the e-payment service and billing system would be also included in the picture. The services that should be linked and synced in digital system and devices are such as billing and payment, EVs identification and tracker, power monitoring and charging location finding, and parking information.

In conclusion, the future of EVs market, especially in developing countries, is still ambiguous if it is going to boom or bust. Despite GHG emission reduction potential in some places, the author are not sure if the majority of global population would care about the extinction of polar bear or the wellbeing of our next generation. In the end, people would be more concerned about their own benefits, style, and convenience. Therefore, it will require many factors that could accelerate and decelerate the coming of passenger EVs market. These are ranging from top-down policy in building infrastructure and providing incentive scheme for both producers and consumers (e.g. taxes), and bottom-up approach derived from preference of consumers who have different style and driving behavior which each EVs type should be designed to serve their obvious and unmet needs.

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