DEVELOPING ACTIONS FOR LOW CARBON CITIES IN MALAYSIA

THE CASE OF GREEN HOME PENETRATION IN CITIES

HO CHIN SIONG
CHAU LOON WAI
JANICE J SIMSON

31 October 2008



WHY GREEN HOMES?

Green homes penetration rate in Malaysia estimated at:

< 2% !!!

An important sector to contribute to LCS; potential to increase penetration rate to:

= 75% by 2050

What constraints / barriers will we likely face?

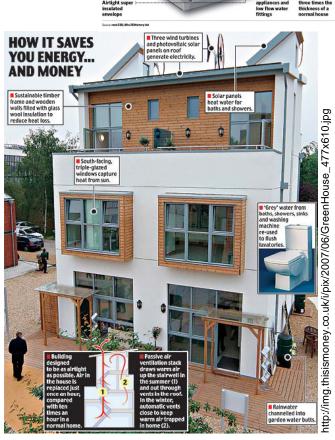
What options are available to us for overcoming the constraints / barriers?

FUTURE OBJECTIVES

Increase percentage of penetration of renewable energy (RE) in Malaysian homes



3 Develop expertise & skills in RE & EE Technologies among built environment professionals



The dream that became reality

GREEN	ASPECTS	STAKEHOLDERS					
HOMES	ASPECTS	Supply Side	Demand Side				
ptions	Renewable Energy (RE) - Solar PV - Solar Heating (Water)	Energy Provider Government (Policies) Developers	Home Owners				
Direct Energy Saving Options	Energy Efficiency (EE) - High Efficiency Appliances - Smart/automated Systems - Technology / Labeling	Manufacturers Government (Policies) Monitoring/Enforcing Agencies	Home Owners				
Direct Energ	Green/Eco- Architecture - Green/Eco- Design (Passive Cooling/Heating, Shading) - Construction Materials (Insulation) - Site Design (Building Siting, Orientation; Lighting & Ventilation)	Planners, Architects Government (Policies) Developers	Home Owners				
Indirect "Enabling" Options	Policies & Regulations - Standards, Design Specifications - City Planning Level - Building Level - Green Targets; Incentives; Taxation	Government (Policies & Enforcement) Planners, Architects	Developers Home Owners				

High Capital Costs of EE & RE Technologies in Homes (E.g. Solar PV, Solar Heating)

Government Subsidies & Taxation

Slide 6

Lack of Awareness, Knowledge & Expertise among Designers, Regulators

Professional Education & Training to Blt. Env. Professions through University Education and

Incorporation into Continuous Professional Development (CPD) to

Related Professions (Architects,

Planners, Engineers etc.)

Lack of Interest, Low Environmental Awareness among the Public

General Education to the Public E.g. Formalisation of Awareness into the National Education System

Slide 8

Absence of Institutional Enforcement in Energy Efficiency (E.g. EE Auditing & Labeling, Standardisation)

Set up EE Auditing, Monitoring, Enforcement Agency

Slide 9

Slide 7

High Capital Costs of RE & EE Technologies in Homes

Initiate & Develop Affordable Homegrown Technologies & Materials in EE & RE

Lack of Local Expertise & Critical Mass I Economies

Commission R&D on EE &
RE Technologies, Materials
& Equipments by Local
Scientists; Establish
International Research
Partnerships; Promote
Technological Transfer

Government Subsidies , Incentives & Taxation

Limited Government Funding

Public—Private
Joint Venture

Project Feasibility
/ Viability

Research /
Studies on Energy
Demand &
Consumption
Trends; Future
Household Profile

Introduce Polluters Pay Principles (PPP) where non-RE/EE homes pay higher electricity tariff that offsets lower tariff for RE/EE homes

Economic Constraints & Political Acceptance?

Research / Studies on Economics &
Efficiency of Low Carbon Energy
Sources; Benefit-Cost Analysis;
Establish Simplified Evaluation
Method for Environmental Efficiency
of Green Homes

Lack of Awareness, Knowledge & Expertise among Designers, Regulators in Green Home Economics, Design, Delivery, Co-benefits etc.

Introduce Professional Education & Training to Blt. Env. Professions through University Education;
Ongoing Syllabus Review

Provide (Re)Training; Encourage
Continuous Learning on LCS; Organise
Seminars/Workshops

Institutional Inertia; Resistance to New Ideas; Lack of Motivation (Market, Incentives)

Institutionalisation of Continuous Professional Development (CPD) as Incentives to Continuous Learning in LCS

Disseminate
Diagnosis for Energy
Saving & CO₂
Reduction Efficiency
to Professionals

Introduce LCS-Supportive
Planning Control through
Expediting Planning Approval &
Building Plan Approval of LowCarbon Green Homes Proposal;
Introduce 'EE-RE Impact
Assessment' in Project Approval

Lack of Interest, Low Environmental Awareness among the Public

Formalisation of Awareness & Environmental Concern into the National Education System

Lack of Knowledge on LCS among Teachers; Absence of the LCS Subject from Syllabus

Provide Training & Guidelines on LCS to Teachers & the Ministry of Education; Ongoing Review of Primary & High School Syllabi General Education to Instill Awareness
& Environmental Concern in the
General Public through Mass Media;
Public Campaigns; NGO Activities

Lack of Public Funding on Campaigns & NGO
Activities related to LCS; Failure to See
Tangible Benefits of Participating

CO₂ Reduction Efficiency through Formal Means (LA21); Environmental NGO Activities; Mass Media



Absence of Institutional Enforcement in Energy Efficiency (E.g. EE Auditing & Labeling, Standardisation)

Set up EE Auditing, Monitoring, Enforcement Agency

Lack of Context-base Knowledge & Absence of Local Database on EE & RE Efficiency & Their Ratings

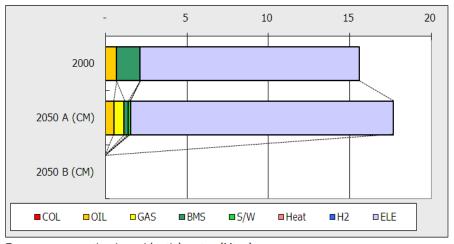
Absence of Legal Framework for Monitoring & Enforcement

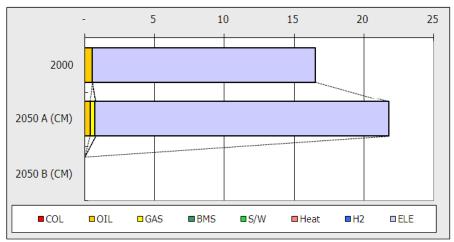
Commission Research on EE & RE
Evaluation and Rating Methods;
Construct National and Local Level
Databases on EE & RE

Beef Up Existing Parliamentary Acts
Related to Environmental Quality &
Development Planning to Provide Legal
Powers for Monitoring & Enforcement

	Residential F	lousehold Energ	y Demand: -50%	
Barriers		(from 2005 lev		Future Objectives
Higher Capital Costs	Data on Household P		·	Increase Percentage of Penetration of
Low Environmental Awareness among	Public Awareness Ca Retrain Teachers; Re		ersity Syllabi	RE in Malaysian Homes
the Public Lack of	CPD for Professional	Retraining & Contin	uous Learning	Enhance Energy
Knowledge & Expertise among Designers,	LCS-supportive Plan Ongoing R&D on RE	Efficiency Level of Malaysian		
Regulators Absence of	Reinforce Existing La			Homes Develop
Institutional Enforcement in		egrown, Affordable RE & EE Technologies EE Auditing, Monitoring, Enforcement Agency		Expertise & Skills in RE & EE
Energy Efficiency		y Principle; Non-RE/		Technologies among Built Environment
	•	te Joint Venture Green en Home Projects Be		Professions
20	2020	2030	2040	2050

ENERGY CONSUMPTION & CO₂ EMISSION OF THE RESIDENTIAL SECTOR IN MALAYSIA (OUTPUT FROM THE ESS MODEL)





Energy consumption in residential sector (Mtoe)

CO2 emission in residential sector with allocated emission from heat, H2, electricity (MtC)

APPLICATION OF THE AIM BACKCASTING MODEL (V.1.414) ON THE RESIDENTIAL SECTOR IN MALAYSIA

ENERGY EFFICIENCY (EE) IN HOUSEHOLD APPLIANCES/EQUIPMENTS:

SPACE COOLING

WATER HEATING

LIGHTING

COOKING

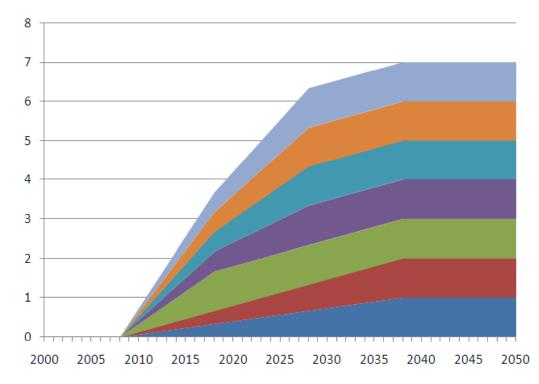
REFRIGERATION

APPLIANCES

ICT

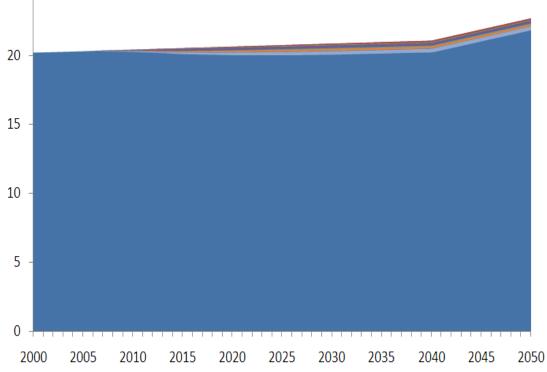
Back to Title	Results Update	Filter	▼ Set	Option Set Years	s: 6 New	Option Se	ets 6 Loa	ad	RES	Sho	w ESS	Penetratio	n 🔻	Show Graph
Avail.	No.	Options	Edit Data Pen∈▼	2000	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050
X	1	EE on cooling												
			96	0%	0%	7%	23%	40%	57%	73%	90%	100%	100%	100%
X	2	EE on water heating												
	_	6.1	%	0%	0%	7%	23%	40%	57%	73%	90%	100%	100%	100%
X	3	EE on lighting		007	007	2024	700/	4000/	4000/	4000/	4.000/	4000/	4000/	4000/
v	4	EE on cooking	%	0%	0%	20%	70%	100%	100%	100%	100%	100%	100%	100%
^	4	EE OII COOKIIIg	%	0%	0%	10%	35%	60%	85%	100%	100%	100%	100%	100%
x	5	EE on referigeration	70	070	070	1070	3370	0070	0370	10070	10070	100%	10070	100%
			%	0%	0%	10%	35%	60%	85%	100%	100%	100%	100%	100%
X	6	EE on appliance												
			96	0%	0%	10%	35%	60%	85%	100%	100%	100%	100%	100%
X	7	EE on ICT												
			%	0%	0%	10%	35%	60%	85%	100%	100%	100%	100%	100%

PENETRATION (%) OF EE TECHNOLOGIES IN MALAYSIAN HOMES



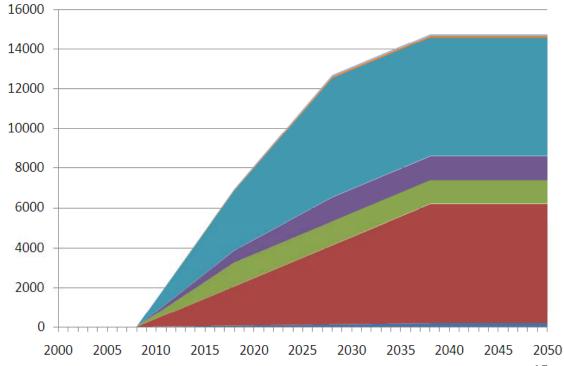


CO₂ REDUCTION AS A RESULT OF EE TECHNOLOGIES IN MALAYSIAN HOMES





COST INCURRED IN TECHNOLOGIES IN MALAYSIAN HOMES



Thank you for your kind attention