



# ***Economics of Climate Change for Malaysia***

## ***Inception Workshop***

***25 – 26 January 2011  
Marriott Putrajaya***



**Day 1: 25 January 2011**

## **Session 2: Presentations on Climate Change**

### **A) Ministry of Natural Resource and Environment**

- Climate Change is real and the impacts are being felt in Malaysia e.g. floods, haze which causes losses in revenue and productivity and health risk to the people; Climate Change is due to the increase in GHG emission especially in CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O etc which causes changes in ambient temperature, extreme weather events, rise in sea water level, rapid long term changes in weather patterns induced by human activities
- Malaysia produces a total of 9.1 PgC/y of which 45% is release to the atmosphere, 29% is sequestered by the forest and 26% into the oceans. Malaysia is moving from a Nett Sink in 2000 to a Nett Emitter in 2005 and 2007, and the trend is increasing with the energy sector being the highest emitter by sector 217 million ton CO<sub>2</sub> equivalent in 2007. In terms of per capita emissions, Malaysia stood at 10.8 ton e CO<sub>2</sub>/capita e while its carbon intensity emission was at 0.58 CO<sub>2</sub>/GDP
- Actions taken by Malaysia are seen in the National Policy on Climate Change as well as a voluntary pledge of ***reducing of up to 40% in terms of emission intensity relative to GDP by the year 2020 compared to 2005***
- In the 10<sup>th</sup> MP, Government's role in combating Climate Change are seen in Green Growth and Green Community, providing integrated and green transportation, and low impact development
- To encourage private sector to mobilize on climate change actions, Incentives are being given in RE and EE Projects and Water Recycling i.e. Pioneer Status, investment tax allowances, Green Building Index, and GHG reductions
- A need for Public role to change its lifestyle and habits to reduce consumption and instill more wise use of resources e.g. electricity and transport

### **B) Asian Development Bank**

- A regional perspective of the ECCSEA study carried out in **Indonesia, Philippines, Singapore, Vietnam and Thailand** with the objective of support adaptation and low carbon planning, and inform policy making; focus on economic aspects to help prioritize options and estimate funding need; raise public awareness about climate change challenges and opportunities; and share knowledge, build capacity and provide training
- The ECCSEA study documented the Climate Change risk in SEA especially as a region we are geographically vulnerable, having tropical climate, long coastlines, and small islands, coupled with high concentration of population and economic activity in low-lying coastal areas, and heavy reliance on climate-sensitive sectors, while millions of its people are still trapped in poverty with low adaptive capacity
- The impacts will be felt across all sectors with **disproportionately impacting the poor**; From the simulation and modeling projections based on PAGE 2002, it was predicted that cost of climate change can reach 6.7% of GDP by 2100, threatening sustainability of most countries
- The ECCSEA recommendations were that SEA countries need to respond to climate change by adapting and take action now as the adaptation makes economic sense and shown by the Cost Benefit Analysis done for this century i.e. by 2100, at a cost of 0.2% of GDP to incorporate adaptation measures, it will bring a benefit of 1.9% GDP; More needs to be done in strengthening overall adaptive capacity and scale up proactive adaptation

- The ECCSEA recommendations were that SEA countries need to respond to climate change by mitigating the effects of climate change through its GHG emissions reduction from the energy, forestry and land use changes sector as this sector has the greatest potential to reduce
- The ECCSEA recommendations for policy makers were that combating climate requires global solution built on a common but differentiated responsibility; more is needed to mainstream adaptation in development planning; we should make greater mitigation efforts and move towards a low carbon growth that is sustainable and brings co-benefits; adaptation and mitigation require a comprehensive policy framework, incentives for private sector action, elimination of market distortions, ample financial resource; international funding and technology transfer are critical; enhance its capacities and regional cooperation

### **C) Economic Planning Unit, Prime Minister's Department**

- The ECCM Project for Malaysia as supported by UNDP and ADB was presented with the objective to assess the costs and benefits of adaptation & mitigation options for climate change in Malaysia as well as to provide options to prescribe mitigation and adaptation measures in line with national priority. The project will run from July 2010 – June 2012 with three main components i.e. Stocktaking and Development of Database/Methodology, Economic Modeling to estimate cost and benefit of alternative options, and to recommend Policy Options through economic measures such as fiscal incentives, regulations studies, and other means to promote the implementation of the strategies
- The ECCM Project would focus on adaptation (water resources, coastal and agriculture), mitigation (energy, transport and LULUCF) and cross cutting (food security, energy security, urbanization, health and poverty)
- The ECCM Project will complement towards building a climate resilient growth strategy, bringing better quality of life and overall achievement of the voluntary emission reduction target by Malaysia.

## **Session 3: Presentation on Adaptation and Climate Change**

### **A) NAHRIM**

- A global perspective of climate change impact was given in that observational records and climate projections provide abundant evidence that freshwater resources are vulnerable and its management can impact other sectors e.g. energy, health, food security and nature conservation based IPCC Assessment Report 4 (2007) and that Climate Projection is a Prerequisite to Climate Change Adaptation to quantify the potential impacts; Global Climate Models (GCMs)
- Malaysia Response to Climate Change in producing its National Policy on Climate Change with strategies on Adaptation Measures to provide greater coherence for addressing climate change with reduction of emissions in carbon intensity of GDP by up to 40% of 2005 level by 2020 as a key indicator for success
- A Regional Climate Model is required as a prerequisite in identification of climate change impact and the Regional Hydro-climate Model (Reg-HCM) was prepared for Peninsular Malaysia in 2006 and for Sabah and Sarawak in 2010

- A study on the impact of SLR in Malaysia was conducted in December 2010 with the aim to project sea level changes along the Peninsular Malaysia (PM) and Sabah and Sarawak (SS) coastlines
- Future Hydro-climate change projection database with 5 main parameters i.e. Precipitation, Evapotranspiration, Soil Water Storage, Surface Temperature and Stream flow with data sets of simulated past data and future data
- Key findings from the studies showed a projected uniform increase in future temperature of annual air temperature by about 1- 1.5°C over all regions of Peninsular Malaysia and an increase in annual rainfall with 10% increase in Kelantan, Terengganu and Pahang while Selangor and Johor have a 5% decrease; more droughts and extreme weather will be felt
- The findings projected an increase of about 4°C in air temperature throughout Sabah and Sarawak towards the end of 21st century while Sabah state will experience some dry years and wet years can be discerned during the 21st century over while no clear trend can be seen over Sarawak state
- In projected stream flow, impact varies with the geographical location within the region, with seasonality, and with the considered time interval in the future

## **B) Economic Planning Unit, Prime Minister's Department**

- The economics of adaptation in Malaysia was presented with a prelude to the impacts of changes in weather and climate trends in Malaysia especially in rainfall, ambient temperature and occurrence in extreme weather; In terms of agriculture and forestry impacts, it was shown from the NC2 studies that an increase of 2°C would reduce yield by 13% or RM200 million for rice cultivation; oil palm yields would reduce by 30% should a 2°C rise above optimum level and decrease in rainfall by 10% or RM5 billion; for rubber production, a 10% drop in yield is predicted with increase in annual temperature above 30°C coupled with reduce rainfall would cause retarded growth costing loss of RM400 million; while in forestry sector, an increase of 1 – 2°C would see an upward shift in climatic conditions in montane forest ecosystem
- Malaysia has seen in the last decade an increased in damages due to floods with the highest in 2006 estimated at RM300 million; while at the state level, Johor incurring the highest cost in damages estimated at RM250 million and Kelantan with RM150 million in the last decade;
- Among the key questions that need to be addressed in the ECCM Project would be determining the expected cost of climate change in the absence of adaptation measures, the economic cost of alternative adaptation measures, the economic benefit of alternative adaptation measures and addressing questions on can adaptation measures can offer the largest economic returns or the best benefit – cost ratio
- It was acknowledge that very little data is available on local cost and benefits of adaptation measures by sectors e.g. coastal, agriculture etc.
- A climate module using Global Climate Models based on climate change Scenario that will look at environmental, social and economic impacts on the various sectors including agriculture, fisheries, forestry, biodiversity, hydropower, water resources, natural disaster, storm surges, SLR, infrastructure, health and migration which would generate adaptation measure and then subjected to microeconomic, macroeconomics and sector level analysis;
- The ECCM Project would look at key sectors of water resources, marine ecosystem, land use changes and forestry as well as cross cutting issues of food security, energy security, public health, urban development and poverty.

## **Questions and Answer Sessions:**

### **Session 2C**

Chee Yoke Lin of TWN enquired why water resources were put into adaptation and mitigation as it is an area that is cross cutting.

En. Azhar of EPU responded that it was overlook and will be adjusted accordingly.

Dr. Ibrahim of EPU raised the issue of voluntary pledge by Malaysia to reduce 40% carbon intensity on condition of support in finance and technology, is Malaysia going for this reduction?

En. Azman responded that though it is a voluntary pledge, Malaysia is already half way into achieving that target now based on carbon intensity and as Malaysia looks at it as a global responsibility to take action in mitigating climate change but in a common but differentiated responsibility.

### **Session 3A**

Mr. Fred Kugan enquired on the datasets of NAHRIM given the great disparity of the temp rise reported for Peninsular Malaysia and Sabah and Sarawak.

Tuan Haji Ahmad responded that Sabah being on an island has a different climate and possibly the Malaysia Meteorological Department would be able to provide an answer to why.

### **Session 3B**

Chee Yoke Lin of TWN enquired on the equity in addressing sustainable development and who will bear the cost; based on the projections, the impacts on Malaysia will be moderate but it must be prepared for future migration and refugees and will this be factored in the study?

Yii Tan responded on equity and poverty, national governments will take the lead as the impact felt will not be evenly spread, special attention will be given on this matter; The study has its boundary but maybe need to look at external influences, the likelihood of it happening and how will Malaysia strategically handle it.

Melissa of WWF-Malaysia enquired on the cost to society in terms of loss of environment and natural resources, has that been factored in?

Yii Tan responded that natural resources are important to a developing country but there is a lack of data on valuation of its natural resources.

Dr. Rahim Nik commented on the lack of data on cost of adaptation and how will that affect the ECCM study.

Yii Tan responded that there was some valuation done on the cost based on NC2 and it will be build upon for this ECCM Study.

## **Session 4: Breakout Groups on Adaptation**

**Objective** of the Session were to gather collective experience on key climate change issues, and advice on the measures that would enhance our response to climate change challenges as well as actions at all levels are needed to reduce climate change impacts i.e. individuals, communities, business and governments.

<p><b><u>Group 1: Planning and Coordination</u></b></p> <ul style="list-style-type: none"> <li>• Key Challenges in mainstreaming adaptation measures in development planning;</li> <li>• Identify lead agency, inter-government coordination, appropriate adaptation measures</li> </ul>	<p>Findings:</p> <ul style="list-style-type: none"> <li>• Lack of intellectual understanding leads to lack of political will on climate change and adaptation; Constitutional set up and the need to work within that framework; Numerous councils not fully functioning which are sector based, Need to build trust and understanding; Need to identify and build knowledge and technical knowledge</li> <li>• <b><u>EPU</u></b> (in coordination with other ministries) and <b><u>state UPEN</u></b> be the lead agencies constituting a standing working mechanism in getting better coordination and cohesive working down to relevant agencies</li> <li>• Adaptation measures in agriculture sector, flood mitigation and the need to plan at the local level</li> </ul>
<p><b><u>Group 2: Planning and Coordination</u></b></p> <ul style="list-style-type: none"> <li>• effective mechanisms for federal-state-local government coordination, and strengthening local planning and implementation capacities</li> <li>• improve inter-governmental coordination and planning mechanisms to promote</li> <li>• identify appropriate adaptation measures</li> </ul>	<p>Issues identified:</p> <ul style="list-style-type: none"> <li>• Need for <b><u>greater awareness and periodical meetings</u></b> among state and federal agencies, funding for implementation, <b><u>gaps in implementation of policies</u></b> at the local level, differential laws between state and federal level and no responsibility and initiatives by the people</li> <li>• Various and <b><u>numerous councils</u></b> and committees in existence, greater need to <b><u>strengthen the implementation of national policies</u></b>, expand the scope or include state members to relevant committees, greater need for <b><u>bottom up and top down</u></b> approach especially in land use planning to allow for adaptation measures to be mainstream and implemented</li> <li>• <b><u>Preventing non-essential</u></b> development in vulnerable coastal areas; Implement strictly hilly land development guidelines; <b><u>Enhance green space</u></b> areas in urban areas, create awareness on potential impacts of climate change to the public and government</li> </ul>
<p><b><u>Group 3: Water Resources</u></b></p> <ul style="list-style-type: none"> <li>• What are the most important challenges in water resources</li> </ul>	<p>Findings</p> <ul style="list-style-type: none"> <li>• Lack of protection measures of water catchments, need for a regulatory regime in <b><u>mapping of ground water resources</u></b>; appropriate, effective and affordable</li> </ul>

<p>planning and management to address climate change impacts</p> <ul style="list-style-type: none"> <li>Identify challenges, lead agencies and measures to overcome in order to mainstream climate change adaptation in water resource planning</li> </ul>	<p>technologies in water recycling efforts; lack of political-will and buy-in at the highest executive level (PM); <b><u>accurate weather forecast</u></b> and climate data; <b><u>coherence in policies</u></b> and <b><u>positive incentives/disincentives</u></b> – e.g. rainwater harvesting, urban storm water management guidelines such as no paving over of private homes lawn, water use conservation (differentiated water tariffs) and removing governmental agencies <b><u>‘turf-mentality’</u></b></p> <ul style="list-style-type: none"> <li>The need for ecosystem protection, sustainable water resources management; Appropriate water for rural and urban poor communities – equipment to store, treat and distribute; stand-alone features, disaster risk management – response plan for dam failures; adaptation of buildings and infrastructure in flood plains (stay above water on stilts)</li> <li>Lead Agency would be <b><u>EPU</u></b> in coordination with <b><u>KeTTHA and NRE</u></b>; leading to Scientific Advisor to PM, Pemandu and implementing good regulatory practices</li> </ul>
<p><b><u>Group 4: Coastal</u></b></p> <ul style="list-style-type: none"> <li>What are the most important challenges in coastal management to address climate change impacts</li> <li>Identify challenges, lead agencies and measures to overcome in order to mainstream Climate Change adaptation in coastal planning</li> </ul>	<p>Findings:</p> <ul style="list-style-type: none"> <li>Protecting property and human life, salt water intrusions, coastal flooding, implementing the Integrated Shore line Management Plan (ISMP) i.e. federal initiative but water and land is state jurisdiction</li> <li>Guidelines and manuals on coastal development should be enforced as a law and adhered by the local authorities and a committee to be formed for federal and State Corporation to ensure its smooth implementation</li> <li><b><u>EPU</u></b> to take a lead in economic and social aspect with the help of technical department such as JPS, NAHRIM, and JPPD</li> <li><b><u>Short term strategies</u></b> identified included measures to include planning for coastal management in 5 year planning, increase R&amp;D on impacts of climate change on other sectors e.g. fisheries and agriculture; increase capacity and awareness</li> <li><b><u>Long term strategy</u></b> identified included developing ISMP for all states and form a new agency to manage coastal zones and monitor impacts</li> </ul>
<p><b><u>Group 5: LULUCF and Forestry</u></b></p> <ul style="list-style-type: none"> <li>What are the most important challenges in LULUCF &amp; agriculture to address climate change impacts?</li> <li>Identify challenges, lead agencies</li> </ul>	<p>Findings:</p> <ul style="list-style-type: none"> <li>Key role to be played by MARDI for <b><u>securing food production</u></b> and its efficiency;</li> <li>Key challenges in forestry sector would be <b><u>land competition</u></b>, seed procurement, maintaining forest security, impacting ecotourism and environmental services of the forest; Lack of Forest Policy as management of forest will increase in cost; Need for valuation of environmental services of forest</li> </ul>



and measures to overcome in order to mainstream climate change adaptation in LULUCF and forestry	<ul style="list-style-type: none"> <li>• A need for lead agency at the state level to tackle climate change, vulnerability assessment need to be conducted and information circulated</li> <li>• Adaptive measures to create artificial reef for coastal fisheries</li> </ul>
<p><u>Group 6: Public Awareness</u></p> <ul style="list-style-type: none"> <li>• What are the most important challenges in raising public awareness to address climate change impacts</li> <li>• Identify means and channels that would be most effective to bring these about, and the roles that each segment of society can play</li> </ul>	<p>Findings:</p> <ul style="list-style-type: none"> <li>• The key challenges identified were the need to understand the impacts of climate change, the public involvement in climate change adaptations, raising awareness among different groups, finding resources to implement and fund the campaign, how to ensure sustainability of awareness campaign</li> <li>• The key sectors identified were water, agriculture, biodiversity, forestry, coastal/marine and public health</li> <li>• <b><u>Awareness raising</u></b> through info-graphics and animation through printed media, electronic media, public forum with tailored made content for each sector</li> <li>• <b><u>Public involvement</u></b> through building mentorship, CSR, influential person or champions</li> <li>• <b><u>Government and private sector</u></b> to fund such initiatives and campaign</li> <li>• <b><u>Sustainability</u></b> of the campaign is to be ensured in having frequency, timing and phases of the implementation as well as conducting evaluations of the campaign</li> </ul>

**Day 2 : 26 January 2011**

## **Session 5: Presentation on Mitigation for Climate Change**

### **A) Malaysia Green Technology Corporation**

- The assessment on the mitigation efforts by Malaysia was based on the National Communication 2 Report and is focused on 5 sectors i.e. energy, forestry, waste, agriculture and industrial processes while a forecast scenario was provided for 3 sector namely energy, forest and waste, looking at policies, action plans and studies carried out by the Government.
- In the **energy sector**, the scenario for **Energy Efficiency Conservation** was develop based on the assumption that potential reduction of **0.8 %** per annum in industrial sector, **1.0 %** per annum (electricity + petroleum products + coal + natural gas) and **0.8 %** per annum from the commercial sector from the year 2015 until 2020; **Renewable Energy** was forecast to be able to supply a total of 2065 MW of electricity from various combination of biomass, biogas, mini-hydro, solar PV and solid waste by the year 2020 while 5% of the share of diesel consumption in the transport sector will come from bio-diesel.
- The CO<sub>2</sub> emission reduction scenario based on the mitigation actions for the energy sector is projected to reduce a total of 25,779 kton CO<sub>2</sub>e from being emitted or 9.9% reduction from the BAU scenario.
- In the **Forestry Sector**, the forecast scenario was built upon the three assumptions to reduce forest conversion to other land uses, reducing emission from timber harvesting activities and establishment of tree plantations. The findings were that **reducing the rate of forest conversion** by as little as 5% has the potential to reduce emissions by as much as 16 million tonnes CO<sub>2</sub>e between now and 2020 but at a cost of RM10,500 per ha; **The establishment of new tree plantations** at a low rate of 5,000 ha a year would sequester up to 3.53 million tons of CO<sub>2</sub> between now and 2020 but at a cost of RM15,500 per ha while **Reducing the harvesting** activities needed to produce the 5 major commodities i.e. logs, sawn timber, plywood, veneer and mouldings, by 5% could reduce GHG emissions by as much as 15 million tons between now and 2020 would come at a cost of RM1,200/m<sup>3</sup> of wood products.
- The carbon price needs to be at least **60% higher** (about RM 32 per ton) to make **forest conservation** feasible, and even higher for **new plantation establishment** and **reduction of timber harvesting** for high-value wood-based commodities.
- In the **waste sector**, 2 scenarios was prepared i.e. efforts to increase 22% of recycling and 25% methane capture and the second scenario to operate several alternative technologies e.g. material recovery facilities, and thermal treatment plants, and 25% CH<sub>4</sub> recovery. Under a BAU scenario, the waste sector would generate a total of 42, 785 KtCO<sub>2</sub>e emission but with mitigations efforts it is possible to reduce 57.7% of the emission with the second scenario.
- In summary, several potential mitigation options were presented for the energy, LULUCF, Waste, Agriculture and Industrial Processes.

### **B) Forest Research Institute of Malaysia and Ministry of Natural Resources and Environment on Role of Forest as Carbon Sinks**

- Carbon Inventory as estimates of changes in stocks of carbon or estimates of its emission or its removal in a given land-use system are expressed in tons of carbon or CO<sub>2</sub> per ha resulting from human interventions and is required under the National GHG Inventory.

- The Malaysian carbon inventory is based on the IPCC Guidelines for estimating GHG for LULUCF (IPCC 1996 and 2006) and IPCC Good Guidance for LULUCF (IPCC 2003) while Forest Carbon Stocks data are from the FAO Forest Resources Assessment 2010.
- In Malaysia based on the FRA 2010, the carbon stocks in the forest are estimated at 3255 million metric ton of C. Forest has a role to sequester carbon emitted into the atmosphere and together with oceans contribute to 60% absorption of CO<sub>2</sub> from human causes; In Malaysia, the CO<sub>2</sub> sinks identified were from permanent reserve forest, industrial plantation (oil palm), stateland forest, industrial rubber plantations. The magnitude of its sequestering potential is co-related to the size of the land area.
- Malaysia have embarked on CO<sub>2</sub> sequestration studies in collaboration with other scientists (Yasuda, Takanashi, Kosugi and Hirata etc) and document that forest plantation sequester a total 6.53 tCO<sub>2</sub>/ha/yr followed by oil palm plantation at 6.3 tCO<sub>2</sub>/ha/yr while forest in Pasoh recorded 4.3 t CO<sub>2</sub>/ha.yr and Lambir recorded 4.9 tCO<sub>2</sub>/ha/yr.
- The mitigation potentials in the land use sector for Climate Change Actions would include reducing emission or enhancing removals for land use sector, slowing and avoiding deforestation, forest degradation, reforestation and afforestation, improving forestry sector and land reclamation and agroforestry.
- The forest related options for climate change mitigation would bring about reduced deforestation, increase in forest land area, increase in afforestation and reforestation and reduced forest degradation, increase forest carbon density, forest conservation, increase use of wood products from sustainably managed forests, increase long term carbon storage in timber products and substitution for fossil fuels and bioenergy use.
- The definition of REDD+ using IPCC expressed in ton per carbon changes per ha was illustrated as a forest continuum where it starts as an intact forest, forest land managed and degraded to forest being converted to other land use and leading to an enhancement of forest carbon stocks via forest being afforest and reforest. Carbon stocks under REDD+ is measured as additional efforts implemented to improve the BAU of forest practices which is permanent for a specific period and measured and able to be verified.
- The Potential of REDD activities in Malaysia includes enhancement of carbon stocks, Sustainable Forest Management, avoiding deforestation and improving forest degradation; Product substitution by reducing fossil fuel emission through use of carbon stored in forest products and bioenergy use is possible (Sathre and O'Conner 2008 studies).
- Forest exert a strong influence in the global carbon cycle and opportunities exist through REDD+ mechanism and SFM provides an effective framework for forest based mitigation of climate change while more rigorous and interdisciplinary R&D is needed but forest alone cannot save the problem of GHG emissions but must be seen as one contribution to the solution.

## **Session 6: Low Carbon Development Planning**

### **A) Asian Development Bank – Strengthening Planning Capacity for Low Carbon Growth in Developing Asia**

- Low carbon growth is needed as mean temperature could increase 4.8°C and sea level up 70cm by 2100 based on 1990 level and more extreme weather conditions will be experienced. Low carbon growth would allow for more resource being used more efficiently and a less

emission-intensive industry is environmentally more sustainable and will help to maintain growth potential and competitiveness of the country.

- Based on a comparative analysis of GNI national savings and genuine savings of Malaysia shows a difference of about 30% GNI reduction in terms of nett adjusted savings reduction due to natural and mineral resource depletion as of 2006 and this scenario is a possible indicative to reflect sustainability is in decline in the country and a low carbon growth is needed
- The pursuit of looking at climate change from the economic angle as it is assist to estimate the cost of climate change, cost of taking actions for how long and how big the scope of intervention and prioritization of actions as well as looking at the investment and financing needs and identified what policies will ensure consistency across adaptation and low carbon agendas for the country.
- The ADB has launched a **Technical Assistance Program** looking into support low carbon planning, leading to a balanced growth path that is more resource efficient, less carbon-intensive, energy secured, environmentally sustainable, and help maintain growth potential and competitiveness; To make available or provide better access to relevant decision-support tools and planning frameworks; and to strengthen capacity of agencies/institutions to utilize and update tools for planning and evaluation of policies/projects.
- The project is funded by government of Japan and United Kingdom with contribution from the ADB and will be looking at the Energy (power, transport, household, industry) and LULUCF sector and will end in November 2013. The components of the project include model/software development, capacity building program and preparing a low carbon roadmap/analysis. This TA project will be running concurrently with the ECCM Project and will help to identify specific framework and tools for Malaysia building on existing tools and efforts in the country and link local and international experts on the subject together.
- A bottom up approach in modeling technologies in energy supply and demand sectors and a top down approach using **Integrated assessment model** (for climate-economy modeling, low carbon analysis with meta and probabilistic analysis will be used in this Project), CGE and optimal growth IAM looking at economic and market instruments will be applied.
- It is probable that a hybrid framework will be the outcome as it will be able to capture interactions between economic instruments and technology options, macro-economic changes, the impact of implementing LC technology options and strategic interactions among countries.

## **B) World Bank - Low Carbon Development Planning**

- **Low Carbon Studies** focused on high GHG emitters and look at development objectives to determine how to lower carbon footprint economically by 2030 as well as assessing the financing and technology requirements. In a smart development that embraces low carbon development it requires a cross sector approach in mitigation and adaptation measures that requires strong commitments and new technology, finance and capacity and national (cross ministry) coordination essential.
- **Low carbon development** needs to look at the enabling environment in totality especially the incentives, regulations, institutions, markets and public outreach to ensure that it happens; types of data and sources of data is essential as well as involvement of multi-stakeholders in the process. Several bottom up tools e.g. EFFECT, TAMT, MACtool, LULUCF in addressing abatement costs, abatement opportunities, technologies and finance as well as top down tools

e.g. multi-region GDE and general stochastic GE to measure the impacts on trade, tax and employment; Low carbon studies are not immediate as it requires scoping, data gathering and validation, stakeholder involvement, developing dynamic baseline, analyzing low carbon options and developing implementation plan

- The presentation on EFFECT, MACtool, TAMT, LULUCF and linking the bottom up and top down models was presented. The summary of the session was that consensus building needs data and assumptions to be openly and transparently shared, Data gathering takes time but is foundation for future results monitoring, a whole suite of different models to answer different questions, it builds upon existing proven approaches and models and a need to build capacity to maintain and update scenarios and models.

### **C) CMCC, FEEM and Princeton University – Assessing optimal policies for Mitigation**

- A presentation on WITCH model was given

## **Questions and Answer Sessions – Day 2**

### **Session 5A:**

Dr. Ibrahim of EPU enquired the cost of implementation the forecasted scenarios to the government during the preparation of the NC2 and the assessment carried out by Malaysia Green Technology Corporation.

En. Azman Zainal Abidin responded in that the ECCM Project that is now being implemented for which this inception workshop was held is to provide that economic costing.

### **Session 5B**

Gurmit Singh of CETDEM enquired the reasons for Malaysia to go for REDD+

Dr. Rahim Nik responded that given the issue is now clearer, there are more opportunity for Malaysia to participate and possibility for Malaysia to implement REDD+ in the country, and more for money to support forest management activities.

Hilary Chiew of TWN sought clarification on the emissions reduction presented for old growth as several recent studies have shown that old growth forest do generate emission reduction role and sought the definition used by Malaysia i.e. SFM or SMF as the UNFCCC negotiation language looks at real management of forest sustainability and not the SFM as interpreted by local industries, and lastly on whether high pesticide use in the plantation sector was measured for emission data from the plantation areas.

Dr. Rahim Nik responded that the data for the old growth came from Pasoh FR and it does capture reduction by old growth, definition of SMF and SFM is the same thing in that measurable forest management as required by UNFCCC processes i.e. in its MRV and the emission from the oil palm plantation covers or captures the total processes of that industry.

Ivy of WWF-Malaysia enquired on the emission reported for oil palm plantation in the NC2 whether it took account on the forest conversion factor as it involves conversion of mineral soil and peat swamp forest into oil palm plantation.

Dr. Rahim Nik responded that the emission and sequestration data is from the 1996 IPCC methods did not split it but noting the new method from IPCC 2007, the separation of emission from conversion of peat swamp to oil palm can be aggregated; and would be look into in the next National Communication i.e. NC3.

### **Session 6A:**

Dr. Ibrahim sought clarification on the sustainability index chart that was shown that noted Malaysia as having a low Adjusted Net Savings as compared to the Gross National Savings.

Dr. Suphachol responded that the data was from scientific findings and is not financial savings but the index looks at natural capital and how each country put value on ecosystem and environment as a measure of sustainability and that finance is not the only index measured as compared to development growth.

Encik Asfaazam (UNDP) reiterated that the group need to understand the parameters and the figures from the sustainability index and especially the relation on extraction of natural resources and its basis annually; There is a need to investigate and incorporate this findings into the ECCM Project.

### **Session 6B**

Gurmitt of CETDEM enquired on how many model is need to determine where Malaysia is in terms of its climate change challenges?

Mr. John Rogers responded that it would require at least 3 different type of model i.e. bottom up, an equilibrium model comparing where Malaysia is compared with the rest of the world and an equilibrium model on taxation etc.

Dr. Ibrahim enquired whether such studies were carried by developed countries on themselves.

Mr. Rogers clarified that the develop countries pledges made are initial and is far from reaching the 2020 target; The WB mission is to assist developing world to rid of poverty and climate change is part of it; Technology Transfer is part of the assistance given; Look for consistent information and sharing it and its scope does not cover developed countries.

### **Session 6C**

Dr. Gary of NRE enquired on the model that was used in on how it can help identify where and what is the breakpoint to mitigate options for future consideration looking on as the carbon markets through the graphs that have shown having a single state situation and a unlimited growth for financing mitigations continued in the last slide, phase shift, pre-2020 and post 2020; using CDM and taking on commitment; Future commitment in carbon tax, add prices into abatement before the phase in the market and losing out.

Dr. Tavoni responded that a model can assumed i.e. using forward looking model, and the strength of this model depends on when which policy will occur and what happen in the neighbouring countries, technology cost and will decide when should we invest in technology; Innovation is cheap and there is great value in waiting and taking on quantum leap based on the innovation now; CCS is still not a feasible option; whereas transportations and urban planning would be critical.



## **Session 7: Breakout Groups on Mitigation**

**Objective** of the Session were to gather collective experience on key climate change issues, and advice on the measures that would enhance our response to climate change challenges as well as actions at all levels are needed to reduce climate change impacts i.e. individuals, communities, business and governments.

A Handout on **Potential Mitigation Options** Table as identified in the NC-2 was circulated as reference material for each group.

<u>Group 1: Planning and Coordination</u> <ul style="list-style-type: none"><li>• Key Challenges in mainstreaming mitigation measures in development planning;</li><li>• Identify Lead agency, inter-government coordination, appropriate adaptation measures</li></ul>	Findings: <ul style="list-style-type: none"><li>• In the energy sector, there is no incentive for the industry to be efficient as there is a surplus of reported 40% of energy produced not utilized, an energy reserved situation should between 10 – 15% of total energy production only; Proper planning for energy generation is needed to address access to energy, promotion of FIT to Oil Palm Millers and Forest Industries,</li><li>• For Forest sector, there is a need to identify the driver of deforestation i.e. Agriculture Policy, Forest Plantation Policy as well as providing incentive such eco-labeling as well as declaring carbon footprint of products; Various policy conflicts in LULUCF and no incentive to keep forest; No recognition for ecosystem services; Does not look at REDD+ options – Stateland Peat converted to permanent reserve forest and cost of avoiding deforestation is estimated at RM10, 000 per ha; while expansion of forest plantation has worker limitation.</li><li>• In the areas of transport, policy conflict was identified as a major contributing factor i.e. No proper road planning and urban development, car ownership, public transport development which is affordable and efficient, introduction of fuel efficient car and fuel subsidies;</li><li>• In the Agricultural sector, food security needs to be prioritized and enhancement of crop productivity in agriculture; Tree and crop improvement to better clones and breed to be climate resilient; Native fast growing species or shorter cycle to produce food</li></ul>
<u>Group 2: Planning and Coordination</u> <ul style="list-style-type: none"><li>• Effective mechanisms for federal-state-local government coordination, and strengthening local planning and</li></ul>	Issues identified: <ul style="list-style-type: none"><li>• In mitigating LULUCF effects, state governments need to be included into main coordinating body. Suggestion of National Fiscal Council? Chaired by the PM.</li><li>• On Energy issues, amendment the UBBL to incorporate energy efficiency, energy pricing mechanism, Government to control the high pollution industries, Implementation</li></ul>

<p>implementation capacities,</p> <ul style="list-style-type: none"> <li>• Improve inter-governmental coordination and planning mechanisms to promote</li> <li>• Identify appropriate mitigation measures</li> </ul>	<p>of RE incentives, improve EE in residential building sector, and development of transportation action plan by federal government;</p> <ul style="list-style-type: none"> <li>• On waste issues, introduction of a sanitary landfill and expand the 3R program;</li> <li>• In the agricultural sector, to improve and strengthen R&amp;D, have centralized livestock waste management to develop biogas to use in generating electricity, and promoting of nitrogenous fertilizer</li> <li>• On innovative processes, clean air regulation under the environmental quality act to be amended in order to reduce clinker use in cement production and to identify key government agencies in Production processes of factories</li> <li>• Green Technologies – Cradle to cradle technologies = designing long lifetime technologies can be reused</li> </ul>
<p><u>Group 3: Energy and Transport</u></p> <ul style="list-style-type: none"> <li>• What are the most important challenges in energy and transport management to address climate change impacts</li> <li>• Identify challenges, lead agencies and measures to overcome in order to mainstream Climate Change mitigation measures in energy and transport</li> </ul>	<p>Findings</p> <ul style="list-style-type: none"> <li>• A comprehensive Green Technology Roadmap that is economically viable is needed for the areas of transport, energy, ICT, building, water and waste including its timeline of implementation</li> <li>• In the areas of transport, there is a conflict of current available policies (National Transport Policy is absent) and lack of coordination between MOT and SPAD, lack of public transport integration and networking, lack of data to develop baseline study and lack of awareness among general public on the challenges of the Malaysian transport system and its connection to climate change; Development of electric car for the country (Legislation and infrastructure to support EV)</li> <li>• In the areas of energy, among the challenges identified was a great need to address policy incoherence (National Energy Efficiency Master Plan) and comprehensiveness (power generation other than fossil fuel), interpretation of Green Technology, providing incentives (including eco-labeling) and dis-incentives (including subsidies for IPP), IPR and expansion of SREP</li> <li>• Under strategies for disaster risk management in light of climate change, development of power plant in low lying areas are to be prohibited to address problem of SLR while development of big mega dams should be stop in light of uncertain rainfall pattern in the coming years; Public transport system needs to be upgraded for connectivity prior to weaning people off car ownership and removal of fuel subsidies.</li> </ul>
<p><u>Group 4: Waste</u></p> <ul style="list-style-type: none"> <li>• What are the most important</li> </ul>	<p>Findings:</p> <ul style="list-style-type: none"> <li>• The main challenges identified was the generation of waste and its treatment and</li> </ul>

<p>challenges in waste management to address climate change impacts</p> <ul style="list-style-type: none"> <li>Identify challenges, lead agencies and measures to overcome in order to mainstream Climate Change mitigation in waste management</li> </ul>	<p>disposal system</p> <ul style="list-style-type: none"> <li>The National Solid Waste Management Department (JPSPN) should take a lead in coordination with local councils</li> <li>The challenges identified for waste management included lack of land for solid waste management facilities, lack of public awareness and participation in recycling (3R) and its facilities; lack of R&amp;D, local experts, funding and technologies in solid waste management; Social acceptance of solid waste and its management was also identified</li> <li>The measures identified included enhancement and continuity of 3R program in Malaysia through multiple channels in coordination with local state government and councils, increased participation of private sector in PPP and PFI Enforcement of Solid Waste Management and Public Cleansing Act 2007 which include mandatory separation at source and strengthening R&amp;D in solid waste management, adapting new technologies to local conditions in waste management</li> </ul>
<p><u>Group 5: LULUCF and Agriculture</u></p> <ul style="list-style-type: none"> <li>What are the most important challenges in LULUCF &amp; agriculture to address climate change impacts?</li> <li>Identify challenges, lead agencies and measures to overcome in order to mainstream Climate Change mitigation in LULUCF and Forestry</li> </ul>	<p>Findings:</p> <ul style="list-style-type: none"> <li>The challenges identified in the <b>Forestry sector</b> was the competing land use due increasing demands for development, in the <b>agriculture sector</b>, existing agriculture practices (use of pesticide and not very optimize agricultural land) and lack of incentive and technology transfer for agriculture industry to be efficient; in the <b>fisheries sector</b>, unsustainable fishing (method of fishing) and its emission from the fishing boats/ships due to lack of technology in modern fishing; a need to rationalize the subsidy of fuel to the fishermen, so that they can operate and fish in a controlled, effective and sustainable manner.</li> <li>In mainstreaming forestry sector in <u>mitigation efforts</u> by the country to address climate change; maintaining forest cover and tapping on the opportunity from REDD+ in rehabilitation and conservation of forest as well as enhancing the forest management procedure, more intensive implementation of forest management such as the RIL and SFM with enforcement to curb illegal logging is needed. More attention is need to be given to rehabilitate peat land, conserve peat swamp forest and mangrove as they are important carbon sink, there is a strong need to engage private sectors to contribute in carbon offsetting project such as voluntary carbon offset scheme (VCOS) e.g. Malaysia Airlines VCOS program and credible methods to measure and verifiable such activities as well as making it reliable is needed to ensure credible outcome of carbon offsetting project</li> <li>In mainstreaming agriculture sector in mitigation efforts, there is a strong need to</li> </ul>

	<p>intensify R&amp;D in agriculture sector, for example, planting of oil palm in peat land needs to be carefully strategize to ensure that peat functions in a healthy ecosystem and its functions as carbon sink is not affected, improve technology in farming especially in highland so that current agriculture land remains but agriculture produce increase due to more efficiencies and introduce land zonation as a way to control unsustainable and over exploitation of land, for an optimized land use</p> <ul style="list-style-type: none"> <li>• There is a strong need to build upon a sustainable consumption pattern by the general public i.e. changing lifestyle to consume sustainable produced agriculture products and forest products</li> <li>• The lead agency identified was Malaysia Green Technology Corporation and Climate Change Council though a broader membership to include local governments and civil society is proposed as well as restructuring it into the 5 pillars (as per Bali Action Plan) and inclusion of all sectors e.g. LULUCF, Water and Agriculture.</li> </ul>
<p><u>Group 6: Public Awareness</u></p> <ul style="list-style-type: none"> <li>• What are the most important challenges in raising public awareness to address climate change impacts</li> <li>• Identify means and channels that would be most effective to bring these about, and the roles that each segment of society can play</li> </ul>	

## **Session 8: Panel Discussion**

- Input generated will channel up to the higher authority and table to the national planning committee; Findings from the workshop will be internally discussed and small group will be created to discuss further the proposal from this inception workshop; Adaptation should be done within the means and affordable; Water resources management needs to manage properly
- The mitigation preparation for NC2 has proposed options that are feasible and it lacks of financial figure based on the mitigation options and hopes that ECCM will look into this issue
- A more coordinated approach is needed in mainstreaming adaptation and mitigation efforts; There is a great need to look into species matching based on weather predictions and will help in agriculture practices in planting development e.g. based on prediction by NAHRIM, water surplus area planted with dry species; Water Resources Mapping can be used to plan adaptation approaches; Portable water will be scarce and Malaysia needs to comply with UN regulation by providing free access to all
- Mitigation potential in Malaysia can be done if it is affordable (for industries or public), providing public transport system that links or is networked; affordable EE appliances (LED lights expansive) and reviewing electricity tariff; But currently consumer do not have the option to choose; Capacity and awareness needs to go beyond electronic media through newspaper
- In Malaysia mitigation scenario – her emission are mimicking the developed countries pattern, where the industry and transport, land fill are highest emitter; whereas the other 9 countries in SEA have rice cultivation as one factor

### **Question and Answer session:**

- Mr. Gurmit Singh:
  - The government needs to take action in area that is significant in mitigating climate change and CETDEM has found from an energy usage study done by household and found that **transport** and in-efficient electrical appliances are the main contributor; In Transport mitigation, affordability, accessibility, connectivity and reliability is crucial to its success as providing options to Malaysia on reducing GHG emissions from vehicles on the road
  - Water resources – Why do government develop on flood plain areas? Land and land management? How much interruption by government? Governance index?
- Ms. Hilary Chiew:
  - Why is IPR not being addressed? How would mitigation actions in the transport, energy, LULUCF be reflected in the output of workshop?
- Dr. Suphachol Suphachalasai:
  - ADB will be supporting EPU project and have received good comments from the group of economist in the project and answer the bigger question on why we are we doing it?
- Mr. Azhar Noraini:

- Several issues are talked about are new in the 10<sup>th</sup> MP; There is a strong need for ministries to work beyond its silo; There are challenges of budget constraints and deficits and would need to work with optimization of its available resources
- Some adaptation and mitigation measures need to be broken to broken to smaller projects: Development carried out in all sector and all states but at a slower pace and longer period of time