



# TERMS OF REFERENCE (ToR) FINALIZATION WORKSHOP FOR THE DEVELOPMENT OF LOW CARBON MOBILITY BLUEPRINT AND ACTION PLAN – REPORT

*“GEF5-UNIDO Project: Energy-Efficient Low-Carbon  
Transport” in Malaysia*

13 March 2018 (Tuesday)  
Pulse Grande Hotel, Putrajaya

## INTRODUCTION

The Low Carbon Mobility Blueprint and Action Plan will be the guiding document, in line with various other policies particularly in the transport sector in Malaysia. The document aims to decarbonize the transportation sector by achieving the targets set in the Green Technology Master Plan (GTMP) 2017-2030 developed by Ministry of Energy, Green Technology and Water (KeTTHA) and Malaysian Green Technology Corporation (GreenTech Malaysia). Key target for transportation sector as listed in the GTMP is in Figure 1:

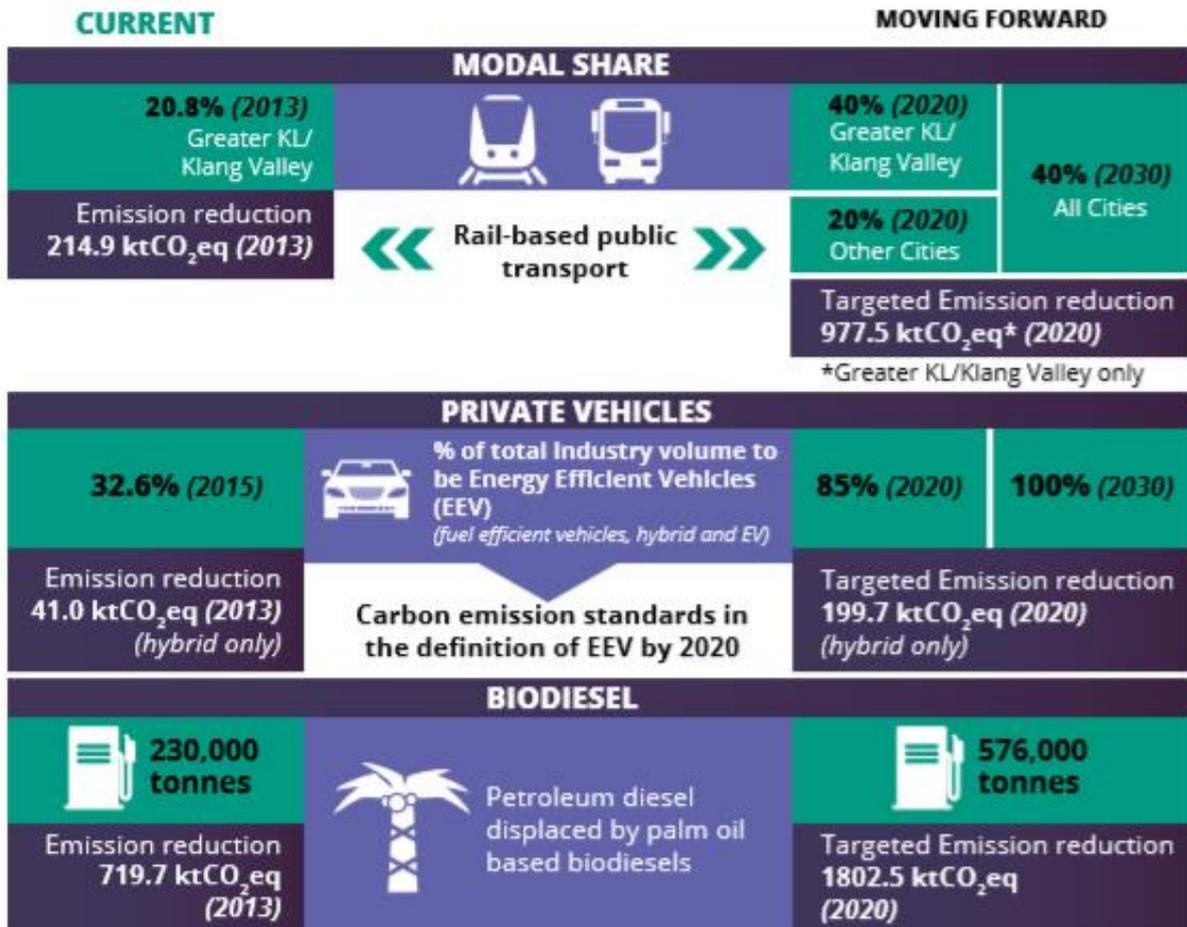


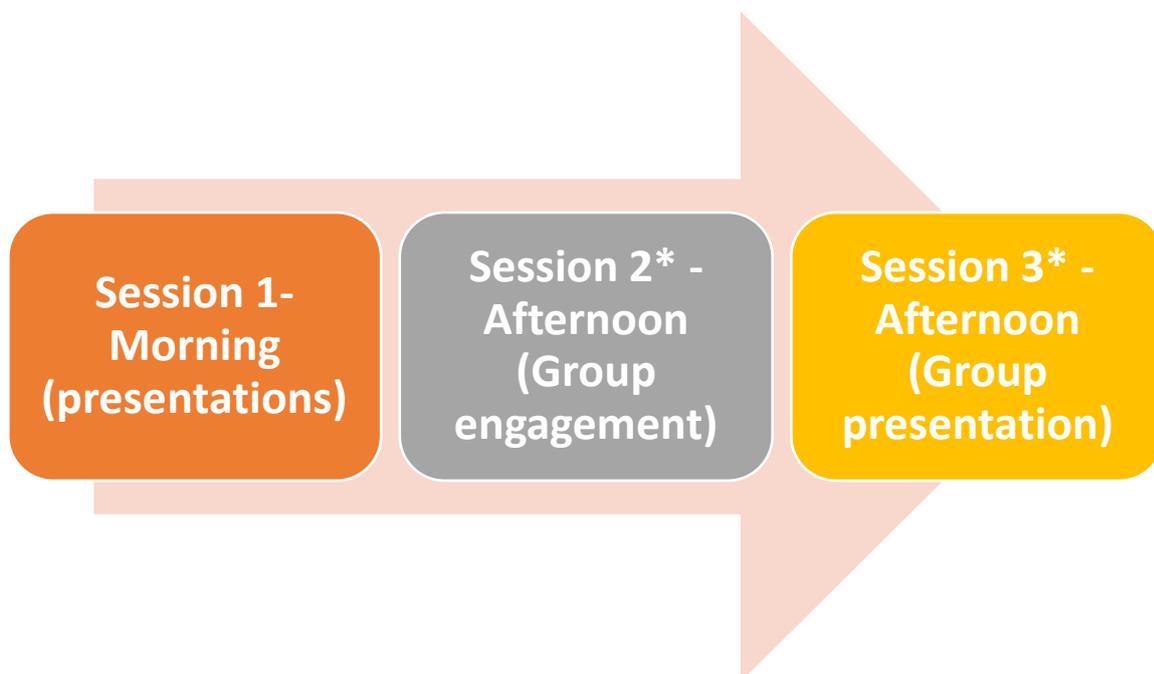
Figure 1: Green Technology Master Plan (GTMP) target for transport sector in Malaysia

The workshop to finalize Terms of Reference (ToR) for the development of Low Carbon Mobility Blueprint and Action Plan was successfully conducted on 13 March 2018 at Pulse Grande Hotel, Putrajaya, Malaysia. The workshop purpose was to gather additional input and comments from various stakeholders (government, agencies, NGO and industry) on the proposed scope of the said document. It was also a platform for the stakeholders to address concern and suggest for improvements to the ToR. A total of 43 participants attended the workshop. Complete attendance list is attached as Annex at the end of this report.

## WORKSHOP SESSION

The workshop was officiated by the Deputy Secretary General of KeTTHA, YBhg. Datuk Badriyah binti Ab. Malek. She also delivered keynote address to the participants highlighting the current transportation sector scenario in Malaysia and the need to develop the Low Carbon Mobility Blueprint and Action Plan to support the on-going effort.

The morning session of the workshop was allocated to speakers that delivered presentation on various topics pertaining to transportation sector. The afternoon session was focused on facilitated group discussion to obtain direct input and future outlook on low carbon mobility development in Malaysia through several key questions.



*\*Session 2:*

- Brainstorming session (KJ Method)
- Divide the participants into 4 groups
- The participants answered questions by writing on notes

*\*Session 3:*

- Group representative presented their outputs from the brainstorming session
- Open discussion

## SESSION 1: PRESENTATION SUMMARY

### **Keynote Address by YBhg. Datuk Badriyah binti Ab. Malek; Deputy Secretary General (Energy and Green Technology), Ministry of Energy, Green Technology and Water**

- a) Based on Organization for Economic Cooperation and Development (OECD) study, the cost of air pollution is about USD1.7 trillion in which 50% is from road transport. More than 3.5 million people die worldwide due to air pollution.
- b) There is an increasing trend in motor-vehicle registration for all categories in Malaysia. Data sourced from Ministry of Transport and Department of Statistics Malaysia shows that there about 26.3 million vehicles registered in 2015, in which motorcars and motorcycles represent 45.1% and 46.0%, respectively. The total number include government motorcars, trailers and driving school vehicles.
- c) In Malaysia, transport sector is the second largest source of carbon dioxide (CO<sub>2</sub>) emission which averages about 43 million tonnes of carbon annually. This constitute to about 5% annual increase. Also, the transport sector has the largest share of the final energy consumption at 47% (2014) and 45% (2015). In 2014, bus, taxis and good vehicle accumulate 19% of CO<sub>2</sub> emission on land transport, next to passenger cars at 67%.
- d) Global future trend for electric vehicle (EV) is promising with at least 10 countries have set sales target for EV. Currently, electric and hybrid vehicles accounts to about 3% of global auto sales. Till date, 95% of electric cars are sold in 10 countries namely, China, US, Japan, Canada, Norway, UK, France, Germany, Netherlands and Sweden. Malaysia need to start embracing the global move in promoting low carbon mobility.
- e) Energy efficient vehicles (EEV) penetration in Malaysia increased for its fourth straight year reaching 52% or 299,850 units of vehicle sold in 2017. As for hybrid and EV, a total of 60,903 vehicles are registered in 2017.
- f) The proposed Low Carbon Mobility Blueprint (LCMB) is intended to rationalize the target set in Green Technology Master Plan 2017-2030. It is expected that the LCMB:
  - i. As a policy direction for low carbon mobility implementation in Malaysia;
  - ii. To provide an action plan for low carbon mobility which include EV and EEV;
  - iii. To include mass transit as a form of low carbon transport mode;
  - iv. To minimize the dependency of fossil fuel in the transport sector; and,
  - v. The spill over of low carbon mobility on economy and GHG reduction.

**Presentation 1: Overview of Transport Sector and National Transportation Policy by Ms. Rosnina Yaacob; Deputy Under Secretary (Strategic Planning and International Division), Ministry of transport Malaysia**

- a) Transport is a key enabler and backbone in facilitating trade. The government is committed in enhancing accessibility and connectivity. Main challenge remains in enhancing competitiveness of the sector, alleviating congestion and embracing green initiatives.
- b) Malaysia's transport infrastructure & facilities has continued to be developed over the years:
  - i. Length of road – 238,823km (2016)
  - ii. Federal and state ports – 10 each (2016)
  - iii. Length of rail – 1,989km (2016); double track – 774km (2016)
- c) Four (4) key mobility trends that need to be managed are:
  - i. Mobility of Malaysians to increase more than 3 folds (131 million daily trips in 2030);
  - ii. Increase on the number of vehicles by 1.4 folds (31 million in 2030, in which 50% are motorcycles);
  - iii. Emerging disruptive technology (autonomous vehicle, EV and vehicle sharing);
  - iv. Demand for sustainable transport (improve safety, reduce fatality and reduce GHG emissions).
- d) Demographic change would require rethinking of current transport strategies to ensure that growing numbers of older people are able to remain active and mobile. The older population aged 65 years and above is expected to be 7% in 2020 and this value will double to 14% by 2043.
- e) As the growth of e-commerce continues, it will increase truck traffic in urban areas as goods need to be delivered to residences, requiring efficient urban logistics with flexible transport connections, choices, affordable and seamless transfers.
- f) The National Transport Policy (2018-2030) developed by Ministry of Transport will provide strategic direction to ministries / agencies to plan & develop the transport sector. Development of the document involve interview and discussion with over 168 stakeholders from 50 ministries / agencies & private sectors.
- g) The vision of National Transport Policy 2018-2030 is anchored on the principle of sustainable transport. For that, 5 policy thrust and 24 strategies have been developed. The policy thrust 4 (advance towards green transport ecosystem) is to address 4 key challenges:
  - i. Current mobility pattern is carbon intensive, with high dependence on fossil fuel;
  - ii. Pollution from the transport sector – air, water, noise, and waste;
  - iii. Lack of / poor compliance to energy efficiency / environmental standards and regulations;
  - iv. Low awareness and poor adoption of sustainable transport practices.

- h) To address those challenges, 5b strategies and 35 action items have been identified.

**Presentation 2: Integrated Green Transportation at Iskandar Malaysia by Mr. Boyd Dionysius Jouman; Head (Environment), Iskandar Malaysia**

- a) Iskandar Malaysia vision is to create a strong and sustainable metropolis of international standing. One of the key pillar is Sustainability that focuses and low carbon-built environment and society. This include:
- i. Walkable, liveable & safe city design;
  - ii. Smart urban growth;
  - iii. Green & blue infrastructure & rural resources;
  - iv. Sustainable waste management;
  - v. Clean air environment.
- b) The Low Carbon Society Blueprint for Iskandar Malaysia 2025 (launched by the Prime Minister and Chief Minister of Johor in 2015) aims to achieve 58% reduction in GHG emission intensity of GDP by 2025 through 12 actions and 281 programs.
- c) Three major themes have been developed to develop a sustainable environment namely Green Economy, Green Community and Green Environment. Low Carbon Action Plan for five (5) local authorities in Iskandar region was developed in 2016.
- d) The first action under the Low Carbon Society Blueprint for Iskandar Malaysia 2025 is to develop integrated green transport. Growth in the transportation sector is expected to add to Iskandar Malaysia GHG emission by 8,584 ktCO<sub>2</sub> (27% of total BaU emission) by 2025.
- e) To mitigate the projected increased transportation demand, development of an integrated green transportation system is highly essential. A four-prong strategy:
- i. promoting a shift to more energy-efficient passenger and freight transportation modes;
  - ii. promoting a shift to more energy-efficient passenger and freight transportation modes;
  - iii. promoting energy efficiency improvement (EEI) in motorised vehicles; and,
  - iv. improving flow and performance conditions in both the passenger and freight transport sectors.
- f) Implementation is projected to reduce GHG emission by 1,916 ktCO<sub>2</sub> equivalent (15% of total emission reduction) in 2025.
- g) Key projects developed to ensure success of this targets are:
- i. Integrated Public Transport
  - ii. Improvement of Singapore and JB-KL Connectivity (HSR & RTS)
  - iii. Enhancing Traffic Flow Conditions and Performance
  - iv. Green Transportation in Rural Areas
  - v. Diffusion of Low Carbon Vehicles
  - vi. Green Freight Transportation

- h) Iskandar Malaysia used the Global Protocol for Community Scale Greenhouse Gas Emission Inventories (GPC) - an internationally-recognised carbon monitoring and reporting framework (by World Resources Institute), recognised by the UNFCCC.

**Presentation 3: GTMP and The Power Industry by Mr. Mohamed Azrin bin Mohamed Ali; General Manager, TNB Energy Services Sdn. Bhd.**

- a) In 2016, the renewable energy (installed capacity) for electricity generation is at 18.4%. The target is to achieve renewable energy mix of 20% (2020), 23% (2025) and 30% (2030).
- b) This target is also to mitigate carbon emission from power plants by imposing clean coal technology for new coal-fired plants.
- c) In terms of energy efficiency, the target is to achieve 10% in 2025 and 15% in 2030.
- d) Three (3) key pillars for TNB is to promote / implement:
- i. Future Generation Sources - "Green and Sustainable Solution":
    - ✓ Investments in solar, wind, biomass, biogas and mini hydro projects.
    - ✓ Solar power purchase, solar hybrid, mini hydro, biomass & biogas.
  - ii. Grid of the Future "Optimal and Dedicated Solution for Utilities":
    - ✓ Greater digitization and automation of the grid, improving the performance and reliability of grid operations.
    - ✓ Smart meter, BELB, street lighting and street furniture.
  - iii. Winning the Customer "Smart and Green Solutions for Customer":
    - ✓ Appreciate customer need beyond electricity consumption to provide more complex products and services.
    - ✓ MaEVi, EV charging infra, energy efficiency and PF improvement.
- e) TNB's perspective on mobility – charging infrastructure, backend ecosystem, green energy source. EV fleets as "green gensets" energy efficiency through shift from fuel to electrons.
- f) Low carbon mobility and the smart home – beyond the meter solution for the tech savvy, green advocate, affluent customer (an energy efficient lifestyle)
- Data & analytics
  - Home automation
  - Home security system
  - Smart, connected appliances
  - Smart lighting
  - Solar photovoltaics
  - Electric vehicle charging
  - Battery storage

**Presentation 4: Usage of LNG in Haulage Sector by Mr. Rosli Khairon; Technical and Project Manager, Malaysian Gas Association**

- a) The credential of Liquefied Natural Gas (LNG) as a clean fuel are undisputable compared to diesel; (-99% of SO compounds; -80% CO; -75% NO compounds; -23% CO<sub>2</sub>)
- b) The demand for LNG for land transportation is picking up. There is a target of 400,000 trucks in Europe to be fuelled by LNG by 2030. Some of the current driving factors:
  - i. North America (50,000 LNG trucks)
    - ✓ Abundance of gas
    - ✓ Clean transportation initiative
    - ✓ Bio-LNG initiative
    - ✓ CO<sub>2</sub> emission limits
    - ✓ Air quality regulations
    - ✓ Price differential with diesel
  - ii. Europe (2,000 LNG trucks)
    - ✓ Air quality regulations
    - ✓ Noise regulations
    - ✓ Price differential with diesel
  - iii. China (300,000 LNG trucks)
    - ✓ Air quality regulations
    - ✓ Wide availability of LNG
    - ✓ CO<sub>2</sub> emission limits
- c) In Malaysia, there is widely distributed infrastructure to ensure accessibility to gas supply.
- d) Widely-distributed gas infrastructure coupled with open market access with multiple competing suppliers ensure the sustainability and security of gas supply.
- e) The technology and the eco-system for usage of LNG in the haulage sector is available today.
- f) LNG trucks have a lower carbon footprint and are low emissions yet retains the same performance, drivability and fuel consumption as its diesel counterparts.

## SESSION 2: GROUP BREAKDOWN SUMMARY / FINDINGS

The questions that was asked to all the participants during the breakout sessions are:

1. How do you view low carbon mobility in Malaysia and what do you think/feel about it and why?
2. What are the existing initiatives/ programs/ projects/policies on low carbon mobility in Malaysia and the challenges/barriers associated with them?
3. What are the current market mechanisms to encourage a shift towards low carbon mobility?
4. How could we create a favourable eco-system for low carbon mobility in Malaysia?
5. What are the relevant policies, regulatory frameworks, incentive schemes, strategies and programs necessary to ensure the successful implementation of low carbon mobility in Malaysia?
6. What is your view on electricity generation/supply and its impact on low carbon mobility?
7. What would you propose for safety standards on low carbon mobility implementation?
8. Matters related to EV Charging stations:
  - a) What are the main issues pertaining to EV charging stations? And how do we address these issues?
  - b) How to decide on locations for and numbers of EV stations? What criteria? Where do you suggest EV charging stations should be located?
  - c) Who should own, built and operate the EV charging stations?
  - d) Who pays for the electricity used to charge EVs and PHEVs? And how?
  - e) Could renewable energy sources be used for charging stations and how?
9. Matters pertaining to lithium battery for EV and PHEV: One issue with hybrid and electric vehicles is the life span of lithium battery and their degradation due to heat (hot climate). How do you propose we can deal with this problem? Who should be responsible for end of life environmental friendly disposal?
10. Future expectations:
  - a) How do you visualize transport landscape in Malaysia in 2020?
  - b) How do you visualize transport landscape in Malaysia in 2030?
  - c) How do you visualize transport landscape in Malaysia in 2050?

The output from each group is listed in table (Annex).

## CONCLUSION

The workshop has met its objective. All the participants were engaging and has highlighted key points that are needed to ensue proper development of the Low Carbon Mobility Blueprint and Action Plan. Moving forward, the ToR document will be amended based on the inputs received and to get final approval from National Project Director.

## ANNEX

**Attendance List**

NO	ORGANISASI	NAMA	JAWATAN	TEL & EMAIL	TANDATANGAN	GROUP
1.	KEMENTERIAN PENGANGKUTAN MALAYSIA <b>(PEMBENTANG)</b>	PN. ROSNINA YAACOB	TIMBALAN SETIAUSAHA BAHAGIAN PERANCANGAN STRATEGIK DAN ANTARABANGSA	<a href="mailto:rosnina@mot.gov.my">rosnina@mot.gov.my</a> Tel : Faks: 03 8888 0158		
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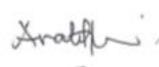

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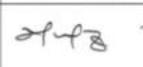
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**Group Output / Key Discussion Points**

**Q1: How do you view low carbon mobility in Malaysia and what do you think/feel about it and why?**

GROUP 1	GROUP 2	GROUP 3	GROUP 4
<p><b>Positive:</b>                      Low carbon mobility in Malaysia is improving, why?                      i. More EEV cars on the road                      ii. Improvement in PT                      iii. More solar/renewable project done                      Less fuel consumption for vehicle                      Need to reduce carbon emission in-line with SDG 2030</p> <p><b>Negatives:</b>                      Premature: the culture of green agenda is not supported by the public &amp; lack of enforcement                      Environmental friendly vehicle (expensive)                      Less awareness from public                      Challenges in achieving reasonable charging time for EV                      Existing charging time could not convince consumer to migrate to full EV                      Change mindset for Malaysian; Why? Not in trend, no buy in from main player (industries, leader, and ministries)</p> <p><b>Neutral:</b>                      Affecting all mode of transport, private, public, land, water &amp; air transport                      Low carbon mobility – EV, EEV, energy efficiency for vehicles / fleet</p>	<p><b>Positive:</b>                      Ample of data to analyse most effective way to plan for LCM                      Malaysia should provide more expert/scientist to help government planning for the LCM                      Infrastructure should be cost efficient/benefits to the operators/consumers, sustainable and accessible to all, value for money                      LCM is vital and must include NMT                      LCM is essential for quality of life                      LCM must be improved at all level                      Sustainable transport, better environment, possible with necessary policies be in place, should be attractive enough for the consumer to switch from ICE to EEV</p> <p><b>Negatives:</b>                      Old car in Malaysia are not meant for LCM, hence people don't want to change coz of not competitive as compared to income level.                      Control at source why is there traffic jammed, network of roads and rails                      Need more attractive business model                      Malaysia should be ready for LCM 10 years ago because of abundance of resources like petroleum and good weather</p>	<p><b>Positive:</b>                      Good initiatives and planning carbon mobility in Malaysia is very challenging. Need to plan in every angle to create sustainability environment.                      Must be more facilities and infrastructure.                      It's a good plan x implement it as it will improve the quality of life of Malaysians.</p> <p><b>Negatives:</b>                      It's still long way to go to achieve low carbon mobility in Malaysia. Lack of will to implement the plan.                      Low carbon mobility in M'sia is terrible in congested area especially in urban area. Due to inefficient management of public transport.</p> <p><b>Neutral:</b>                      The level of awareness among Malaysians still at low or moderate level. This effect the trend of application of EEV in our country.                      A new direction towards transportation initiatives/goal in Malaysia.</p>	<p><b>Positive:</b>                      More promotion needs to be done.                      Good, still need info and educate industries                      Are there any facilities to measure?                      LCM - good for M'sia but very difficult to achieve because majority of population do not know what it is about.                      Why? – For better living condition for our next generation.                      Good for reduce GHG emission., Sustainable                      Better collection of GST because of dependence on to expose the importance from early education.                      new mobility transactions.                      Critically important to the globe.                      Good opportunity for innovative technology because of demand for new goods and service.                      Manufacturers are keen to support the initiatives.</p> <p><b>Negatives:</b>                      LCM is a dream because expensive to realize.                      Public not care about it.                      Not comprehensive as it focuses solely on carbon and no other pollutants as well.</p>

	<p>Low carbon vehicles/less GHG emission, the awareness is there but the technology is still expensive &amp; not affordable to the public, Usage of MRT/LRT is not primary due to convenience, and hot/raining weather, facilities, waiting time No institutional/regulatory framework to dedicate on LCM Policy unclear</p> <p><b>Neutral:</b> Should govern all transport mode (public, private including NMT) Although Transport contribute to more 40% GHG emission, the low hanging parts to mitigate this in the Transport sector are yet to be identified.</p>		<p>Expensive. LCM will make cost of living higher because new life style usually costly to introduce. High end brand.</p> <p><b>Neutral:</b> TOR should include emphasize on reducing number of vehicles &amp; shift to public transport. LCM should be integrated and include personal mobility vehicles not just EV/EEV LCM will force/drive social transformation /re-engineering because the change in lifestyle. LCM – for public transport / sharing system. LCM – to include public transport. Attractive package to attract consumer</p>
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## Q2: What are the existing initiatives/ programs/ projects/policies on low carbon mobility in Malaysia and the challenges/barriers associated with them?

GROUP 1	GROUP 2	GROUP 3	GROUP 4
<p>Eco-ride, solar, purchasing EV The world focus on EVs (hybrid &amp; full batteries) Large scale solar (LSS), Bio-diesel B7 to B10 Incentives to OEM to produce EEV Solar &amp; EEV – no. policy Solar PV E-Bus/EEV/EV (private) Mobile sharing First mile last mile Rail/transit based Electric pool car E-bike/ bike sharing Existing projects: electric bus under SBST programme, increase use of PT to 40% mode share by 2030 Electrical EPAB should be further supported Programmes: using solar system program, using HEV, PREV/BEV for vehicles Challenges: to educate people of the new technologies/system EEV/ EV Solar/ Hybrid/ E-Bus</p> <p><u>Challenges:</u> No sufficient/present infrastructure, No incentives Expensive capex, High cost Less information (no communication) LSS – land scarcity Biodiesel Bio – incompatible with engine by OEM</p>	<p>Green technology masterplan low carbon cities Purchasing of EV vehicles; need to educate public as many are worried about the maturity of the technology, given incentives to hybrid luxury car such as BMW and Mercedes, possibility for home charging Incentives: for important EEV, GTUP produced NLPTMP (by SPAD) is in the implementation stage, Iskandar Green master plan developed, electric bus rolled out Existing incentives: integrated PT at KL (LRT/MRT/Monorail/Buses), LNG Transport and Hybrid Transport</p> <p><u>Challenges:</u> infrastructure not ready is the people concern Not enough incentives, implementation very weak Challenges: Rail transport (MRT, LRT etc) not covering wide area and not efficient enough. Not integrated enough, failure in connectivity National Transport Policy – new policy – this implementation need to look forward Conflicting policies Tax incentives for EEV, no long-term policy plan</p>	<p>Can we reduce carbon footprints with practical programs? Initiatives to promote EEV cars but our national automakers don't embrace the programme in lower the car price. NGV for public vehicle and taxis but most of the station are close due to low demand. Pelaksanaan EEV (R101) untuk kenderaan baru. So many old vehicles. Green technology application Low Carbon Cities. Project by UNDP, EPU and KETTHA. Low Carbon Society by IRDA Low carbon transport blueprint Implementation period Low Carbon Cities Framework by MGTC and KETTHA As a framework in implementing Low Carbon Cities initiated in city. Asian Development Bank</p>	<p>MRT / LRT/BRT/KUDT – Punctuality and reliability of public transport. O-bikes, Cycling mode of transport People / citizen is not educated to use the facilities to the fullest. National Automotive Policy 2014/2018 NAP 2014 – Customised incentives EEV – Pocket sensitive M'sia GTMP – Challenges as per Keynote address. Climate change- climate change policy by NRE. Implementations require huge investment. Low carbon city policy e.g. Langkawi No effort from local authority. Only waits from feds to give instruction. Planning Guidelines/National planning policies. National Physical Plan 3 National Urbanization Policy. Awareness <u>Challenges:</u> Transparency, Weak Monitoring, Weak Implementation LCCF / LCG Different implementation &amp; authority Challenges to harmonize, Standards and regulations</p>

<p>Not seamless/not integrated                  No standards to adopt                  Multiple shareholders needed to ensure it success                  Restore import duties for CBU, EVS and not CKD                  GTMP Transportation – no RM, no talk, business terribly disappointed</p>	<p>Electric mobility blueprint, concentrated on an exploratory approach, not governing                  Lack of support from the ministries/stakeholders</p>		<p>GTALCC investment toward LCB infra                  Readiness of infra in cities                  Public not educate/not aware/not consulted                  Financing incentives for LCM Infrastructure</p>
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**Q3: What are the current market mechanisms to encourage a shift towards low carbon mobility?**

GROUP 1	GROUP 2	GROUP 3	GROUP 4
<p>Financial support (grants, incentives)                  Infrastructure support – PT, charging station                  Ride sharing – free shuttle bus                  Integrated/seamless PT                  CKD to enjoy tax free                  TnG improvement                  EEV incentives                  Tax incentive – for manufacturer for EEV product/purchase                  Town planning/government shift</p>	<p>TOD &amp; BRT                  Lack of incentives                  All developed countries implementing various type of LCM: Malaysia can select &amp; adopt the best choice and become partner to the implementing countries.                  COMOS, ride sharing, e-bike, HSR and whole rail development</p>	<p>Introducing NGV for private and commercial vehicle (taxis)                  No public awareness.                  Didn't know about mechanism to encourage towards low carbon mobility.                  Provide incentive to mobile related company (manufacturer, dealer, etc) to encourage the players and people to use EEV.                  Hybrid car incentive - fare rebate.                  Through LNG trucks</p>	<p><u>Challenges:</u>                  Not clear incentives to promote LCM.                  No wide awareness                  No clear mechanism or incentives heard of.                  High cost of public transport to encourage modal shift.                  Financing there but difficult to secure.</p> <p><u>Existing mechanism:</u>                  Green Technology financing                  NAP – customised incentives                  Tax rebate                  Carbon development mechanism                  GTFS for LCM                  MIDA – GITE                  Discount                  Previous hybrid incentives car already discontinued.                  Tax – rebate for EEV                  Lower car price</p>

			<u>Propose:</u> Carbon tax Cap and trade
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#### Q4: How could we create a favourable eco-system for low carbon mobility in Malaysia?

GROUP 1	GROUP 2	GROUP 3	GROUP 4
Tax rebate, incentives, waive GST Need agreed action plan for each shareholder and move in tandem to achieve milestones on a gradual basis Faster charger, bigger share from renewable energy power generation, ride sharing Incentives needed for purchase subsidies in the initial terms of implementation Tax incentives, easy access to PT Standardized & alternative TNB tariff for EV charging Infrastructure ready, incentives & tax rebate Integrated/seamless transport, up to date infra. Effective FMLM (from residential to workplace), PT tariff Introduce carbon tax, congestion charges Ensure universal standards for EV charging 3 <sup>rd</sup> party to be responsible for EV charging (e.g. TNBES) More maintenance facilities Provide more financial support <b>Tax incentives/rebate, improve infra. (facilities) – charger, parking, building, seamless network, tariff (attractive, standardized)</b>	Improve facilities Provide incentive Inculcate awareness Start with an evidence-based policy planning Low prices for Electric Vehicles Create better connectivity for public transport Capacity building TVET to introduce low carbon mobility Need Public Private Partnership (PPP) Must get public's intervention in governing a policy, public's feedback is a must Long term incentives for consumers A clear roadmap with methodology commitment from top management to bottom Policy and implementation Integrated Low Carbon Mobility with complete of low carbon infrastructures to support the mobility with government incentives to encourage people to use it Policy first. Identify the gaps and set a right policy Keep track of required data (verified) Identify funding mechanism to maintain the sustainable transport system.	Guideline for low carbon mobility Let develop whatever proposal with the participation of the stakeholders Proper a well-planned connectivity especially in the city. Restricted number of cars entering the city. Provide shaded (by tree or covered structure) and connected walkway.	One lead agency One agency in charge so there is no unnecessary dispute. Grand master plan Every agency can work together to achieve the vision Awareness Provide incentives for the reinforcement. E.g road tax rebate, financed support. Cater needs every generations /society Educate public on LCM More incentives for public transport – promotion on public transport Affordable LCM is to have EV and FCV but will take time so transition actions need to be implemented e.g continuing to use/promote clean fuels such as CNG/LNG/ Bio fuels “Inviting” technology players to develop expertise for Malaysia. Incentive users Creative funding for LCM “supporters”

	<p>Special tariff for EV</p>		<p>Have clear targets and action plan for immediate, medium and long term. Too much emphasize on EVs &amp; FCVs which are of long term.          Make case study and lesson learnt from early adopters.          Higher taxes for private vehicle.          Entrance / city tax          Less parking / higher rates          Better policy and regulations          Regulate LCM tax for negative reinforcements. e.g. manufacturer production incentive/tax on non-compliance in LCM regulations</p>
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**Q5: What are the relevant policies, regulatory frameworks, incentive schemes, strategies and programs necessary to ensure the successful implementation of low carbon mobility in Malaysia?**

GROUP 1	GROUP 2	GROUP 3	GROUP 4
<p>Scrappage policy to dispose old cars, free PT Differentiate EVs and EEVs (not done in NAP). The world going for EVs not EEVs. Tax refund for CKD, to ban vehicle into town Waive GST 6%, subsidy to all EVs and EEVs EEV and low carbon policy Subsidised and standardised TNB tariff for EV charging Permanent committee for EV bus Enforcement, highlight the benefit of giving RE &amp;EE to public (awareness) Purchase subsidies for EV bus, later to be strictly enforced as % of the fleet Low carbon mobility policy/blueprint, framework from MOT/JPM/EPU/ICU direct to the industry players, clear mandate, awareness through social media, company, operator GSR, university, school, residential. <b>Scrappage policy, waive GST, subsidy (EEV/EV), low carbon mobility blueprint, awareness program – direct to users, enforcement and implementation to be done effectively.</b></p>	<p>TOD policy- harmonizing infrastructure for EEV and non-motorized transport Introduce carbon tax Inter-ministerial intervention, the current existing policies and segregated and coordination is weak Policy and on Had Usia Kenderaan Private vs Public Transport Benchmark India and EU Program Tax free EU Vehicle battery management program Benchmark global best practices SDG 11- Sustainable Cities and Communities Planning permission – Allocation of EEV in new development The Green Technology Master Plan, low carbon mobility blueprint and national Physical Plan should be design as xxx that the policy and action plan for these 3 plan in order and some. Battery management program Road tax exemption until 2050 for EEV</p>	<p>Disposing. Additional charges for 10-year-old car. Special duty tax on car above 10 years old. Implementation of EEV policy Out facing the combustion engine for private vehicle Special tariff for EV charging No more 2 stroke engines. Local policy on housing development to incorporate solar PV as source of energy in the future. Incentives for public transport users through some sort of ‘Bonuslink’ point (collect point &amp; redeem, no monetary involve). One tariff for public transport (one rate)</p>	<p>Scheme: GTFS “Cash for Clunkers” trade in program for low carbon mobility vehicles Financial and non-financial incentives to be green e.g subsidy, grants, tax exception, preference finding. Individual tax incentives Incentive consumer Policy: LCM policy for relevant current technology. LCCF NAP Policy on type of clean fuels to be used for the transport sector in M’sia. Education policy – at least as a co-curriculum. National Transport Policy –NTP End of life policy for: Cars, bikes, logistic setup (bus/lorries) Newer public transport (bus/trams) Higher taxes on private vehicle Lower taxes on EV/EEV/Hybrid and Eco Car GTMP</p>

			<p>Regulatory framework for “non-amphiamer” and “amphiamer” mobile vehicle.</p> <p>Enforcement of Clean Air Regulations 2014.</p> <p>Strategy:</p> <p>LCM Action Plan</p> <p>No strategy paper showed to public.</p> <p>Public consultation process</p> <p>Transparency in formulating policies and implementation them.</p> <p>Affordable public transport Plan/Fares</p> <p>Incentive to use public transport</p> <p>Cheaper using cashless.</p> <p>Cost-sharing on advertising &amp; promotions between regulators and operators.</p>
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**Q6: What is your view on electricity generation/supply and its impact on low carbon mobility?**

GROUP 1	GROUP 2	GROUP 3	GROUP 4
<ul style="list-style-type: none"> <li>- RE will kill the critique, EVs source is fossil fuel i.e. not green</li> <li>- Need to increase renewable energy share in power generation</li> <li>- Demand for electricity to shoot up. TNB need to come out with a projection plan to cater this problem</li> <li>- Controllable pollution, hydro, solar</li> <li>- Good/crucial, save fuel, more electricity usage – tariff should be rationalized</li> <li>- Hydro powerplant, solar</li> <li>- Explore hydrogen fuel cell as source of power</li> <li>- Electric generation can reduce low carbon emission but to use renewable energy – solar, wind turbine, hydro.</li> <li>- 50% coal now. To reduce fossil fuel and change to alternative energy to reduce greenhouse gas emissions.</li> <li>- <b>Higher electricity demand, rationalize tariff, reduce fossil fuel, increase RE</b></li> </ul>	<ul style="list-style-type: none"> <li>• RE has to strengthen to support LCM</li> <li>• LCM integration with RE source</li> <li>• Energy storage (cost)</li> <li>• Power generation must come from renewable i.e. solar, nuclear, hydro</li> <li>• Power plant – should start replacing coal with renewable energy (natural gas) – towards greener grid</li> <li>• High demand in electricity, limited electricity supply, more power plant required</li> <li>• Electricity generation/supply grid can only impact LCM if the mode of transportation is sourced by electricity.</li> <li>• Supply of electricity is from renewable sources</li> <li>• Electricity generation/supply is the most important source to support LCM. Government should encourage alternatives of green power generation to providers so it can help TNB or other service provider to prepare adequate facilities.</li> <li>• Renewable source of energy for changing station.</li> </ul>	<ul style="list-style-type: none"> <li>• It depends on whether we use coal or other source of energy.</li> <li>• Increase electric generation by R.E</li> <li>• Energy source from nuclear (in future).</li> <li>• Proper policy</li> <li>• They will charge in hubs at optimal times, sometimes in the middle of the day, when wind and solar generations is most productive, sometimes at night, when rates are low.</li> <li>• Changing the ways that people commute in cities.</li> <li>• Support mobility ambitions and provide with cheaper, safer and greener urban mobility.</li> </ul>	<ul style="list-style-type: none"> <li>• Current diesel and petrol still on low euro standards and its bad for the environment</li> <li>• Promotion of greener electricity generations instead of coal.</li> <li>• If power is mainly coal based, it will negate the effects of economies of scale – Power must be generated from clean fuels.</li> <li>• Extra energy will be available for another end user</li> <li>• lead to higher price.</li> <li>• Therefore, drive LCM facility</li> <li>• Too much wastage in electricity reserve margin.</li> <li>• Constraints / lack of good quality electricity supply infrastructure will greatly hold back the smooth implementation of LCM especially for EVs.</li> <li>• Still depending on coal to generate electricity.</li> </ul>

**Q7: What would you propose for safety standards on low carbon mobility implementation?**

GROUP 1	GROUP 2	GROUP 3	GROUP 4
<ul style="list-style-type: none"> <li>- Strict enforcement on standards – MS2541, 2413, 6023</li> <li>- Malaysia Std to align with International Standards</li> <li>- To be develop to cater for new technologies for EEVs and EVs</li> <li>- MS ISO – the enforcement must be in</li> <li>- Water proof for battery and awareness to public</li> <li>- Develop new safety standard for Malaysia (more holistic), do a research study (universities)</li> <li>- Don't buy China EVs, low in quality though cheap in price</li> <li>- <b>Enforcement, develop new standards for safety align internationally</b></li> </ul>	<p>Improved PT, better rail connectivity                      More EEVs on the roads                      Reduce CO2 emission from the aviation sector done to the implementation of CORSIA (carbon offsetting &amp; reduction scheme in aviation)                      Less road-based freight transport by 70%                      50% of road-based freight transport in EEVs.                      More 70% EEV/EV                      20% LNG vehicle                      10% old vehicle more than 20 years old.                      IE</p> <p>To set the standard</p> <ul style="list-style-type: none"> <li>Governing safety</li> <li>Chemical spillage from battery</li> <li>Security of battery during crash</li> <li>Isolate chassis from high voltage</li> <li>Pedestrian alert since pedestrian maybe less likely to hear EV</li> </ul> <p>Safety standard – the source provider or manufacturer should know before sale to the public.</p>	<ul style="list-style-type: none"> <li>• Increasing the efficiency of the transport system by making the most of digital technology, smart pricing and further encouraging the shift to lower emission transport mode.</li> <li>• 2030, Green + Cleaner Transportation system.</li> <li>• More efficient public transport system.</li> <li>• Freight transport by land. Hope 50% of passengers is moved by rail</li> </ul>	<ul style="list-style-type: none"> <li>• Equipment safety standard</li> <li>• Installation safety std.</li> <li>• Operators Safety std.</li> <li>• Passenger Safety std.</li> <li>• Public Safety std.</li> <li>• How will any enforcement of standard in Malaysia?                             <ul style="list-style-type: none"> <li>○ Seat belt for rear passenger.</li> </ul> </li> <li>• Skills and behaviour training for drivers</li> <li>• Special standard for battery to prevent explosion</li> <li>• Generators growth will reduce for transport sector</li> </ul>

**Q8: Matters related to EV Charging stations:**

- a) **What are the main issues pertaining to EV charging stations? And how do we address these issues?**
- b) **How to decide on locations for and numbers of EV stations? What criteria? Where do you suggest EV charging stations should be located?**
- c) **Who should own, built and operate the EV charging stations?**
- d) **Who pays for the electricity used to charge EVs and PHEVs? And how?**
- e) **Could renewable energy sources be used for charging stations and how?**

GROUP 1	GROUP 2	GROUP 3	GROUP 4
No response	<ul style="list-style-type: none"> <li>• Business model</li> <li>• Currently is exclusive for private vehicles</li> <li>• Need to be standardized for all modes</li> <li>• Guidelines installation &amp; operation EV charging</li> <li>• Rehabilitate of charging station</li> <li>• The issue is how fast is the charging station can effectively charging the EV?</li> <li>• The technology of EVs charging system must use the high-end model, but it may be costly.</li> </ul>	<ul style="list-style-type: none"> <li>• Study the demand</li> <li>• Focus on city centre / dedicated area</li> <li>• No fast charging (2-3 hour)</li> <li>• Improve DC charging (fast charging)</li> </ul>	<p>Availability of charging station</p> <p>Speed of charging and quality of charging</p> <p>If many charging stations in one area, can quality of electricity supply be still maintained?</p> <p>Must have enough EV to justify the cost</p> <p>EV for public transport</p> <p>Wiring capacity/infrastructure</p> <p>Ownership or right to own the EV charging station</p> <p>Safety standard</p> <p>Contribute to GHG emission since connected to grid</p> <p>Connected to grid introduce RE charging station</p> <p>Lack of infra due to low demand (EV)</p> <p>Scattered EV charging in public</p> <p>Personal EV charging at home</p> <p>Use/develop drive by charging.</p>

**Q9: Matters pertaining to lithium battery for EV and PHEV: One issue with hybrid and electric vehicles is the life span of lithium battery and their degradation due to heat (hot climate). How do you propose we can deal with this problem? Who should be responsible for end of life environmental friendly disposal?**

GROUP 1	GROUP 2	GROUP 3	GROUP 4
<ul style="list-style-type: none"> <li>- Get manufacturers to provide at least 6 years warranty</li> <li>- More research on battery technology</li> <li>- To increase the heat temperature resistant</li> <li>- There are other technologies out there for batteries. We can do a pilot for all of them to see which is more suitable.</li> </ul>	<p>No response</p>	<ul style="list-style-type: none"> <li>• Give grant to university agencies to do research                             <ul style="list-style-type: none"> <li>○ How to overcome life spent problem of degradation lithium batteries in hot climate.</li> </ul> </li> <li>• Less land transport, more air transport</li> <li>• More air transport, less land transport</li> <li>• Transportation industry will be operated by robots/ automation basis.                             <ul style="list-style-type: none"> <li>○ Less manpower</li> </ul> </li> </ul>	<p>No response</p>

**Q10: Future expectations**

**a) How do you visualize transport landscape in Malaysia in 2020?**

GROUP 1	GROUP 2	GROUP 3	GROUP 4
<ul style="list-style-type: none"> <li>- Very hazy &amp; conflicting. Going nowhere</li> <li>- More renewable power generation</li> <li>- More PT/ride sharing</li> <li>- More EEV on the road</li> <li>- MRT &amp; LRT very expensive, very impractical. No connectivity</li> <li>- Higher mode share for PT, more 25% for GKL/KV</li> <li>- More commuters shift towards PT</li> <li>- More e-bus/EEV/EV</li> <li>- Main city with transit</li> <li>- Less carbon – vehicle hybrid</li> <li>- Pad car in Malaysia</li> <li>- <b>More efficient/seamless PT</b></li> <li>- <b>More RE/ power generation</b></li> </ul>	<ul style="list-style-type: none"> <li>• More usage of PT, better connection, convenience, more frequent</li> <li>• 2020: EEV &amp; EV cars &amp; facilities increase. Lorry, truck remain the same. Pedestrian movement remains unattractive.</li> <li>• By 2020: a number of new policies will stream in, hopefully by then some action plan is placed to change the existing landscape.</li> <li>• TOD &amp; sustainable energy transportation</li> <li>• Transport landscape in 2020, integrated transportation system</li> <li>• Upon completion of all LRTs (1.2.3), majority of population will use Park n Ride</li> <li>• More electric buses, price congestion enforced, policies for PT in place (age of vehicles)</li> <li>• 10% - electric vehicles</li> <li>• 60% - hybrid vehicles</li> <li>• 20% - LNG Vehicles</li> <li>• 10% - Old vehicles more than 20 years old</li> </ul>	<p>No response</p>	<p>Multi-mode of transport.            New produced vehicles are EEV            Walkable city            Refuelling stations reimaged.            No bus in CBD except for low carbon technology.            Still have many separate entities doing same things separately with no central coordination.            More low carbon transport for goods.            Transport as a service less car ownership.            More working people will use 50% of their mobility need using public transport.            In 2020, we will still be where we are. No change.            More driver less cars            More electric cars, less fossil fuel cars.            More integrated public transport network: LRT, MRT, BRT, Bus.            Better awareness on cycling – citizens are more responsible and use the fuel better.            Efficient public transport.            Excellent inter-connection of public transport            More vehicles on the road because of lack FM/LM</p>

			<p>Congestions will still a problem on peak hours</p> <p>Increase in the availability of private service for hire. E.g UBER and Grab</p> <p>More professional champion/role model &amp; commuted.</p> <p>More integrated transport payment system</p> <p>Cheaper fares</p> <p>Working person will have 2 models of transportation ownership.</p>
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**Q10: Future expectations**

**b) How do you visualize transport landscape in Malaysia in 2030?**

GROUP 1	GROUP 2	GROUP 3	GROUP 4
<ul style="list-style-type: none"> <li>- Fast charger, longer range EVs, more ride sharing, higher parking fees in city centre to promote PT, more RE share</li> <li>- Personalized pod car, car sharing – seamless, integrated, only owned EV</li> <li>- EVs will catch on but very slow</li> <li>- Available infra. for charging (electrical) for any type of vehicle.</li> <li>- By 2030 – 100% EV, drones, autonomous vehicle, integrated mobility</li> <li>- Integrated land, air, maritime PT</li> <li>- More BRT in lower price and available in all municipalities</li> <li>- Low carbon mobility agenda – 100% EVs, efficient, seamless PT</li> </ul>	<p>No response</p>	<ul style="list-style-type: none"> <li>• Increasing the efficiency of the transport system by making the most of digital technology, smart pricing and further encouraging the shift to lower emission transport mode.</li> <li>• 2030, Green + Cleaner Transportation system.</li> <li>• More efficient public transport system.</li> <li>• Freight transport by land. Hope 50% of passengers is moved by rail</li> </ul>	<ul style="list-style-type: none"> <li>• Less private car on the road</li> <li>• Better First mile and last mile</li> <li>• Half of the implementation of clean energy like natural gas on commercial service vehicle</li> <li>• Better train connectivity</li> <li>• 2030                         <ul style="list-style-type: none"> <li>○ More people using MRT/LRT</li> <li>○ Majority of cars in cities are EVs</li> <li>○ Majority of city buses and city delivery trucks or EVs</li> <li>○ Heavy duty vehicles/trucks/freight</li> </ul> </li> </ul>

<ul style="list-style-type: none"> <li>- 2000 electric buses with 3<sup>rd</sup> party running the charging management</li> <li>- 40% mode share – facilitated by TOD (to minimize/optimize mobility)</li> <li>- NGV &amp; Biofuel will die slowly</li> <li>- Its inevitable we have to adopt EVs as the whole world is doing so</li> <li>- More bicycle on the road, national car to go EVs</li> <li>- Seamless PT in Putrajaya &amp; Cyberjaya, strengthen FMLM – introduce multimode of PT, higher fees for people entering the main city like Singapore</li> <li>- For e-buses, no public based EV charging stations, it need to be installed at dept/terminal, where no 3<sup>rd</sup> party is willing at present. Installation is costly</li> <li>- Low population f EV (unattractive to install EV charger), what to do (1-2 hours ) while charging car?</li> <li>- Slow charging (rapid charging 130km), infra not ready</li> <li>- Not enough stations to charge during long hour travel</li> <li>- Limitation at charging station, too long charging hour</li> <li>- Government subsidy, charger provide by manufacturer</li> </ul>			<ul style="list-style-type: none"> <li>• Using CNG/LNG &amp; Bio fuels</li> <li>• People stay indoor for individual as most personnel meal will be home delivered.</li> <li>• Probability transport will be only for good delivery</li> <li>• Low fare for public transport</li> <li>• Flying cars</li> <li>• Connected cities – established connected public transport.</li> <li>• Higher public transport use and less PV for people – trans for intercity</li> <li>• Less congestion / toll roads due to less cars on the road</li> <li>• Car sharing / ride sharing</li> <li>• Higher use of green vehicle in logistics/ cargo industry especially trains.</li> </ul>
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**Q10: Future expectations**

**c) How do you visualize transport landscape in Malaysia in 2050?**

GROUP 1	GROUP 2	GROUP 3	GROUP 4
<ul style="list-style-type: none"> <li>- Power SHOES</li> <li>- Personal rapid transit – PRT – pod car</li> <li>- Autonomous vehicles, solar power EV, hyperloop, flying car</li> <li>- Flying car, space X</li> <li>- Battery technology makes it cheaper with higher capacity to offer air-based mobility</li> <li>- Hyperloop 1</li> <li>- No more internal combustion engine on the road</li> <li>- Integrated land, air, maritime personal/private transport</li> </ul>	<ul style="list-style-type: none"> <li>• Safer and stricter regulations in place for vehicles, roads conditions</li> <li>• 10% road-based freight</li> <li>• 100% EEV for freight</li> <li>• Green transport rating established</li> <li>• Permeable city planning for NMT</li> <li>• Price congestion in place</li> <li>• Exclusive lanes for EEVs</li> <li>• Create more people collection centre to recycle the degraded lithium battery.</li> <li>• 2050: EV is the norm</li> <li>• UBER/GRAB using autonomous vehicle, people do not have to own vehicles</li> <li>• In 2050: EV increase to 40%, hybrid car increased to 60%</li> <li>• No more old vehicles (more 30 years) allowed to be on the road – petrol or diesel-based vehicles)</li> <li>• Smart traffic light (base on red-time date)</li> <li>• Either less or more air pollution depending on the number of vehicles on the road and enforcement</li> <li>• Transport in 2050: efficient use of fuel</li> <li>• Cleaner combustion</li> <li>• Cheaper fare</li> </ul>	<p>No response.</p>	<ul style="list-style-type: none"> <li>• Manufacturer to take back the battery</li> <li>• 2050 – more autonomous taxi cab around in M’sia</li> <li>• Use non-lithium batteries e.g. air batteries</li> <li>• 2050 – public transit will be more reliable and integrated</li> <li>• 2050 – petrol and diesel no longer is used on vehicle</li> <li>• Look at hydrogen fuel cells</li> <li>• Hybridization of rail and land vehicles – driverless vehicles that travel in convoys to maximize efficiency of infrastructure.</li> <li>• National problem the public account should be used for the public benefit (not individual alone) since every one benefit.</li> <li>• R&amp;D for better lithium battery or alternative to lithium battery.</li> <li>• One central governmental body should be responsible for disposal of EV battery</li> <li>• Strengthen national e-waste policy &amp; action plan</li> </ul>

			<ul style="list-style-type: none"><li>• 2050 – No more private ownership of cars</li><li>• Full control/usage of autonomous vehicle</li><li>• Everyone uses public transportation<ul style="list-style-type: none"><li>○ Trains, buses, cars which run on zero emission mode</li></ul></li></ul>
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**Event Pictures**

