



MARii
INSTITUT AUTOMOTIF, ROBOTIK & IoT MALAYSIA
MALAYSIA AUTOMOTIVE, ROBOTICS & IoT INSTITUTE

EV Safety Standards and Development Trends in Global and Regional (Malaysia Perspective)



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INTRODUCTION - MARii



MINISTRY OF INTERNATIONAL TRADE AND INDUSTRY



An agency under the Ministry of International Trade and Industry, Malaysia (MITI) to **lead** the development of the Malaysian automotive sector and the overall mobility ecosystem through the adoption of Robotics and IoT

Headquartered in Cyberjaya, Selangor.

“ENHANCING THE COMPETITIVENESS OF THE **AUTOMOTIVE INDUSTRY** AND OVERALL MOBILITY INCLUDING INTELLIGENT TRANSPORTATION SYSTEM AND RELATED SERVICES THROUGH ADOPTION OF ROBOTICS & IOT”

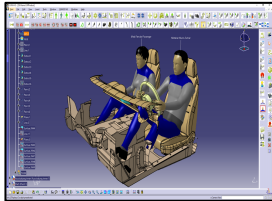
THINK TANK

FOCAL POINT

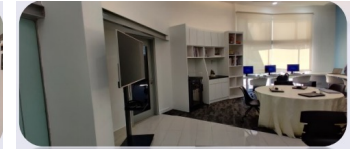
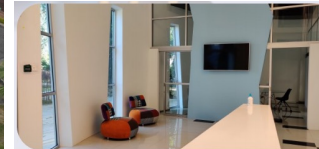
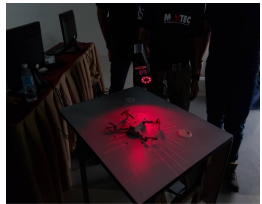
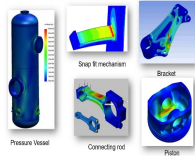
TECHNOLOGY ENABLER

KNOWLEDGE & COORDINATION CENTRE

INTRODUCTION - MARii



Linear Static Analysis



MARii Additive Technology Centre (MAMTEC)

MARii Main Office
Block 2280, Jalan Usahawan 2,
Cyber 6, 63000 Cyberjaya

MARii Simulation & Analysis Centre (MARSAC)

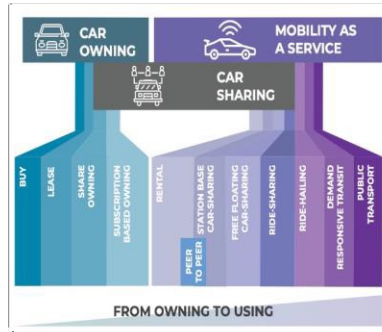
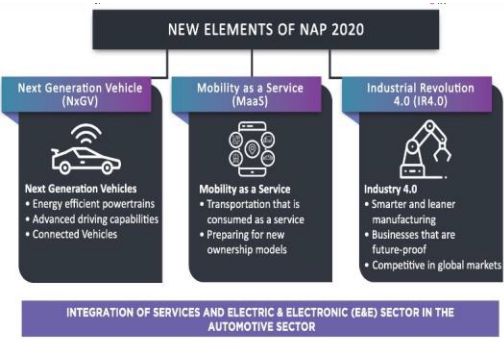


MARii Academy of Technology
Jalan Jasmine, Bandar Bukit Beruntung,
Selangor (Relocation)

National Emission Testing Centre (NETC),
Mukim Serendah,
48000, Rawang, Selangor

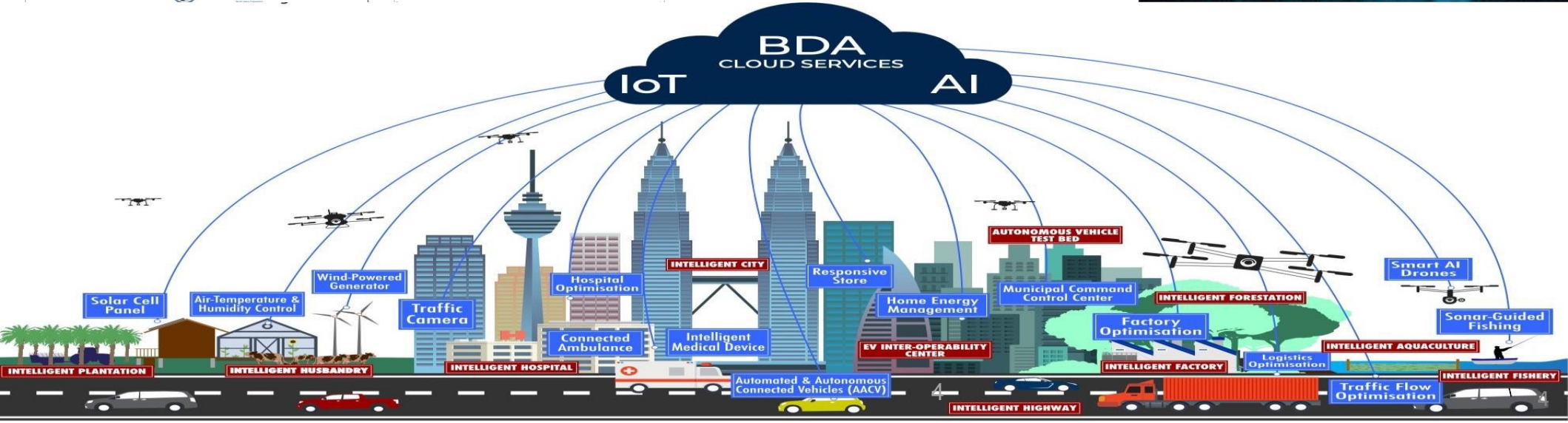
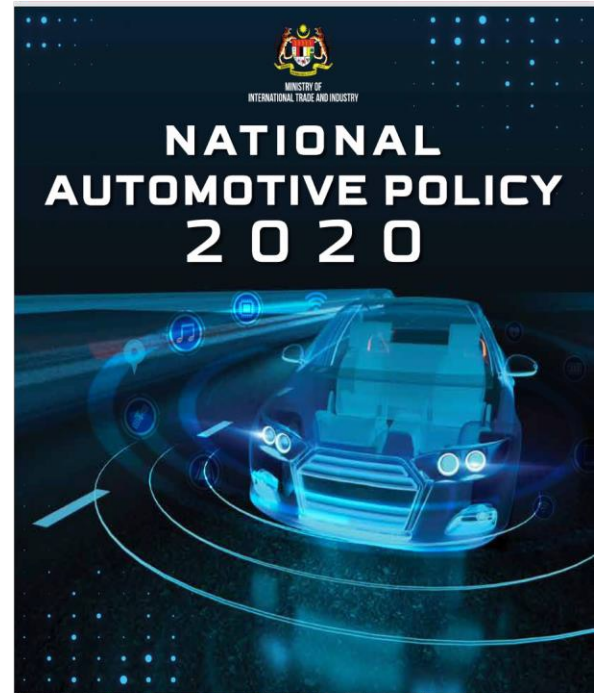
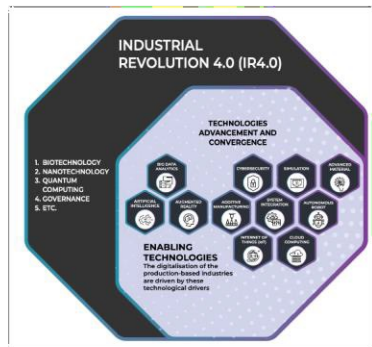
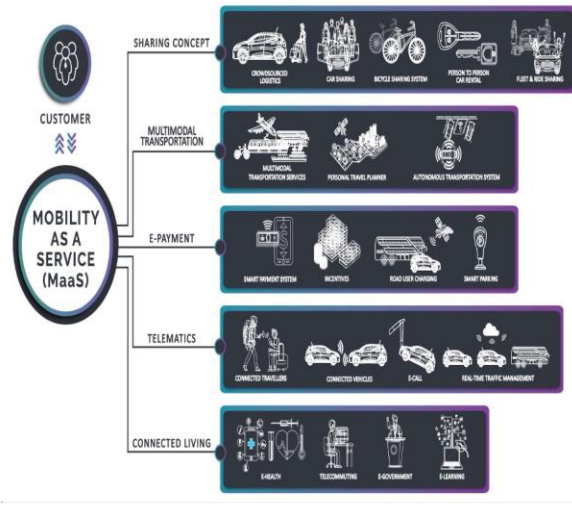
MARii Design Centre (MDC)
Jalan Jasmine, Bandar Bukit Beruntung,
48300, Selangor (Relocation)

INTRODUCTION - Background of NAP

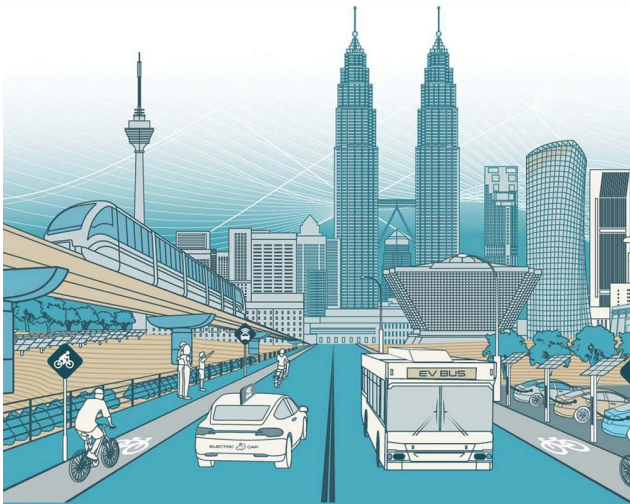


CLASSIFICATION

- MaaS is a concept created to integrate various types of services and transport modes into an efficient and centralised mobility service.
- MaaS provides a wide range of transportation options such as a combination of public transport services and private vehicles, besides enabling users to enjoy other services such as optimised product delivery services, online health diagnostics and others.



INTRODUCTION – Transportation Scenario in Malaysia



LOW CARBON MOBILITY BLUEPRINT

Decarbonizing Land Transportation

THE VISION OF LCMB 2021-2030 IS TO DRIVE THE PRINCIPLES OF SUSTAINABLE MOBILITY

to assess the best options in energy and GHG mitigation planning in the transport sector, in particular land transport, using scenario analyses of a business-as-usual case and similarly for 2030.

OBJECTIVES

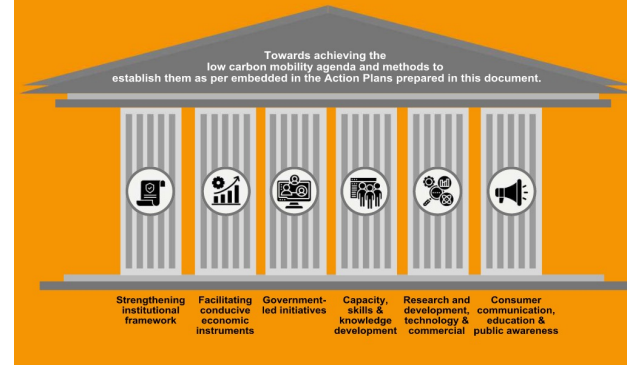
- Energy – Reduction in total primary energy supply and energy consumption
- Economy – Fuel expenditures savings and industrial expansion
- Environment – Greenhouse gas emission reduction

FOCUS AREAS

- The output of the LCMB study is organised into four focus areas, namely:
- 1 GHG emission and energy reduction via vehicle fuel economy and emission improvement
 - 2 GHG emission and energy reduction via electric mobility adoption in strategic applications
 - 3 GHG emission and energy reduction via alternative fuel adoption
 - 4 GHG emission and energy reduction via mode shift

4 focus areas and 10 strategies had been developed

The Six Strategic Actions for Low Carbon Mobility

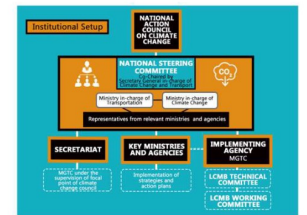


Action 1: Strengthening institutional framework via establishment of a dedicated council for Low Carbon Mobility Blueprint and Action Plan (LCMB) implementation

Climate change and transportation governance in Malaysia are strongly determined at the national level. However, due to decentralisation of economic and political power to state and local governments, it is important to ensure there is coherence in existing policies at different levels to ensure a sustainable pathway for achieving low carbon mobility. Spatial planning at city and district levels must as much as possible incorporate principles and action plans suggested at a national level document, that is, the Low Carbon Mobility Blueprint and Action Plan. In addition, the LCMB should also include a mode shift and planning for electric charging infrastructure.

A council should be established as the national focal point on low carbon mobility policy, strategy and programme formulation. The council plays a coordinating role among sectorial agencies. It should have an institutional structure composed of an operating secretariat and several working groups to formulate and coordinate policy implementation with nationwide responsibility to support low carbon mobility agencies and programmes.

The council can be in the form of a Steering Committee (SC) to be co-chaired by the ministry in-charge of environment and climate change and the ministry in-charge of transportation. The members of the SC would comprise of representatives from ministries and agencies that have interest and/or stake in the environment, climate change and transportation. The main task of the SC is to undertake the implementation and monitoring of the LCMB. The SC will also be responsible to conduct a mid-term review and propose necessary improvements and/or remedial actions to achieve the desired objectives of the LCMB.



Upon adoption of the LCMB, the SC will need to mobilise resources through discussions with key agencies to move forward the implementation of the LCMB. Lead agencies for each of the action plan need to engage with supporting agencies so that resource mobilisation are realised effectively. Resource mobilisation encompasses both funding and human resource mobilisation.

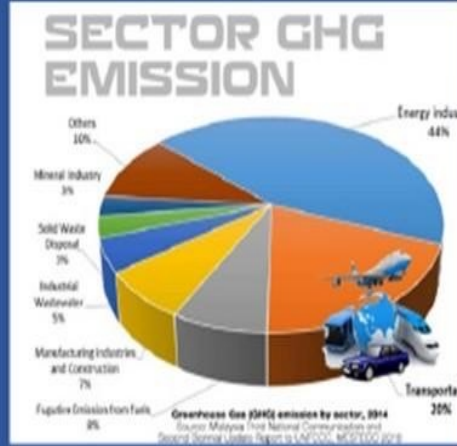
<https://www.kasa.gov.my/resources/alam-sekitar/Low-Carbon-Mobility-Blueprint-2021-2030.pdf>

INTRODUCTION - Background of Low Carbon Mobility Blueprint (LCMB)



Malaysia ranked 3rd among ASEAN countries for total CO₂ emissions per capita (2018)
 Transport sector represented 28.8% of total fossil fuel combustion, above global average of 24.5%.

Source: International Energy Agency CO₂ Emissions from Fuel Combustion (2019)



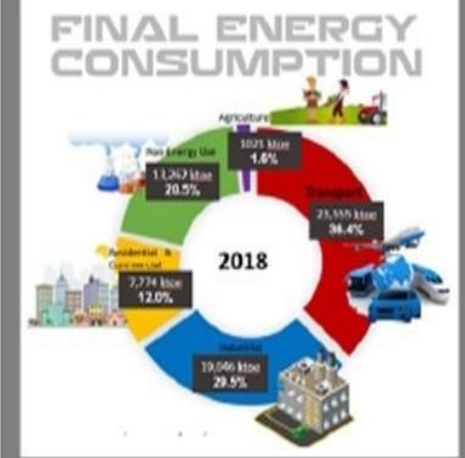
Transport sector is 2nd biggest driver of CO₂ emissions (21%) after the energy industries.

Source: Malaysia Third National Communication and Second Biennial Update Report to UNFCCC (2018)



Road transport is the largest CO₂ emitter among all transport subsectors.
 Car accounted for the highest emission (58%), followed by goods vehicle (23%) and motorcycle (12%).

Source: Malaysia Third National Communication and Second Biennial Update Report to UNFCCC (2018)



Transportation contributes to 36.4% of the final energy consumption in 2018, which is the largest energy user in Malaysia.

Source: Malaysia Energy Statistics Handbook 2020

The Low Carbon Mobility Blueprint (LCMB) 2021 - 2030 document led by the Ministry of Environment and Water (KASA) outlines strategies and actions required to mitigate energy consumption and greenhouse gas (GHG) emissions



EV DEVELOPMENT

MAIN EV OEM'S IN MALAYSIA



Source: MAA and OEMs

WHERE WE ARE TODAY... CURRENT STATUS & TARGETS



**15,307
units**

***xEV (PV+CV)**

2.42% of TIV
as at 31 October 2022

compared to

0.58% of TIV
as at Year 2021

2030: 15% of TIV
2040: 38% of TIV



354 units

xEV (Motorcycles)

0.06% of TIV
as at 31 October 2022

compared to

0.05% of TIV
as at Year 2021

2030: 15% of TIV
2040: 38% of TIV



88 units

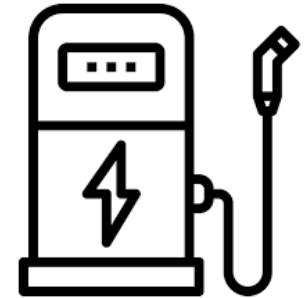
Electric Bus

0.76% of active permit**
as at 31 October 2022

compared to

0.32% of active permit
as at Year 2021

**2030: 20% of active
permit**



900 units

EV Charges

DC: 109 units
AC: 791 units

as at 30 November 2022

2025: 10,000 units
DC: 1,000 units
AC: 9,000 units

* xEV (PV+CV): Electric and hybrid (including PHEV) for passengers and commercial vehicles;

** active permit (referred to registered buses from 2011 until 30 October 2022 = 11,630)

Source: MOT, MGTC

NATIONWIDE DISTRIBUTION OF CHARGING FACILITIES

Public EV Charging Infrastructure (as at 2 December 2022): Towards 10,000 by 2025 (LCMB)

900
PUBLIC CHARGING STATIONS
791AC 109DC
5.7kW - 22 kW 50 kW - 560kW



EV CHARGER DISTRIBUTION BREAKDOWN



CHALLENGES

01



UNAFFORDABLE EVS AND LACK ADOPTION

- i. The price of EVs and Battery are high and expensive;
- ii. Low localisation for critical parts and components for EV causes price of EV to be high;
- iii. Insufficient EV aftersales support in terms of service and maintenance;
- iv. Lack of available facilities to support EV R&D and well-to-wheel analysis; and
- v. Low EV adoption in Government and public transportation.

02



LIMITATION IN PROVIDING EV CHARGING FACILITIESLIMITATIONS

- i. Long lead time for the approval process to install chargers at highways;
- ii. High installation cost for DC chargers;
- iii. Land Issues; and
- iv. Absence of EV charging planning in locality plan.

03



LACK OF TALENTS FOR EV DEVELOPMENT

- i. Lack of talent in service and maintenance;
- ii. Inadequate experts that suit industry needs; and
- iii. Limited anchor EV companies especially for the critical components i.e. battery affect local vendor's readiness and participation

KEY IMPLEMENTATION STRATEGIES

S1

Effort to Introduce Affordable & Safe EV and its adoption

- Incentives
- Improve AP Mechanism
- Establish Safety Standard
- Promotion of EV adoption

S2

EV Charging Facilities Ecosystem Development

- Establish Guide and roadmap for EV Charging Station
- Improve current procedures
- Charge Point Operator (CPO) Licensing

S3

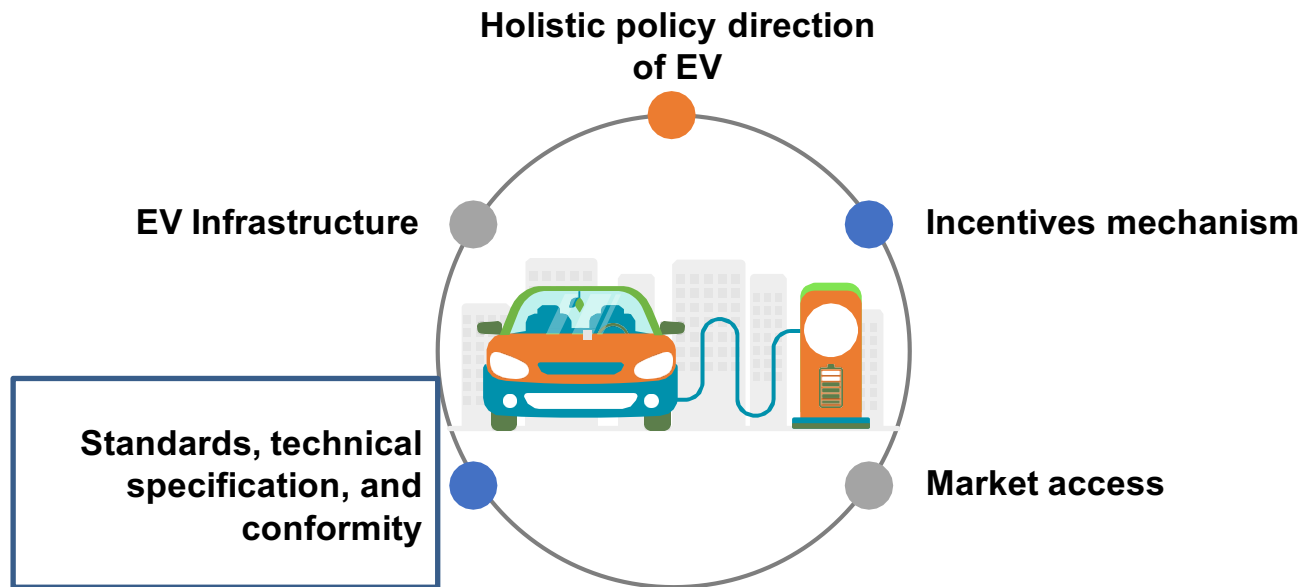
Sustainability of EV Support System

- Human Capital Development
- Strengthen aftersales market support
- R&D

NATIONAL ELECTRIC VEHICLE TASK FORCE (NEVTF)

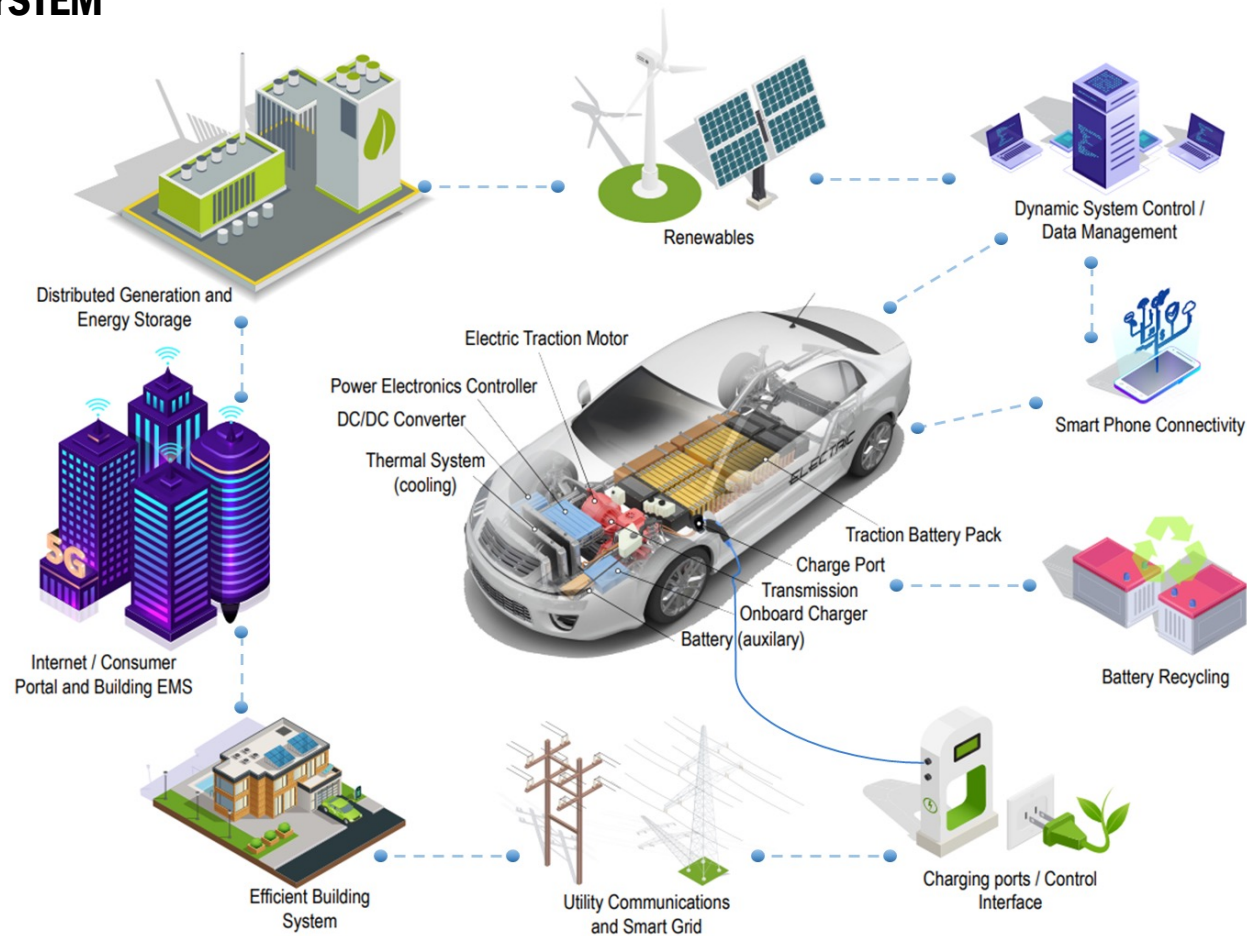
The National Electric Vehicle Taskforce (MEVT) was established in November 2020 to spearhead the strategic initiative towards the development and deployment of Electric Vehicle in Malaysia which include the followings:

- I. to identify gaps and ratify issues on the existing and/or new policy/initiatives related to development and deployment of Electric Vehicle in Malaysia; and
- II. provide policy recommendation, mechanism and/or specific initiatives together with its timeline on matters pertaining to the overall development and deployment of Electric Vehicle in Malaysia.



INTRODUCTION OF EV LANDSCAPE IN MALAYSIA

EV ECOSYSTEM

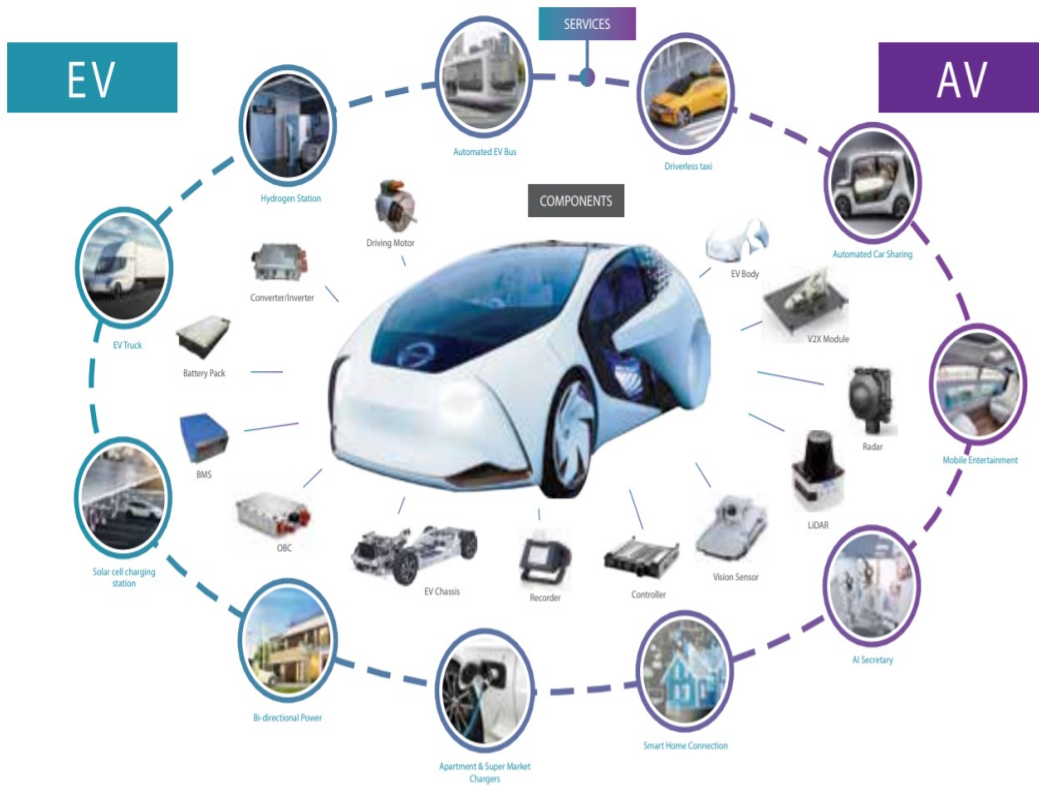


A complete vehicle electrification requires several ecosystems to develop and work collaboratively to leverage one another's capabilities to ensure a seamless development of the entire EV network.

Accelerating EV ecosystem development across the nation is a major opportunity to seize significant growth while enticing the EV business opportunities in the country.

INTRODUCTION OF EV LANDSCAPE IN MALAYSIA

NAP 2020 ON EV DEVELOPMENT



- The NAP 2020 focuses on the enhancement in the development of critical components and systems for technology and engineering of NxGV, MaaS and IR4.0.

CRITICAL COMPONENT DEVELOPMENT

PHASE 1	PHASE 2	PHASE 3
Continuation of NAP 2014	2020 - 2024	2025 - 2027
<ul style="list-style-type: none"> Engine transmission, control system Tool, Die and Mould (TDM) Aluminium and other Non-Ferrous Casting Design engineering and prototyping Vehicle, sub-system and component testing Automotive grade steel Engineering Plastics 	<ul style="list-style-type: none"> Big Data Analytics (BDA) Internet of Things (IoT) Additive Manufacturing Advanced Material Battery Management System (BMS) Thermal Management System (TMS) Battery Pack & Capacity Recycling Processes Light Detection and Ranging (LIDAR) Cloud Computing Cybersecurity System Integrator Artificial Intelligence 1 On-board Charging Charging Infrastructure 	<ul style="list-style-type: none"> Complex network of Radio Detection and Ranging (RADAR) Computing Vision Sensor Controller and Cloud-based Controller Recorder Advanced Communication Protocol Stimulation Digital Twin Autonomous Robot and Cobot Augmented Reality/Mixed Reality Artificial Intelligence 2
		2028 - 2030
		<ul style="list-style-type: none"> Advanced tooling Machine Learning Powertrain (Fuel Cell) Nano- Material Charging Infrastructure - mass deployment of ultra fast charging Modular based battery swapping technology Converter/Inverter Driving motor Interoperability Vehicle to Everything (V2X) communication module

STANDARDS DEVELOPMENT

PREVIOUS	EFFECTIVE JUNE 2022	SECTOR NAME
NSC A →	NSC 01	Agriculture
NSC B →	NSC 02	Chemicals and Materials
NSC C →	NSC 03	Consumer Interest
NSC D →	NSC 04	Construction, Building, and Civil Engineering
NSC E →	NSC 05	Generation, Transmission & Distribution of Energy
NSC F →	NSC 06	Mechanical Engineering
NSC G →	NSC 07	Information Technology, Communication & Multimedia
NSC H →	NSC 08	Petroleum & Gas
NSC I →	NSC 09	Halal
NSC J →	NSC 10	Plastics and Plastic Products
NSC K →	NSC 11	Logistic
NSC L →	NSC 12	Transport
NSC M →	NSC 13	Fire Safety
NSC N →	NSC 14	Rubber and Rubber Products

PREVIOUS	EFFECTIVE JUNE 2022	SECTOR NAME
NSC P →	NSC 16	Metallic Materials & Semi-finished Products
NSC Q →	NSC 17	Textiles and Apparels
NSC R →	NSC 18	Medical Devices and Facilities for Healthcare
NSC S →	NSC 19	Electrical & Electronic Equipments & Accessories
NSC T →	NSC 20	Tourism, Exhibition & Hospitality Services
NSC U →	NSC 21	Food, Food Products and Food Safety
NSC V →	NSC 22	Timber, Timber Products & Timber Structures
NSC W →	NSC 23	Occupational Safety & Health
NSC X →	NSC 24	Oil Palm & Its Products
NSC Y →	NSC 25	Quality & Organisational Management
NSC Z →	NSC 26	Environmental Management
New Sector →	NSC 27	Smart City

STANDARDS DEVELOPMENT

NSC 12	TC (Previous)	TC		ISO	WP29 (1958 AGREEMENT)
SCOPE: Scope: Standardisation in the transport sector including on parts/components for construction of vehicles as well as it's related services and maintenance	L1	TC1	Safety & Impact Testing Ergonomics Code VIN-Code WMI	SC36 SC39 WG17	General Safety (GRSG), Passive Safety (GRSP), R.E.3
	L2	TC2	Electrical and Electronics Components and general system aspects	TC22/SC32	UN R10 , AACV (GRVA)
	L3	TC3	Vehicle Dynamics & Chassis Components	TC22/SC33	GRVA (Brakes related), UNR30, R54, R75
	L4	TC4	Specific aspects for gaseous fuel	TC22/SC41	Exhaust Emission (GRPE)
	L6	TC6	Lighting & Visibility	TC22/SC35	Lighting & Signaling (GRE) , UN R43
	L7	TC7	Propulsion, Powertrain & Powertrain Fluids	TC22/SC34	Noise (GRB), Exhaust Emission (GRPE)
	L8	TC8	Motorcycles & Mopeds	TC22/SC38	All GRs related with motorcycle
	L9	TC9	Specific aspects for lights & heavy commercial vehicles, buses & trailers	TC22/SC40	All GRs related with commercial vehicles, buses & trailers
	L10	TC10	Road Traffic Safety Management Systems	TC 241	
	L11	TC11	Tyres, Rims and Valves	TC31	UNR30, R54, R75
	-	L12 (NEW)	Data Communication	TC22/SC31	AACV (GRVA)
	-	L13 (NEW)	Electrically Propelled Vehicles	TC22/SC37	UNR30, R54, R75

STANDARDS DEVELOPMENT

Request for NP

Drafting

NSC Acceptance

Step 01



Step 03



Step 05



Finish

Start

Step 02



**NSC
Approval**

Step 04



**Public
Comment**

Step 06



**Minister
approval**

Adoption

4 – 9 months

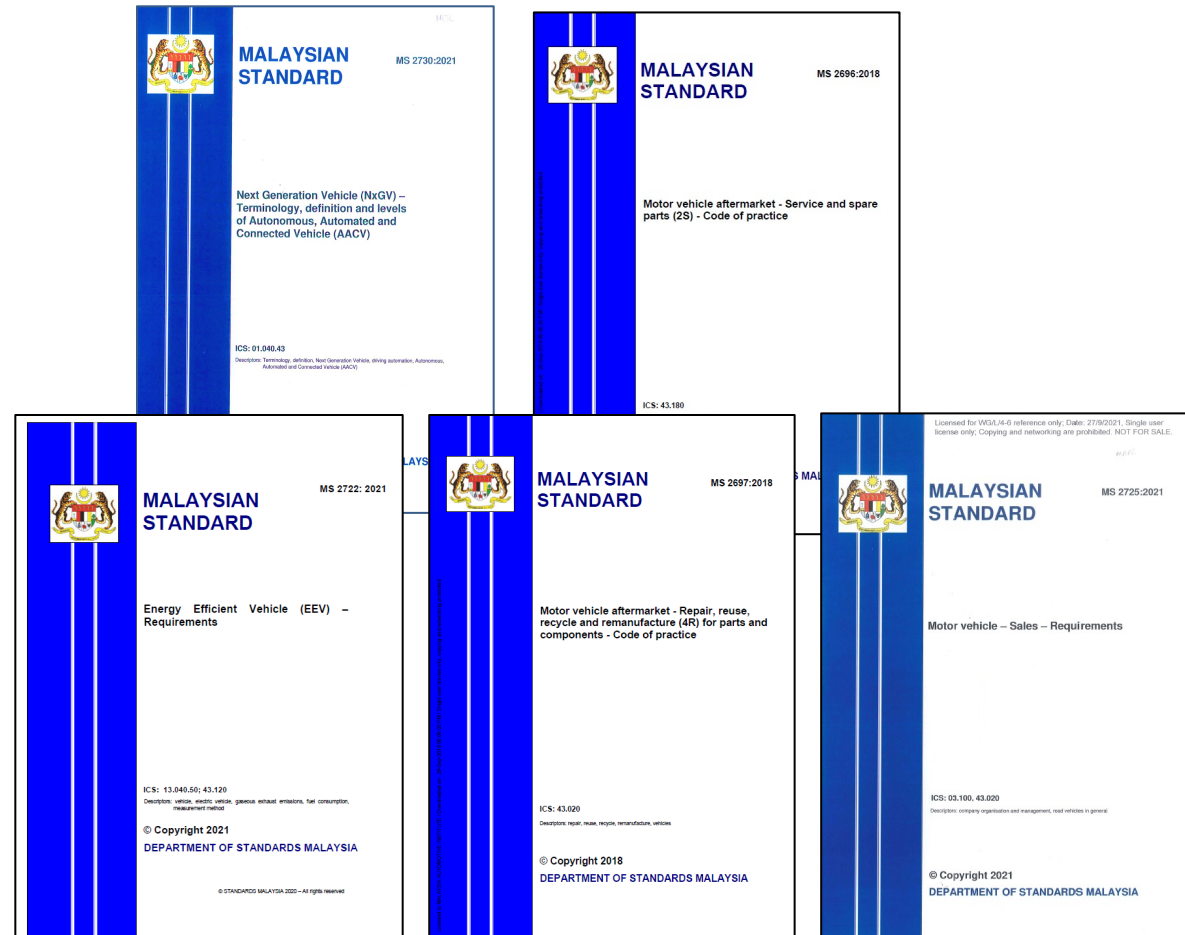
Indigenous

12-18 months

STANDARDS DEVELOPMENT

LIST OF GENERAL STANDARDS RELATED TO EVs

- MS 2722:2021: Energy Efficient Vehicle (EEV) - Requirements gazetted on 22nd April 2021
- MS 2730:2021: Next Generation Vehicle (NxGV) – Terminology, definition and levels of Autonomous, Automated and Connected Vehicle (AACV) gazetted on 28th July 2021.
- MS 2697:2018: Motor Vehicle Aftermarket – Repair, reuse, recycle and remanufacture (4R) for parts and components – Code of practice gazetted on 13th September 2018.
- MS 2696:2018 (Motor vehicle aftermarket - Service and Spare parts (2S) gazetted on 13th September 2018.
- MS 2725: 2021 Motor vehicle – Sales - Requirements gazetted in 2021.



STANDARDS DEVELOPMENT – APPLICATION OF GTRs

World Forum for Harmonization of Vehicle Regulations (UN/ECE/WP29)



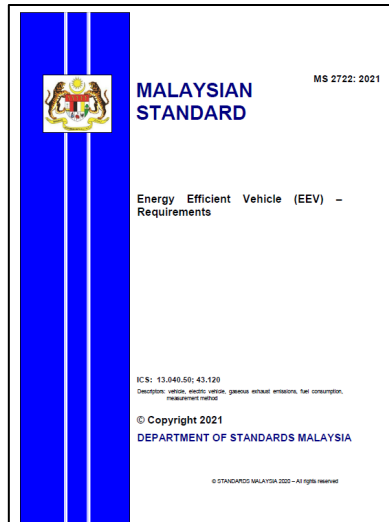
1998
GTR

Agreements
1958
ECE
Output

1997
Rule

MALAYSIA ALREADY ACCEDED TO WP29 SINCE
4th APRIL 2006

9



2 Normative references

The following normative references are indispensable for the application of this standard. For dated references, only the edition cited applies. For undated references, the latest edition of the normative reference (including any amendments) apply.

UNRs and GTRs have been made as main references in MS development – Technical Requirements, Procedures and etc

UN Regulation No.49 (UN R49), *Uniform provisions concerning the measures to be taken against the emission of gaseous and particulate pollutants from compression ignition engines and positive ignition engines for use in vehicles*

UN Regulation No.83 (UN R83), *Uniform provisions concerning the approval of vehicles with regard to the emission of pollutants according to engine fuel requirements*

UN Regulation No.101 (UN R101), *Uniform provisions concerning the approval of passenger cars equipped with an internal combustion engine with regard to the measurement of the emission of carbon dioxide and fuel consumption and of categories M1 and N1 vehicles equipped with an electric power train with regard to the measurement of electric energy consumption and range*

UN Global Technical Regulation No. 2 (UN GTR 2), *Measurement procedure for two-wheeled motorcycles equipped with a positive or compression ignition engine with regard to the emission of gaseous pollutants, CO₂ emissions and fuel consumption*

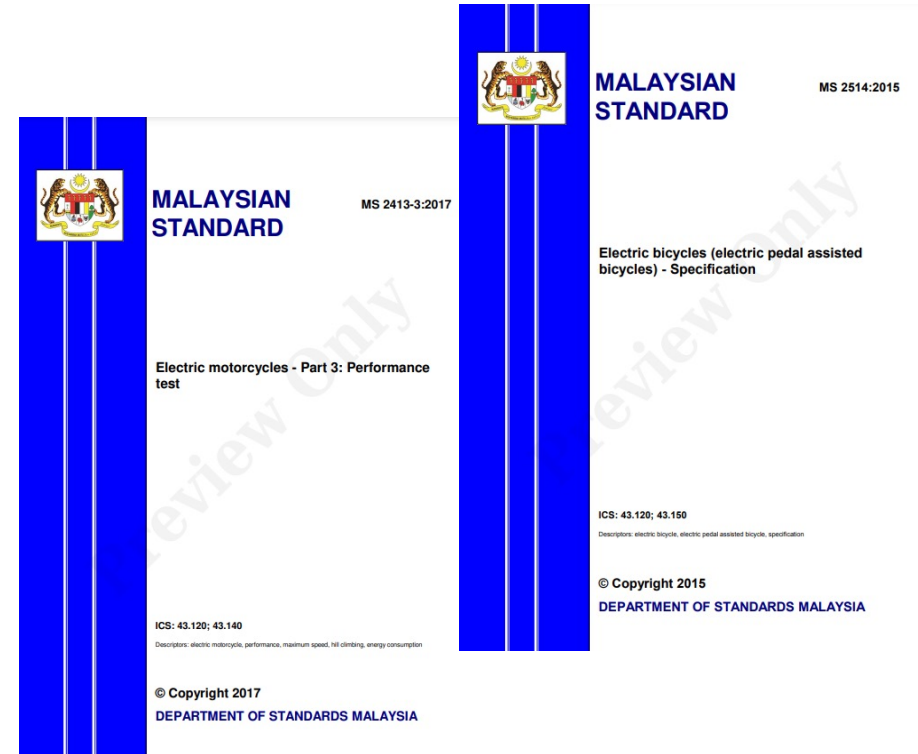
UN Global Technical Regulation No. 15 (UN GTR 15), *Worldwide harmonized Light vehicles Test Procedure (WLTP)*

STANDARDS DEVELOPMENT

LIST OF EV STANDARDS

- Passenger Car :
 - United Nations Regulations No. 100
- Electric Motorcycle :
 - MS 2413 : Electric motorcycle (>50 km/h)
 - MS 2688 : Electric moped (25-50 km/h)
 - United Nations Regulations No. 136
- Electric Bicycle :
 - MS 2514 : Electric bicycle (<25 km/h)
- EV Battery & Chargers :
 - MS IEC 62196 : EV Connectors & Inlet
 - MS IEC 61851 : EV Conductive Charging System
 - MS IEC 62660 : Li-Ion Testing for EV
 - SAE 1772 : EU-Type 2

*Development of standards for EVIC & battery swapping related (including charging protocols) is on-going with DSM.



STANDARDS DEVELOPMENT (CHARGING)

NO.	INTERNATIONAL STANDARDS	NATIONAL STANDARDS	DETAILS DESCRIPTION
1.	IEC 61851-1:2017	MS IEC 61851-1:2021	Electric vehicle conductive charging system - Part 1: General requirements
2.	IEC 61851-21-1:2017	MS IEC 61851-21-1:2021	Electric vehicle conductive charging system - Part 21-1 Electric vehicle on-board charger EMC requirements for conductive connection to AC/DC supply
3.	IEC 61851-21-2:2018	MS IEC 61851-21-2:2021	Electric vehicle conductive charging system - Part 21-2: Electric vehicle requirements for conductive connection to an AC/DC supply - EMC requirements for off board electric vehicle charging systems
4.	IEC 61851-23:2014	MS IEC 61851-23:2021	Electric vehicle conductive charging system - Part 23: DC electric vehicle charging station
5.	IEC 61851-24:2014	MS IEC 61851-24:2021	Electric vehicle conductive charging system - Part 24: Digital communication between a d.c. EV charging station and an electric vehicle for control of d.c. charging
6.	IEC 61851-25:2020	N/A	Electric vehicle conductive charging system - Part 25: DC EV supply equipment where protection relies on electrical separation
7.	IEC 60364-7-722:2018	N/A	Low-voltage electrical installations - Part 7-722: Requirements for special installations or locations - Supplies for electric vehicles
8.	IEC 61439-7:2018	N/A	Low-voltage switchgear and control gear assemblies - Part 7: Assemblies for specific applications such as marinas,

NO.	INTERNATIONAL STANDARDS	NATIONAL STANDARDS	DETAILS DESCRIPTION
			camping sites, market squares, electric vehicle charging stations
9.	IEC TR 61850-90-8:2016	N/A	Communication networks and systems for power utility automation - Part 90-8: Object model for E-mobility
10.	IEC 61980-1:2020	N/A	Electric vehicle wireless power transfer (WPT) systems - Part 1: General requirements
11.	IEC 62196-1:2014	MS IEC 62196-1:2021	Plugs, socket-outlets, vehicle connectors and vehicle inlets - Conductive charging of electric vehicles - Part 1: General requirements
12.	IEC 62196-2:2016	MS IEC 62196-2:2021	Plugs, socket-outlets, vehicle connectors and vehicle inlets - Conductive charging of electric vehicles - Part 2: Dimensional compatibility and interchangeability requirements for a.c. pin and contact-tube accessories
13.	IEC 62196-3:2014	MS IEC 62196-3:2021	Plugs, socket-outlets, vehicle connectors and vehicle inlets - Conductive charging of electric vehicles - Part 3: Dimensional compatibility and interchangeability requirements for d.c. and a.c./d.c. pin and contact-tube vehicle couplers
14.	IEC TS 62196-3-1:2020	N/A	Plugs, socket-outlets, vehicle connectors and vehicle inlets - Conductive charging of electric vehicles - Part 3-1: Vehicle connector, vehicle inlet and cable assembly for DC charging intended to be used with a thermal management system
15.	IEC 62752:2016+AMD1:2018	N/A	In-cable control and protection device for mode 2 charging of electric road vehicles (IC-CPD)

STANDARDS DEVELOPMENT (CHARGING)

NO.	INTERNATIONAL STANDARDS	NATIONAL STANDARDS	DETAILS DESCRIPTION
16.	IEC PAS 62840-3:2021	N/A	Electric vehicle battery swap system - Part 3: Particular safety and interoperability requirements for battery swap systems operating with removable RESS/battery systems
17.	IEC 62893-1:2017+AMD1:2020	N/A	Charging cables for electric vehicles for rated voltages up to and including 0,6/1 kV - Part 1: General requirements
18.	IEC 62893-2:2017	N/A	Charging cables for electric vehicles for rated voltages up to and including 0,6/1 kV - Part 2: Test methods
19.	IEC 62893-3:2017	N/A	Charging cables for electric vehicles for rated voltages up to and including 0,6/1 kV - Part 3: Cables for AC charging according to modes 1, 2 and 3 of IEC 61851-1 of rated voltages up to and including 450/750 V
20.	IEC 62893-4-1:2020	N/A	Charging cables for electric vehicles of rated voltages up to and including 0,6/1 kV - Part 4-1: Cables for DC charging according to mode 4 of IEC 61851-1 - DC charging without use of a thermal management system
21.	IEC 62893-4-2:2021	N/A	Charging cables for electric vehicles of rated voltages up to and including 0,6/1 kV - Part 4-2: Cables for DC charging according to mode 4 of IEC 61851-1 - Cables intended to be used with a thermal management system
22.	IEC 62955:2018	N/A	Residual direct current detecting device (RDC-DD) to be used for mode 3 charging of electric vehicles

NO.	INTERNATIONAL STANDARDS	NATIONAL STANDARDS	DETAILS DESCRIPTION
23.	IEC TS 62840-1:2016	N/A	Electric vehicle battery swap system - Part 1: General and guidance
24.	IEC 62840-2:2016	N/A	Electric vehicle battery swap system - Part 2: Safety requirements
25.	IEC 62305-1:2006	MS IEC 62305:2007	Protection Against Lightning - Part 1: General Principles (First Revision)
26	IEC 61000-4-11:2004, MOD	MS 61000-4-11:2015	Testing and measurement methods-Voltage dips, short interruptions and voltage variations immunity tests (Second revision)
27	IEC 61000-4-34:2009, MOD	MS 61000-4-34:2014	Testing and measurement techniques - Voltage dips, short interruptions and voltage variations immunity tests for equipment with mains current more than 16 A per phase (First revision)
NOTE:			
(a) If no MS or MS IEC standard exists, the relevant IEC standard shall apply.			
(b) All equipment shall be approved by the Energy Commission if required.			

STANDARDS DEVELOPMENT

NATIONAL OCCUPATIONAL SKILLS STANDARDS



NOSS outlines the skills required by an employee working at a certain level of employment to achieve specific competency.

NOSS is developed by a pool of the industry expert and skilled workers in the area of performed job.

The NOSS can be used for

- Pengiktirafan Pencapaian Terdahulu (PPT)/Recognition of Prior Achievement certification for experienced manpower.
- SLDN stands for National Dual Training System is for graduates which includes actual workplace (company) of 70% to 80% practical training (performance) and 20% to 30% theoretical learning (knowledge).

15) **STESEN PENGECAS KENDERAAN ELEKTRIK
(ELECTRIC VEHICLE (EV) CHARGING STATION)**

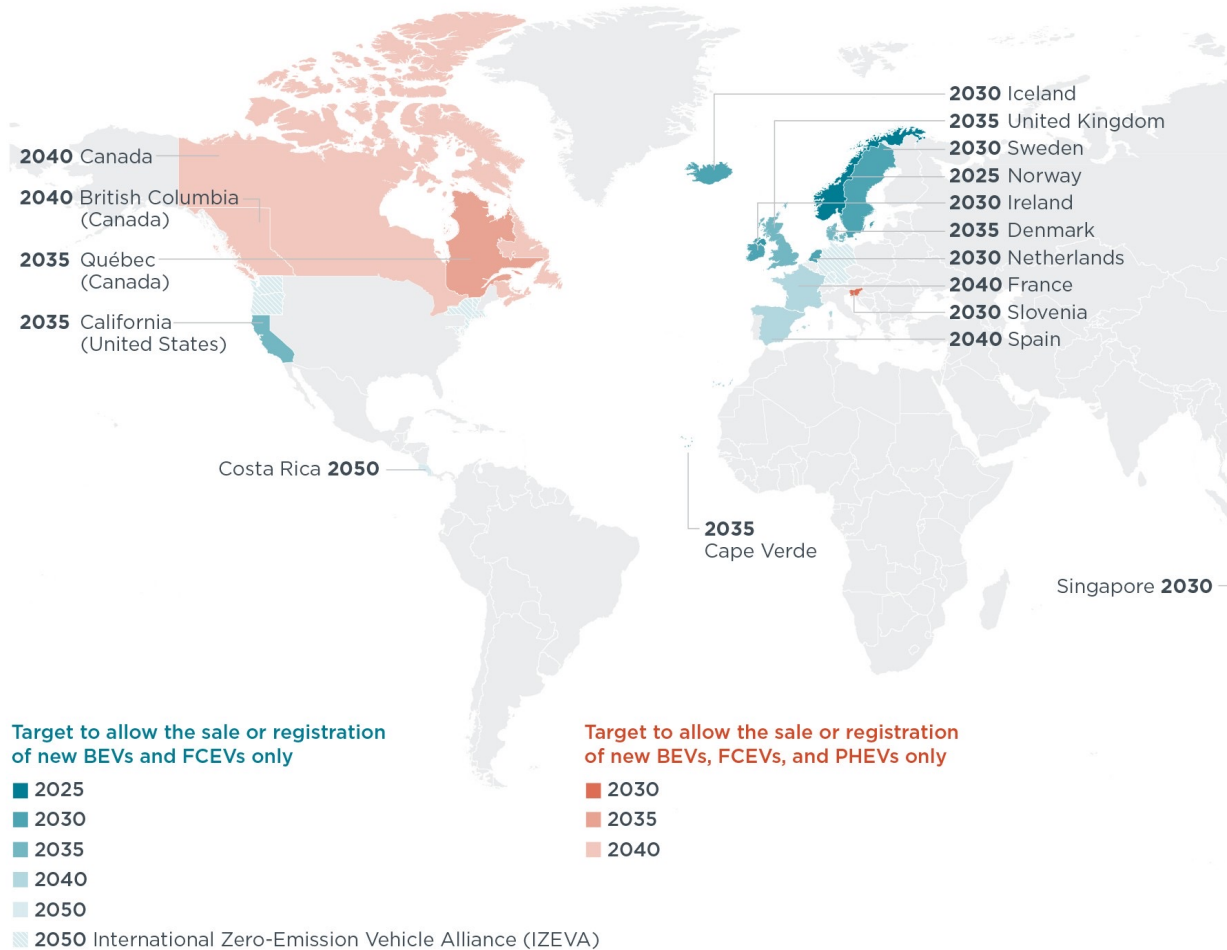
Tiada Tahap (No Level)	NCS-005:2017 Pemasangan dan Penyelenggaraan Stesen Pengecas Kenderaan Elektrik <i>Electric Vehicle (EV) Charging Station Installation and Maintenance</i> (27-11-2017)
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Area	Operasi Bas Elektrik / <i>Electric Bus Operation</i>	Servis Kereta Elektrik dan Hibrid / <i>Electric and Hybrid Car Service</i>	Operasi Tempat Letak Kereta / <i>Car Parking Operation</i>
L5	TP-331-5:2014 Pengurusan Penyelenggaraan Bas Elektrik <i>Electric Bus Maintenance Management</i> (16-12-2014)	G452-002-5:2017 Selepas Jualan – Pengurusan Servis <i>After Sales - Service Management</i> (20-06-97)(17-07-2012)(28-03-2017)	Belum ada (Not Available)
L4	TP-331-4:2014 Pengurusan Penyelenggaraan Bas Elektrik <i>Electric Bus Maintenance Management</i> (16-12-2014)	G452-002-4:2017 Selepas Jualan – Operasi Servis <i>After Sales - Service Operation</i> (20-06-97)(17-07-2012)(28-03-2017)	Belum ada (Not Available)
L3	TP-331-3:2014 Operasi Bas Elektrik <i>Electric Bus Operation</i> (16-12-2014)	G452-007-3:2019 Servis Kereta Elektrik dan Hibrid <i>Electric and Hybrid Car Servicing</i> (16-12-2014)(07-08-2019)	TP-335-3:2016 Operasi & Perkhidmatan Tempat Letak Kereta <i>Car Park Operation & Services</i> (04-02-2016)
L2	Tiada Tahap (No Level)	G452-002-2:2018 Perkhidmatan Pembaikan – Kenderaan Ringan <i>Light Vehicle – Repair Service</i> (07-07-93)(16-07-98) (25-10-10)(24-04-2013) (11-10-2016)(08-10-2018)	Tiada Tahap (No Level)
L1	Tiada Tahap (No Level)	Tiada Tahap (No Level)	Tiada Tahap (No Level)

Area	2 Tayar / 2 Wheel	Penyenggaraan Motosikal / <i>Motorcycle Servicing</i>
L5	TP-119-5:2015 Kejuruteraan Sukan Bermotor (2 Tayar) <i>Motorsport Engineering (2 Wheel)</i> (31-03-2015)	TP-118-5:2015 Pengurusan & Penyelenggaraan Motosikal <i>Motorcycle Servicing & Management</i> (31-03-2015)
L4	TP-119-4:2015 Kejuruteraan Sukan Bermotor (2 Tayar) <i>Motorsport Engineering (2 Wheel)</i> (31-03-2015)	TP-118-4:2015 Pengurusan & Penyelenggaraan Motosikal <i>Motorcycle Servicing & Management</i> (31-03-2015)
L3	G454-001-3:2018 Motosikal - Perkhidmatan Diagnosis <i>Motorcycle - Diagnose Service</i> (19-07-96)(30-05-2002)(05-04-2012)(07-05-2018)	
L2	G454-001-2:2018 Motosikal - Perkhidmatan Pembaikan <i>Motorcycle - Repair Service</i> (19-07-96)(30-05-2002)(05-04-2012)(07-05-2018)	
L1	G454-001-1:2018 Motosikal - Penyelenggaraan & Perkhidmatan <i>Motorcycle - Maintenance & Service</i> (19-07-96)(30-05-2002)(05-04-2012)(07-05-2018)	

MOVING FORWARD

Governments with official targets to 100% phase out sales or registrations of new internal combustion engine cars by a certain date*
(Status: June 2021)



- This is a global overview of all targets announced, as of June 2021, for phasing out of the sale or registration of new internal combustion engine (ICE) passenger cars.
- Additionally, as countries seek to reduce the impacts of emissions from transport on climate change and to comply with the GHG reduction goals under the Paris Agreement, these targets will be increasingly relevant. A transition to zero-emission vehicles is necessary to reach these goals.
- Malaysia will decide the way forward upon the conclusion of domestic consultation – CAFÉ implementation (to work closely with U.S) to discourage ICE and EV Incentives to encourage the development.

* Includes countries, states, and provinces that have set targets to only allow the sale or registration of new battery electric vehicles (BEVs), fuel cell electric vehicles (FCEVs), and plug-in hybrid electric vehicles (PHEVs). Countries such as Japan with pledges that include hybrid electric vehicles (HEVs) and mild hybrid electric vehicles (MHEVs) are excluded as these vehicles are non plug-in hybrids.

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THANK YOU

