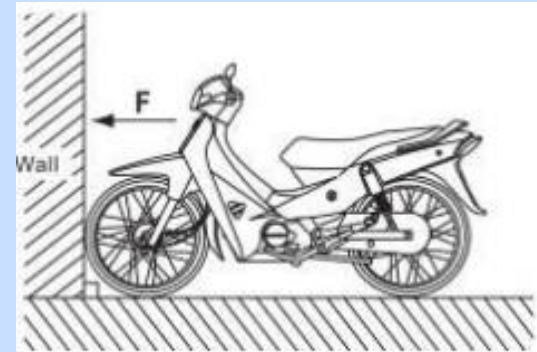


THE STATE OF E2/3Ws IN MALAYSIAN

United Nations Environment Program



**NUMBERS AND TYPES
REGULATIONS
FUEL + POWER COST
COST OF OWNERSHIP**



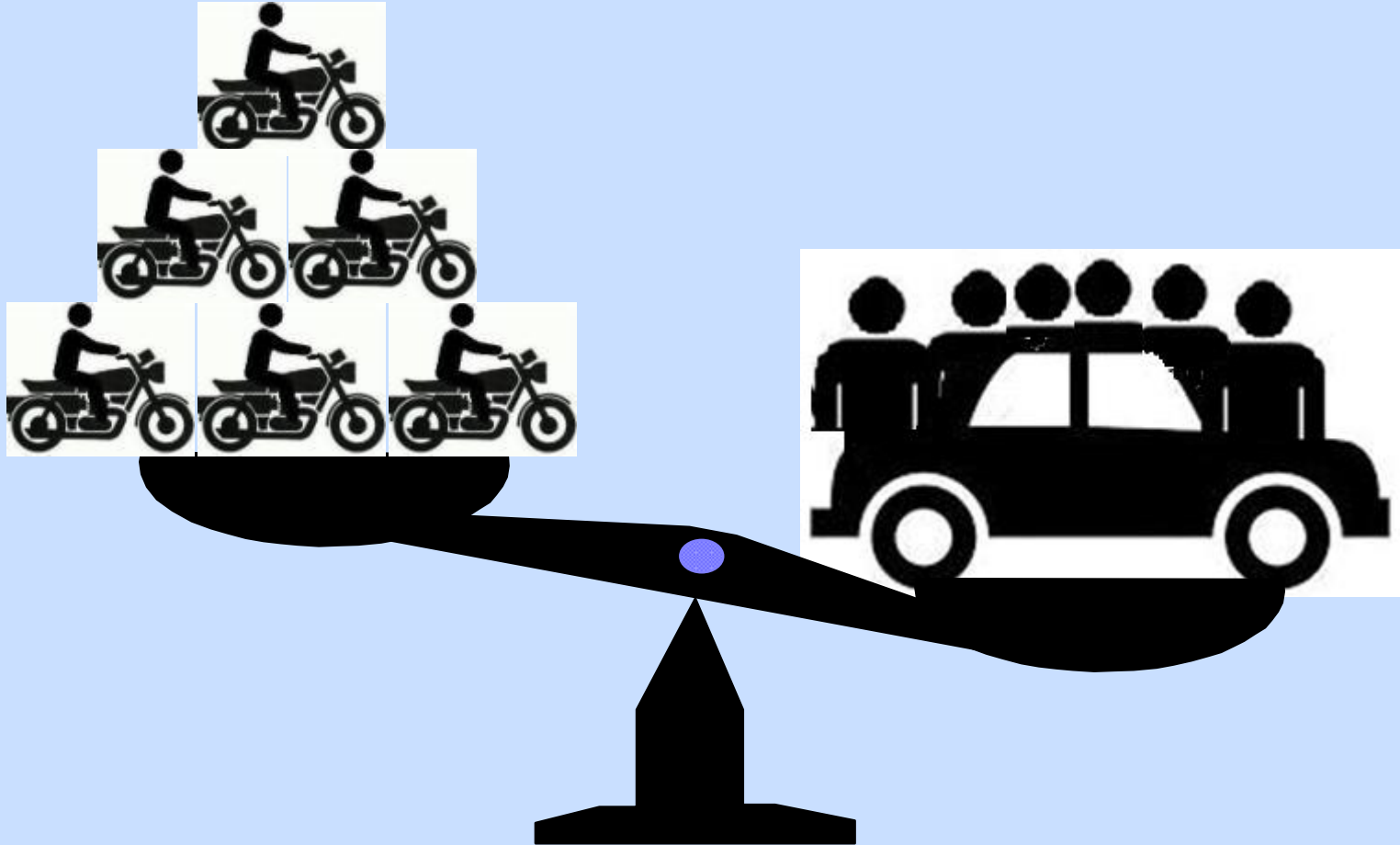
Prof. Dr. Horizon Gitano

Rev 2



MOTIVATION

6 guys on 6 E-scooters uses less energy than 6 guys in 1 car.



If energy efficiency or CO₂ emissions are a priority, then usage of Electric 2-Wheelers should be too.

Malaysian National E2W Standards

<u>Category</u>	<u>Speed</u>	<u>Standard</u>	<u># Mfgrs</u>
BICYCLE	0-25 kph	MS2514	5
SCOOTER	25-50	MS2688	0
MOTOR	50+	MS2413	4



Bike <25kph



Motorcycle
>50kph



EXISTING E2W POLICY GUIDELINES & **PROPOSED**

CLASS	E-Bicycle <25 kph	E-Scooter 25-50 kph	E-Motor >50 kph
License Plate	E-Bike	E-Skuter	Standard Motorcycle
Annual Tax	No	No	Standard
Roads	Ped, Side Streets	Side Streets, No Highway	All
Drivers License	No	Yes	Yes
Age	Any	>16	>16
Insurance	No	Government	Standard Motorcycle
Helmet	Optional	Yes	Yes

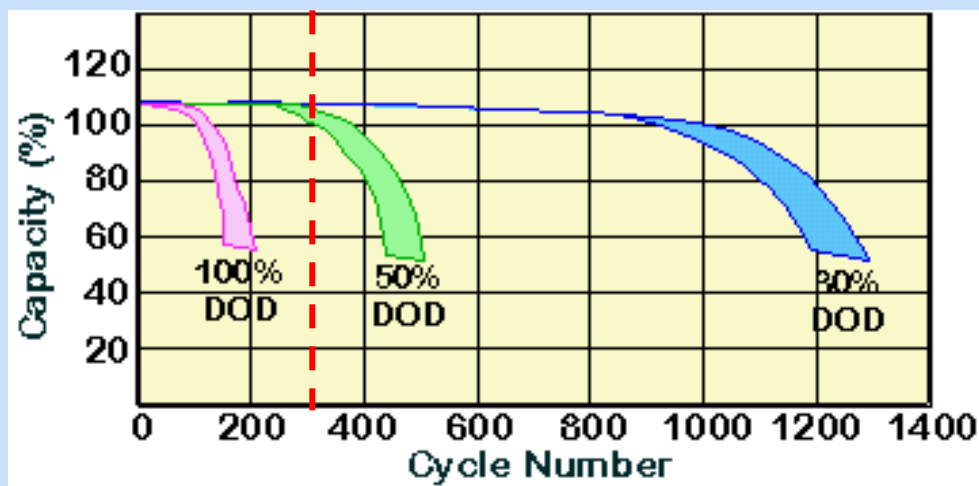
STANDARDS: Battery Life Cycles

Most “low cost” E2Ws still use Lead Acid batteries which wear out after 4 months to 3 years.

More expensive models use Lithium batteries but the cheap ones may have problems after 1 to 2 years.

Malaysian standards include a 300 cycle charge/discharge minimum limit which is easy for good quality bikes to pass, but low quality bikes fail:

*300 cycles is
minimum
limit*



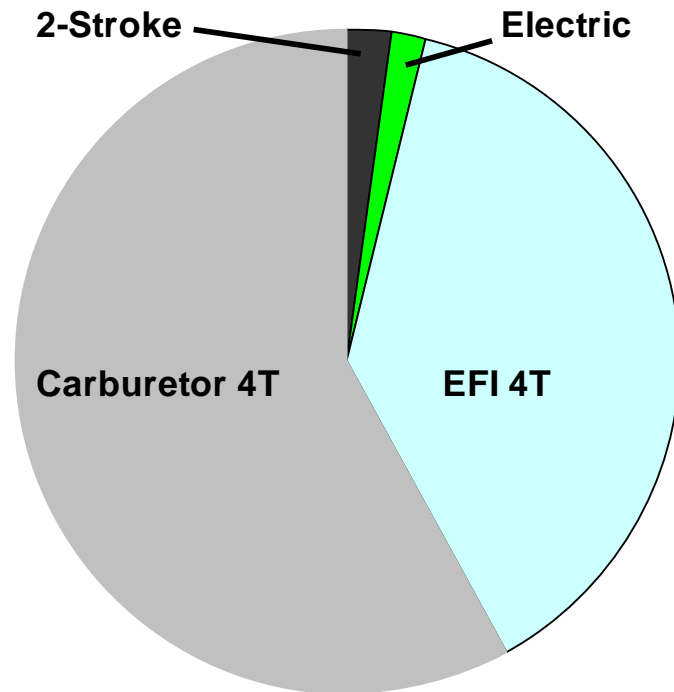
Quiz: What is this?



E-Scooter



About 2% of 2-Wheelers on the road are Electric



<u>E2W Class</u>	<u># On Road</u>
Bicycle	30,000
Scooter	100,000
Motorcycle	40,000

***ALL OF THE “Scooters” & 90% of the “Motorcycles” & “Bicycles” ARE ILLEGAL
They were either illegally imported, or imported with a “bicycle” AP***

Most of the E2Ws on the road are “scooter” class vehicles.

E2W Users: Predominantly B40

E-Scooter Users are mostly from the lower economic levels, with an over representation of:

Women

Elderly people

Very Young people

Feigners



Official Government statistics are sometime wrong

“Official” government numbers have 1000’s of Electric motorcycles on the road.

This is because most of the E2Ws on the roads ***ARE NOT REGISTERED***

They have NOT passed Vehicle Type Approval, or the associated standards.

THE SAME IS TRUE IN MOST OF SE ASIA.



CURRENT STATUS: Actual 10,000 E3W on the road



Only very small units (no passenger or cargo 3-wheelers)
Popular with old folks, mothers with kids, disabled people

NONE OF THESE 3-WHEELERS ARE LEGAL for road use

CURRENT STATUS: Available Online



★LEM★Model E-Bike
bike/electric bicycle mo

★★★★☆ 2 Ratings

150 USD

**CBU – China
Bike <25kph**



CURRENT STATUS: Available Online



1500W E Bike Electric
Skuter Elektrik Escooter

No Ratings Yet

1 Sold ?

750 USD

**China CBU
Scooter
25-50kph**



Add To Cart

CURRENT STATUS: Available Online



Treeletrik T-70 Speed

☆☆☆☆☆ No Ratings | 8 Answers

Brand: Treeletrik | More Motorcycle

2000 USD

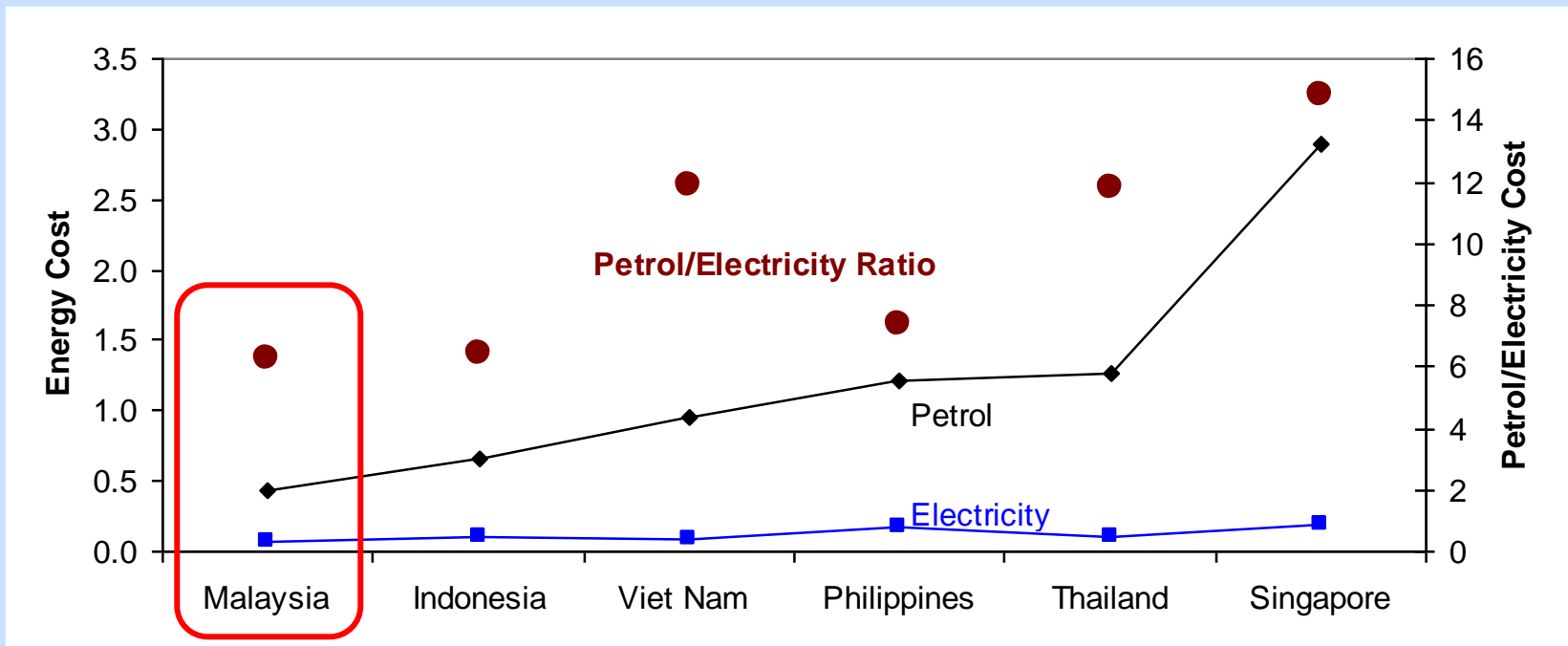
**Malaysian
Assembled
Motorcycle
>50kph**

Energy Price Comparison

Country	Petrol	Electric	Ratio
	USD/liter	USD/kWh	Pet/Elect
Malaysia	0.44	0.07	6.3
Indonesia	0.65	0.101	6.4
Viet Nam	0.96	0.081	11.9
Philippines	1.21	0.165	7.3
Thailand	1.26	0.107	11.8
Singapore	2.89	0.195	14.8

Malaysia is at a “disadvantage” for Electric Propulsion at the cost of petrol is quite low.

Countries with high petrol costs compared to Electricity will more readily adopt Electric Vehicles.



E2W – ICE 2W Economic Comparison

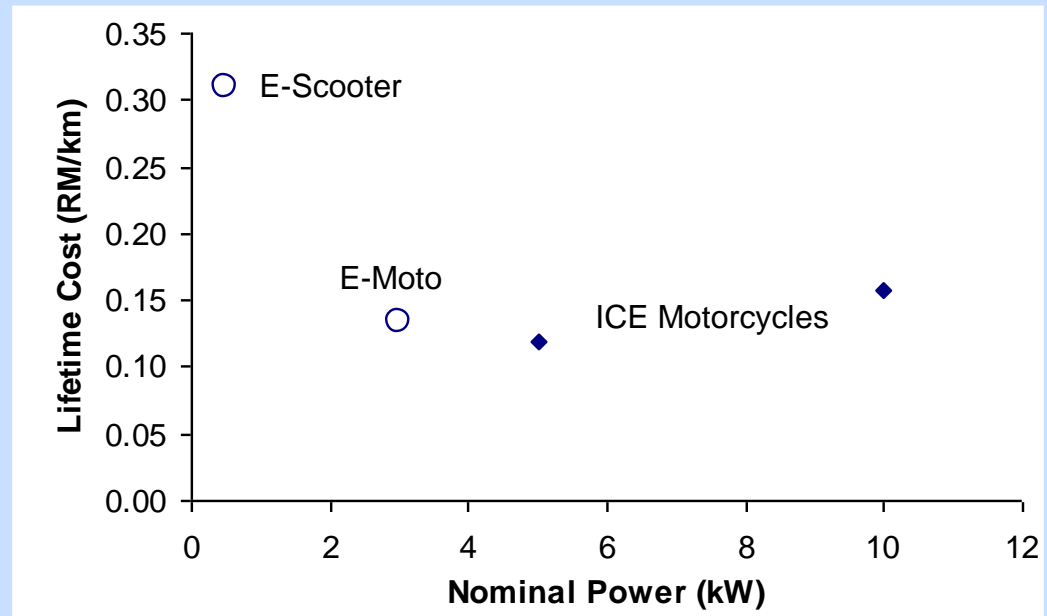
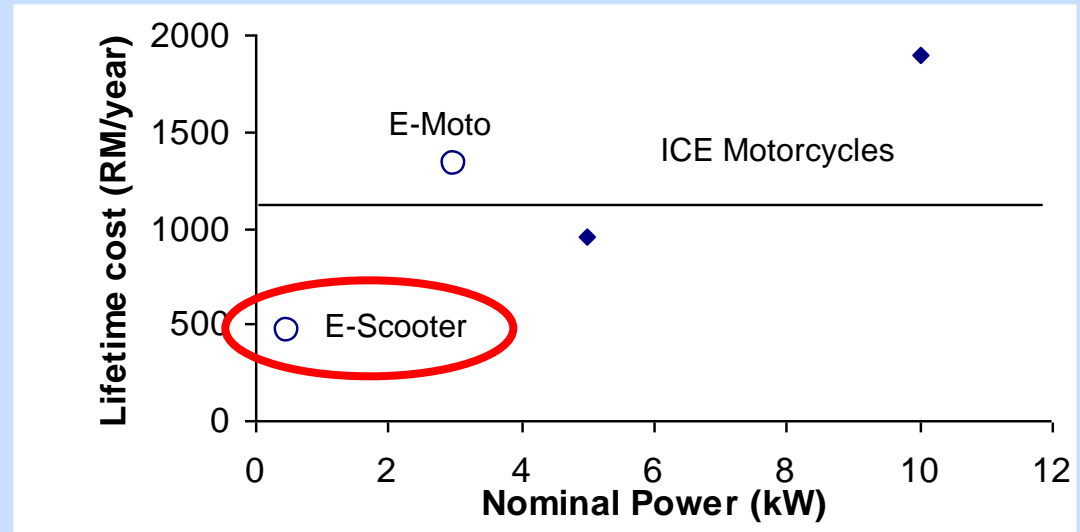
Fuel/Power Cost		Petrol	2.05	Electricity	0.3
			RM/liter		RM/kWh
Vehicle	ICE "Cub"	E-Scooter	ICE 150	E-Moto	
Nominal Power (kW)	5	0.5	10	3	
Displacement/Volt	90cc	48V	150cc	70V	
Purchase Cost (RM)	3500	2000	10000	14000	
Life (years)	15	8	20	15	
Battery Life (years)		2		15	
Battery Cost (RM)		500			
# of Battery Replacements		3			
Range (km/year)	8000	1500	12000	10000	
Fuel Efficiency (km/l, km/kWh)	60	34.4	40	24.6	
OPERATIONAL COSTS (RM/Year)		718.3	215.6	1400.0	397.0
Maintenance Cost (RM/year)	245	202.5	385	75	
Annual Fees (RM/year)	200	0	400	200	
Fuel Cost (RM/year)	273.3	13.08	615.00	121.95	
Lifetime Range (km)	120000	12000	240000	150000	
Lifetime Cost	14275	3725	38000	19954	
LIFETIME COST					
RM/km	0.119	0.310	0.158	0.133	
RM/year	952	466	1900	1330	

E2W – ICE 2W Economic Comparison

The smaller “E-Scooters” are less expensive *per year* when used for short hops...

But are more expensive *per kilometer*.

Even the “E-Motorcycles” can’t compete with ICE vehicles at current fuel prices



MAJOR OBSTACLES TO E2W PROLIFERATION

- Low Cost of Petrol

- High EV Cost

- Low EV Battery Life (mostly for lead-acid batteries)

We already have standards to cover this, but they are not being enforced

- Lack of charging points, especially at flats

SAFETY AND SOCIAL CLASS ISSUES

As the most popular class E-scooters road usage regulations are not being enforced, so many people assume they can be driven on the roads without drivers license or even helmets

E2Ws in Malaysia are overwhelmingly used by the B40 lower income group. In many cases it is their ONLY transport.

It is important to keep it available and inexpensive.

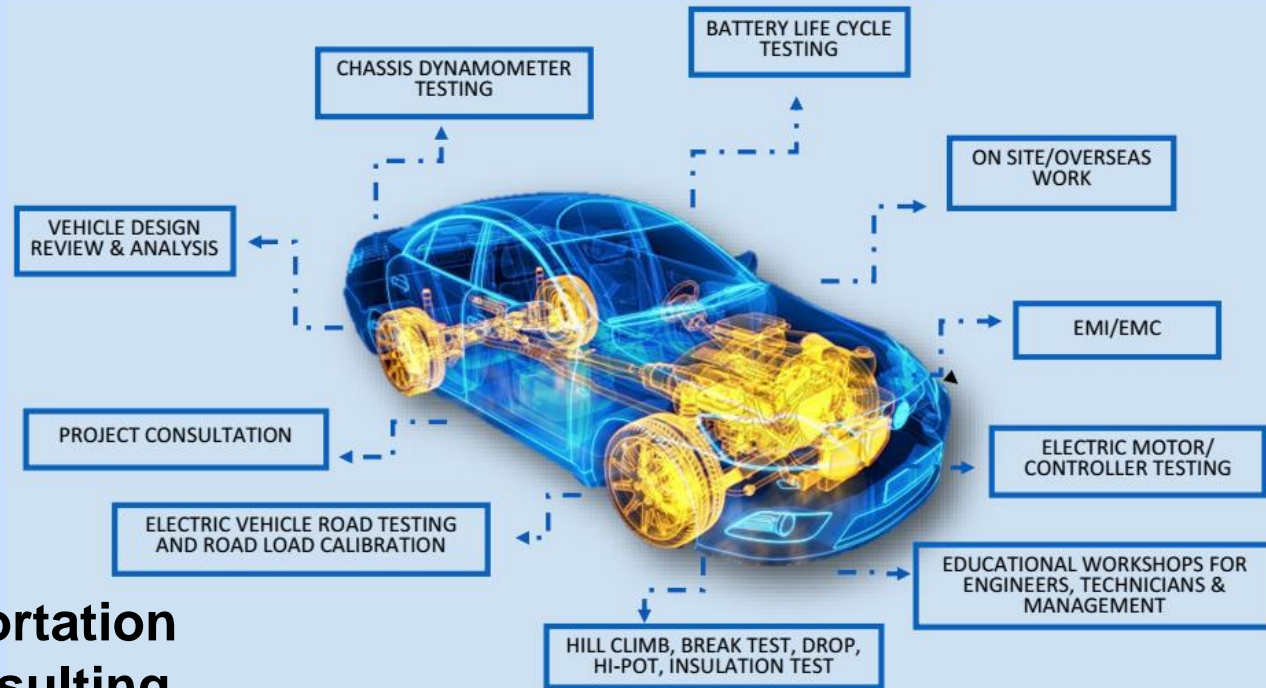


THIS IS NOT THE END!

This work is ongoing and scheduled to finish ~Sept 2023



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