

1A3B Road Transportation

GHG mitigation options	Fuel switching			
Target (CO2 reduction)	Maximize efficiency with cost reduction			
Drivers	Emission control and environmental regulation			
Capacity gap and barrier	Unclear business model, High cost, Long life time of old vehicle	High cost and high import content	High cost and unclear business model and market, lack of H2 infrastructure	
Technology options and Research questions	<p>Electric vehicle</p> <p>Long-term Better Electric Vehicle (BEV) + energy storage in household</p> <p>Short-term Plug-in Hybrid Electric Vehicle (PHEV)</p> <p>Current Hybrid Electric Vehicle (HEV)</p> <p>Research questions - How to reduce cost, improve performance with ICT integration - What is application for energy storage function in household</p>	<p>Batteries for vehicle</p> <p>Long-term Ultra-battery, Li-Air, Li-S</p> <p>Short-term Advanced Lead-acid, Li-ion battery</p> <p>Current Lead-Acid battery</p> <p>Research questions - How to reduce cost, enhance capacity, and prolong life of Battery - How to minimize charging time and etc.</p>	<p>Hydrogen and fuelcell</p> <p>Long-term Light hydrocarbon Fuel Cell (Flex-Fuel Fuel Cell) (ITSOFC)</p> <p>Short-term Hydrogen Fuel Cell (PEM), Hybrid technology with Battery</p> <p>Current - Polymer electrolyte membrane fuel cells (PEMFCs)</p> <p>Research questions - How to improve performance of material - How to produce bio-Hydrogen From algae, bacteria and archaea</p>	
Current technology support	<p>EV</p> <ul style="list-style-type: none"> - Electric Vehicle Association of Thailand (EVAT): Support knowledge exchange and consult for EV and related industries - ENCON fund, TRF, NRCT: R&D funding 	<p>Batteries for vehicles</p> <ul style="list-style-type: none"> - NSTDA: R&D activities on hydrogen and fuel cell - DEDE: Training and project implementation for waste-to-oil - ENCON fund, TRF, NRCT: R&D funding 	<p>Hydrogen and fuel cell</p> <ul style="list-style-type: none"> - NSTDA: R&D activities on hydrogen and fuel cell - DEDE: Training and project implementation for waste-to-oil - ENCON fund, TRF, NRCT: R&D funding 	
Resources	<p>Policy and regulation:</p> <ul style="list-style-type: none"> - Reduce life time of old car usage. - Increase standard of emission control for tail pipe. - Promote domestic industries related to new innovative products in mobility, vehicle and energy businesses, e.g. parts of EV, batteries and etc by provide privileges, e.g. tax incentives, BOI and etc for domestic firms and new start-up with in-house R&D 	<p>Institution:</p> <ul style="list-style-type: none"> - Strengthen capability of the exiting institute/association, e.g. TAI, EVAT and expand their function for technical service and R&D activities - Set up centers of excellences for government agencies and research universities in each single technology, and linkage with the industries. 	<p>Financing:</p> <ul style="list-style-type: none"> - Cluster national R&D budget and funding according to priorities 	<p>Capacity building:</p> <ul style="list-style-type: none"> - Strengthen international relations and research network to enhance R&D activities, e.g. training, exchange programmes, research projects and etc at all level. - Develop accessible database for experts, publications, patents and intellectual properties.
References	<p>EV, Hydrogen and Fuelcell</p> <p>IEA - Hydrogen and Fuel Cells</p> <p>IEA - Global EV outlook 2016</p> <p>US-DOE Energy Efficiency and Renewable energy</p>			