

Development of Low Carbon Society Scenarios for Asian Regions



Japan International Cooperation Agency

Workshop on Asia LCS scenarios and actions
February 22, 2011
JICA Research Institute, Tokyo

Yuzuru Matsuoka

Now we are launching a project titled:

“Development of Low Carbon Society Scenarios for Asian Regions”

- **Project Period: Five years (2011 ~ 2015)**
- **Project Area: Iskandar Development Region (IM), Malaysia**
- **Sponsored by JICA (Malaysian side) and JST(Japanese side)**
- **Project Purpose**
Establishment of a Methodology to create Low-Carbon Society (LCS) scenarios and applied to Iskandar Development Region (IM), as well as other regions in Malaysia, and the research findings are disseminated to Asian Countries.

Where is “Iskandar Development Region”



Iskandar Development
Region
Area : 2,216 km²
Population : 1,353,200



Major Activities and Expected Outputs of the project

- 1. Establish a Methodology to create LCS scenarios which is appropriate for Malaysia**
- 2. Creation and Utilization of LCS scenarios for policy development in IM (Iskandar Malaysia).**
- 3. Quantification of Co-benefits of LCS policies on air pollution and on recycling-based society in IM.**
- 4. Conduct training activities on LCS scenarios for Malaysia and Asian countries, and establish a network for LCS in Asia.**

Project Schedule of Iskandar Study

- Need substantial input to blueprints etc.
- Compiling the first draft of LCS roadmap

Interim project Evaluation

Final project Evaluation

	2011	2012	2013	2014	2015
ACTIVITY 1: METHODOLOGY	Apply the whole methodology and tools			Revising and Improvement	
ACTIVITY 2: IMPLEMENTATION	Design the scenarios and roadmaps		Details for Implementation	Implementation	Revising and Improvement
ACTIVITY 3: AIR & SWM	Detailed basic survey			System integration	
				Manual development	
ACTIVITY 4: DISSEMINATION	International Expert Workshop once per year		International Training Workshop once per year		

Wrap up the project



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- Need substantial input to blueprints etc.
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ACTIVITY 4: DISSEMINATION	International Expert Workshop once per year International Training Workshop once per year				

Prof. Ho Chin Siong will introduce the detail in the next presentation.



Development of Low Carbon Society Scenarios for Asian Regions

- The background of the study -

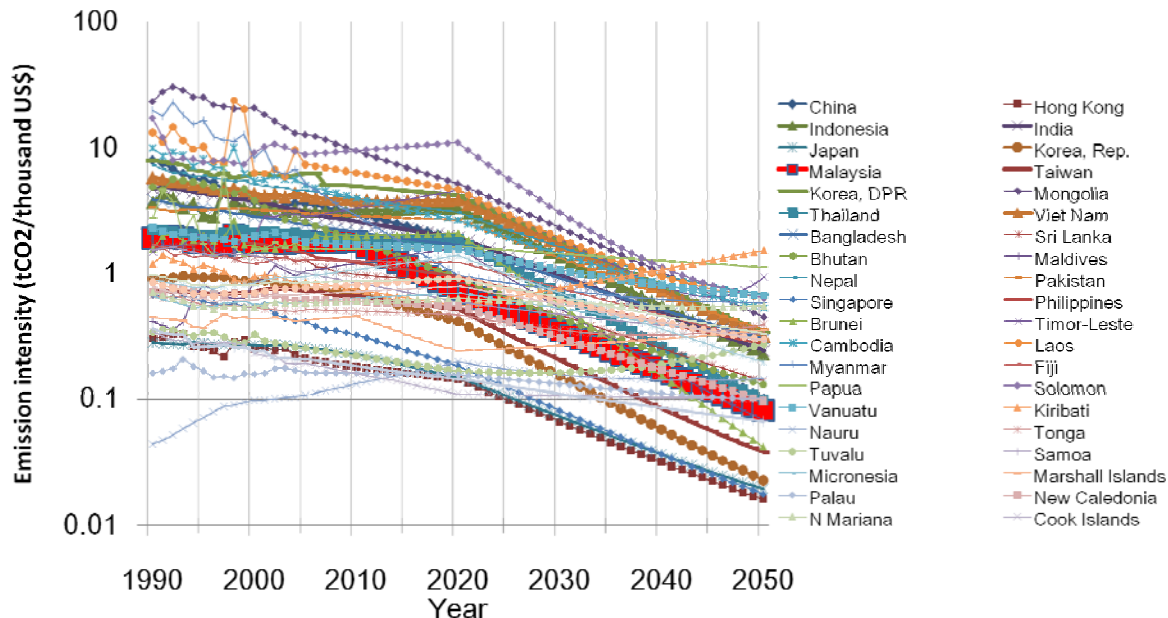
1. What are the required emission reduction targets in Asian countries ?
2. How to design Asia Low Carbon Societies. What tool we have, and how to apply them to the Asian Low Carbon studies ?
3. How to implement the study output to the real world ?

From the global scale aspect, the required national reduction targets in case of keep the global temperature increase within 2 C are :

Malaysia pledged 40 % reduction of carbon intensity by the year 2020 compared with its 2005 levels, subject to assistance from developed countries.

In case we assume other nations follow their own pledges until 2020, if they have, and after 2020, they converge per capita GHG emissions by 2050, the required national reduction in 2030 and 2050 are;

year	Probability of exceeding 2 C		Reduction rate compared with 2005 (%)							
	(AIM/IP)	(Meins-hausen)	China	India	Japan	Indonesia	Korea, Rep.	Thailand	Malaysia	Viet Nam
2030	0.30	(0.13-0.47)	1	-64	63	-86	49	-11	39	-106
2050			66	-35	88	28	86	62	70	2



Required national reduction for global 50% reduction (1)

	1990	2005	2020(1)	2030				2050			
	(GtCO2)	(GtCO2)	(GtCO2)	Conv @2050(2)	Conv @2075(3)	Conv @2050(2)	Conv @2075(3)	Conv @2050(2)	Conv @2075(3)	Conv @2050(2)	Conv @2075(3)
				(GtCO2)	%	(GtCO2)	%	(GtCO2)	%	(GtCO2)	%
China	3.563	6.868	10.628	6.799	(1)	9.431	(-37)	2.325	(66)	6.059	(12)
India	1.279	1.956	3.399	3.200	(-64)	3.654	(-87)	2.648	(-35)	3.937	(-101)
Japan	1.168	1.293	0.876	0.484	(63)	0.650	(50)	0.156	(88)	0.347	(73)
Indonesia	0.403	0.656	1.759	1.220	(-86)	1.650	(-151)	0.473	(28)	1.144	(-74)
Korea, Rep.	0.271	0.514	0.493	0.263	(49)	0.379	(26)	0.072	(86)	0.197	(62)
Thailand	0.177	0.320	0.566	0.356	(-11)	0.510	(-60)	0.120	(62)	0.351	(-10)
Pakistan	0.169	0.283	0.574	0.566	(-100)	0.646	(-128)	0.550	(-94)	0.770	(-172)
Taiwan	0.125	0.275	0.276	0.133	(52)	0.184	(33)	0.035	(87)	0.079	(71)
Malaysia	0.090	0.214	0.171	0.130	(39)	0.167	(22)	0.065	(70)	0.135	(37)
Viet Nam	0.088	0.188	0.489	0.385	(-106)	0.490	(-161)	0.183	(2)	0.377	(-101)
Bangladesh	0.115	0.150	0.277	0.322	(-114)	0.366	(-143)	0.365	(-143)	0.499	(-232)
Philippines	0.090	0.137	0.210	0.232	(-69)	0.254	(-86)	0.240	(-75)	0.305	(-123)
Myanmar	0.128	0.122	0.053	0.064	(47)	0.066	(45)	0.104	(14)	0.090	(26)
Korea, DPR	0.144	0.096	0.135	0.095	(0)	0.122	(-27)	0.040	(58)	0.082	(14)
Singapore	0.030	0.048	0.036	0.023	(53)	0.030	(38)	0.009	(82)	0.018	(63)
Hong Kong	0.035	0.044	0.050	0.033	(25)	0.042	(5)	0.014	(68)	0.027	(40)
Cambodia	0.019	0.030	0.041	0.040	(-34)	0.045	(-52)	0.039	(-31)	0.047	(-57)
Nepal	0.025	0.030	0.045	0.047	(-58)	0.053	(-77)	0.080	(-171)	0.084	(-181)
Sri Lanka	0.017	0.026	0.038	0.037	(-46)	0.042	(-63)	0.036	(-39)	0.049	(-93)
Mongolia	0.026	0.019	0.018	0.013	(31)	0.017	(13)	0.006	(70)	0.012	(40)
Laos	0.013	0.018	0.029	0.021	(-18)	0.026	(-50)	0.018	(-1)	0.021	(-19)
Brunei	0.008	0.011	0.021	0.008	(29)	0.014	(-20)	0.001	(91)	0.005	(57)

(1) Calculated with countries' pledges, and model calculation

(2) By 2050, 50% reduction of global GHG emission compared with 1990, and per capita emissions are converged. () is the required reduction % compared with 2005

▶ 9 (3) By 2075, 50% reduction of global GHG emission compared with 1990, and per capita emissions are converged. () is the required reduction % compared with 2005

Required national reduction for global 50% reduction (2)

	1990	2005	2020(1)	2030				2050			
	(GtCO2)	(GtCO2)	(GtCO2)	Conv @2050(2)	Conv @2075(3)	Conv @2050(2)	Conv @2075(3)	Conv @2050(2)	Conv @2075(3)	Conv @2050(2)	Conv @2075(3)
				(GtCO2)	%	(GtCO2)	%	(GtCO2)	%	(GtCO2)	%
Papua	6.5E-03	6.0E-03	1.2E-02	1.5E-02 (-155)	1.5E-02 (-150)	2.1E-02 (-251)	2.0E-02 (-227)				
Solomon	5.9E-03	4.2E-03	1.0E-02	4.3E-03 (-2)	6.8E-03 (-63)	1.7E-03 (61)	3.1E-03 (27)				
Fiji	2.3E-03	2.5E-03	3.1E-03	2.6E-03 (-5)	3.0E-03 (-24)	1.5E-03 (39)	2.5E-03 (-1)				
New Caledonia	1.6E-03	1.7E-03	2.1E-03	1.4E-03 (19)	1.8E-03 (-2)	5.9E-04 (66)	1.1E-03 (34)				
Bhutan	1.3E-03	1.6E-03	1.7E-03	1.5E-03 (6)	1.7E-03 (-7)	1.7E-03 (-4)	2.1E-03 (-33)				
Maldives	1.3E-04	8.9E-04	3.2E-03	1.8E-03 (-106)	2.6E-03 (-188)	7.5E-04 (16)	1.7E-03 (-93)				
Timor-Leste	4.5E-04	8.9E-04	4.1E-03	3.1E-03 (-249)	4.0E-03 (-349)	5.3E-03 (-496)	3.7E-03 (-318)				
F Polynesia	1.0E-03	8.4E-04	8.1E-04	7.3E-04 (13)	7.9E-04 (6)	5.8E-04 (31)	7.2E-04 (14)				
Vanuatu	4.3E-04	4.5E-04	7.8E-04	7.0E-04 (-55)	7.5E-04 (-66)	7.9E-04 (-74)	7.8E-04 (-72)				
Samoa	2.8E-04	3.0E-04	2.7E-04	2.9E-04 (5)	3.0E-04 (2)	3.2E-04 (-4)	3.2E-04 (-7)				
Micronesia	1.3E-04	1.3E-04	2.3E-04	2.3E-04 (-75)	2.4E-04 (-86)	2.1E-04 (-60)	2.5E-04 (-92)				
Tonga	8.0E-05	8.5E-05	1.1E-04	1.1E-04 (-33)	1.2E-04 (-39)	2.0E-04 (-137)	1.4E-04 (-60)				
N Mariana	5.1E-05	7.8E-05	1.3E-04	1.6E-04 (-111)	1.6E-04 (-104)	2.5E-04 (-219)	2.1E-04 (-165)				
Marshall Islands	5.5E-05	5.5E-05	4.8E-05	7.1E-05 (-30)	6.3E-05 (-16)	1.5E-04 (-177)	1.0E-04 (-84)				
Kiribati	3.5E-05	4.4E-05	4.2E-05	7.8E-05 (-76)	6.2E-05 (-41)	2.5E-04 (-463)	1.3E-04 (-187)				
Cook Islands	2.5E-05	2.3E-05	2.0E-05	2.6E-05 (-14)	2.4E-05 (-8)	3.9E-05 (-75)	3.3E-05 (-47)				
Wallis And Futuna	2.2E-05	2.1E-05	3.6E-05	3.4E-05 (-59)	3.7E-05 (-74)	2.8E-05 (-32)	3.6E-05 (-69)				
Palau	1.9E-05	2.1E-05	3.2E-05	3.5E-05 (-69)	3.6E-05 (-71)	4.3E-05 (-107)	4.2E-05 (-98)				
Tuvalu	4.0E-06	5.0E-06	5.1E-06	6.7E-06 (-33)	6.2E-06 (-23)	1.8E-05 (-259)	9.4E-06 (-87)				
Nauru	2.8E-06	4.0E-06	1.1E-05	1.2E-05 (-201)	1.2E-05 (-208)	1.8E-05 (-344)	1.5E-05 (-265)				
Niue	3.4E-06	2.6E-06	6.0E-06	4.0E-06 (-54)	5.1E-06 (-96)	1.8E-06 (30)	3.4E-06 (-33)				
Tokelau	2.1E-06	1.4E-06	2.5E-06	2.4E-06 (-74)	2.6E-06 (-89)	2.0E-06 (-44)	2.6E-06 (-85)				
Pitcairn	9.0E-08	6.4E-08	1.2E-07	1.1E-07 (-66)	1.2E-07 (-87)	8.4E-08 (-31)	1.1E-07 (-69)				

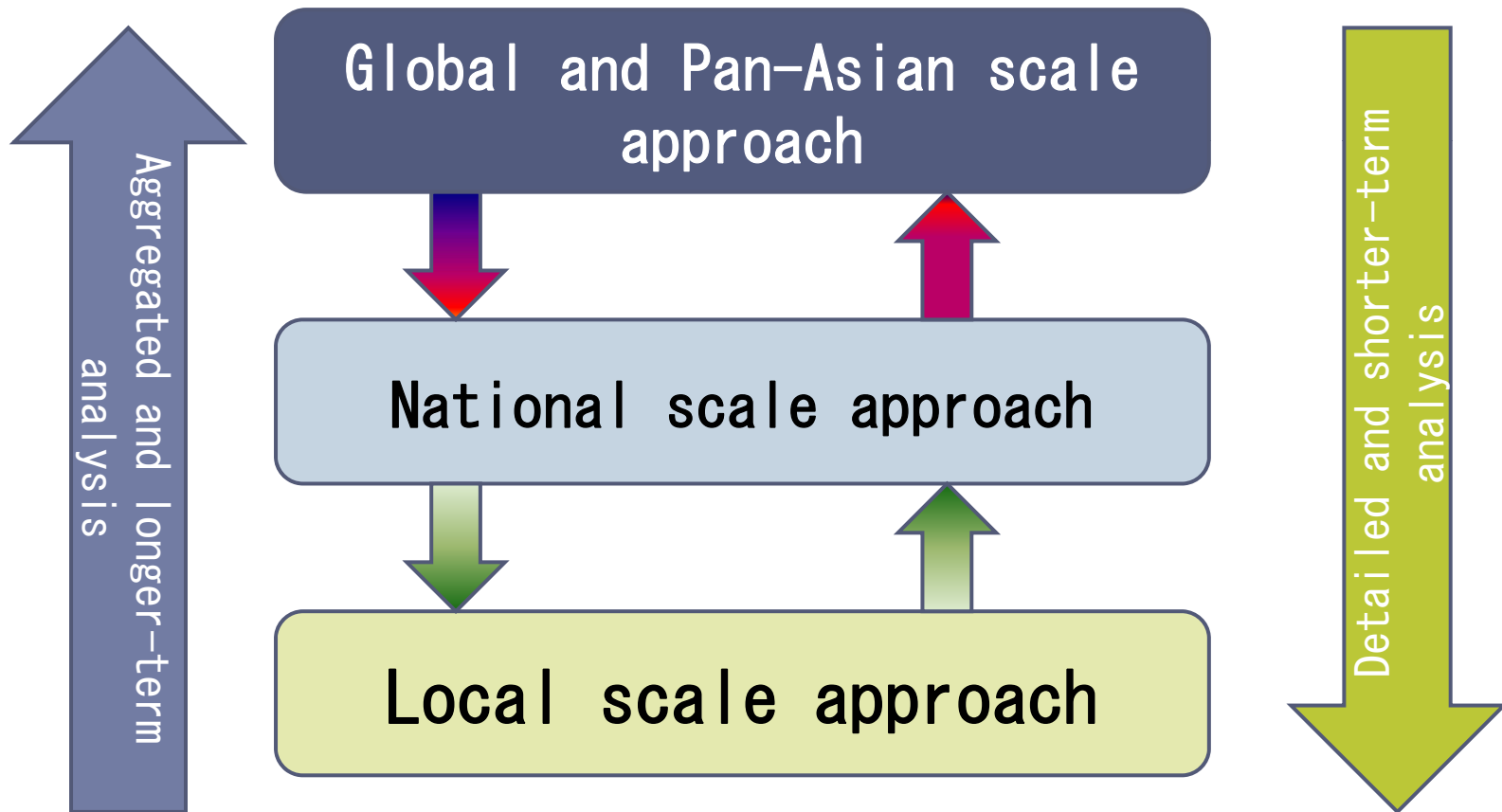
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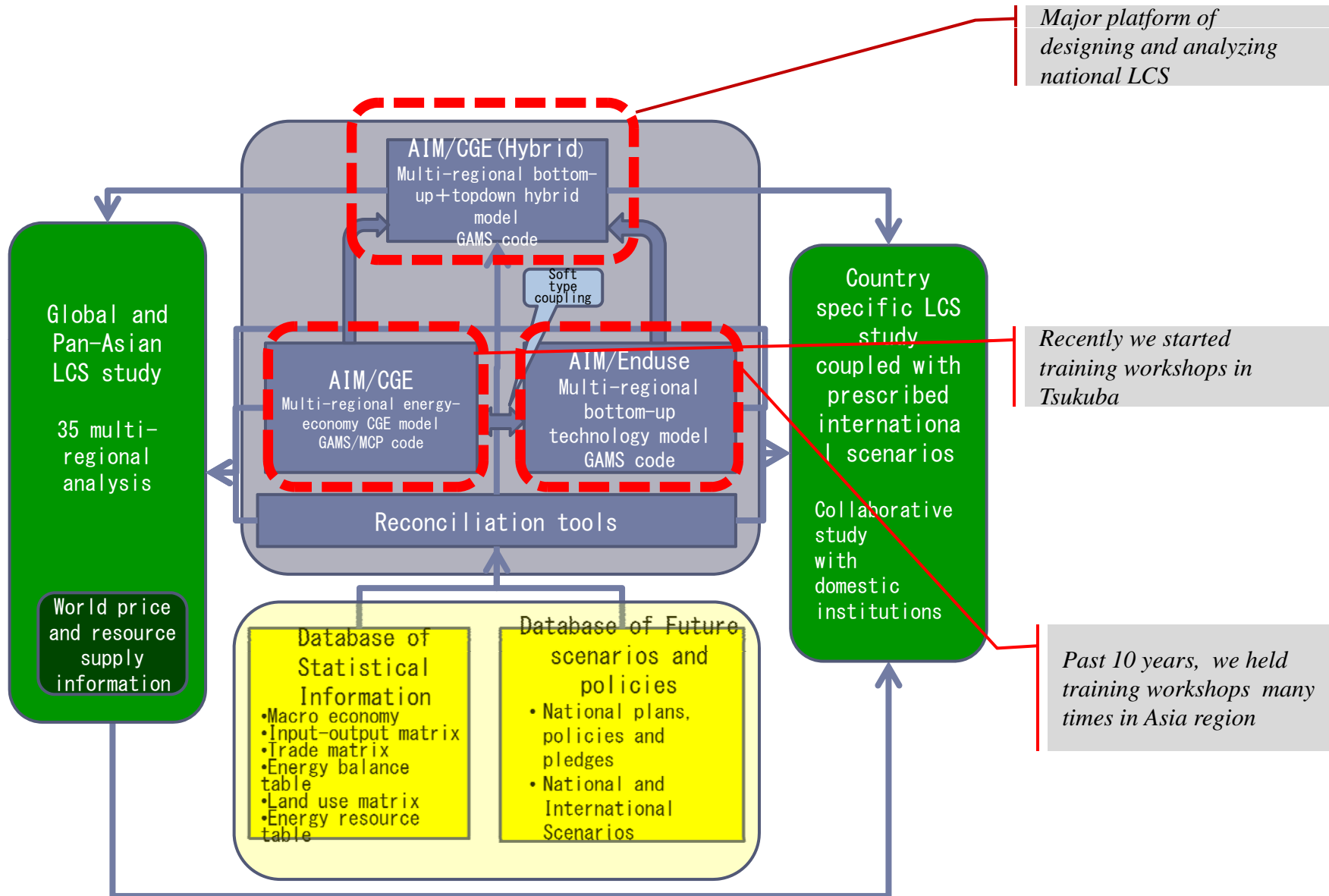
(3) By 2075, 50% reduction of global GHG emission compared with 1990, and per capita emissions are converged. () is the required reduction % compared with 2005

From the view point of methodology

Three different scales but interactive approaches are necessary for designing LCS scenarios



Approach for Global/Pan-Asian/National LCS



National studies now going on

	Progress up to now	Collaborating Research Institutes
China	Up to now, disclosed national LCS scenarios, occasionally. Now preparing provincial energy, industrial, and economic database in order to integrate national level and provincial level scenarios.	China Energy Research Institute
India	Proposed national scenarios with global LCS scenarios by combining AIM/enduse and other models.	IIM Ahmedabad
Thailand	Preliminary analysis of Thailand energy related LCS with ExSS was finished	Thammasat University
Indonesia	Preliminary analysis of Indonesia energy related LCS with ExSS was finished	Institut Teknologi Bandung
Vietnam	Preliminary analysis of Vietnam energy related LCS with ExSS was finished	
Bangladesh	Preparation of related information	
Peninsula Malaysia	Preliminary analysis of Peninsula Malaysia energy related LCS with ExSS was finished	Universiti Teknologi Malaysia



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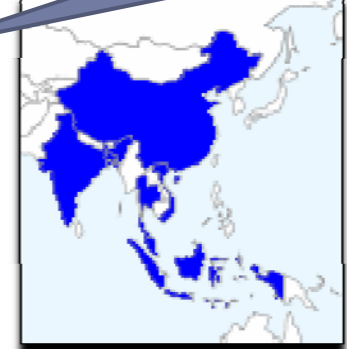
Dr. Jiang Kejun presentation



National studies now going on

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Bangladesh	Preparation of related information	
Peninsula Malaysia	Preliminary analysis of Peninsula Malaysia energy related LCS with ExSS was finished	Universiti Teknologi Malaysia

Prof. Shukla's presentation



National studies now going on

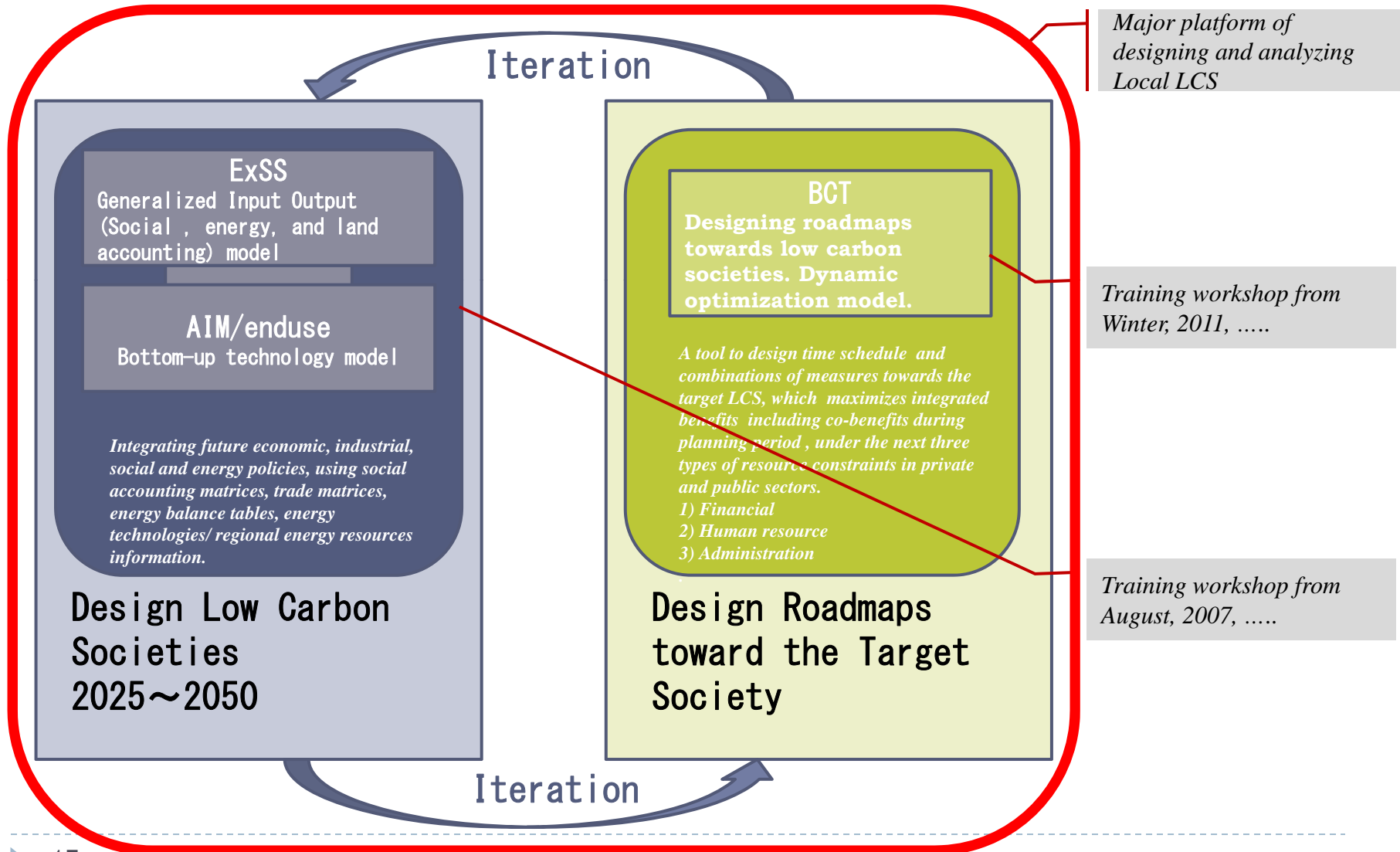
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Bangladesh	Preparation of related information	
Peninsula Malaysia	Preliminary analysis of Peninsula Malaysia energy related LCS with ExSS was finished	Universiti Teknologi Malaysia



Prof. Bundit's presentation



Approach for Asian Local LCS



Local regional studies now going on

Local region studies

	Progress up to now	Collaborating Research Institutes
• Iskandar, Malaysia	Feasibility study finished and consolidating full-scale research task force composed of implementation agencies and research institutions	Universiti Teknologi Malaysia Iskandar Regional Development Authority Federal Department of Town and Country Planning Malaysia Malaysian Green Technology Corporation
• Putrajaya, Malaysia	Feasibility study and identification of policy option was finished	Universiti Teknologi Malaysia Putrajaya Corporation
• Ratchaburi, Thailand	Preliminary analysis of energy related part almost finished with ExSS, now adding AFOLU part	King Mongkut's University of Technology
• Guangzhou, China	Preliminary analysis of energy related part almost finished with ExSS	Guangzhou Institute of Energy Conversion
• Ahmedabad, India	Preliminary analysis of energy related part finished with ExSS	IIM Ahmedabad
• Bhopal, India	Preliminary analysis of energy related part almost finished with ExSS	Maulana Azad National Institute of Technology, Bhopal School of Planning and Architecture, Bhopal
• Liau, Indonesia	Developing FOLU modeling	Bogor Agricultural University
• Kyonggi Province, Korea	Preliminary analysis of energy related part are conducting with ExSS	Seoul National University



Local regional studies now going on

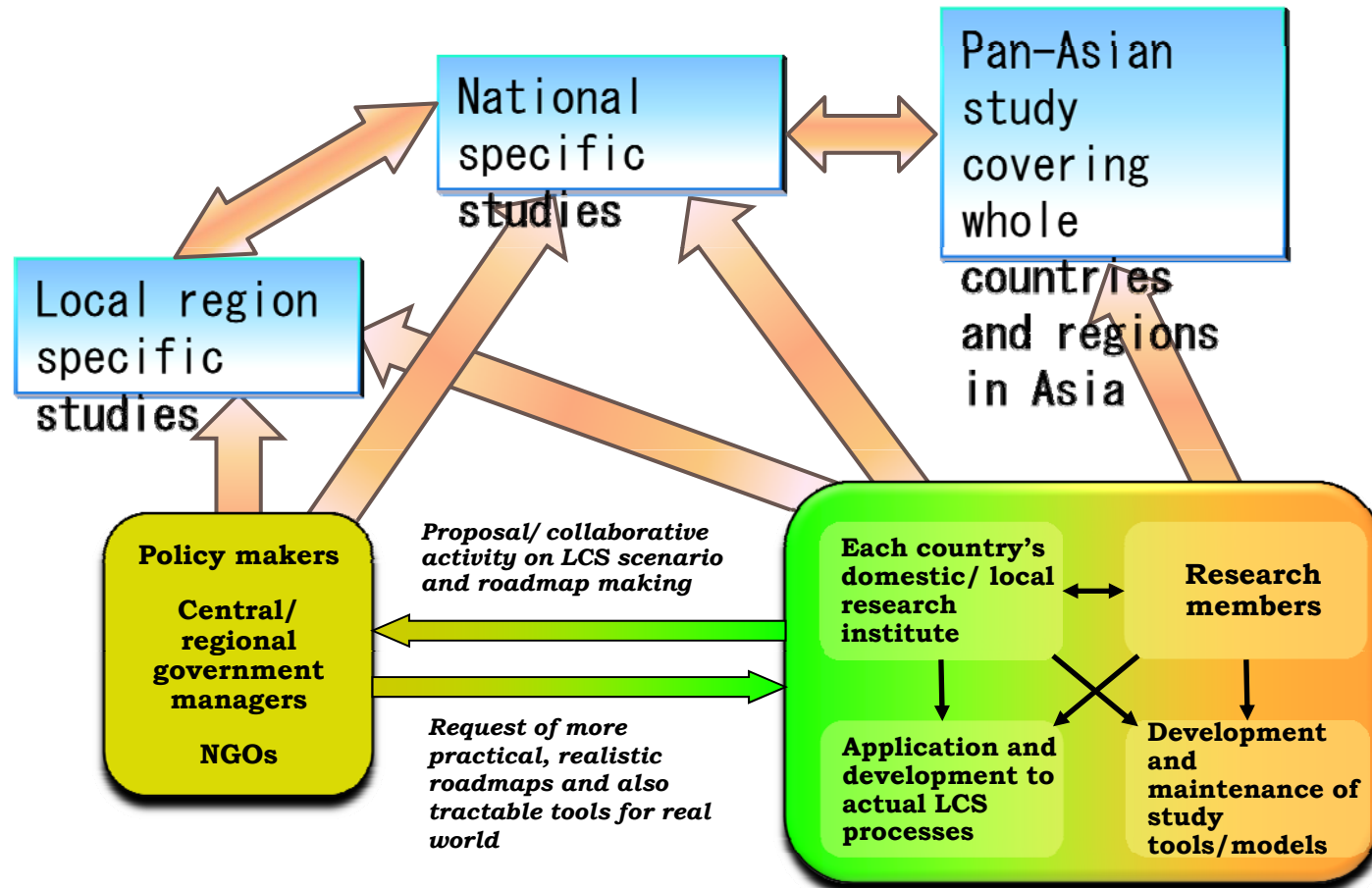
Prof. Ho's presentation

Local region studies

	Progress up to now	Collaborating Research Institutes
*Iskandar, Malaysia	Feasibility study finished and consolidating full-scale research task force composed of implementation agencies and research institutions	Universiti Teknologi Malaysia Iskandar Regional Development Authority Federal Department of Town and Country Planning Malaysia Malaysian Green Technology Corporation
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*Ahmedabad, India	Preliminary analysis of energy related part finished with ExSS	IIM Ahmedabad
*Bhopal, India	Preliminary analysis of energy related part almost finished with ExSS	Maulana Azad National Institute of Technology, Bhopal School of Planning and Architecture, Bhopal
*Liau, Indonesia	Discussion on FOLU part modeling	Bogor Agricultural University
*Kyonggi Province, Korea	Preliminary analysis of energy related part are conducting with ExSS	Seoul National University



How to collaborate with Asian colleagues in order to implement the study output to the real world ?



How to collaborate with Asian colleagues ?

National energy research centre administered by the Ministry of Energy, Green Technology and Water (MEGTW), Malaysia



National specific studies

Local region specific studies

Federal Department of Town and Country Planning, Ministry of Housing and Local Government



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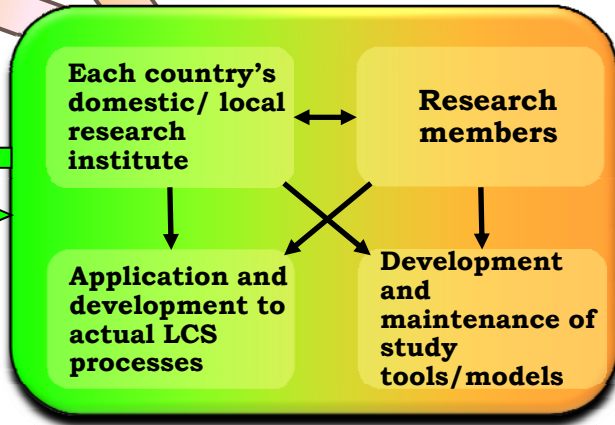


Policy makers
Central/
regional
government
managers
NGOs

Federal Government statutory body for promoting regulating and driving Iskandar Regional development

Proposal/ collaborative activity on LCS scenario and roadmap making

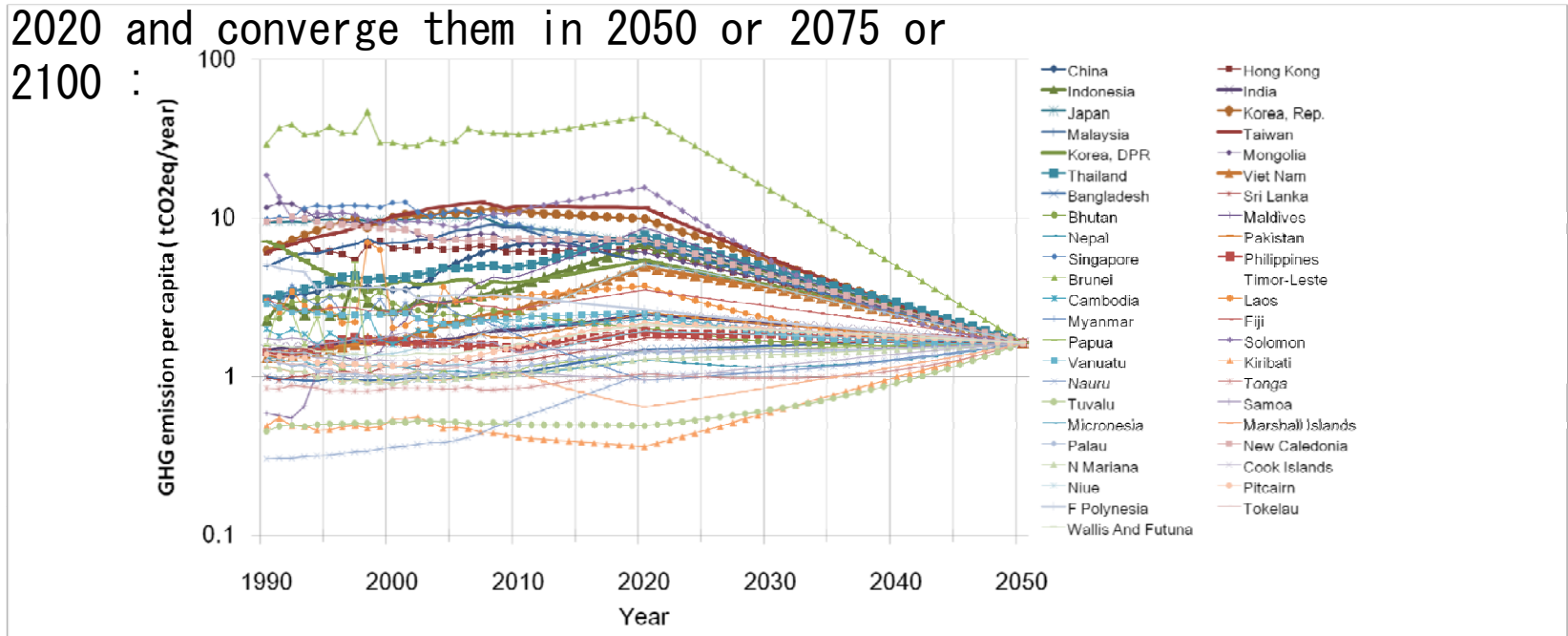
Request of more practical, realistic roadmaps and also tractable tools for real world





Pan-Asian approach: How much are the required national reduction for global 50% reduction ?

If we contract per capita GHG emissions from 2020 and converge them in 2050 or 2075 or 2100 :



	Target and convergence year	Probability of exceeding 2 C		Reduction rate in 2050 compared with 2005 (%)							
		(AIM/IP)	(Meins-hausen)	China	India	Japan	Indonesia	Korea, Rep.	Thailand	Malaysia	Viet Nam
50% reduction of GHG emission compared with 1990	2050	0.30	(0.13-0.47)	66	-35	88	28	86	62	70	2
	2075	0.45	(0.27-0.67)	12	-101	73	-74	62	-10	37	-101
	2100	0.67	(0.42-0.87)	-32	-188	64	-166	39	-79	9	-187

Members of the Project

