Climate Change and Technology Needs of Developing Countries

WIPO Regional Forum on Intellectual Property (IP) and Environmentally Sound Technologies (ESTs)

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TECHNOLOGY NEEDS

DEFINITION

The evolving need for technologies (new equipment, techniques, practical knowledge or skills) to meet development priorities through provision of low greenhouse gas services (mitigation) or reduction of the vulnerability of sectors (adaptation) to promote sustainable livelihoods and minimize the extent and adverse impacts of climate change.

Source: UNFCCC (2010) Handbook for Conducting Technology Needs Assessment for Climate Change

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MITIGATION

Technologies to reduce the sources

e.g. The use of RE in

- Electricity production
- Heating for Domestic and Industrial Use
- Cooling Climate control
- Transport etc

or enhance the sinks of greenhouse gases

e.g:

- Carbon capture and storage
- Carbon sequestration

Source: UNFCCC (2010) Handbook for Conducting Technology Needs Assessment for Climate Change

ADAPTATION

Technologies that can provide adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects

e.g.

- Coastal Zones: Coastal topography mapping and surveying, Hard coastal protection (dykes, floodgates, seawalls)
- Agriculture: Drought resistant varieties, crop rotation system, improved distribution system.

Source: UNFCCC (2010) Handbook for Conducting Technology Needs Assessment for Climate Change

Source: UNFCCC (2010) Handbook for Conducting Technology Needs Assessment for Climate Change

TECHNOLOGY NEEDS

Process

- Identify technology needs based on development priorities and criteria of sustainability
- Identify the best technology options to address those needs
- To ensure that the technology options are able to address the needs in a sustainable manner (short, mid and long term)

Source: UNFCCC (2010) Handbook for Conducting Technology Needs Assessment for Climate Change

Technology Needs Assessment (TNA) under UNFCCCC

TNA is defined as

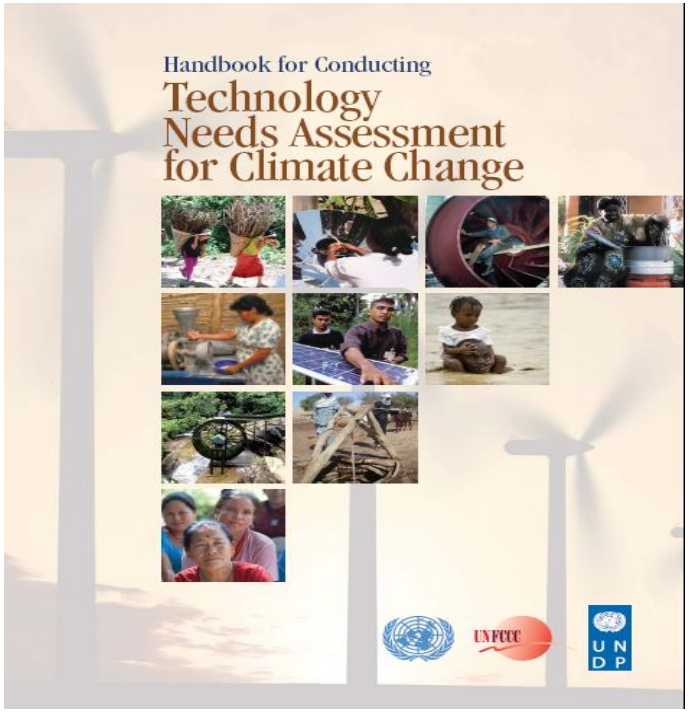
• a set of **country-driven activities** that identify and determine the mitigation and adaptation technology priorities of Parties other than developed country Parties, and other developed Parties not included in Annex II, **particularly developing country Parties.**

• They involve **different stakeholders in a consultative process to identify the barriers to technology transfer** and measures to address these barriers through sectoral analyses.

• These activities may address soft and hard technologies, such as mitigation and adaptation technologies, identify **regulatory options and develop fiscal and financial incentives and capacity-building"**

(4/CP.7).

Source: UNFCCC website



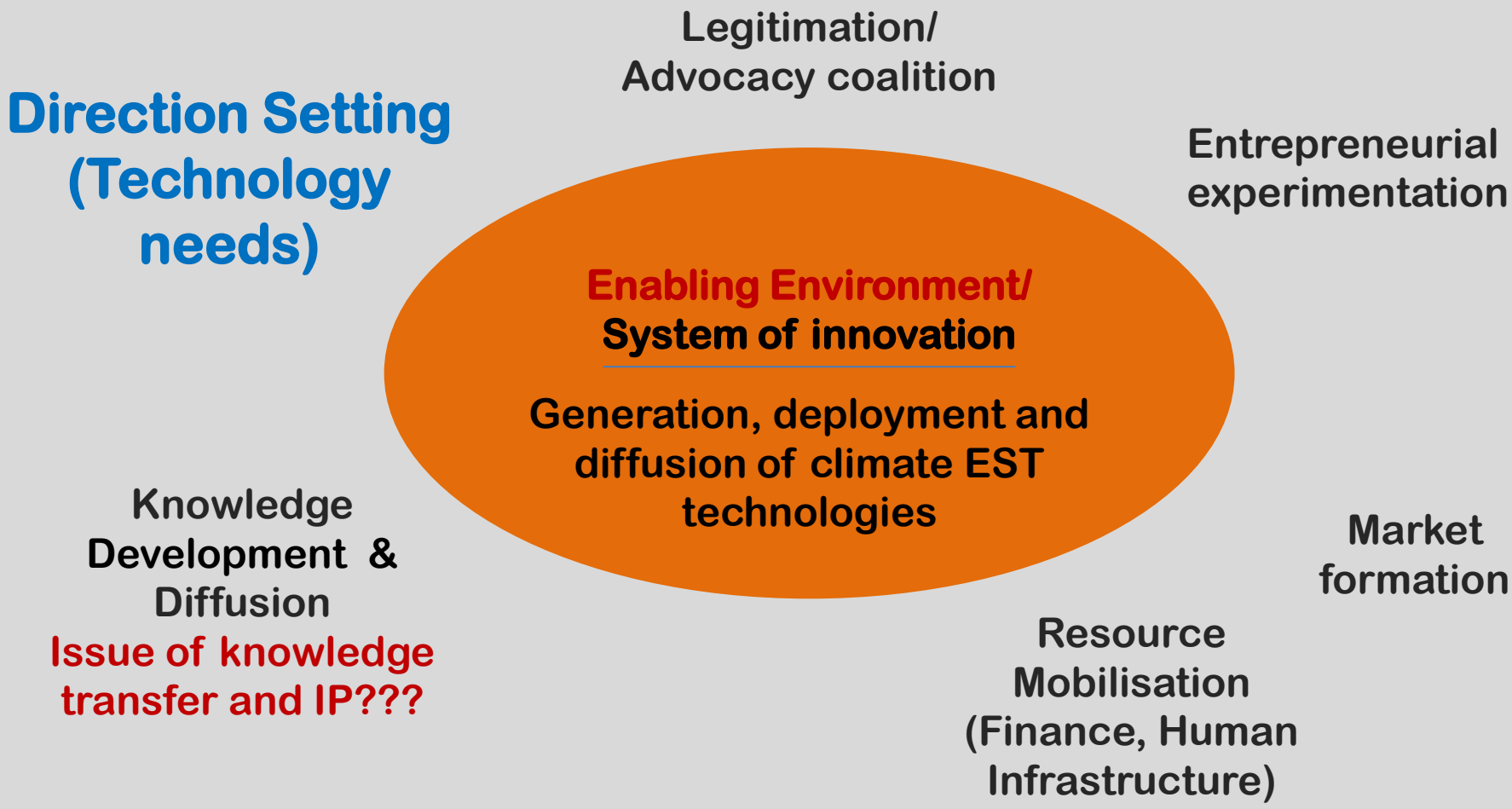
Other types of support by UNFCCC:

- Technology Transfer Supported by the GEF
- Bilateral support
- Poznan Strategic Programme
- Training in preparing technology transfer projects for financing

ClimateTechWiki
A CLEAN TECHNOLOGY PLATFORM

For more info, please go to:
http://unfccc.int/ttclear/jsp/Support.jsp

Source: UNFCCC website


Legitimation/
Advocacy coalition
Direction Setting
(Technology
needs)
Entrepreneurial
experimentation
Enabling Environment/
System of innovation
Generation, deployment and
diffusion of climate EST
technologies
Knowledge
Development &
Diffusion
Issue of knowledge
transfer and IP???
Market
formation
Resource
Mobilisation
(Finance, Human
Infrastructure)

BASED ON SUSTAINABILITY (e.g. CLIMATE CHANGE) RELATED POLICIES

POLICY MAKERS
Top down Technology Needs

Global Level

- Mitigation
- Adaptation

National Level

Local Level

Local technology producers

Local technology users

Bottom up Technology Needs
LOCAL COMMUNITIES

BASED ON EVERYDAY TECHNOLOGY NEEDS OF DIFFERENT COMMUNITY

Overall Sustainable development and livelihoods →

Industrial-led Green Growth →

	Needs of providers			Needs of Users
	Generation	**Export Market Deployment**	**Local Market Deployment**	**Diffusion (Adoption & Adaptation)**
Low-income and isolated communities	X	X	X	- **Meeting & greening** everyday needs
Low-income and well-connected communities	X	X	X	- **Meeting & greening** everyday needs
High & Middle income and well connected communities	X	X	X	- **Greening** everyday needs
Universities / Research Institutes	**Research outputs/ Consultancy**	X	X	- **Greening** everyday needs - **Example** to the community
SMEs / University & RI Spin-offs	**New business** (for profit & strategic CSR)			- **Greening** everyday needs
Large firms (MNEs, GLCs)	**New business** (for profit & strategic CSR)			- **Greening** everyday needs - **Example** to the industry

WIPO
WORLD INTELLECTUAL PROPERTY ORGANIZATION

WIPO: Tech Transfer & IP Support

Different Challenges ??

The Malaysian Experience

Development Needs

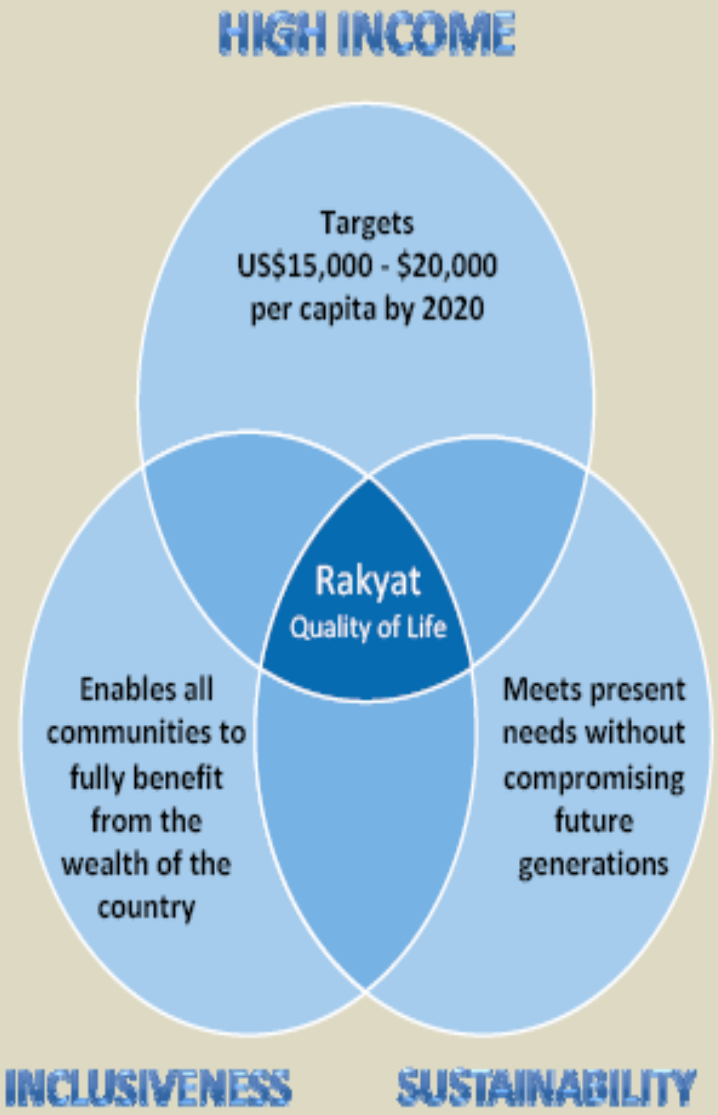
Policy framework:

- **New Economic Model**
- **National Policy on Climate Change 2009**
- **National Policy on Green Technology 2009**
- Economic Transformation Programme
- 10 years Malaysian Plans

Institutional framework:

- Various National Councils
- Economic Planning Unit (EPU)
  → Environment and Natural Resource Economics Section
- Ministry of Natural Resource and Environment (MNRE)
- Ministry of Energy, Green Technology and Water (KETTHA)

Development Needs: The New Economic Model



HIGH INCOME

GROWTH + WEALTH CREATION

SUSTAINABILITY

FIXING THE FOUNDATIONAL ISSUES

INCLUSIVENESS

NARROWING DISPARITY

Development Needs: Climate Change Policy (2009)

Policy Statement:

Ensure **climate-resilient development** to fulfil national aspirations for sustainability

Objectives:

- Mainstreaming climate change through wise management of resources and enhanced environmental conservation resulting in strengthened **economic competitiveness** and **improved quality of life**
- **Integration** of responses into national policies, plans and programmes to strengthen the resilience of development from arising and potential impacts of climate change; and
- **Strengthening** of institutional and implementation capacity to better harness opportunities to reduce negative impacts of climate change.

Development Needs: Green Technology Policy (2009)

Policy Statement:

Green Technology shall be a **driver** to accelerate the national economy and promote sustainable development

4 Main Pillars

Energy: attain energy independence and promote efficient utilization
Environment: conserve and minimise impact on the environment
Economy: enhance national economic development through use of technology
Social: improve the quality of life for all

Significant progress and major improvements in 4 areas:

Energy sector (Energy supply and utilisation)
Building sector
Water and waste management sector
Transportation sector

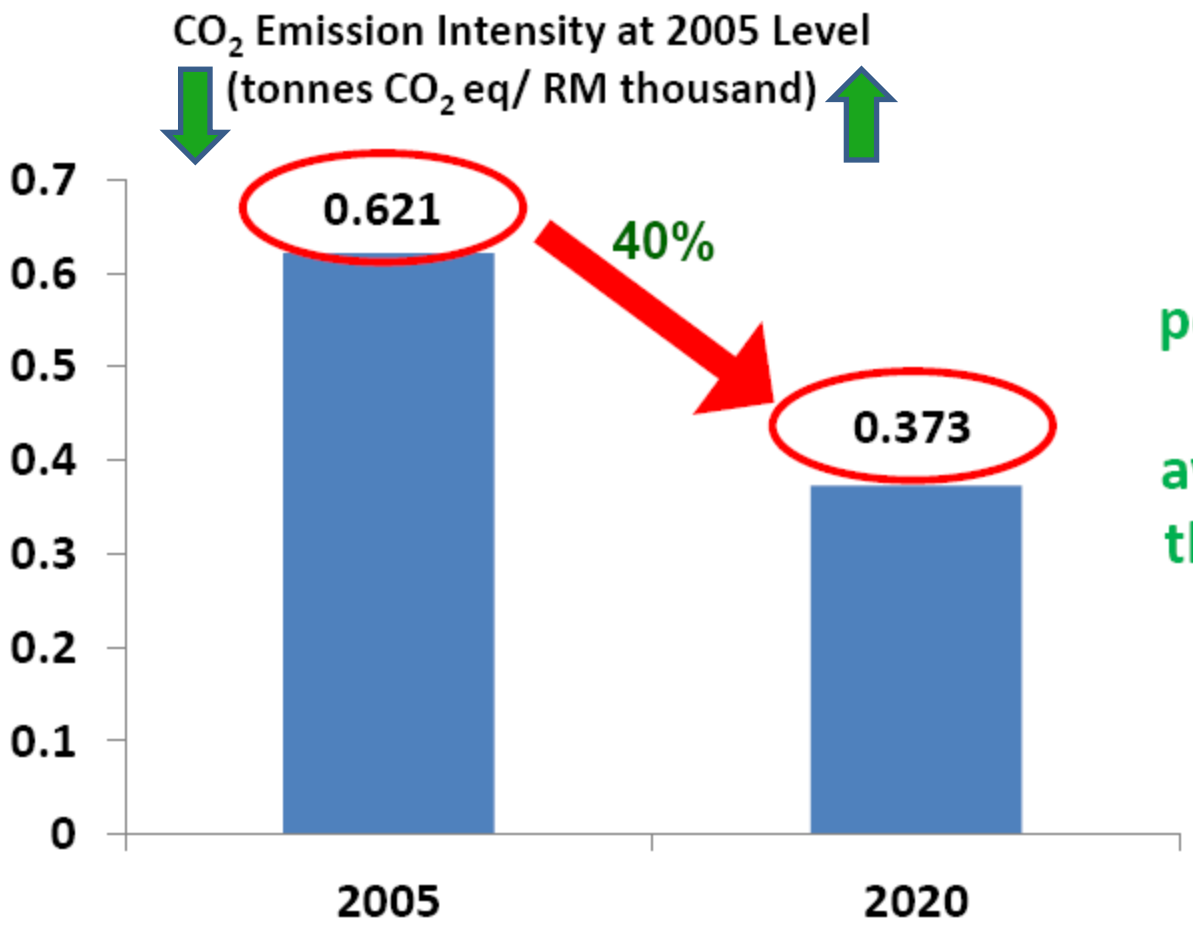
The pledge: Voluntary reduction

"voluntary reduction of up to 40% in terms of carbon emission intensity of GDP by the year 2020 compared to 2005 levels.

....conditional on receiving the transfer of technology and finance of adequate and effective levels from Annex 1 countries"

YAB Prime Minister Datuk Seri Najib Tun Razak
17th December 2009, during his speech at COP15

Target Reduction of "Carbon Emission Intensity"



Source: NC2, 2011

The question is...

What are the potential mitigation options that are available to achieve the 40% reduction?

MITIGATION

Population Malaysia

18 million (1990) to 27.6 million (2010) – increase by 53%

(Source: Census Data, 2010)

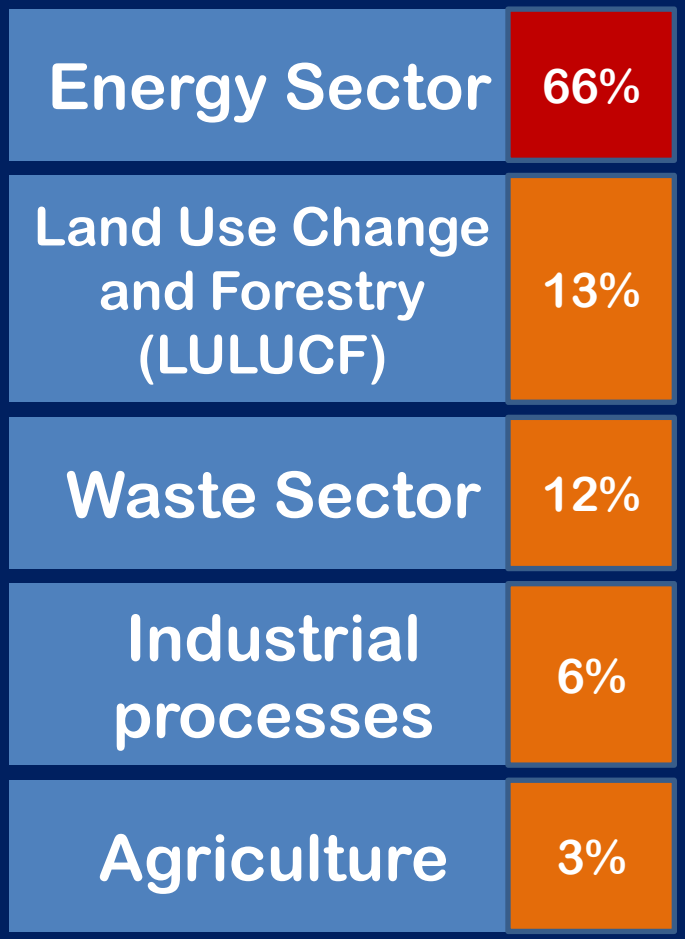
Urbanization Rate

27% in 1960, 42% in 1990, 54% in 1994, 61.8% in 2000;expected to grow to 75% by 2020

(Source: RFN 2001)

Greenhouse gas inventory

Percentage of Greenhouse Gas Emission by Sectors in 2000



Key Source Analysis for Greenhouse Gas Emissions for Year 2000, with LULUCF

Sector	Key category	GHG	Emissions (Gg CO_2 eq)	Level assessment (%)[35]	Cumulative total (%)[36]
Energy	Energy industries	CO_2	58,486	26.2	26.2
Energy	Transport	CO_2	35,587	16.0	42.2
Energy	Manufacturing industries and construction	CO_2	26,104	11.7	53.9
Waste	Landfills	CH_4	24,541	11.0	64.9
LULUCF	Forest and grassland conversion	CO_2	24,111	10.8	75.7
Energy	Fugitive emissions from oil and gas systems	CH_4	21,987	9.9	85.6
Industrial processes	Mineral products (cement production, lime production and limestone and dolomite use)	CO_2	9,776	4.4	90.0
LULUCF	Emissions and removals from soil	CO_2	4,638	2.1	92.1
Industrial processes	Metal production (iron and steel production)	CO_2	2,797	1.3	93.4
Energy	Commercial	CO_2	2,122	1.0	94.4
Agriculture	Rice production	CH_4	1,861	0.8	95.2

Source: Malaysia: Second National Communication to UNFCCC (2010)

Potential Mitigation Measures

Table 3.1
Potential Mitigation Options in Key Sectors

Sector	Potential Mitigation Options			
Energy	Implementation of RE for power generation	Implementation of EE in the industry, commercial and residential sector	Implementation of RE in the industrial, commercial and residential sector	Transportation - Hybrid (hydrogen, fuel cell) & electric vehicles, integrated public transportation system, bio fuels, low carbon petrol & diesel
LULUCF	Maintain existing forest cover	Reduce emission from forest and land use related activities	Where appropriate, to increase existing forest cover	
Waste	Encourage methane capture facilities at new sanitary landfills	Encourage palm oil millers to capture biogas for power generation	Encourage composting of organic waste, especially food waste and 3R (Reduce, Reuse and Recycle)	
Agriculture	Rice Management with water saving production: • Intermittent flooding • Aerobic rice	Livestock waste management through • Aerobic manure composting • Biogas capture	Partial replacement of synthetic Nitrogenous Fertilizer	
Industrial Processes	Employ processes to reduce clinker use in cement production			

Source: Malaysia: Second National Communication to UNFCCC (2010)

MITIGATION

MAIN POLICY FRAMEWORK

Overarching

New Economic Model (Economic Transformation Plan)

Cross-cutting Sustainability Policy

Green Technology Policy 2009; Climate Change Policy 2009

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Sectoral (Energy)

National Energy Policy; Petroleum Development Act ; National Petroleum Policy ; Renewable Energy Act ; Feed-in Tariff (FiT); National Energy Efficiency Master Plan

Low Carbon Cities

National Urbanisation Policy (2006), National Physical Plan (NPP), Regional Development Plans

MITIGATION

INSTITUTIONAL FRAMEWORK

Prime Minister

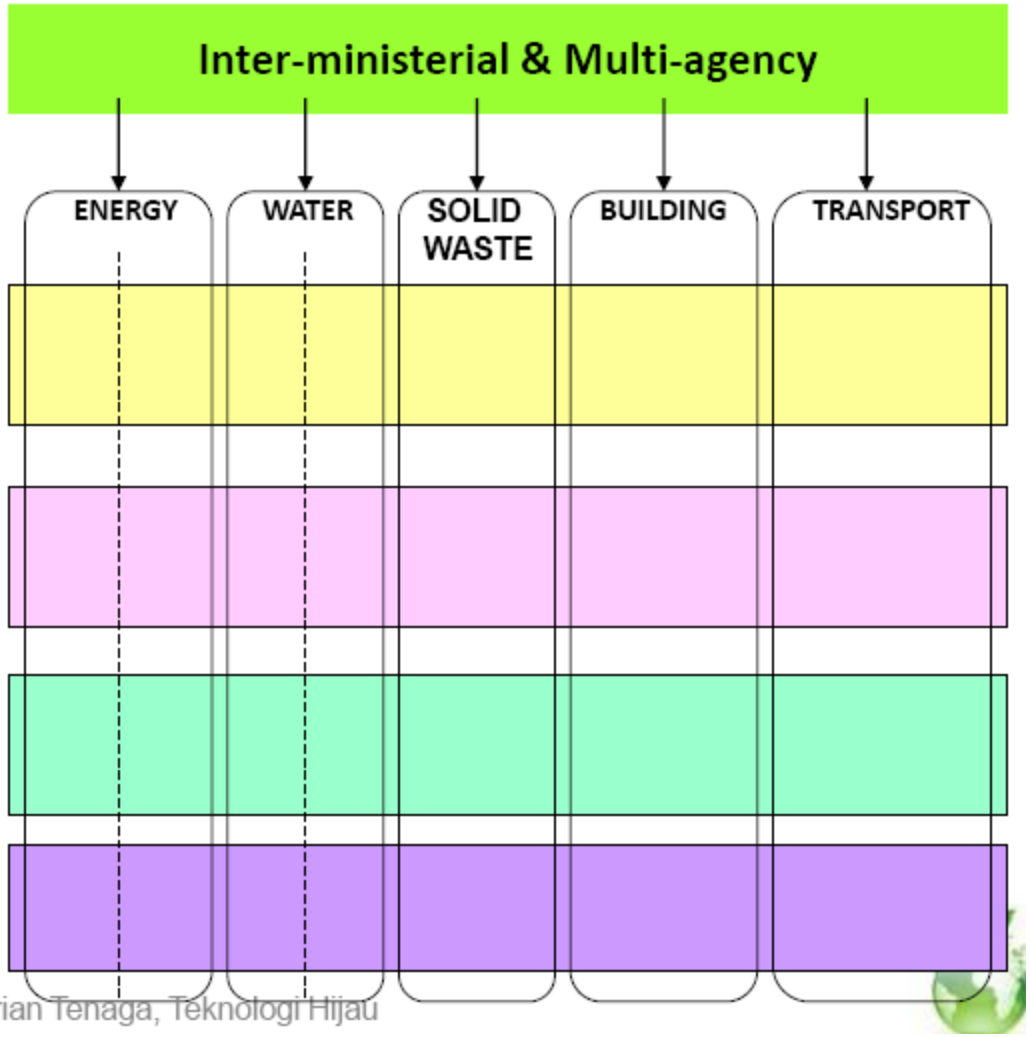
Working Committee on Green Technology and Climate Change (MTHPI)
(Industry, Human Capital, Research & Innovation, Promotion and Public Awareness, Transportation,
Green Neighbourhood, Green growth, Adaptation)
Led by specific Ministries

KeTTHA
KEMENTERIAN TENAGA, TEKNOLOGI HIJAU DAN AIR

Strategic Thrust 1

Strengthen the Institutional Framework

Sector Implementation Plans



Strategic Thrust 2

Provide conducive environment for Green Technology Development

Strategic Thrust 3

Intensify Human Capital Development in Green Technology

Strategic Thrust 4

Intensify Green Technology Research and Innovations

Strategic Thrust 5

Promotion and Public Awareness

MITIGATION

SPECIFIC ASSESSMENT

Specific Climate Change Technology Needs Assessment

Green Technology Roadmap

Regulatory Framework for Green Technology

Suruhanjaya Tenaga

EPU
ECONOMIC PLANNING UNIT
PRIME MINISTER'S DEPARTMENT, MALAYSIA

Mitigation options – Energy

Potential Mitigation options (NC2)

- **Implementation of Renewable Energy (RE) for power generation**
- **Implementation of RE in industry, commercial and residential sector**
- **Implementation of Energy Efficiency in industry, commercial and residential sector**
- Transportation: hybrid (hydrogen, fuel cell) & electric vehicles , integrated public transport system, bio-fuels, low-carbon petrol & diesel.

Possible Mitigation options (MNRE)

Example: Supercritical coal-fired power plant

Actual Mitigation options (LCCFAS)

Assessment tool to track carbon emission at city levels to identify appropriate mitigation strategies in cities

ADAPTATION

?

Technology Needs Analysis (TNA)

- Identify tech needs based on development priorities and criteria of sustainability
- Identify the best technology options to address those needs
- To ensure that the technology options are able to address the needs in a sustainable manner (short, mid and long term)

Direction Setting (Technology needs)

Legitimation/ Advocacy coalition

Entrepreneurial experimentation

Enabling Environment/ Innovation system

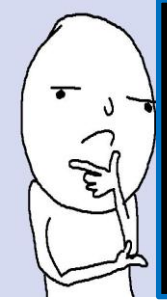
Generation, deployment and diffusion of climate technologies

Market formation

Knowledge Diffusion & Development

Issue of tech transfer and IP???

Resource Mobilisation (Finance, Human Infrastructure)



Conclusion and way forward

- There are on-going efforts by UNFCCC to enhance TNA for developing countries. Access to these initiatives need to be improved.
- Strategic coordination and integration between initiatives under WIPO and UNFCCC e.g. between WIPO GREEN and ClimateTechWiki.
- A TNA is not a one off exercise, but an on-going and evolving process. Developing countries may already have various policies and institutional framework as a basis of its TNA. The big challenge is to reframe, improve, integrate and coordinate these different elements into a more a specific and sustainable TNA strategy.
- Current focus in countries like Malaysia is more on mitigation. How about other countries? How do we deal with adaptation?
- There are different levels and types of technology needs. Most challenging is to meet the needs of different community groups in developing countries – both for the purpose of economic develoment (providers) and overall sustainable development & livelihoods (users). The issue of tech transfer and IP may differ in different context.

Thank you!!!

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