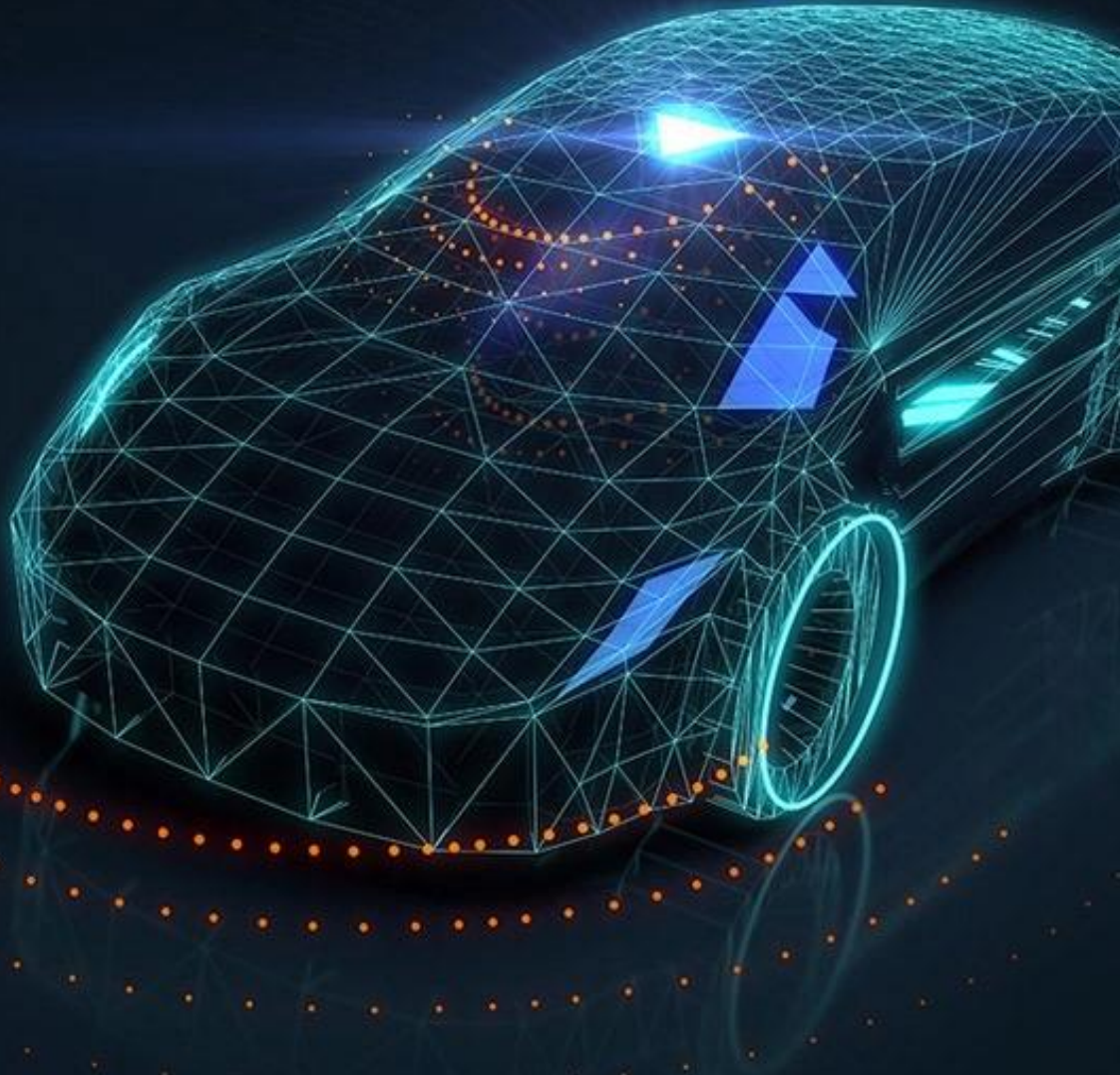




MINISTRY
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NATIONAL AUTOMOTIVE POLICY (NAP) 2020



OUTLINE OF NAP 2020

- Background and Key Achievements of NAP 2014
- National Automotive Vision
- Malaysian Vehicle Project
- Framework & Objectives of NAP 2020
- New Elements in NAP 2020
- Targets
- CMV
- Conclusion



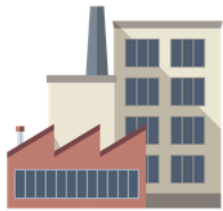
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BACKGROUND AND KEY ACHIEVEMENTS OF NAP 2014

BACKGROUND OF NAP

POLICY DRIVEN

VISION DRIVES POLICY



| SUPPLY CHAIN INTEGRATION | INVESTMENTS PROMOTION | GREEN AND SUSTAINABILITY | CONNECTED MOBILITY |
|---|---|--|---|
| NAP 2006 (2006-2009) | NAP 2009 (2009-2014) | NAP 2014 (2014-2020) | NAP 2020 (2020-2030) |
| ADOPTED POLICY | REVIEWED | FOCUSED | ENHANCED |
| Introduced to transform the domestic automotive industry and integrating it into the increasingly competitive regional and global industry network. | Reviewed to enhance the capability and competitiveness of the domestic automotive industry. | Focused on developing Malaysia as the hub for Energy Efficient Vehicle (EEV) | Enhance Malaysia's automotive industry in the era of digital industrial transformation. |

KEY ACHIEVEMENTS OF NAP 2014



RM48.6 BIL WORTH OF GDP CONTRIBUTION (MANUFACTURING)



RM10.05 BIL OF TOTAL INVESTMENTS (2014 TO 2018)



247,177 EMPLOYMENT IN AUTOMOTIVE INDUSTRY (2014 TO 2018)



62% TIV EEV PENETRATION IN 2018 (FROM 14.1% IN 2014)



RM58.7 BIL LOCAL CONTENTS USED (2014 TO 2018)



RM12.1 BIL COMPONENTS EXPORTED IN 2018 (FROM RM4.7 BILLION IN 2014)



405 VENDORS CAPABLE TO BE OEMS' SUPPLIERS IN 2018 (FROM 277 IN 2014)

- LEVEL 5: 55 COMPANIES
- LEVEL 4: 130 COMPANIES
- LEVEL 3: 405 COMPANIES



598,704 UNITS OF TOTAL INDUSTRY VOLUME (TIV) (2018)



564,971 UNITS OF TOTAL PRODUCTION VOLUME (TPV) (2018)



RM2.08 BIL WORTH OF CBU VEHICLES (2018)



RM523.1 MIL WORTH OF REMANUFACTURED AUTOMOTIVE PARTS AND COMPONENTS (2018)



ESTABLISHMENT OF TWO AUTOMOTIVE SPECIALIZED DESIGN AND ENGINEERING CENTERS (MALAYSIA TECHNOLOGY CENTRE AND NETC) (2014-2018)

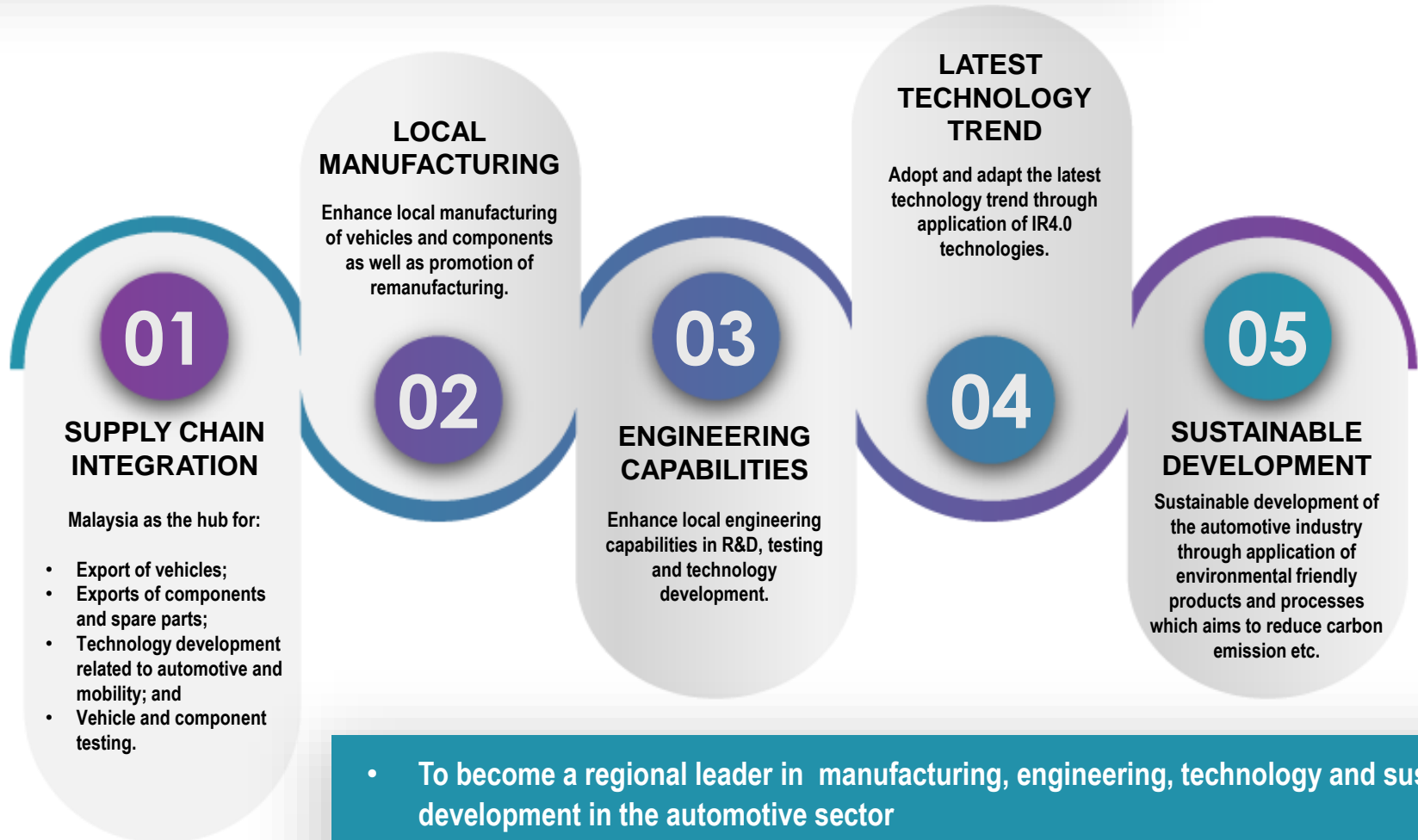


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NAP 2020

**NATIONAL
AUTOMOTIVE
VISION**

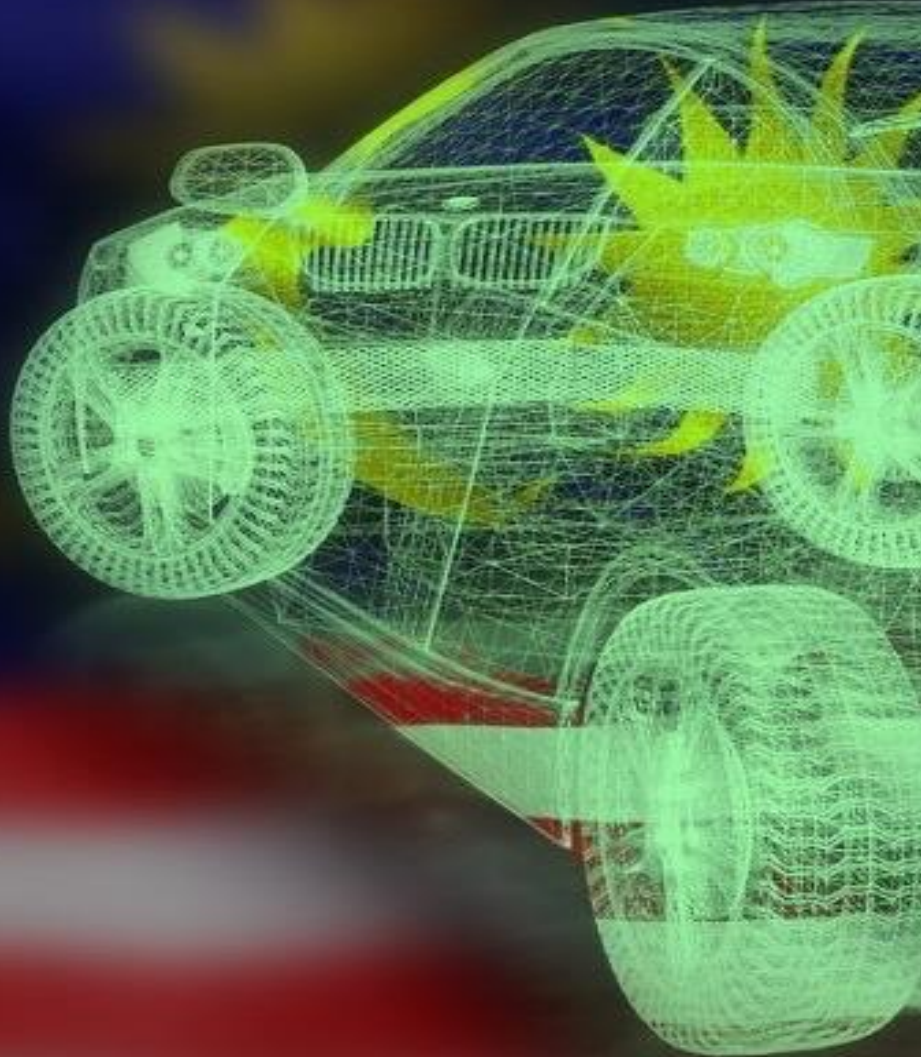
NAP 2020: NATIONAL AUTOMOTIVE VISION



- To become a regional leader in manufacturing, engineering, technology and sustainable development in the automotive sector
- The National Automotive Vision will support the establishment and development of existing projects and Malaysian Vehicle Project

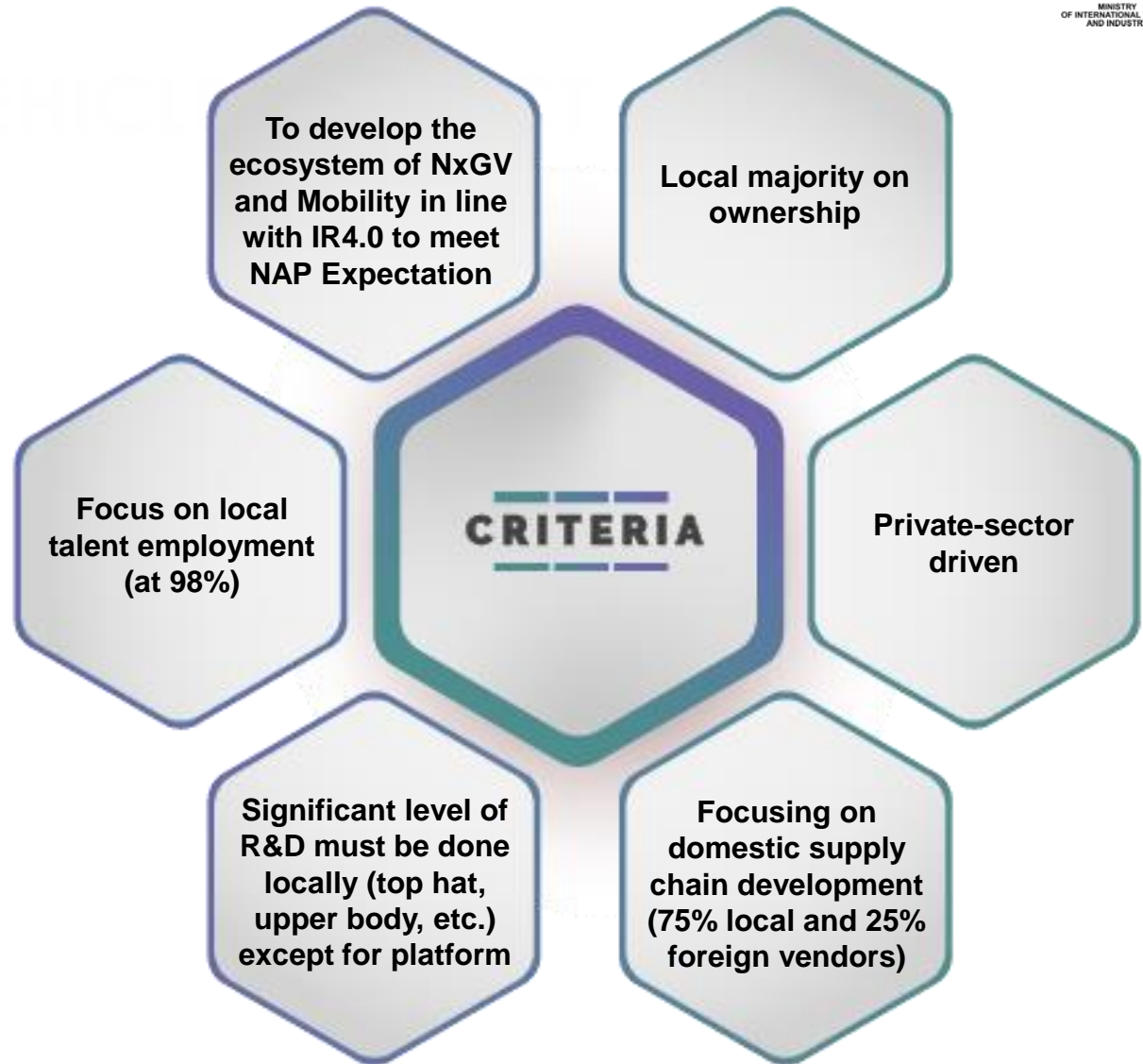


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MALAYSIAN VEHICLE PROJECT

MALAYSIAN VEHICLE PROJECT



Support for PROTON, PERODUA and MODENAS to be continued.



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FRAMEWORK AND OBJECTIVES OF NAP 2020

NAP 2020 FRAMEWORK

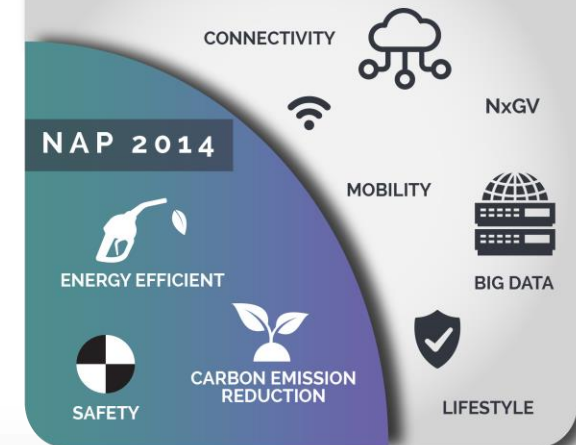
NAP 2014 FRAMEWORK



NEW ELEMENTS



NAP 2020



THE FRAMEWORK OF THE NAP IS SUPPORTED BY THE IMPLEMENTATION OF THESE DOCUMENTS:

NAP 2020

1. National Roadmap for Automotive & Mobility Value Chain (NRAMVC)
2. National Roadmap for Automotive & Mobility Technology (NRAMT)
3. National Roadmap for Automotive & Mobility Talent (NRAMTa)
4. National Roadmap for Automotive Aftermarket (NRAA)

5. National Blueprint for Automotive Mobility as a Service (NBAMaaS)
6. National Blueprint for Automotive Robotics (NBAR)
7. National Blueprint for Automotive Internet of Things (IoT) (NBAlot)

NAP 2020 OBJECTIVES

Develop NxGV technology ecosystem to make Malaysia the regional hub for NxGV production.

Expand automotive sector participation in MaaS sector.

Ensure local automotive industry is ready with new automotive paradigm closely related to IR4.0 development.

Ensure whole ecosystem benefits from the spin-off of NxGV implementation.

Reduce vehicle carbon emission by improving fuel economy level in Malaysia by 2025.



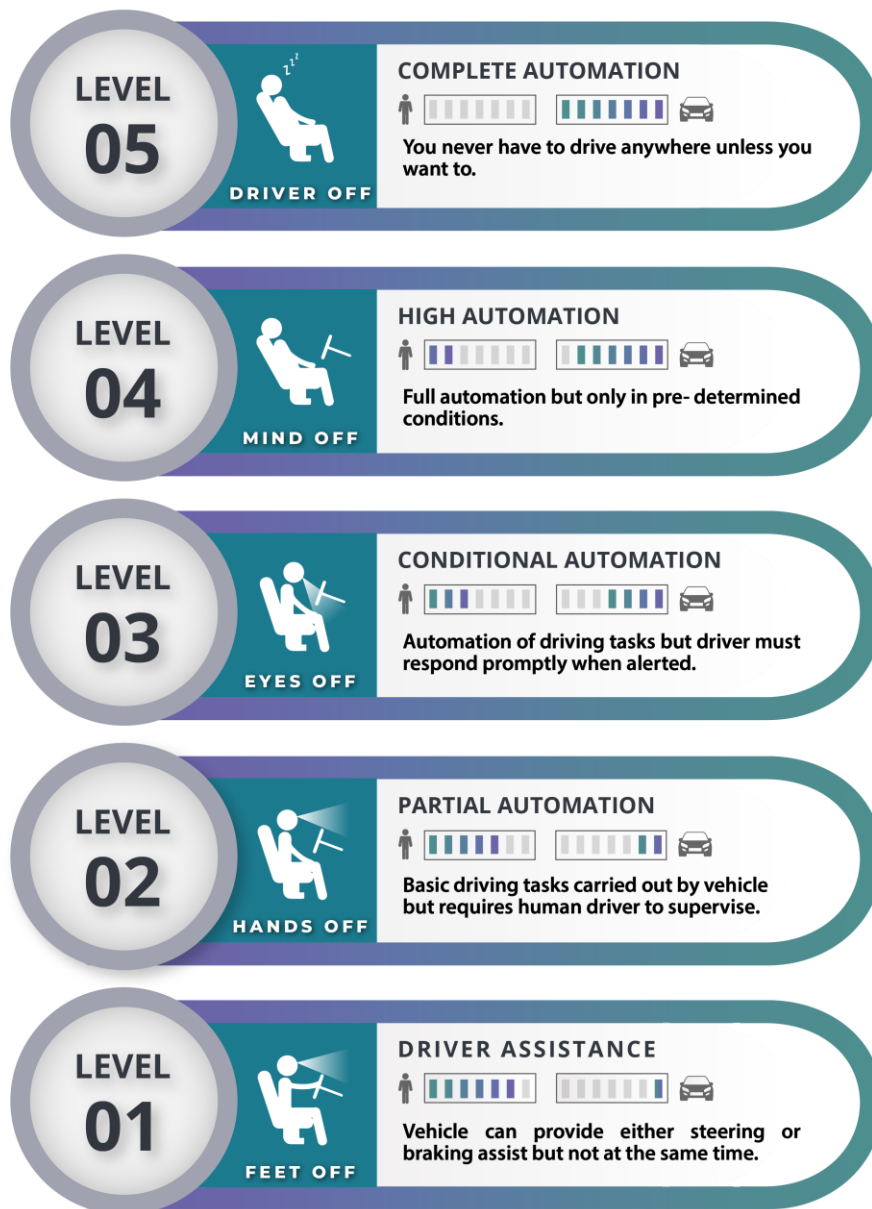
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NEW ELEMENTS IN NAP 2020

5 LEVELS OF VEHICLE AUTONOMY

NEXT GENERATION VEHICLE (NxGV)

- NxGV - vehicle with EEV status and achieve at least Level 3 Automation (Conditional Automation).
- Development of standards by 2021 to ensure market penetration by 2025.



STANDARDS TO BE DEVELOPED FOR NxGV

NEXT GENERATION VEHICLE (NxGV)

Autonomous, Automated And Connected Vehicles (AACV) Development

- Establishment of AACV in specifying its safety requirements for AACV testbed.
- Covering few vehicle categories in Malaysia with regards to the intelligent mobility and automation level features.

Electric Vehicle Interoperability Centre (EVIC)

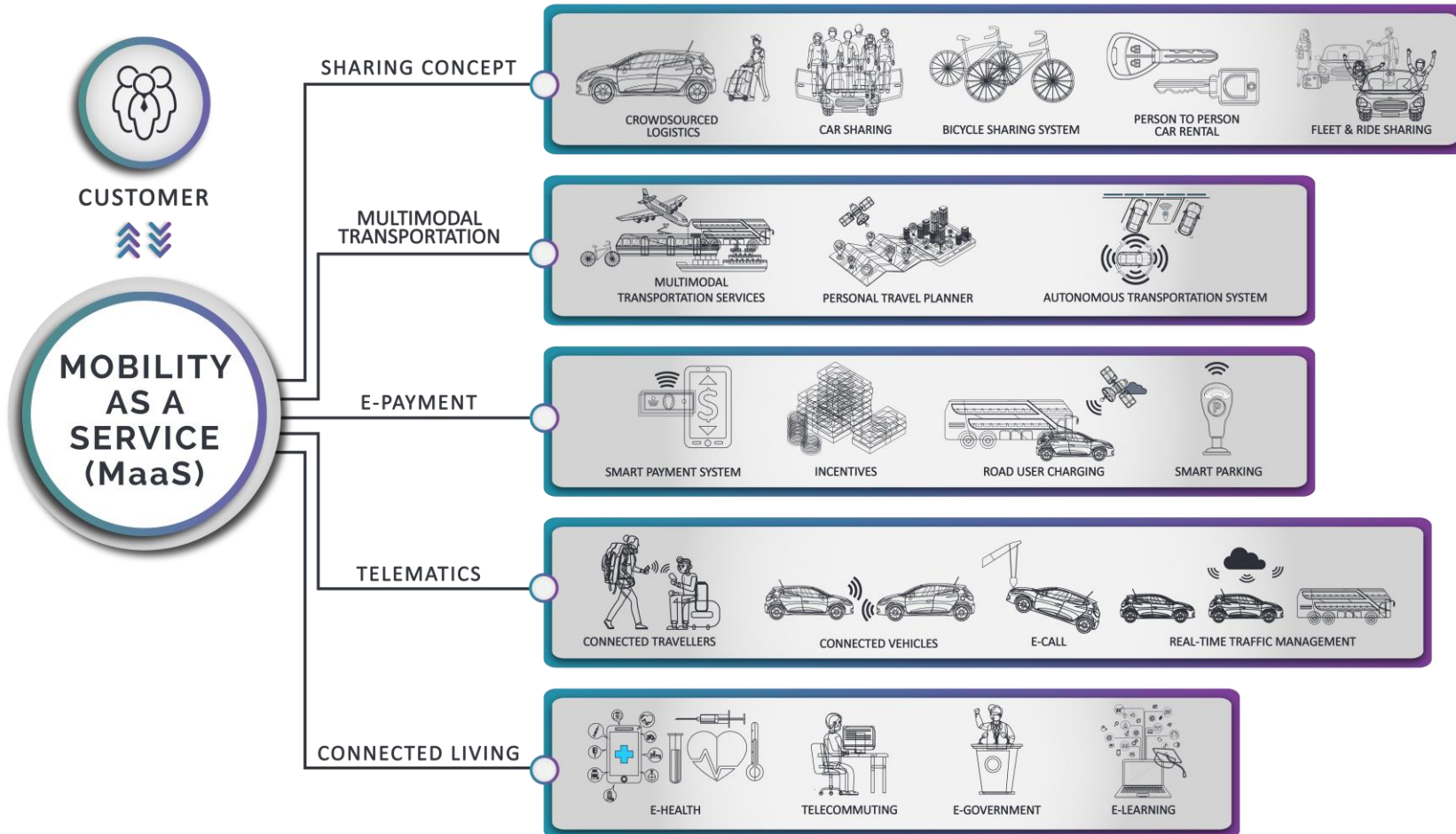
- EV Charging protocol
- Energy management system for EV ecosystem
- Safety usage of the critical components

Energy Efficient Vehicle (EEV) and Next Generation Vehicles (NxGV) specifications

- Revise definition of EEV and NxGV for wider scope – all vehicle category
 - i) Passenger Vehicle
 - ii) Commercial Vehicle
 - iii) Motorcycle

MOBILITY AS A SERVICE (MaaS)

MaaS - concept of integrating various types of transport services to centralized mobility services.



Use of IR 4.0-related technology applications especially AI, Big Data Analytics (BDA) and IoT will enable the implementation of NxGV and MaaS.

INDUSTRIAL REVOLUTION 4.0 (IR 4.0)

INDUSTRIAL REVOLUTION 4.0 (IR4.0)

1. BIOTECHNOLOGY
2. NANOTECHNOLOGY
3. QUANTUM COMPUTING
4. GOVERNANCE
5. ETC.

TECHNOLOGIES
ADVANCEMENT
AND
CONVERGENCE

BIG DATA
ANALYTICS

CYBERSECURITY

SIMULATION

ADVANCE
MATERIAL

ARTIFICIAL
INTELLIGENCE

AUGMENTED
REALITY

ADDITIVE
MANUFACTURING

SYSTEM
INTEGRATION

AUTONOMOUS
ROBOT

**ENABLING
TECHNOLOGIES**

INTERNET OF
THINGS (IoT)

CLOUD
COMPUTING

The digitalization of the production -
based industries are driven by these
technological drivers

Industry4WRD

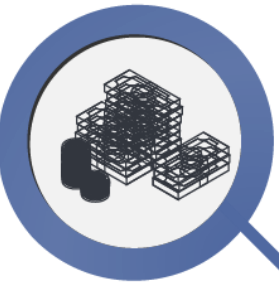


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TARGET OF NAP 2020

GDP CONTRIBUTION (MANUFACTURING)

NAP 2014 TARGET (BY 2020)
10%



NAP 2020 TARGET (BY 2030)
RM 104.2 BIL

EXPORTS - CBU VEHICLES

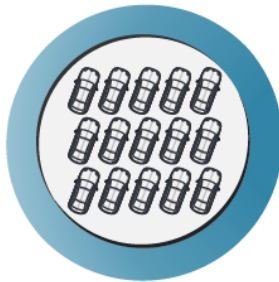
NAP 2014 TARGET (BY 2020)
250,000 UNITS



NAP 2020 TARGET (BY 2030)
RM 12.3 BIL

TARGETS

TOTAL PRODUCTION VOLUME (TPV)



NAP 2020 TARGET (BY 2030)
1.47 MIL UNITS

NAP 2014 TARGET (BY 2020)
1.35 MIL UNITS

EXPORTS - NEW AUTOMOTIVE PARTS & COMPONENTS

NAP 2020 TARGET (BY 2030)
RM 28.3 BIL

NAP 2014 TARGET (BY 2020)
RM 10 BIL



TOTAL INDUSTRY VOLUME (TIV)

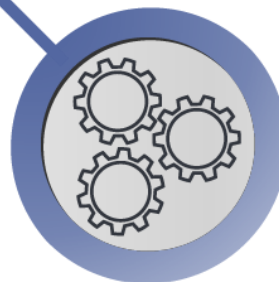
NAP 2014 TARGET (BY 2020)
1.0 MIL UNITS



NAP 2020 TARGET (BY 2030)
1.22 MIL UNITS

EXPORTS - REMANUFACTURED AUTOMOTIVE PARTS & COMPONENTS

NAP 2014 TARGET (BY 2020)
RM 2 BIL



NAP 2020 TARGET (BY 2030)
RM 10 BIL

EMPLOYMENT OPPORTUNITIES - MANUFACTURING

NAP 2014
TARGET
(BY 2020)
87, 520 JOBS



**NAP 2020 TARGET
(BY 2030)**
128, 000 JOBS

TOTAL EMPLOYMENT OPPORTUNITIES

NAP 2014 TARGET
(BY 2020)
177, 520 JOBS



**NAP 2020
TARGET (BY
2030)**
323, 000 JOBS

EMPLOYMENT OPPORTUNITIES - AFTERMARKET



**NAP 2020
TARGET (BY
2030)**
46, 000 JOBS

NAP 2014
TARGET
(BY 2020)
80, 000 JOBS

EMPLOYMENT OPPORTUNITIES - ROBOTICS



**NAP 2020
TARGET (BY
2030)**
30, 000 JOBS

NAP 2014
TARGET
(BY 2020)
N/A

TARGETS

EMPLOYMENT OPPORTUNITIES - MaaS



NAP 2014
TARGET
(BY 2020)
N/A

**NAP 2020 TARGET
(BY 2030)**
75, 000 JOBS

EMPLOYMENT OPPORTUNITIES - IoT



NAP 2014 TARGET
(BY 2020)
N/A

**NAP 2020
TARGET (BY
2030)**
44, 000 JOBS

SUPPLIER DEVELOPMENT - TOTAL AUTOMOTIVE SUPPLIERS

NAP 2014 TARGET (BY 2020)
N/A



NAP 2020 TARGET (BY 2030)
TOTAL – 1, 285 SUPPLIERS
TIER 1 – 400 SUPPLIERS
TIER 2 & BELOW – 885 SUPPLIERS

SUPPLIER DEVELOPMENT - NEW SYSTEM INTEGRATOR (S.I)

NAP 2014 TARGET (BY 2020)
N/A



NAP 2020 TARGET (BY 2030)
350 ROBOTICS CO.
380 IoT CO.

SUPPLIER DEVELOPMENT - SUPPLIER COMPETITIVENESS LEVEL

NAP 2020 TARGET (BY 2030)

LVL 5 – 360 CO.
LVL 4 – 660 CO.
LVL 3 – 880 CO.



NAP 2014 TARGET (BY 2020)
LVL 5 – 180 CO.
LVL 4 – 330 CO.
LVL 3 – 430 CO.

TECHNOLOGY DEVELOPMENT

NAP 2014 TARGET (BY 2020)

Establish two automotive specialized design and engineering centers

Establishment of a full-fledged Vehicle Type Approval (VTA) Testing Centre

Establishment of Vehicle User Solution
Malaysia as the preferred destination (for investment, research, technology adoption and human capital development) in areas related to Green Powertrain Technology, Advanced Automotive Manufacturing and Low carbon manufacturing process.



NAP 2020 TARGET (BY 2030)

Establishment of VTA Testing Centre;

Establishment of Electric Vehicle Interoperability Centre (EVIC);

Establishment of NxGV Test Bed;

Establishment of Virtual Design Centre;

Establishment of Additive Manufacturing Design Centre;

Establishment of Robotics & AI Centre;

Establishment of BDA Centre;

Establishment of Digital Twin Centre; and

Establishment of Technology Academy (Automotive & Overall Mobility).

TARGETS

SUPPLIER DEVELOPMENT - INDUSTRY4WRD READINESS

NAP 2014 TARGET (BY 2020)
N/A

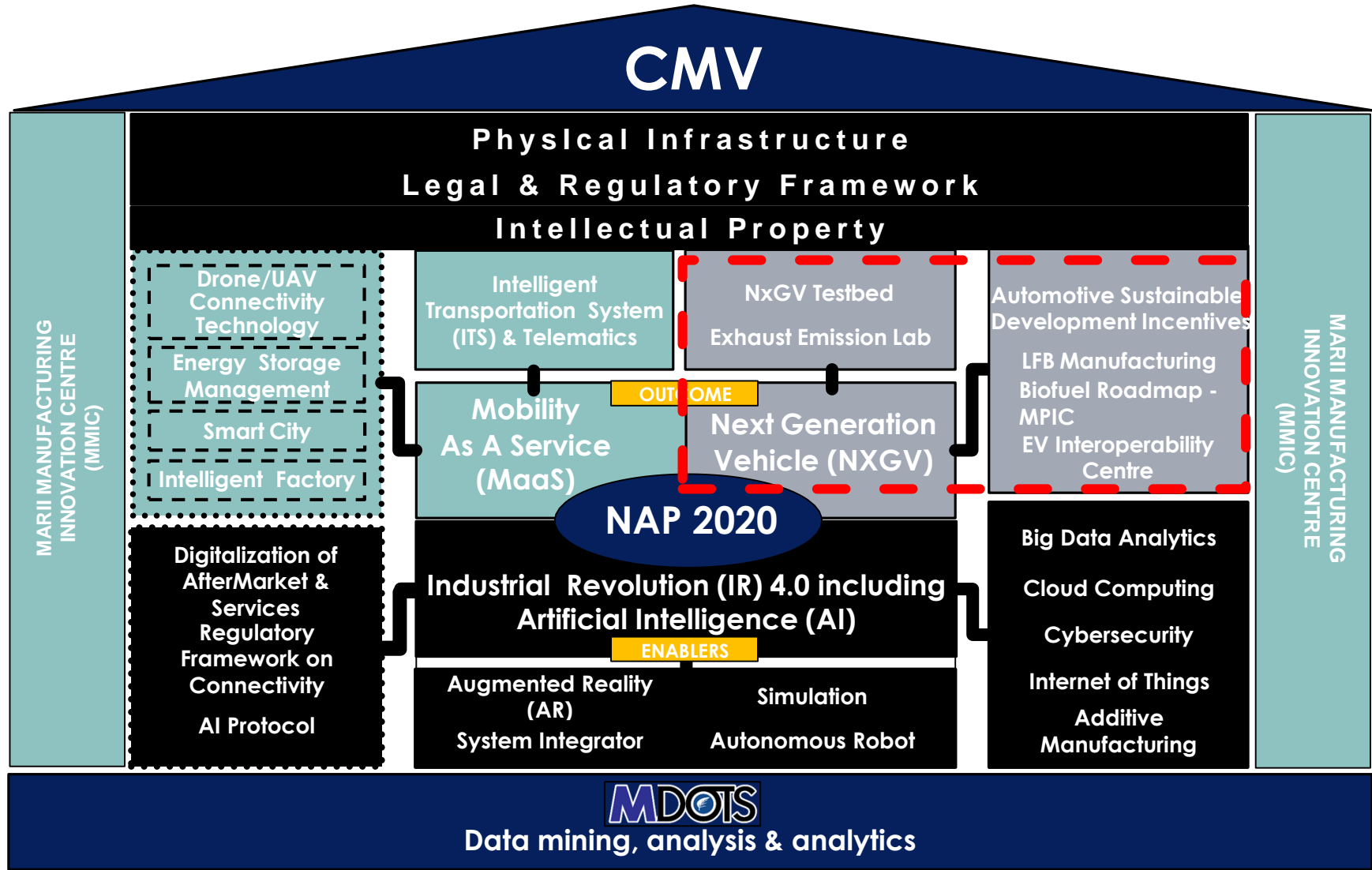


NAP 2020 TARGET (BY 2030)
LEADER – 280 CO.
EXPERIENCED – 500 CO.
LEARNER 660 CO.

MONITORING AND REPORTING

1. Develop and monitor the local automotive industry will continue to be led by MITI as the custodian of NAP.
2. Monitoring and reporting of NAP 2020 implementation will continue via the Malaysian Automotive Council with YBM MITI as the Chairman and appointed members from Government and industry players.

CONNECTED MOBILITY VISION



CURRENT FACILITIES

| ESTABLISHMENT OF CENTRES OF EXCELLENCE (COE) - TECHNOLOGY CENTRES

| MALAYSIA TECHNOLOGY CENTRE

The Malaysia Technology Centre is a technology commercialisation centre to undertake technology transfer, validation and adoption of automation practices. The academy is also a one stop centre or hub for Industry 4.0 Human Capital Development in automotive and connected mobility ecosystem, bridging industry players, academia, training institutions, students and government agencies.

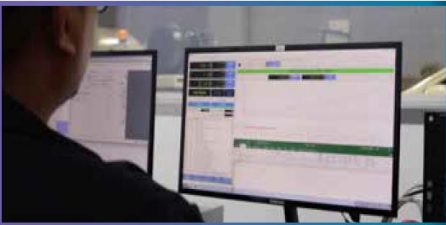


| NATIONAL EMISSION TEST CENTRE (NETC)



National Emission Test Centre (NETC) is an independent entity and recognised as a national laboratory. It is owned by Malaysia Automotive Robotics and IoT Institute (MARii), an agency under the Ministry of International Trade and Industry (MITI).

NETC provides testing facilities in measuring vehicle emission pollutants and fuel consumption. NETC is the most advanced emission testing facility in the ASEAN region (measures up to Euro 6d Emission Standard - WLTP).

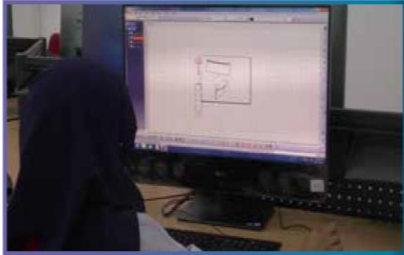


| AUTOMOTIVE DESIGN CENTRE

The Automotive Design Centre is established with the purpose of enhancing the implementation of Industry 4.0 in the Malaysian automotive industry specifically in the areas of design engineering, simulation and prototyping.

It is an open sharing Industry 4.0 platform, whereby any OEM and vendor from various tiers can leverage on the hardware and software available, such as Fused Deposited Modelling (FDM) and Selective Laser Sintering (SLS) for additive manufacturing, Augmented Reality, High Performance Computing Server and more.

The Centre also enables the automotive industry to conduct simultaneous engineering between the OEMs and their vendors during the product development stage. This will assure quality and improved productivity of new model development, thus ensuring good user-experience in the finished product.



LIST OF TECHNOLOGY DEVELOPMENT PROJECTS

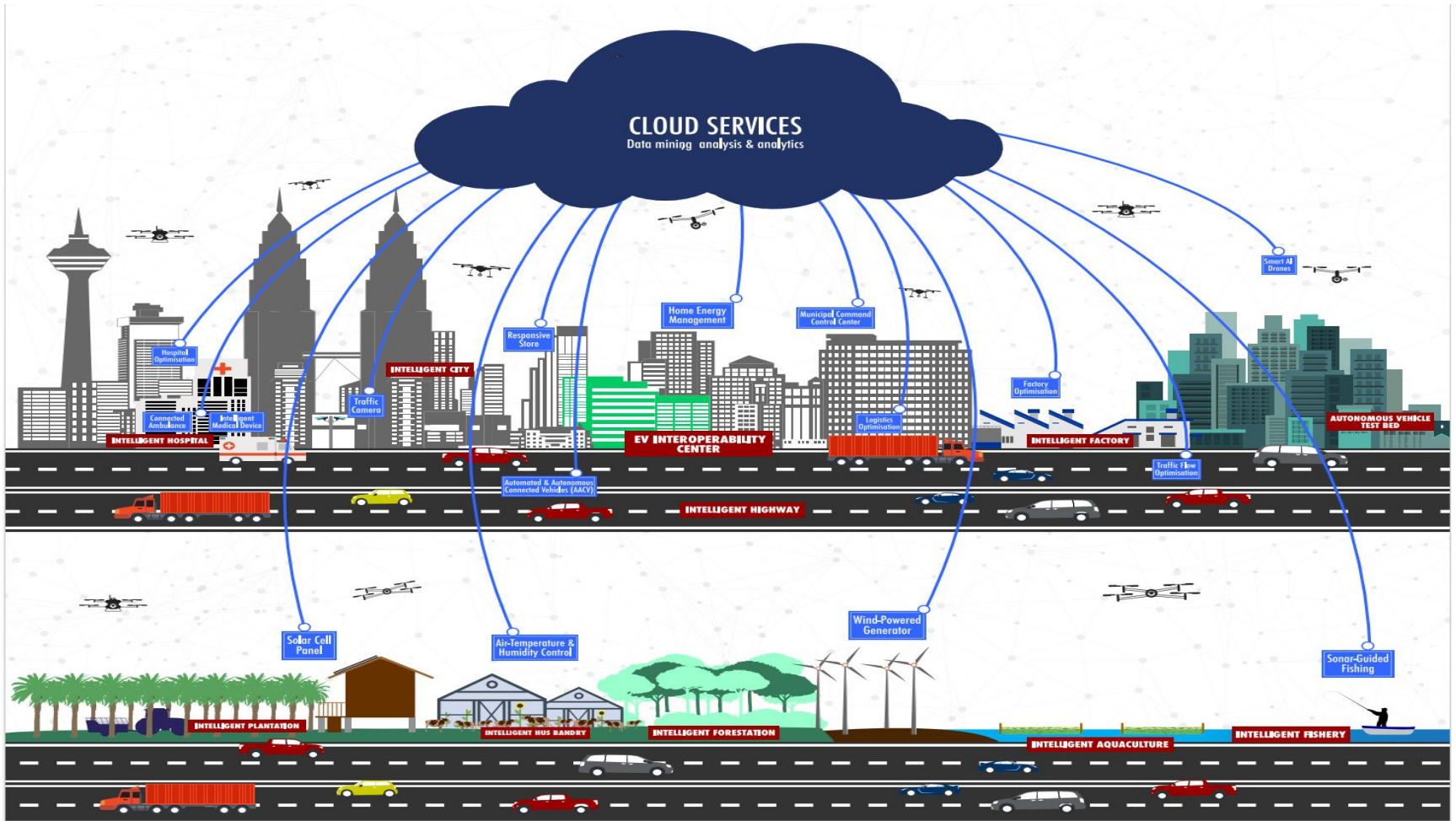
16
TOTAL PROJECTS

RM **18.07**
MIL PROJECTS VALUE

9
PROJECTS READY TO BE COMMERCIALISED

- | | | |
|--|--|---|
| Development of Advanced Electrode and Electrolytes for Lithium-Ion Battery (LIB) | Lithium-ion Battery Material Manufacturing Scale up and Process Optimization | Plastic Injection Mould Design Optimisation |
| Battery Charge, Mechanical and Thermal Management System Development | Modular Electric Bus Driveline Systems | Flexible Roll Forming of a Component Section from AHSS |
| Lithium Ion Battery Module Packaging and Testing | Bus Tracking Systems | Tool Wear Prediction Model on the Stamping of AHSS and UHSS |
| Next Generation Battery Technology Roadmap Development | Market Intelligence and Technology Assessment (MITA) 2030 | 3R's Recyclability, Recoverability, Reusability |
| Lightweight Plastic Glazing for the Automotive Industry | ATM Diecasting Demonstration Trials | Automotive Composites Manufacturing Capability and Quality |
| | Plastic Injection Mould Process Optimisation | |

CONNECTED MOBILITY GENERAL ECOSYSTEM



NxGV will be communicating with the whole ecosystem to further improve its operation which include sensing, cognition, decision and action.

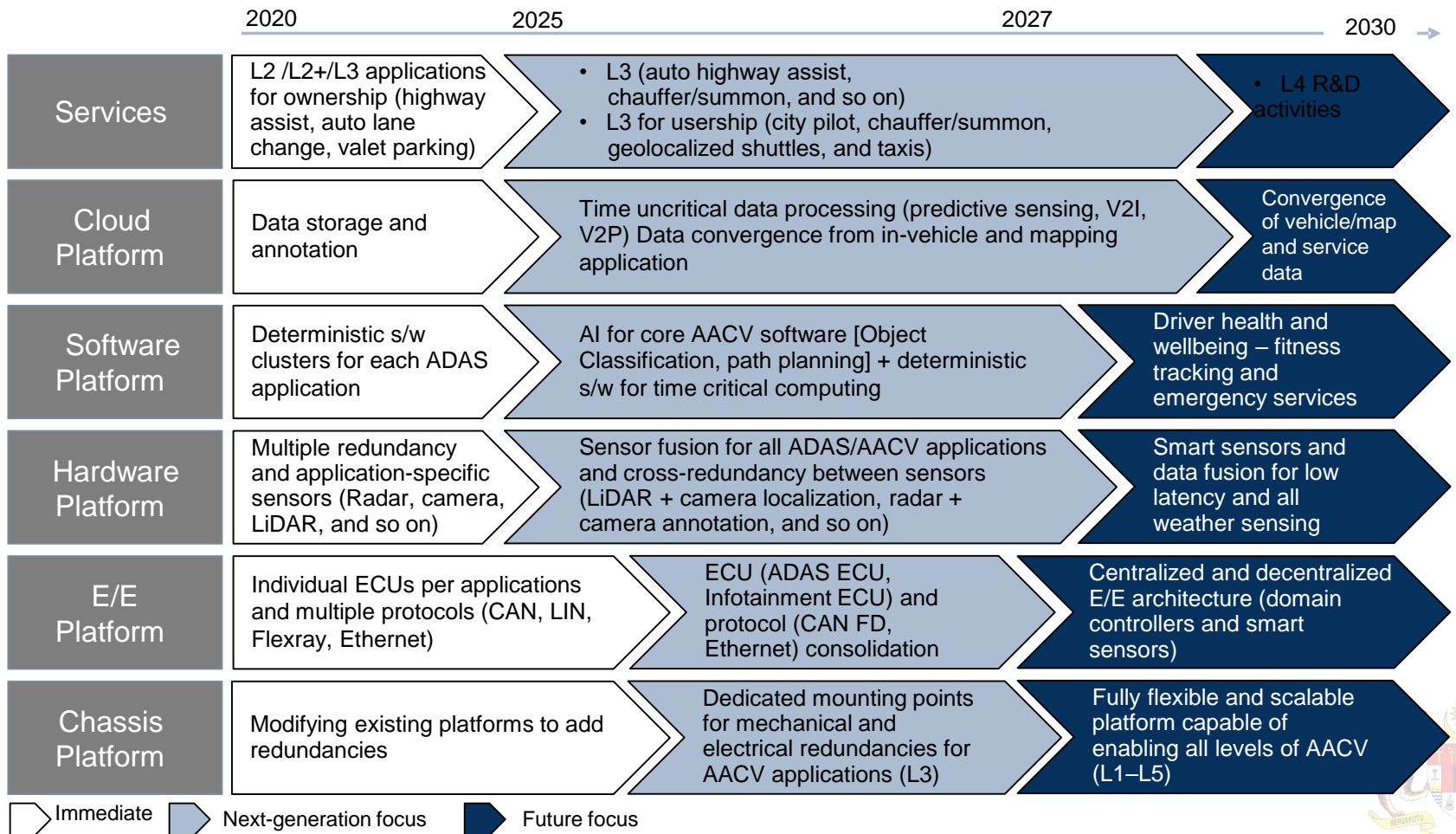
NxGV: Definition

In the NAP 2020, EEV technology will be further enhanced towards NxGV which is defined as Energy Efficient Vehicle (EEV) powertrain and meet at least Level 3 of Automated, Autonomous and Connected Vehicle (AACV)*

| | LEVEL 1 | LEVEL 2 | LEVEL 3 | LEVEL 4 | LEVEL 5 | | |
|--|--|--|--|---|---|--|--|
| What does the human in the driver's seat have to do? | <p>You <u>are</u> driving whenever these driver support features are engaged – even if your feet are off the pedals and you are not steering</p> <p>You must constantly supervise these support features; you must steer, brake, or accelerate as needed to maintain safety</p> | | <p>You <u>are not</u> driving when these automated driving features are engaged – even if you are seated in —the driver's seat!</p> <p>When the feature requests, You must drive</p> <p>These automated driving features will not require you to take over driving</p> | | | <p>1</p> <p><u>Handover</u> L3: AACV feature will request handover L4/5: AACV feature will not request handover</p> | |
| What do these features do? | <p>These are driver support features</p> <p>These features are limited to providing warnings and momentary assistance</p> <p>These features provide steering OR brake/ acceleration support to the driver</p> <p>These features provide steering AND brake/ acceleration support to the driver</p> | | | <p>These are automated driving features</p> <p>These features can drive the vehicle under limited conditions and will not operate unless all required conditions are met</p> <p>This feature can drive the vehicle under all conditions</p> | | | <p>2</p> <p><u>Operation Condition</u> L3/L4: Preset condition will define operation. L5: Unconditional operating parameters (geography/use case)</p> |
| Example features | <ul style="list-style-type: none"> Automatic emergency braking Blind spot warning Lane departure warning | <ul style="list-style-type: none"> Lane centering OR Adaptive cruise control | <ul style="list-style-type: none"> Lane centering AND Adaptive cruise control at the same time | <ul style="list-style-type: none"> Traffic jam chauffeur | <ul style="list-style-type: none"> Local driverless taxi Pedals/ steering wheel may or may not be installed | <ul style="list-style-type: none"> Same as L4, but feature can drive everywhere in all conditions | <p>3</p> <p><u>Vehicle Hardware</u> L4/5: Both can have steering wheel/brake L4: Can be controlled by teleoperation.</p> |

* To be developed as Malaysian Standards

Implementation Timeline



MALAYSIA AS NxGV TECHNOLOGY FRONTIER

CRITICAL COMPONENT DEVELOPMENT

| PHASE 1 | | PHASE 2 | PHASE 3 |
|--|--|---|--|
| Continuation of NAP 2014 | 2020 - 2024 | 2025 - 2027 | 2028 - 2030 |
| <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 | <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 |



CONCLUSION

1. Formulated to continue the development of local automotive industry and its overall ecosystem.
2. To ensure the realisation of the National Automotive Vision.
3. Introduction of new elements in technology are crucial in ensuring the local automotive industry continues to grow and remain competitive.
4. Create new opportunities not only focusing on the automotive sector but also the services sector.