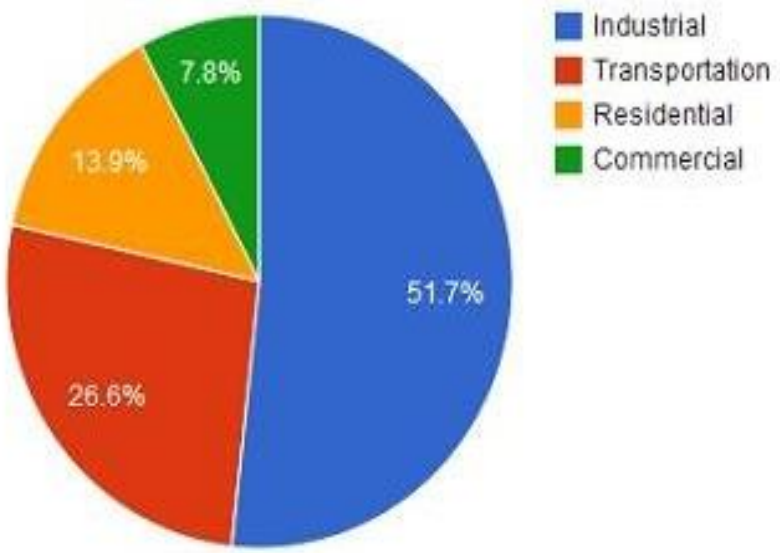
Bring Back our Blue Sky

Developing Clean and Efficient Vehicle policy for Bangladesh

Why Clean and Efficient Vehicle Policy ?

- Reduces CO_2 emissions and dangerous pollutants, including particulate matter (PM) from Transport Sector
- Reduces fuel consumption : Improve fuel economy
- Reduces energy demand and petroleum imports

Sustainable Development Goals (SDG)



Goal 7: Ensure access to affordable, reliable, sustainable and modern energy for all

Target 7.3: By 2030, double the global rate of improvement in energy efficiency

Nationally Determined Contribution (NDC)

Paris agreement (2015), COP 21 : keep temperature rise below 2^0 C

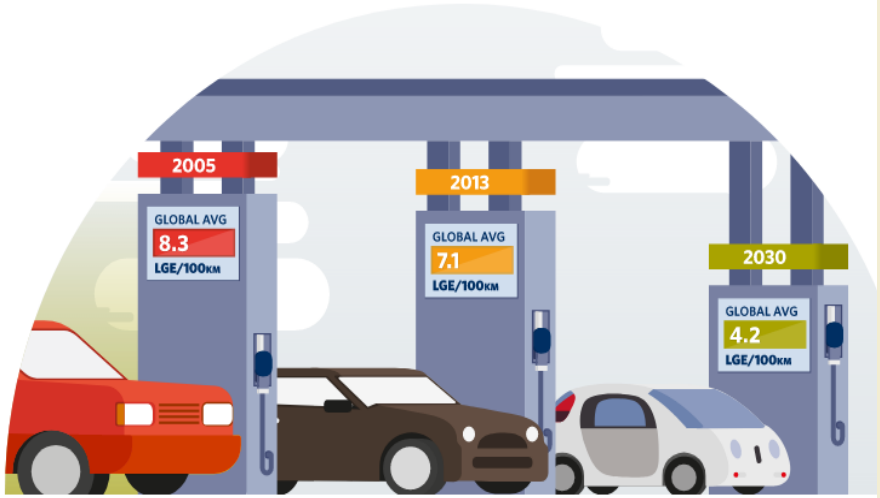
Sector	Base year (2011) ($MtCO_2$)	BAU scenario (2030) ($MtCO_2e$)	BAU change from 2011 to 2030	Unconditional contribution scenario (2030) ($MtCO_2$ e)	Change Vs BAU	Conditional contribution scenario (2030) ($MtCO_2e$)	Change Vs BAU
Power	21	91	336%	86	-5%	75	-18%
Transport	17	37	118%	33	-9%	28	-24%
Industry (energy)	26	106	300%	102	-4%	95	-10%
Total	64	234	264%	222	-5%	198	-15%

Global Fuel Economy Initiative (GFEI)

- **GLOBAL GOAL: Make Cars 50% More Fuel-Efficient by 2050 Worldwide**

DOUBLE AVERAGE FUEL ECONOMY

OF NEW CARS BY 2030
AND ALL CARS BY 2050



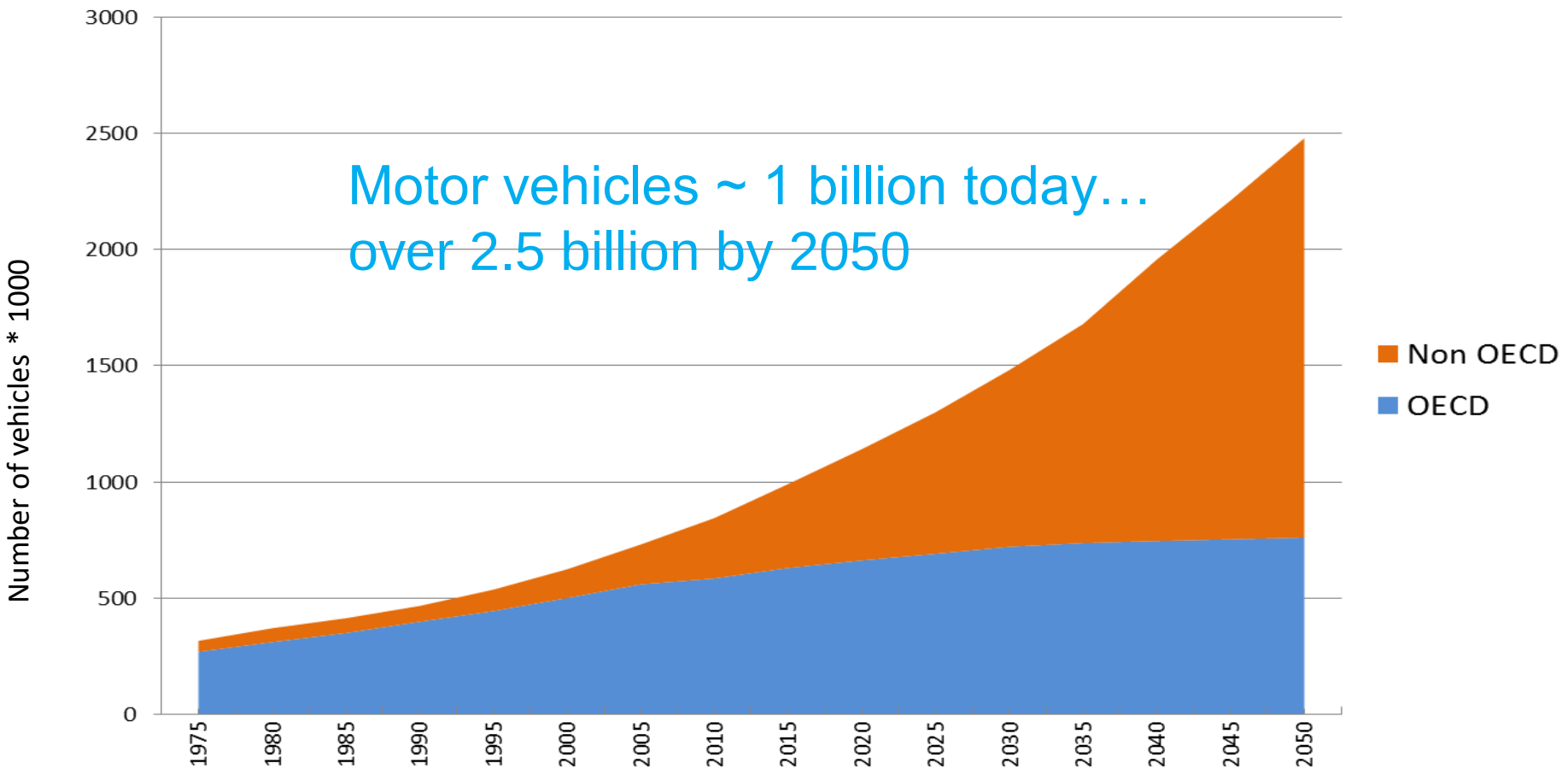
THE GFEI FUEL ECONOMY TARGETS:

30% **30% reduction** in L/100km by 2020 in **all new cars in OECD countries**

50% **50% reduction** in L/100km by 2030 in **all new cars globally**

50% **50% reduction** in L/100km by 2050 in **all cars globally**

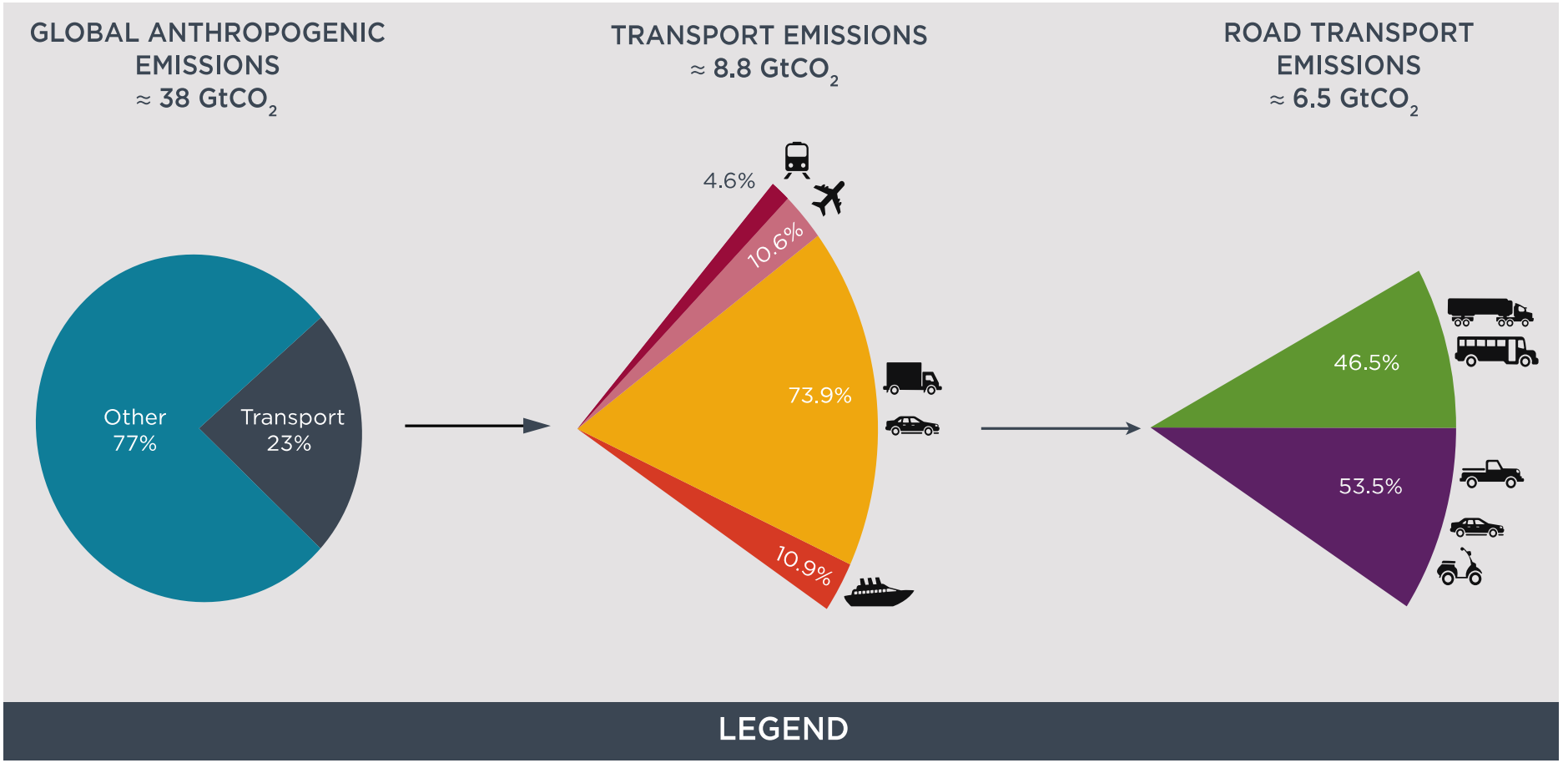
Motorization Trend Globally



- **90%+ of growth in developing, emerging economies**

Source: IEA 2015

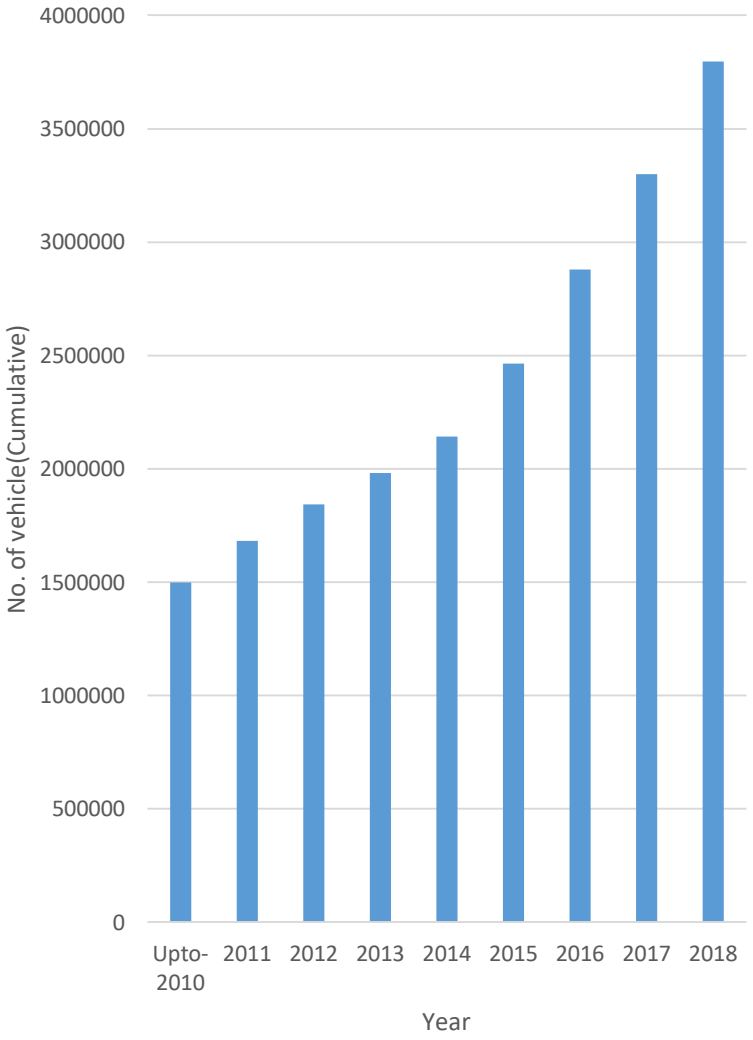
Transport and GHG

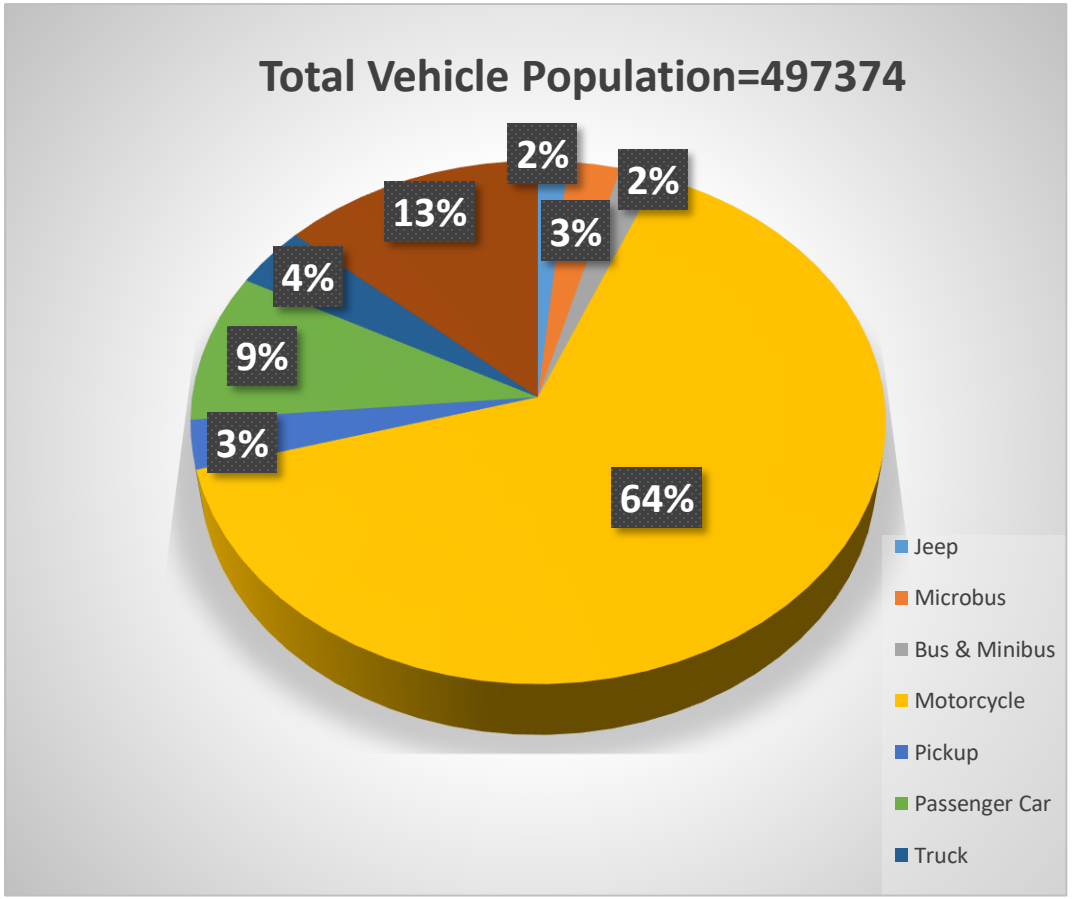


Notes:
Global anthropogenic CO_2 emissions in 2010 based on IPCC (2014).
Transport CO_2 emissions in 2010 estimated by ICCT (2014) include the full fuel lifecycle, including direct emissions from combustion & upstream emissions from extraction, refining, & distribution of fuels.

** Vehicles make up more than 20% of greenhouse gas emissions

Vehicle Fleet in Bangladesh





- **Car ownership (per 1000)** : **Bangladesh - 1.8**
  Dhaka -15
- **Motorcycle owner ship(per1000)** : **Bangladesh - 11.87**

Source : BRTA 2018

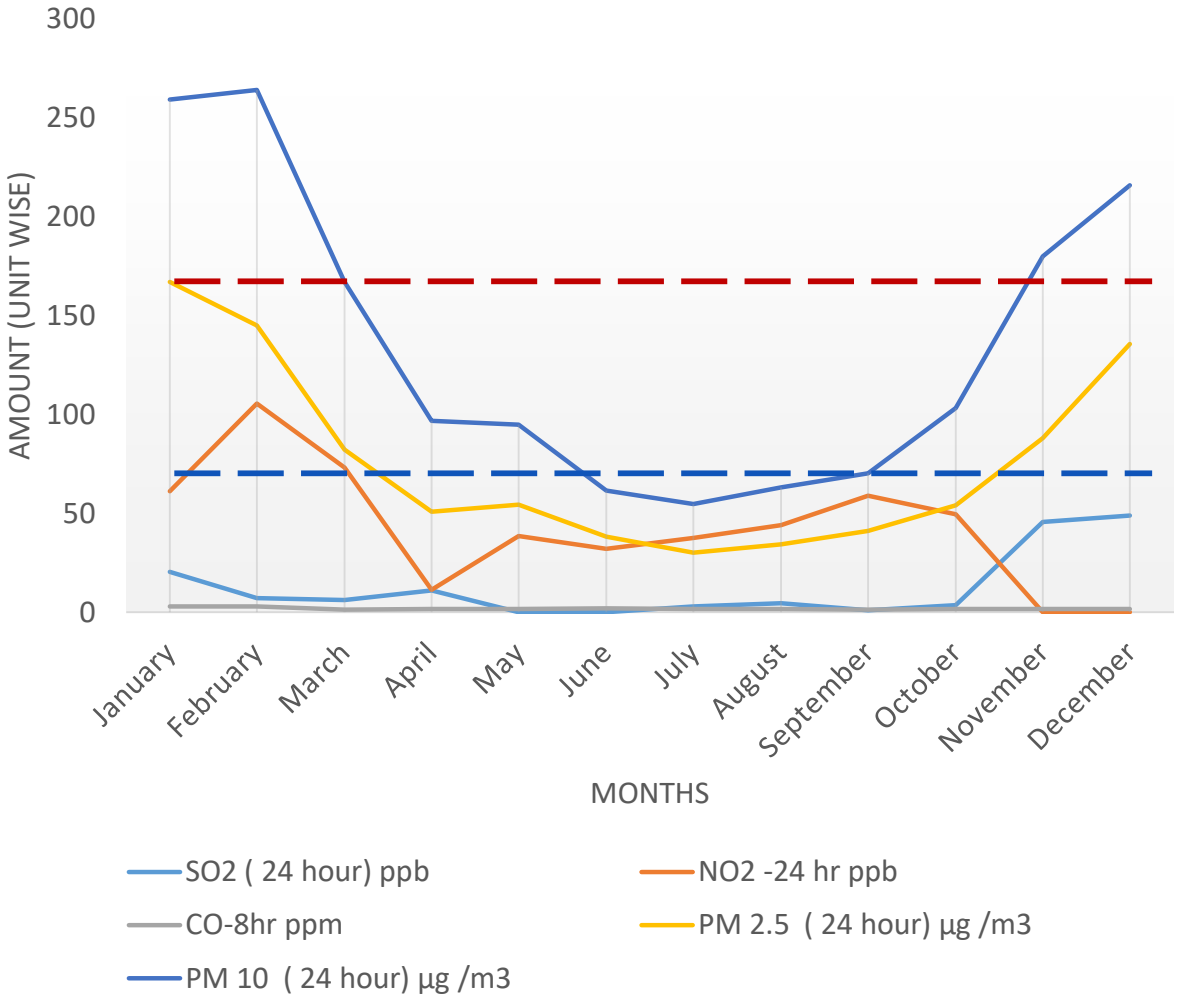
Fuel used in Transport Sector

Type of Fuel (consumption in 2017-18)	Type of Vehicle	Major pollutants	Comments
Petrol (509903MT)	LDV	PM, VOC, lead, Nox, SO2, GHG	From July 1999 import of unleaded petroleum
Diesel (2434880 MT)	Bus/Truck/Jeep		500 ppm from 2016
CNG (1260 MMCM)	LDV/Bus/Truck	GHG (small)	Introduced in 1995 CNG 3 Wheeler-193243 Total: 501599 (feb.18)
LPG	LDV	GHG (small)	Introduced in 2016 5000 nos.(2017)
Electricity	Passenger car/SUV Auto Rickshaw	"0" emission (TTW)	

Emission Standard & Sources in Bangladesh

	Bangladesh Standard	WHO Standard	Major Source
PM 10	150 µg/m^3	50 µg/m^3	Brick Kiln, Transport
PM 2.5 (24 hour)	65 µg/m^3	25 µg/m^3	Brick Kiln, Industry, Transport
SO_2 (24 hour)	365 µg/m^3 0.14 ppm	20 µg/m^3	Brick Kiln, Industry, Transport
NO_2 (Annual)	100 µg/m3 0.053 ppm	40 µg/m^3	Transport, Industry
CO (8 Hour)	10 µg/m^3 9.0 ppm	10 µg/m^3	Transport, Industry, Agriculture
Pb (8 Hour)	0.5 µg/m^3	0.5 µg/m^3	Metal refineries, battery manufacturers, iron and steel producers.

Existing Air Quality Situation



Source: Department of environment 2017, Dhaka

Vehicular emission Standard

Vehicle Type	Present	2018	2020
Light duty diesel vehicles with GVW≤ 2500 kg	EURO I	EURO II	EURO III
All Cars and light duty diesel vehicles with GVW: 2500 -3500 kg	EURO I	EURO II	EURO III
Light duty Petrol and CNG vehicles with GVW≤ 2500 kg	EURO II	EURO III	EURO IV
All Cars and light duty Petrol and CNG vehicles with GVW: 2500 -3500 kg	EURO II	EURO III	EURO IV
All commercial Diesel vehicles > 3500 kg	EURO I	EURO II	EURO III
All commercial CNG vehicles > 3500 kg	EURO II	EURO III	EURO IV

Bangladesh I/II/II/IV (Draft ECR 2017)

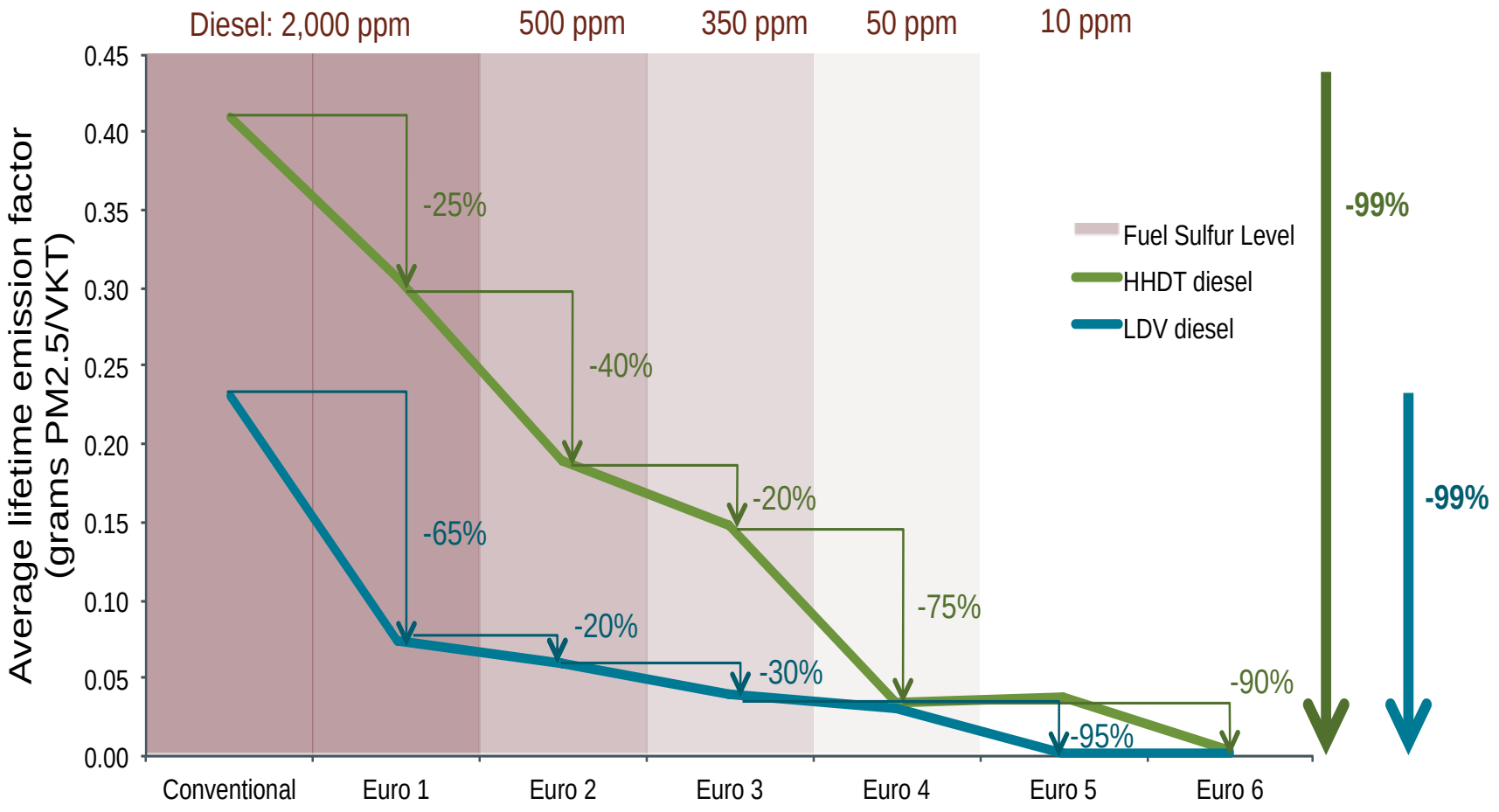
Option I: Use of low sulfur Diesel

Time Line	2016*	2017	2018	2019*	2020	2021	2022*	2023	2024	2025*
Sulfur Content (PPM) [All Over Bangladesh]	500	500	500	500	350	350	350	50	50	50
Imported Diesel (PPM)	500 or Less	500 or Less	500 or Less	500 or Less	350 or Less	350 or Less	350 or Less	50 or Less	50 or Less	50 or Less
ERL Diesel (PPM)	3000 or Less	3000 or Less	3000 or Less	3000 or Less	350 or Less	350 or Less	350 or Less	50 or Less	50 or Less	50 or Less

Adulteration !!!!

Source: Department of Environment

Option I: Use of low sulfur Diesel



- Diesel particle filters required by Euro VI reduce diesel PM to near zero.
- Euro IV is a good intermediate goal.

Option I: Use of Low Sulfur Diesel

Srilanka :

- Introduction of low Sulfur Diesel (10 ppm)from June 2014
- Reduction of regular diesel sulfur level to 1,000 ppm from December , 2015
- 350 ppm Sulphur Diesel by 2016
- Transition to low sulfur diesel (10 ppm) entirely by 2020
- No vehicle less than euro std. Euro 5 will not be sold and start selling EURO VI after 2020

India

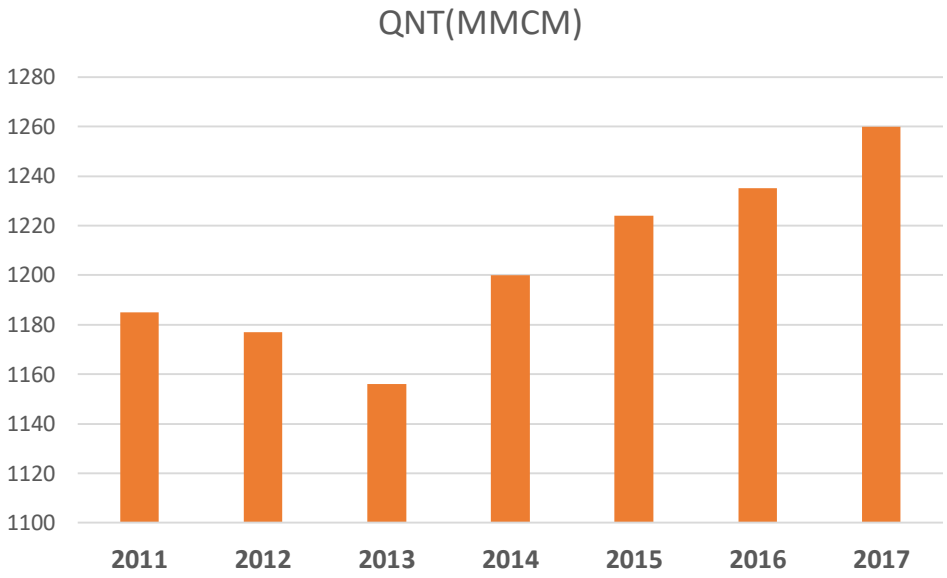
- Bharat Stage (BS) IV from 2010
- India Fuel Policy - by 2020 EURO VI

Option I: Use of low sulfur Diesel

- ***Recommendation***

- ERL produce Low Sulfur diesel
- Strict enforcement for adulteration
- Dedicated supply for Transport sector
- Different pricing of diesel
- Enhance quality control and enforcement
- Campaign should be carried out to raise public awareness regarding the benefits of cleaner fuels.

Option II: Use of CNG



- NO_x and soot emissions of CNG powered vehicles are substantially lower than from diesel powered vehicles.
- CNG passenger vehicles emit 5-10% less CO_2 than comparable gasoline powered passenger vehicles.

Total no. of CNG vehicle : 5,01,599 (Feb. 2018)

2,67,974 – Converted
40,383 --Imported
1,93,243 - Three wheeler

Total CNG filling station : 544

- **Every year around 6,000 premature deaths were avoided**
- **A saving of USD 1.15 billion/ year**

CNG powered vehicle

Option II: Use of CNG

Delhi , India

The final countdown for phasing out diesel buses began in November 2002. On December 1, 2002, the last diesel bus was flagged off by Dikshit.

Finally, it's bye bye diesel buses

By Shishirh Nuy
Times News Network

New Delhi: It's the end of the road for diesel buses in Delhi. From Sunday the city will have only CNG buses plying on its roads.

The last batch of about 600 diesel buses will be phased out on Saturday. There are about 7,400 CNG buses plying on Delhi roads.

As on December 1, the entire public transport fleet in Delhi will run on CNG. "Among 40 cities with CNG vehicles in the world, Delhi has the highest number of CNG vehicles," said Delhi state transport minister Ajay Maken. There are about 4,000 mini-buses, 15,000 taxis and 45,000 autorickshaws in the city.

GREEN RUN

- 280 diesel buses go off the road after November 30, 2002
- In total 600 diesel buses will be phased out.
- 7,400 CNG buses are plying on Delhi road.
- 2141 CNG run DTC buses are plying in the city
- 1000 more CNG buses will be introduced by DTC by June 2003.
- About 4,000 mini buses, 15,000 taxis and 45,000 autos are running on CNG.

Dec 1 2002

be curbed to reduce further pollution.

The phasing out of diesel buses has taken place over a period spanning the last eight months. After the apex court cracked its whip in April, the Delhi government started phasing out diesel buses at the rate of 600 buses a month. In this manner, more than 6,000 buses were phased out since April.

Now, the owners of the last batch of buses will have to show a proof that they have bought a bus chassis. "Only after they produce the permanent evidence, we will give them the permit to bring in bus es in two months," said transport commissioner Sindhushree Khullar. It takes about 60 days to build the body of the bus over a chassis.

The victory of the clean air campaign

All Public bus runs with CNG in Delhi, India

Option II: Use of CNG

- ***Recommendation***

- **Priority for Public Transport**
- **Increase price for private vehicle**
- **Stop Conversion of Private Vehicle**

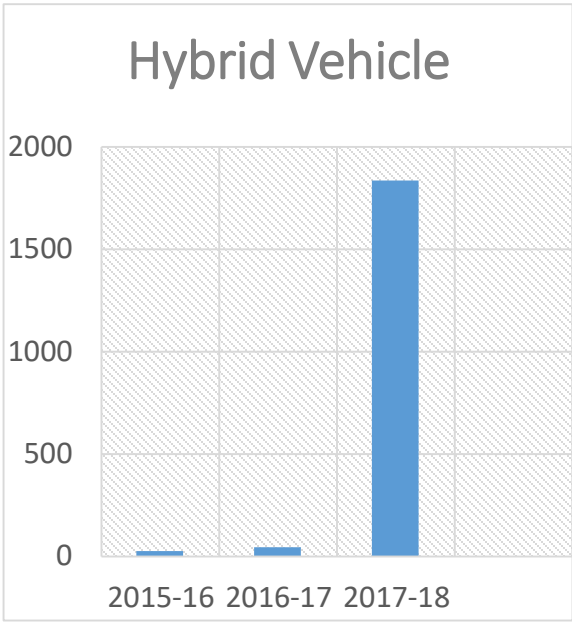
Option III: Electric / Hybrid Vehicle

E-mobility in Bangladesh (Journey started 2007)

- 6 lac easy bike (1000-1200 watt)
- 5 lac auto rickshaw
- Price – 1.5-1.75 lac
- Charging time : 6-8 hours (100-120 km)
- Battery (pb-acid), imported and locally made , Battery life max 1 year
- Comfortable for short distance travel
- Creation of new job/business

- No restriction on numbers
- Need longer time for charging
- Battery disposal and recycle

E-mobility in Bangladesh



Car: Toyota prius/AQUA, BMW 530e, 40e
SUV: Nissan X-Trialis ,Honda vesel ,
Microbus: Toyota Esquiare

Issues with Hybrid Vehicle

- Not enough maintenance facilities
- Fear about battery life and cost

Source: NBR 2017

E-mobility : Recent tax incentive

Electrical Vehicles	CD %	SD %	VAT %	AIT %	RD %
Electric Battery-operated 3-wheelers	28	20 (25)	15	5	4
Electric Battery-operated 2-wheelers	28	20 (25)	15	5	4
Hybrid Vehicles					
Up to 1600 cc - Reconditioned and New	28	25 (45)	15	5	4
1601 to 2000 cc- Reconditioned and New	28	45 (100)	15	5	4
2001 to 3000 cc- Reconditioned and New	28	60 (150)	15	5	4
3001 to 4000 cc- Reconditioned and New	28	100 (300)	15	5	4
4001 cc and above- Reconditioned and New	28	300 (500)	15	5	4

E-mobility: Shenzhen, China , the first city worldwide to rely on zero emission transportation

Started: Jan. 2011

Fleet: **780** buses

Single Mileage : **349,000** km

Fleet Total Mileage: **124,790,000** km

As the end of Jul. 2016

E-mobility : Long range Buses

Proterra with heavy-duty, battery-powered Catalyst E2 max (660 kwh battery) bus set a new world record for the longest distance traveled by an EV on a single charge.
According to Proterra, the company's e-bus drove for 1,101.2 miles at the Navistar Proving Grounds in New Carlisle, Indiana

Tesla Model S P 100D with `100kwh battery -315 miles

Hyundai Elec City Bus with 256 kwh battery -180 miles and can be recharge in one hour

New Global Industry Partnership on Soot-Free Clean Bus Fleets

Scania, BYD, Volvo Buses and Cummins signed public statements on 27 September 2017 committing themselves to bring soot-free clean engine technology to 20 megacities no later than 2018

Abidjan, Accra, Addis Ababa, Bangkok, Bogotá, Buenos Aires, Casablanca, Dar es Salaam, Dhaka, Istanbul, Jakarta, Johannesburg, Lagos, Lima, Manila, Mexico City, Nairobi, Santiago, Sao Paulo, and Sydney.

Single E-Bus Energy Saving		Tailpipe Emissions Elimination
BYD k9 Electric Bus	One k9 Saving **185,055 USD** In 10 years	Diesel Bus
1.30 kWh	Energy Consumption / km	0.467 L
$ 0.1 / kWh	Energy Price (USD)	$ 0.64 / L
$ 0.130	Cost / km (USD)	$ 0.299
1,095,000	10 Years Mileage (km)	1,095,000
$ 142,350	Total Cost (USD)	$ 327,405

E-Bus	Accumulated Kilometers	Fuel Saving (L)	CO_2 Saving (kg)	Number of Trees Planted
1 k9 Buses	1,095,000	511,365	1,176,139.5	653

Action plan for e- mobility in Bangladesh (short term – within 1 year)

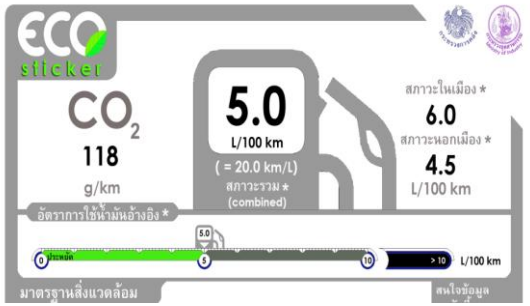
- Amend / modify existing regulation/Policy to facilitate EV / Hybrid vehicle registration including NIMTP
- Government should install some charging station at some important location to show commitment for greener transport
- Initially E –vehicle for Dhaka and Chittagong with limited numbers
- Awareness campaign (fear to adopt new technology , range anxiety)
- Recon. Hybrid/ New Hybrid vehicle import should be
- Inter-ministerial coordination

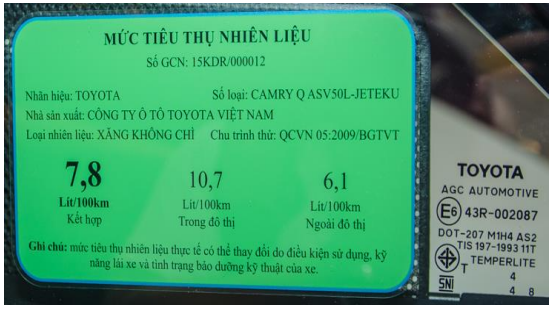
Action plan for e- mobility in Bangladesh (medium term- within 3 years)

- All e-rickshaw should undergo BRTA registration
- Additional tax reduction of 25-30 % for vehicle less than 1600 cc
- Fiscal incentive and supportive policy measures for the import of Li-ion batteries or production locally.
- E taxi (reduce tax for taxi)
- Charging stations on PPP basis a
- Mandatory Procurement of large EV's fleet fully or at a certain ration by the government (BRTC and staff buses, specialized vehicles such as police cars, vehicles for utility services, and sedan cars/microbuses/SUVs for government officials)
- Government can give soft loan (dedicated fund)to operator buy E- bus

Action plan for e- mobility in Bangladesh (long term within 5 years)

- *Renewable energy source (solar/wind)/ Hydro power*
- *Vehicle labelling sticker (fuel economy and co2 emission)*
- *CO_2-based vehicle taxation system*
- *Incentive for local EV manufacturers*





Taxation Policy

IC engine vehicle policies

- Present tax policy in Bangladesh classifies four-wheeled diesel and petrol automotive vehicles into 5 (five) separate classes based on engine capacity only.

- The classifications are :

1. 1600 cc
2. 1600 to below 2000 cc
3. 2000 to below 3000 cc
4. 3000 to below 4000 cc and
5. 4000cc and above.

Taxation Policy

IC engine tax breakdown

Description	CD%	SD%	VAT%	AIT%	RD%	Total Taxes %
Up to 1600 cc (Car & SUV) Reconditioned and New	28	45	15	5	4	127.8
1600 cc-2000 cc (Car & SUV) Reconditioned and New	28	100	15	5	4	212.4
2001 cc-3000 cc (Car & Jeep) Reconditioned and New	28	200	15	5	4	366.1
3000 cc-4000 cc (Car & Jeep) Reconditioned and New	28	350	15	5	4	596.6
4001 cc and above (Car & Jeep) Reconditioned and New	28	500	15	5	4	827.1

Taxation Policy

Electric vehicles tax breakdown

Description	CD%	SD%	VAT%	AIT%	RD%	Total Taxes %
Electric Battery-operated 3-wheelers	28	20	15	5	4	89.4
Electric Battery-operated 2-wheelers	28	20	15	5	4	89.4
Other Vehicles with only electric motor for propulsion	25	20	15	5	3	ATV (5)

Taxation Policy

Hybrid vehicles tax breakdown

Description	CD%	SD%	VAT%	AIT%	RD%	Total Taxes %
Up to 1600 cc - Reconditioned and New	28	25	15	5	4	97.1
1601 to 2000 cc- Reconditioned and New	28	45	15	5	4	127.8
2001 to 3000 cc- Reconditioned and New	28	60	15	5	4	150.9
3001 to 4000 cc- Reconditioned and New	28	100	15	5	4	212.4
4001 cc and above- Reconditioned and New	28	300	15	5	4	519.7

FISCAL POLICIES : Srilanka

- Vehicle Importation Taxes – Previous structure:

Engine Capacity (CC)	Total Tax (% of FOB): 2015-2017 (Prior to 2015)		
	Gasoline	Diesel	Hybrid
< 1000	195 (180)	245 (245)	97 (77)
1000 - 2000	205 (191.6)	270 (262.6)	117 (104.9)
2000 - 2500	265 (247.5)	297.5 (287.5)	178.5 (143.5)
> 2500	295 (267.5)	337.5 (347.5)	228.5 (188.5)

- ✓ Three-Wheelers: 120%
- ✓ EVs: 20% (<3yrs), 30% (>3yrs)

Taxation Policy

Recommendation:

- New Tax slab : Upto 1000 cc and 1000-1600 cc
- Different tax for Gasoline and Diesel
- Tax slab for Four wheel Electric Vehicle
- Tax incentives or rebates for higher engine std.
- Emission based tax (fuel level)
- Discourse importing more than 3 years old Hybrid/EV


Thank you