REFSA MEMO

Jumping the curve:

National electric buses and the future of Malaysia's public transport

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Abstract

Malaysia needs to jump the curve to a new idea of improving our stagnant public transport system by embarking on a bus-based system, riding on a two-pronged growth strategy. First, this can be achieved by providing a large number of buses and bus rapid transit system (BRT) to drive a swift improvement in 5 years. Second, this period of time will allow us to build a national electric bus and car industry, jumping the curve straight into the frontier production of electric vehicles.

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Foreword by REFSA Chairman

"Don't throw the baby out with the bathwater"

The proposal for a third national car has been heavily criticised. Some of the criticism is valid, but we have yet seen informed debate -not just about the cars- but also about the future of Malaysia's industrial sector, and by extension, the economy.

If one follows Prime Minister Tun Dr. Mahathir Mohamad's discourse, the need for Malaysia to produce goods instead of merely trade is an important point we can agree with. Also, the need to nurture Malaysia's engineering sophistication through industrialisation.

Some time back when neoliberal views held sway, the view that producing potato chips and computer chips mean the same thing to the economy was touted as benign. But potato chips and computer chips mean very different levels of industrialisation and economic outcomes.

A nation that is about to manufacture computer chips has the capability to produce even more sophisticated products with high value-added components. Whereas the nation that produces potato chips will continue to produce potato chips or low value-added products.

Unlike neoliberals, we believe that the State has an obligation to nurture industries through industrial policy. It is a point of debate whether industrial policy should be implemented through assisting a particular company in a particular sector, or through the government providing base load demand to support new industries. We should also consider how to instill discipline through some forms of market mechanism or proof of export etc.

Findings by scholars such as Dani Rodick and Ha-Joon Chang (whom I just met in Kuala Lumpur on 8th October 2018) provide a framework for further discussion.

In this context, Yap Lay Sheng's paper, published by Research For Social Advancement (REFSA), provides some new angles. Malaysia needs to improve our public transport services, especially since oil prices are high, while most ordinary citizens are struggling with the rising cost of living. But the provision of public transport would be too expensive for the government if done through what I call "big toy infrastructure" such as the MRT, which typically benefits companies like MMC-Gamuda in the form of big fat contracts. Buses are the easiest and cheapest option to start with.

On the other hand, Malaysia has a huge electrical and electronic industry which has a wealth of knowledge and know-how. We must find ways to tie the currently export-led E&E manufacturing sector, which is particularly concentrated in Penang and Kulim, to a deeper national industrial effort. Electric vehicles can be a worthy venture that solves two pertinent problems at the same time.

The following is a proposal for a "double jump" – improve our public transportation system through a new electric bus venture that would help Malaysia's automobile, E&E and technology sectors leap forward. The world's personal car market is very crowded and competitive, but the bus industry is not. Malaysia could capitalise on this niche and eventually become one of the world's important producers of electric buses.

In the spirit of New Malaysia, let's discuss and debate, and not throw the baby out with the bathwater. Enjoy reading.

Liew Chin Tong

1 Introduction

Automobile manufacturing is a comprehensive industry that brings together thousands of parts, components and processes in a long value chain. To develop the automotive industry is one of the ways to deepen industrialisation. Consistent product innovation and advancement in technology are needed to ensure the industry stays relevant.

With increasing global and regional competition, Malaysia can no longer rely on a conventional way of producing cars. The competition is a stern reminder that Malaysia needs to jump the curve and move straight into developing electric vehicles (EVs) if we are to make fresh breakthroughs in our national car industry.

Developing ahead of the curve would entail investing in a domestic electric bus industry. Besides meeting changing global transport demands, this will fulfil the urgent need for a high quality, dependable and efficient local public transport system. The time has come for electric buses to complement the existing conventional buses, alongside developing more trunk and feeder routes to enable further connectivity.

Developing an electric car and bus industry together could serve to achieve two aims– reducing the usage of private cars and building a high-tech automotive industry. Malaysia would be a new innovative manufacturer of EVs, as well as ASEAN's very own champion.

2 Too many cars, motorcycles on the road reduce economic productivity

Since the year 2000, private car ownership has doubled to a ratio of two cars to one resident (World Bank, 2015). Overall, 93% of households own at least one car, making Malaysia a country with the third highest level of car ownership globally (Nielsen, 2014).

High rates of motorisation have negatively impacted our economy, wellbeing, and ecosystem. The World Bank (2015) estimates that 1.1%-2.2% of Malaysian GDP is lost annually to congestion, well above the European average range of 0.5%-1.7%.

Recently, authorities have made commendable effort to reduce the number casualties from accidents, but the number of deaths from accidents has defied the downward trend (refer to table 1). Two-thirds of annual deaths fall on motorcyclists, one of the most vulnerable groups of road users (JKJR, 2018).

Overall, the cumulative healthcare bill, loss of lives and economic productivity will be stumbling blocks to transform our cities into competitive centres of growth.

Table 1: The number of injuries[1] caused by accidents

	2008	2009	2010	2011	2012	2013	2014	2015	2016
Minor	16,879	15,823	13,616	12,365	11,654	8,388	8,598	7,432	7,415
Major	8,868	8,849	7,781	6,328	5,868	4,597	4,432	4,120	4,506
Deaths	**6,527**	**6,745**	**6,872**	**6,877**	**6,917**	**6,915**	**6,674**	**6,706**	**7,152**
Total	32,274	31,417	28,269	25,570	24,439	19,900	19,704	18,258	19,073

Source: Road Transport Department, 2016

3 Ownership of cars is linked to higher cost of living, household indebtedness and bankruptcy

Kuala Lumpur citizens spend a high proportion of household income (7.5%) on transport expenditure, a figure that is 50% higher than Tokyo and Hong Kong (World Bank, 2015). Improving mobility by providing affordable public transport options is a low-hanging fruit for the government to alleviate the cost of living of the people.

A substantial percentage of loans by major Malaysian banks are made to finance the ownership of cars (refer to table 2). With one of the highest levels of household indebtedness in the world, decreasing our reliance on private vehicles will translate into a significant reduction in household indebtedness.

Table 2: Percentage of Vehicles Loans to bank gross loans, advances and financing in 2017

Bank	Percentage of Vehicle Loans
Maybank	12.99%
CIMB	6.66%
Public Bank	16.64%

Source: 2017 annual financial reports of major banks

[1] The Road Transport Department (RTD) disaggregates data on casualties according to an increasing order of severity: minor injuries, major injuries and death.

Moreover, another major cause of concern is the alarming trend of bankruptcy by young people in Malaysia. Those aged 25-44 form the largest group of those bankrupted, with the top reason of bankruptcy being car loans. This is the reason for 26.63% of all youth-bankruptcies (Tong, 2018). Reducing our reliance on cars can bolster the financial position of our young people.

4 Building a good urban transport system by investing in buses

For cities to function, transport is the key underpinning factor. One cost-effective way to encourage the uptake of public transport is by making vast improvements to our bus networks.

However, at present, buses comprise only 0.21% of all registered vehicles on the road, a number that is a far cry from the 45.84% of motorcycles and 47.26% of cars registered (JKJR, 2018). The World Bank (2015) estimates that there are two kilometres of bus lanes per million population in Greater Kuala Lumpur, lower than major cities such as Shanghai (7 km), Seoul (29 km) and Singapore (37 km).

Table 3: Malaysian bus infrastructure lags other cities

City	Population (in million)	No. of stage buses	No. of stage buses per thousand population
Greater Kuala Lumpur (GKL)*	7.20	2320	0.32
Greater Johor Bahru (GJB)**	1.36	842***	0.62***
Penang	1.53	579	0.38
Singapore	5.61	5665	1.01
Hong Kong	7.35	12967	1.76
London	8.14	10,121	1.24
Seoul	9.86	8955	0.91

Source: REFSA calculation based on Malaysian SPAD statistics (2018); UK Department for Transport (2017); Seoul Metropolitan Government (2017); Singapore Land Transport Authority (2017); Hong Kong Transport Department (2018)

** Bus companies active in GKL are Prasarana RapidKL, Perbandanan Putrajaya, Setara Jaya, Cityliner, and Selangor Omnibus.*
*** Greater Johor Bahru includes the Johor Bahru, Pontian and Kulai districts. Major buses active are the Causeway Link, JB Central Line, Maju Buses and Transit Link.*
**** The number of stage buses in Johor includes the highly popular transnational JB-Singapore route, which accounts for inflated figure. Number of buses operating within the city limits is believed to be substantially lower.*

At 0.32 stage buses per thousand population, the Greater Kuala Lumpur area lags other cities (table 3). This figure falls outside the range of of 0.5-1.2 number of buses per thousand population recommended by the World Bank (2006). GKL, GJB and Penang also trails other cities such as Singapore (1.01), Hong Kong (1.76), London (1.24) and Seoul (0.91). Our aspirations to be a developed society must be matched by policies to enable the mobility of our people.

Furthermore, sprawl and low urban density spread commuters out of walking range from the nearest rail station. Given the highly sprawled urbanisation of Klang Valley, buses are even more important, as feeder buses connect commuters to the main trunk lines. This resolves the first and last mile connectivity dilemma.
With good buses, we can phase out the “Park N’ Ride” facilities. According to transport experts, these facilities have the unintended effects of increasing overall car ownership rather than reduce it – commuters who had previously commuted entirely by transit now prefer to drive cars to the station (Dickins, 1991). Moreover, “park and walk” users displace actual transit commuters, as the former group use car parks to access surrounding facilities (Mingardo, 2013). This is especially true in urban areas, where ‘park n ride’ spaces are located close to urban amenities and work locations. Overall, reducing the need for ‘park n ride’ facilities free up land surrounding rail stations for more productive usage.

Finally, we need to complement conventional bus transport networks with a Bus Rapid Transit (BRT) system, which has dedicated bus lanes, upgraded ticketing booths and information boards. The BRT system replicates the service quality of rail transport, but with greater infrastructure flexibility, lower cost and design simplicity. A properly built BRT system can cost 20 times less than an LRT system (Wright and Hook, 2007).

5 Buses for small towns, secondary cities and intercity travels

Buses can also be developed as the primary mode of mobility for those living in secondary cities, smaller towns, and for inter-city transport. While the more developed areas of Greater Penang, urban Greater Johor Bahru, and Greater Kuala Lumpur have

more developed bus networks (table 3), there is a glaring underinvestment in much of the rest of Malaysia (table 4). In places where rail investment would prove too costly, bus networks are our next best alternative.

Table 4: Number of buses per thousand inhabitants for state capitals in peninsular Malaysia*

State Capital	Population (thousands)	No. of Stage Buses	Buses per thousand inhabitants	Main Operators
Alor Setar	416	225	0.54	MARA, Langkasuka, The Jalan Langgar Transport, Transwind
Kota Bharu	315	184	0.37	Syarikat Kenderaan Melayu Kelantan
Malacca City	503	121	0.24	Malacca Omnibus, Panaroma, Town Bus Service
Seremban	515	128	0.25	Cityliner
Kuantan	428	93	0.22	Bee Huat Omnibus, Rapid Kuantan
Penang	1,526	579	0.38	Cityliner, Rapid Penang
Kuala Terengganu	338	50	0.15	Syarikat Pengangkutan Bumi Pentai Timur
Ipoh	738	297	0.40	CKS Bumi, Hup Soon Omnibus, Ipoh Omnibus, Red & Yellow Omnibus, The General Omnibus, Kinta Omnibus

Source: REFSA calculation based on SPAD (2018) statistics
*Data is missing for Sabah and Sarawak.

6 Transitioning towards Electric Cars and Buses

According to a Bloomberg New Energy Finance 2018 report, it is estimated that by 2040, 54% of new cars sold will beEVs, accounting for 33% of the global car fleet. Moreover, in the market for buses, the report also predicts that 84% of all bus sales will be electric in nature by 2040.

Local automakers must articulate clear goals and strategic plans towards becoming major export players for electric cars and buses within the region. By developing the electric passenger car and bus industries in parallel, manufacturing players in the

automotive industry can reap supple chain synergies. A McKinsey report notes the potential to achieve technology and cost advantage through an integrated industry, arising from the usage of common battery and electric motor components in electric cars, buses and trucks (Heid, Hensley and Tschiesner 2017).

Local industries could also benefit from increased local demand for electric buses and cars. To achieve the dual purpose of meeting stringent environmental standards, and to help kickstart the local EV manufacturing industry, REFSA recommends producing and acquiring 4,000 electric buses locally every year for the next five years. This amounts to a total of 20,000 electric buses to meet our latent transport demand. The government can explore environmental guidelines that incentivises bus operators to gradually phase out conventional buses.

In the future, mass production and innovation will drive the cost of an electric bus further down to 500,000 ringgit for each unit. This adds up to a total figure of 10 billion ringgit to finance our EV industry, with two billion ringgit invested in each year for the next half decade. This substantial investment is important to kickstart the local EV industry.

Although this figure is much higher than diesel-run buses (approximately half the price of an electric bus), in the long-run, lower maintenance cost and fuel efficiency would add to an overall lower lifetime cost for electric buses (Bloomberg, 2018; Guerrero, 2017). Malaysia should look ahead and get ready for an era where electric buses will be ubiquitous.

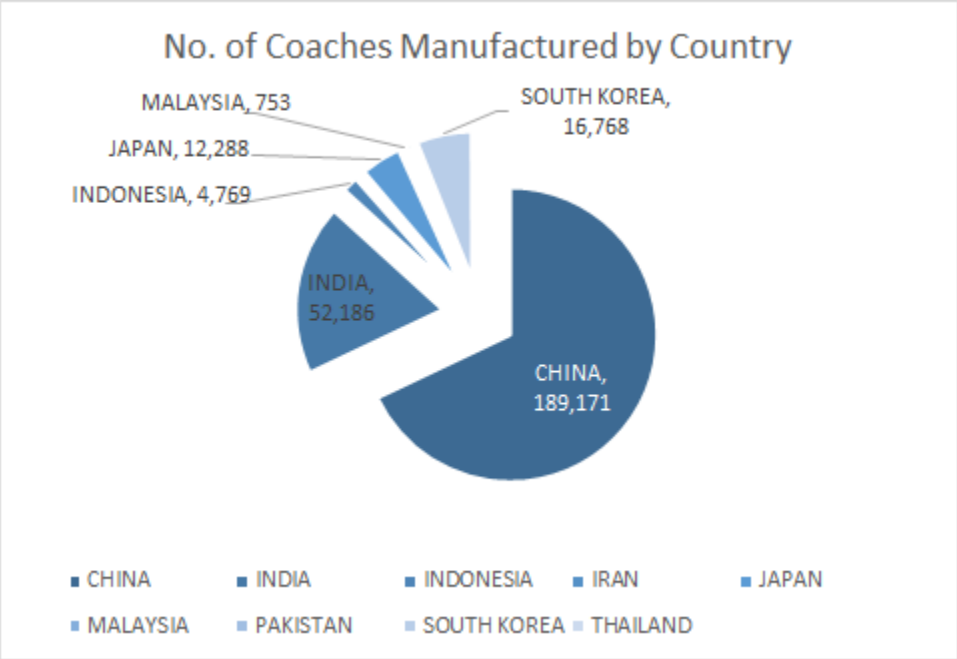
7 Becoming ASEAN's manufacturing hub for conventional and electric buses

The global bus manufacturing market remains dominated by German and Chinese manufacturers. Zhengzhou Yutong Bus (China) is the dominant market player, with Xiamen King Long (China) coming in second, while once market leader Daimler (Germany) now occupies the third spot. No important regional players have yet emerged in ASEAN (figure 1).

As ASEAN experiences high population growth rates and rapid urbanisation over the next decade, it is crucial that Malaysia acts fast. Through decades of experience in automotive manufacturing, and with sufficient skilled manpower and capital, Malaysia is uniquely positioned to become a hub for bus manufacturing. Our centrality in ASEAN markets can aid the exports of locally-made electric buses, enabling the local electric bus industry to achieve economies of scale and competitive pricing of its products. By

prioritising the export of Malaysian buses in ASEAN, we are also able to refocus our economy towards a model of manufacturing export-led industrialisation.

Figure 1: Number of coaches manufactured in Asia (by country)



Source: International Organization of Motor Vehicle Manufacturers, 2017
**Data is missing from Vietnam, Taiwan, Philippines, Bangladesh and Australia.*

8 Manufacturing breakthroughs must be complemented by software innovation

As our nation prioritises the sunrise EV industry, we must not lose sight of other disruptions happening on the horizon.

Traditional automakers are actively taking steps to guard against a future of reduced private car ownership. For example, Toyota has invested $1 billion in Southeast Asian ride-hailing technology company Grab, as well as pouring money into Uber to access its driverless technology. There is an industry-wide trend of traditional automotive industry players forming partnerships in a bid to acquire novel technologies—electrification, driverless cars, ride-sharing and Internet of Things (IOT)—in an increasingly tech-dominated automotive industry.

The development of a local EV industry allows to simultaneously nurture the technology sector. By focusing on the synergies between traditional automakers and other technology companies, the Harapan government can re-look the Multimedia Super Corridor (MSC) project advocated by Mahathir in the 1990s. Providing the physical infrastructure for automakers and tech companies to be co-located, so as to benefit from synergistic partnerships and agglomeration economies, may be breakthrough we need to be a truly innovative transport manufacturing hub.

9 Reiterating the purpose of public transport

Public transport is a form of public good. To cater for the transport needs of the entire nation, and not just Kuala Lumpur, more affordable transport options have to be adopted. Traffic congestion does not occur in Kuala Lumpur alone as it is building up in many secondary cities.

The focus on public transport is important as we grapple with increased transport needs of a growing population, energy efficiency, reducing road deaths and accidents and other economic and liveability choices. We need a new paradigm of public transport for all.

Overall, although cars (in particular, electric cars) will remain an important component of mobility in urban areas, the much desired paradigm shift towards prioritising the mobility of people instead of merely cars must occur at all levels of policy-making and urban planning.

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