Electrified Vehicle Overall Environment, Industry & Social Impact Study in Indonesia

Chaikal Nuryakin, Ph.D.

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Background

 The high growth rate of Automobile Industry Sector in Indonesia's GDP (5.6% annually) versus Energy Security (fuel availability) and Environmental Issues (pollution)

Kebijakan Energi Nasional PP No. 79 tahun 2014

The role of petroleum in the Primary Energy Mix less than 25% in 2025, less than 20% in 2050 Paris Agreement COP-21 2015

Indonesia participates in a world commitment to reduce greenhouse gas emissions by 29% in 2030

- Ministry of Energy and Mineral Resources, Ministry of Finance, and Ministry of Industry draft a Presidential Regulation to support the development of Electric Vehicles in Indonesia
- Mol also set up Target: 20% market share of Electrified Vehicle (HEV, PHEV, BEV) in 2025 under Low Carbon Emission Vehicle program

Electrified Vehicle (EV) Policy in Other Countries

Some developed/developing countries has <u>strong intention</u> to introduce <u>Electrified Vehicles</u> in their countries by <u>developing</u> Electrified Vehicle sales target in certain years.

Aspect/Country	China Starting Year: 2009	Japan Starting Year: 2010	Thailand Starting Year: 2016	United Kingdom Starting Year: 2009	Germany Starting Year: 2007
Target	5 million EV sales in 2020	15-20% market share in 2020 20-30% market share in 2030	Not yet set	100% EV sales in 2040	1 million EV sales in 2020
First Priority in EV Development	EV Purchase Incentives (Demand Side)	EV Purchase Incentives (Demand Side)	Investment/Production Incentives (Supply Side)	Infrastructure Development (Demand Side)	R&D (Supply Side)
Investment/Production Incentives	For every 10 ICE sales, car company must sell 1 EV	No specific policy, only encourages R&D	Exemption of component import duties, exemption of import duty for BEV for 2 years, exemption from corporate tax	Provision of competitive grants, company tax cuts from 17% to 9%	120% deductible of company tax, integration of production and R&D
EV Purchase Incentives			See next slide		
Other Incentives	EV can access restricted area	No Policy	No Policy	No Policy	EV can access restricted area, can use the bus lane

Compiled from various literature. (Main references: Cheng & Tong (2017), d'Arcier & Lecler (2014), Yongpisanphob (2017), Germany Trade & Invest (2015), Butcher, Hinson, & Hirst (2018))

Electrified Vehicle (EV) Incentives in Other Countries

Therefore, in order to achieve the Electrified Vehicle sales target, their Government provides some incentives such as tax exemption, subsidy, rebates, etc.

Country	EV Purchase Incentives	Value				
	Tax exemption	Exemption from Sales Tax (PPN) and Automobile Tax (PKB)				
China	Subsidy from Central Government and Local Government	From central government: 35.000 – 60.000 RMB (74 million – 127 million rupiah) From local government: 40.000 – 60.000 RMB (84,5 million – 127 million rupiah)				
	Subsidy/Rebates from Car Company	Max. 20.000 RMB (42,5 juta Rupiah)				
	Tax exemption/Reduction	Exemption from Sales Tax (PPN) and Automobile Tonnage Tax 50% automobile tax (PKB) reduction				
Japan	Subsidy from Central Government	Max. 50% from the price difference between ICE and EV (with same specification), Max. 1 million JPY (130 million rupiah)				
Thailand	Tax Reduction	Automobile tax (PKB) cut from 25% to 5% (PHEV) and 2% (BEV)				
United Kingdom	Tax exemption	5% subsidy, max. 4500 GBP (75,5 million rupiah) for BEV, max. 2500 GBP (42 million rupiah) for PHEV				
	Subsidy from Central Government	Exemption from Sales Tax (PPN)				
Germany Subsidy from Central Government		Max. 4.000 Euro (67 million rupiah) for EV with price below 60.000 Euro (1 billion rupiah)				

Compiled from various literature. (Main references: Cheng & Tong (2017), d'Arcier & Lecler (2014), Yongpisanphob (2017), Germany Trade & Invest (2015), Butcher, Hinson, & Hirst (2018))

Price Comparison & Market Share

According to the data, Electrified Vehicle market <u>show positive growth</u> as an impact of government fiscal support to <u>minimize price gap between Electrified Vehicle technology and ICE</u>

Country	Price ICE	Price EV*	Price EV	PHEV and BEV Market Share (after purchase incentives)***			
		(Defore incentives)	(Alter incentives)	2 years	5 years	2017	
China Purchase incentives: 2013	1x	BEV 1.1 – 3.4x PHEV 2.2x	BEV 0.8 –1.9x PHEV 1.4x	1% (sales 2015: 188.700 unit)	5 year in 2018	2.2% (sales 2017: 579.000 unit)	
Japan Purchase incentives: 2009	1x	BEV 1.5 – 2x PHEV 1.3x	BEV 1.2 – 1.7x PHEV 1.15x	0,4%	0,7%	1%	
Thailand	1x		no mass prod	uction/purchase of ele	ectric cars yet		
United Kingdom Purchase incentives: 2010	1x	BEV 1.8x PHEV 1.2x	BEV 1.5x PHEV 1.1x	0,1%	1%	2%	
Germany Purchase incentives: 2016	1x	BEV 1.7x PHEV 1.15x	BEV 1.5x PHEV 1x	2 year in 2018	5 year in 2021	2% (Sales 2017: 54.560 unit)	

*.** Based on 1st – 3rd top selling EV prices in each country, compared to ICE cars with the same specifications, sourced from the respective car company website *** Compiled from various literature. Main references: Cheng & Tong (2017), d'Arcier & Lecler (2014), Yongpisanphob (2017), Germany Trade & Invest (2015), Butcher, Hinson, & Hirst (2018), Electric Car Market Statistics (2018). https://www.nextgreencar.com/electric-cars/statistics/., Electric Car Sales Are Surging in China (Infographic by Forbes)



Conventional or Electrified - Vehicle (E-Car)?



According to the survey result, we found :

1. 61.90% (130/210) of Users want to **substitute** their car. Around **54.62%** (71/130) of them, choose E-car

2. 23.81% (50/210) of Users want to **add** their car. Around **62.00%** (31/50) of them, choose E-car

3. 8.10% (17/210) of Users want to **substitute** and also **add** their car. Around **82.35%** (14/17) of them, choose E-Car

Current result:

Half of respondents preferred Conventional Car rather than E-car

Assumption for Simulation

Demand Analysis	 Electrified Vehicle Demand Analysis → Infrastructure is negligible
EV Price	 HEV : 1,25 PHEV : 1,4 BEV : 1,5 Locally
Car Usage / year	Produced • 12,000 km
Gasoline Price	• IDR 9,000 / Liter
ICE Fuel Efficiency	• 10 Km / Liter
Electricity Price	No Subsidy for Household PLN
Likelihood to Buy	• A customer able to switch has a 30% likelihood to buy EV instead of ICE of the same price

Reference Average Price of ICE, HEV, PHEV and BEV

	ICE	HEV	PHEV	BEV
US	1	1.2 ~ 1.3	1.4	1.6
Japan	1	1.2	1.5	1.5
Germany	1	N/A	N/A	1.5
To be used	1	1.25	1.4	1.5

Percentage of Sales Target ICE:EV



Framework : Cost to be Incentivized to Achieve 20% Market of HEV (MPV1 Segmen)



Price to be Accepted by Customer and Cost to be incentivized to Achieve 20% Market of EV (HEV Technology)

Around IDR 221 Million is the maximum price (Price Gap 7% compare to ICE) to achieve 20% market of EV (MPV1 Segment)

Segment	Level	Тах	2017 Sales (Unit)	Average OTR Price 2017 (Mio IDR)	Elasticity	HEV Price in 2025 = 1.25 x ICE OTR Price	Potential Demand HEV (% of ICE)	HEV Price to Achieve 20% Market Demand	Necessary Incentive	Necessa ry Incentive (in percent)	
	Entry Low	30%	3,144.00	296.00	-3.31	380.33	3.99	316.39	63.94	16.813%	
	Medium	40%	5 809 00	64በ በበ	-3 31	821 84	3 99	683 67	138 17	16 813%	Average
	meanann	4071	0,007.00	040.00	0.01	021.04	0.77	003.07	130.17	10.01370	incentive
Sedan Type	Luxury	125%	100.00	1,019.00	-2.68	1,308.75	1.20	1,000.07	228.68	17.473%	needed is
	MPV1	10%	460,570.00	207.00	-3.48	265.55	3.01	221.10	44.45	16.740%	
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	MPV2	20%	134,399.00	358.00	-3.48	460.28	3.01	383.23	77.05	16.740%	achieve
	MPV2 MPV3	20% 40%	134,399.00 1,723.00	358.00 406.00	-3.48 -3.48	460.28 521.88	3.01 3.01	383.23 434.51	77.05 87.36	16.740% 16.740%	achieve
MPV	MPV2 MPV3 MPV4	20% 40% 125%	134,399.00 1,723.00 201.00	358.00 406.00 1132.00	-3.48 -3.48 -3.48	460.28 521.88 1 454 17	3.01 3.01 3.01	383.23 434.51 1 210 74	77.05 87.36 243.43	16.740% 16.740%	achieve price gap
MPV	MPV2 MPV3 MPV4	20% 40% 125%	134,399.00 1,723.00 201.00	358.00 406.00 1,132.00	-3.48 -3.48 -3.48	460.28 521.88 1,454.17	3.01 3.01 3.01	383.23 434.51 1,210.74	77.05 87.36 243.43	16.740% 16.740% 16.740%	achieve price gap 7%
MPV	MPV2 MPV3 MPV4 SUV1	20% 40% 125% 10%	134,399.00 1,723.00 201.00 245.00	358.00 406.00 1,132.00 193.00	-3.48 -3.48 -3.48 -3.36	460.28 521.88 1,454.17 247.56	3.01 3.01 3.01 3.69	383.23 434.51 1,210.74 206.00	77.05 87.36 243.43 41.56	16.740% 16.740% 16.740% 16.787%	achieve price gap 7%
MPV	MPV2 MPV3 MPV4 SUV1 SUV2	20% 40% 125% 10% 20%	134,399.00 1,723.00 201.00 245.00 2,260.00	358.00 406.00 1,132.00 193.00 417.00	-3.48 -3.48 -3.48 -3.36 -3.36	460.28 521.88 1,454.17 247.56 535.74	3.01 3.01 3.01 3.69 3.69	383.23 434.51 1,210.74 206.00 445.80	77.05 87.36 243.43 41.56 89.93	16.740% 16.740% 16.787% 16.787%	achieve price gap 7%
MPV	MPV2 MPV3 MPV4 SUV1 SUV2 SUV3	20% 40% 125% 10% 20% 125%	134,399.00 1,723.00 201.00 245.00 2,260.00 1,133.00	358.00 406.00 1,132.00 193.00 417.00 1,624.00	-3.48 -3.48 -3.48 -3.36 -3.36 -5.93	460.28 521.88 1,454.17 247.56 535.74 2,085.56	3.01 3.01 3.01 3.69 3.69 0.00	383.23 434.51 1,210.74 206.00 445.80 1,730.62	77.05 87.36 243.43 41.56 89.93 354.94	16.740% 16.740% 16.787% 16.787% 17.019%	achieve price gap 7%

Cost to be Incentivized

Electrified vehicle could be **achieved 20% Market Share** if certain amount of **incentive is provided**. Required incentive for <u>HEV and combination of Electrified Vehicle is lower</u> than for PHEV and BEV.



(Reference) Well to Wheel

A well-to-wheels (WTTW) means that a sum of <u>energy use and emissions with fuel production (or well-</u> to-tank [WTT]) and vehicle operation (or tank-to-wheels [TTW]) activities in a entire vehicle fuel-cycle.



Environmental Impact Scenario

Electrified Vehicle could minimize the emission amount of CO2.

BEV has the least amount of CO2 emission (Can reduce CO2 Emission around 33% from BAU)



Impact of Electrified Vehicle to National Economic

Electrified vehicle has opportunity to give **good contribution towards national economic** if all of the component can be localized, Therefore **Step-by-step shifting of Electrified Vehicles** is necessary to create economic scale of electrified component industry (To be localized)

	Additional Component of Automotive Sector	Loses Component of Automotive Sector	% Output Changes of Automotive Sector	% National Output	% National GDP	% Man Power
HEV Only	18,51%	0%	20,30%	0,33%	0,32%	0,21%
PHEV Only	33,33%	0%	36,54%	0,60%	0,57%	0,37%
BEV Only	43,80%	- 20,00%	26,10%	0,40%	0,36%	0,21%
Electrified Vehicle	30,97%	- 3,66%	27,31%	0,48%	0,46%	0,29%

Working Population : 108,207,767 (People)

Recommendation

- Introduction of Electrified Vehicle could bring positive effect to Indonesia by potentially giving additional component industry and contribute to lower CO2 emission.
 - Shifting to electrified vehicle potentially increase 20% 30% automotive component
 - CO2 Emission will decrease at least ± 18% from BAU
- According to the simulation, In order to introduce Electrified Vehicle need to manage price gap between ICE and Electrified vehicle
 - 7 10% is average price gap to achieve 20% electrified vehicle
- Need to study proper fiscal support (Incentive) to achieve Government target 20% of electrified vehicle in 2025 while managing government income (i.e. Tax reform, market incentive, more user benefit for electrified vehicle, etc)
- To implement the acceleration of sales of electric cars the government can do this with a 'mixed' scheme, with a mix of HEV, PHEV and BEV entering the market;
- Need for good incentive policies such as tax exemptions and non-fiscal instruments such as free of even odd numbers, special parking, etc. to encourage people to use electric cars;
- The government must give an example to use electric cars, such as replacing cars from government employees with electric cars.

Thank you