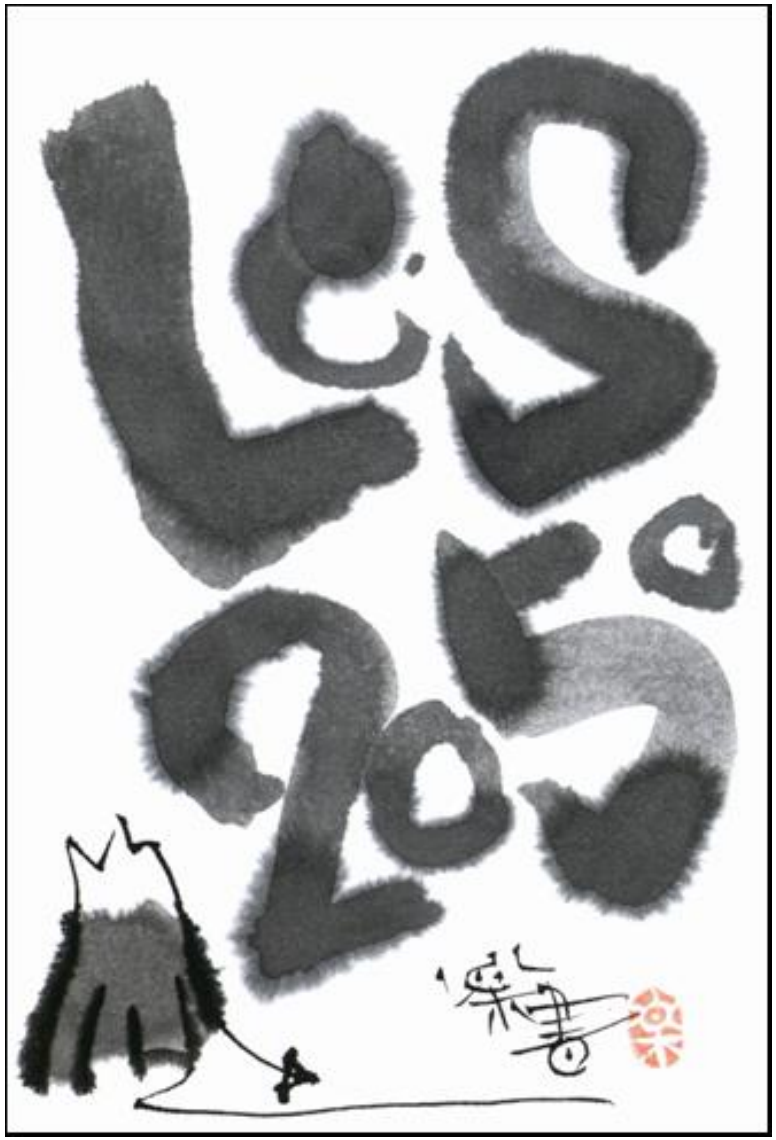
Develop Sustainable Low-Carbon Society Scenarios by Simulation Models – In the case of Vietnam and its implementation to Asia –

Junichi Fujino, Yumiko Asayama (NIES)
Nguyen Tung Lam (ISPONRE, Vietonam)
Nguyen Thai Hoa (Kyoto University)

WGIA2012, 12 July 2012, Hanoi



Designed by Hajime Sakai

My hypothesis…

GIO + AIM

=

MRV + NAMAs???

AIM is an abbreviation of “Asia-Pacific Integrated Model” to support design sustainable societies and suggest actions comprehensively and consistently in quantitative manner.

AIM developed by National Institute for Environmental Studies (NIES) in collaboration with Kyoto University and several research institutes in the Asia-Pacific region since 1990.

AIM has more than 20 simulation models such as top-down economy models, bottom-up technology models, sector-wise service demand and energy supply model, and environmental aspect models in global/national/sub-national scale.

LCS study by AIM team

- 1990 start AIM (Asia-Pacific Integrated Model) project
- 2000 provide IPCC/SRES A1B maker scenario
- 2004.4-2009.3 “Japan LCS research project” coordinated by AIM/NIES funded by MOEJ and provide 70% CO2 cut scenario by 2050
- 2006.2-2008.3 “Japan-UK joint LCS research project” submitted “call for action” to G8 Japan summit
- 2009.4-2014.3 “Low-Carbon Asia research project” coordinated by AIM/NIES funded by MOEJ
- 2010.4-2015.3 SATREPS “Development of Low Carbon Society Scenarios for Asian Region” especially focused on Iskandar and Malaysia funded by JST/JICA

Vietnam

Low Carbon Society Study Workshop
31st May 2012, Hanoi, Vietnam


CÁC TỔ CH
JICA, NIES
Dr. Shuzo Nishioka
IGES

Low Carbon Society Study Workshop
31st May 2012, Hanoi, Vietnam

DEVELOPING VIETNAM LOW CARBON SOCIETY

Kyoto University: Nguyen Thai Hoa, Kei Gomi, Yuzuru Matsuoka
National Institute for Environmental Studies: Tomoko Hasegawa, Junichi Fujino, Mikiko Kainuma
Institute of Strategy, Policy and Natural Resources: Nguyen Thi Thuy Duong, Nguyen Tung Lam, Nguyen Lanh, Nguyen Van Tai
Institute of Meteorology, Hydrology and Environment: Huynh Thi Lan Huong, Tran Thuc
Water Resources University: Nguyen Quang Kim
Japan International Cooperation Agency: Hiroshi Tsujihara

Background

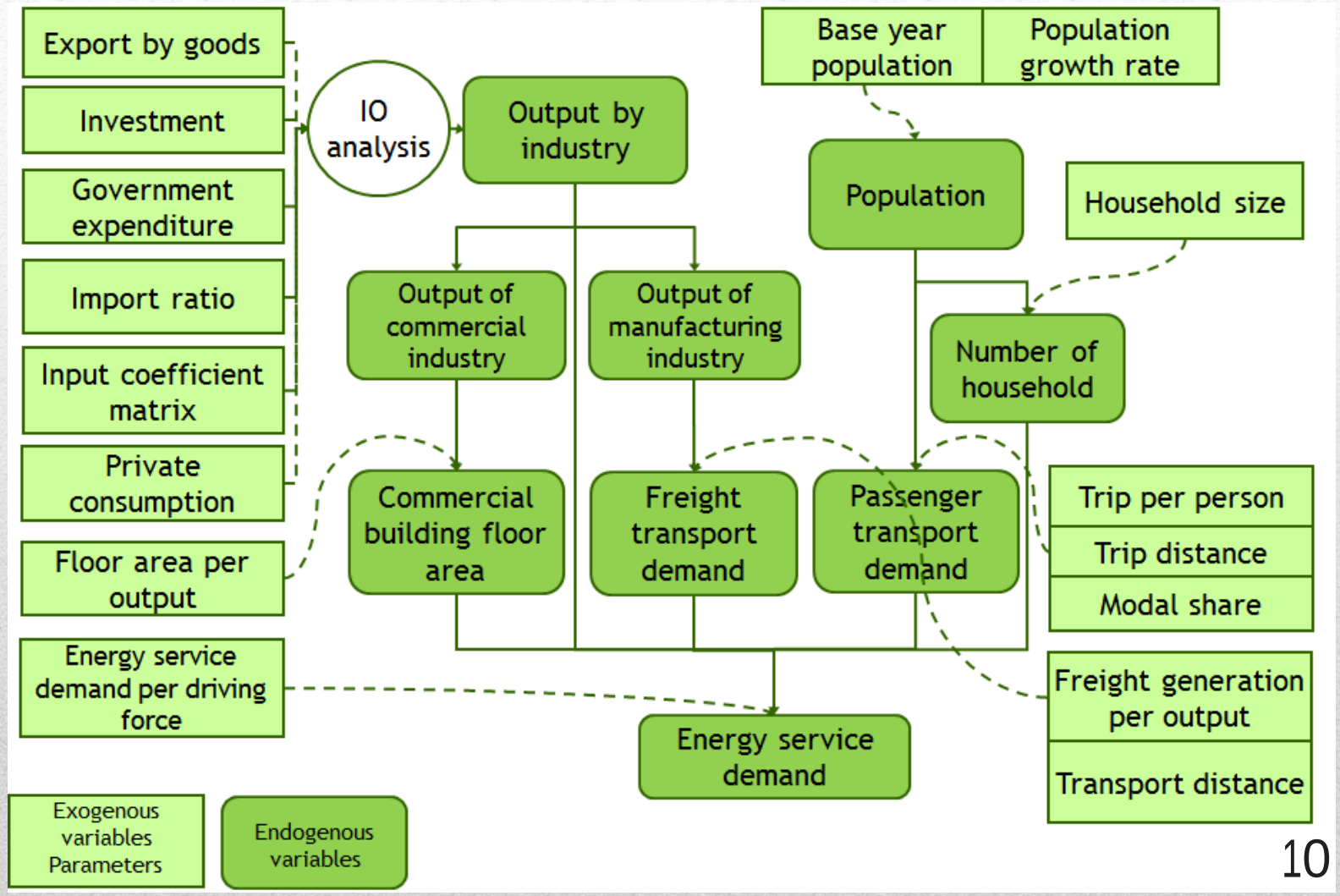
In conventional growth pathway, developed countries have been emitting a large amount of green house gases in the process of economic growth.

To avoid it, a developing country like Vietnam should leap-frog this process and creates low-carbon society (LCS) directly.

One of the strategic objectives of “National Target to Respond to Climate Change” is “take an opportunity to develop towards a low-carbon economy” and “ National Climate Change Strategy” is “consider low carbon economy as principles in achieving sustainable development; GHG emission reduction to become mandatory index in social and economic development”

In order to contribute discussion on LCS, we created a national sustainable LCS scenario in Vietnam in 2030.

Socio-economic part of ExSS



Data collection (socio-economic)

Data	Source
Population	Population Division - United Nations Population low variant, 2030 for Vietnam, General Statistic Office of Vietnam (2008)
Household	Vietnam Population and Housing Census (2009).
IO table	Input-output table 2005 (Trinh Bui, 2009)
Transport	JICA/MoT(2009): The comprehensive study on the sustainable development of transport system in Vietnam (VISTRANSS 2) General Statistic Office of Vietnam (2009) Schipper L., A. T. Le, O. Hans., 2008. Measuring the invisible. Quantifying emissions reductions from transport solutions. Hanoi case study. EMBARQ – The WRI Center for Sustainable Transport and World Resources Institute. Walter, H. and R. Michael (1995). Motorization and non-motorized transport in Asia. Transport system evolution in China, Japan and Indonesia. Land Use Policy, Vol 13, No.1, pp. 69-84, 1996.

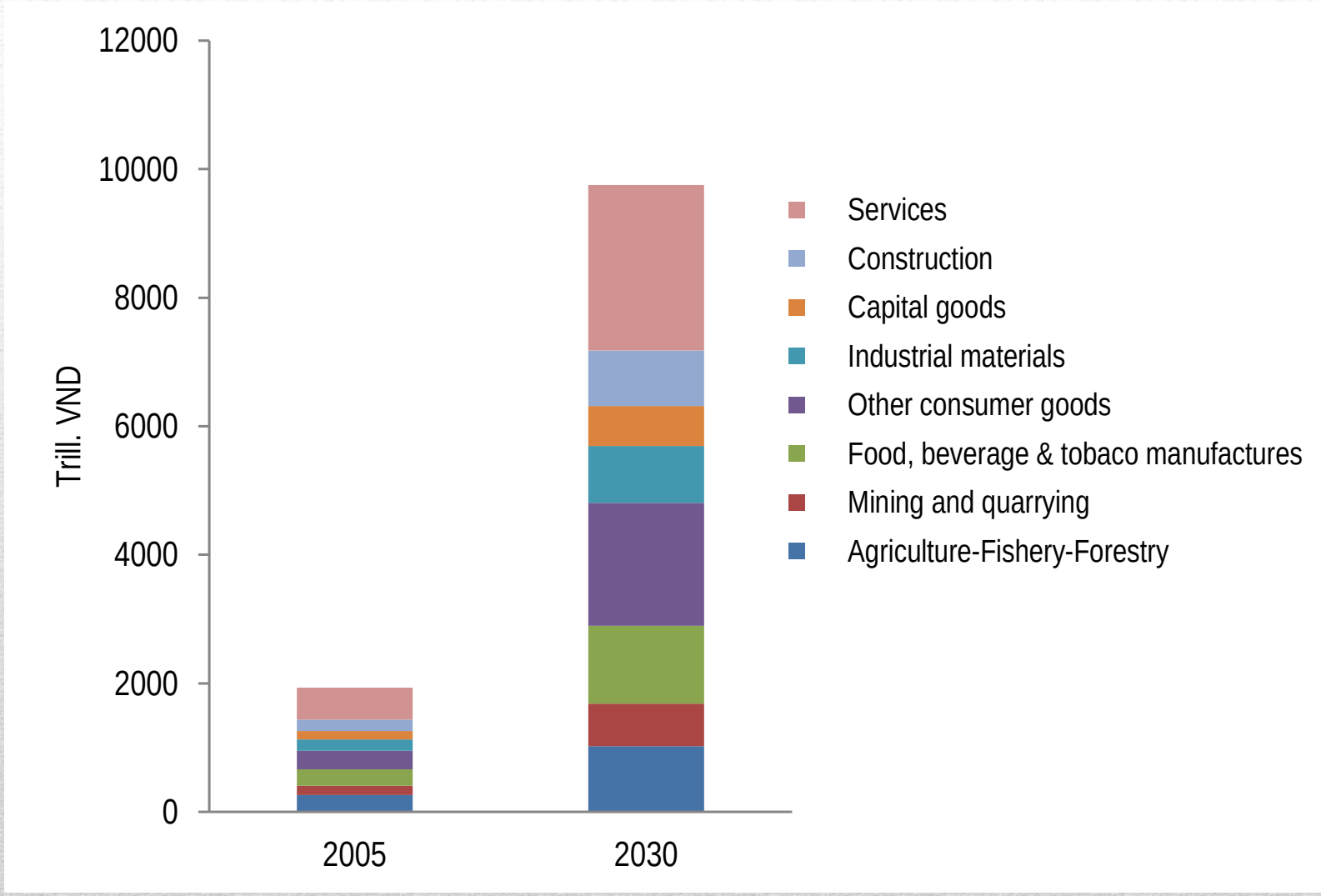
2030 BaU Assumptions

Indicator	Quantification (2030BaU scenario)	Tendency to
Population	104 million people	Growth rate at 0.9 % per annum
Demographic composition	[Male] 0-14: 8%, 15-64: 35.9%, 65 and over: 5.8% [Female] 0-14: 7.7%, 15-64: 35.2%, 65 and over: 7.4%	Number of male births are higher than female births
Average number of persons per household	3.5 (4.2 in 2005)	Slight decrease in average size of household
GDP	6.5%	Average annual growth rate during the period 2005 - 2030
Industrial structure	[Agriculture, Fishery, Forestry]: 17% (22% in 2005) [Industry, Construction]: 43% (41% in 2005) [Service]: 40% (37% in 2005)	Primary industry sectoral share has a decrease trend, whilst secondary and tertiary industry have an increasing trend.
Demand structure	Contribution of export in GDP: 29% (29% in 2005)	Export maintains there share in GDP
Modal shift in transport	Passenger transport: [Train] 0%, [Bus] 0.6%, [Waterway] 0.6%, [Car] 0.3%, [Motorbike] 8.3% [Walk & Bike] 90%, [Aviation] 0.1%	Increasing of public transport, keep people respond to walk and use bicycle
	Freight transport: [Train] 2%, [Waterway] 27%, [Truck] 71%, [Aviation] 0%	Increasing of share of train and waterway freight transport

Estimated socio-economic indicators

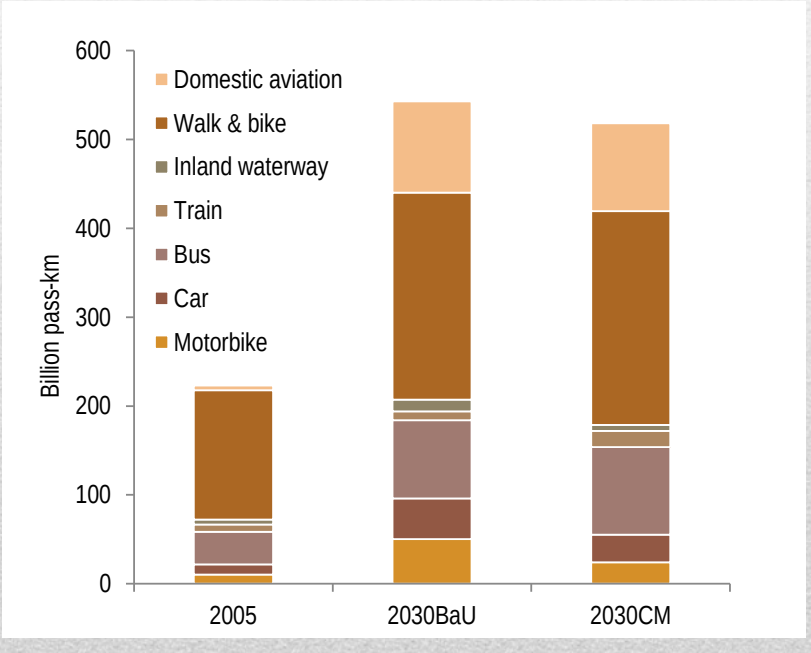
	2005	2030 BaU	2030 CM	2030BaU/2005	2030CM/2005
Population (million people)	83.1	104.0	104.0	1.3	1.3
No. of households (million)	20.0	29.7	29.7	1.5	1.5
GDP (trillion VND)	818.5	3,963	3,963	4.8	4.8
Gross output (trillion VND)	1,934	9,750	9,750	5.0	5.0
Primary industry (trillion VND)	404	1,684	1,684	4.2	3.9
Secondary industry (trillion VND)	1,033	5,497	5,497	5.3	5.2
Tertiary industry (trillion VND)	497	2,569	2,569	5.2	5.2
Passenger transport demand (million people-km)	223,981	542,687	518,028	2.4	2.3
Freight transport demand (million ton-km)	38,856	235,212	235,124	6.1	6.1

Projected industrial output

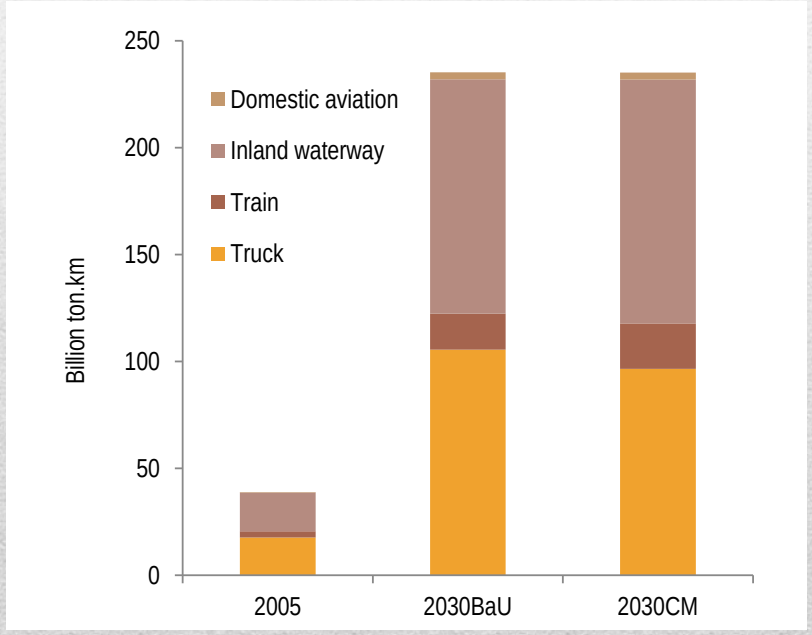


Projected transport demand

- ✓ There is an increasing share of motorbike and domestic aviation in passenger transport in 2030
- ✓ Freight transport volume increases proportionally with growth of secondary industries

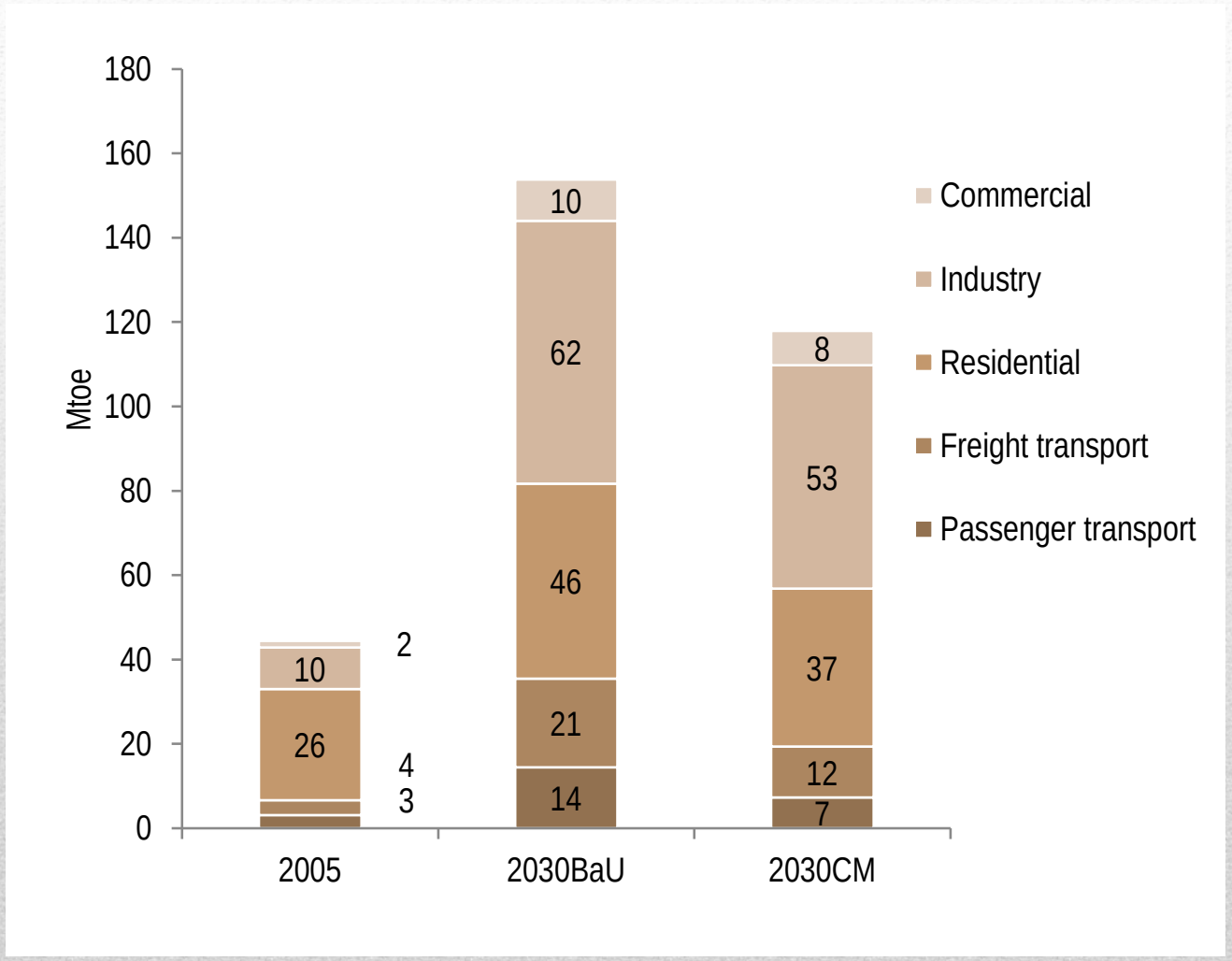


Passenger transport

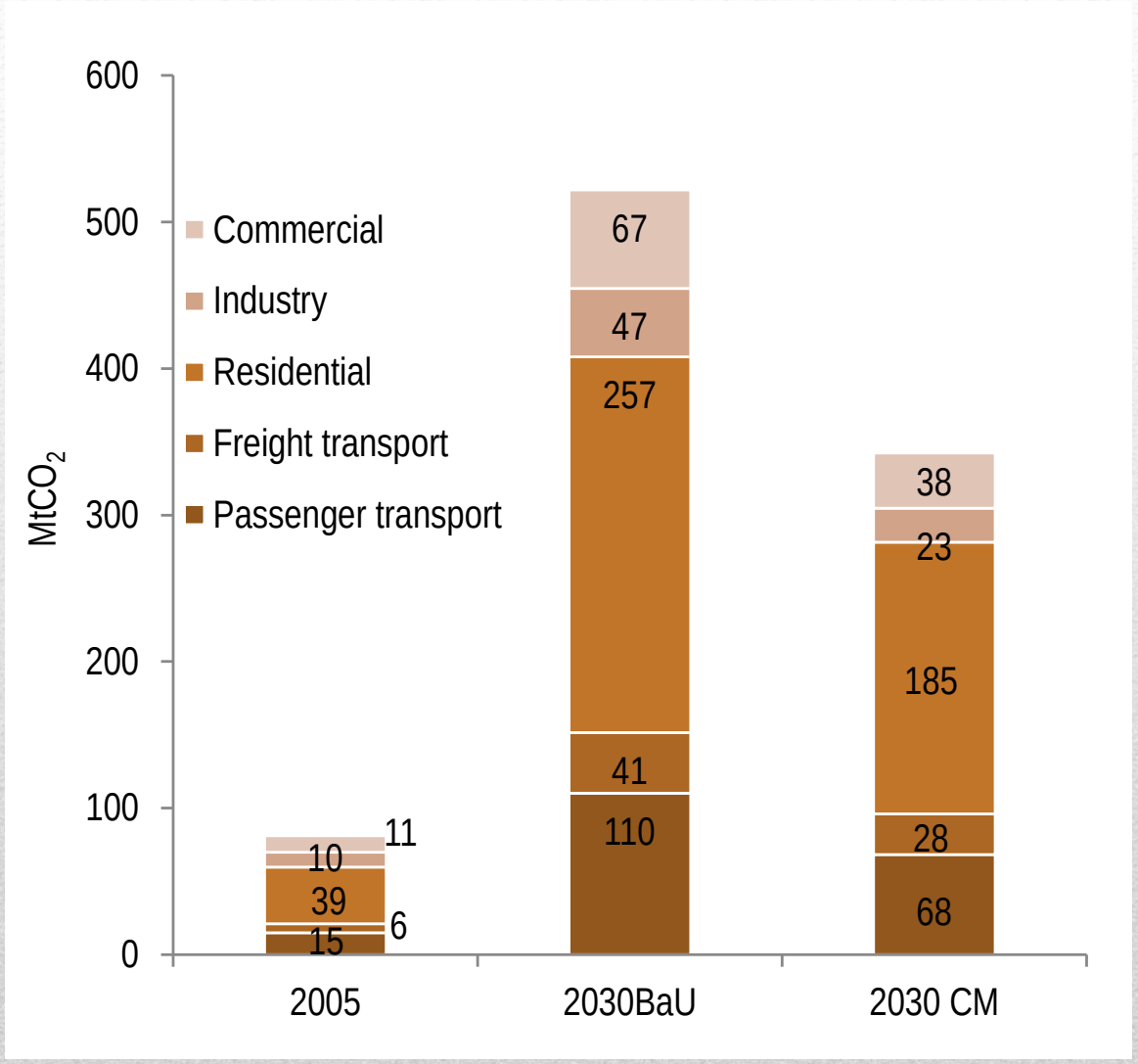


Freight transport

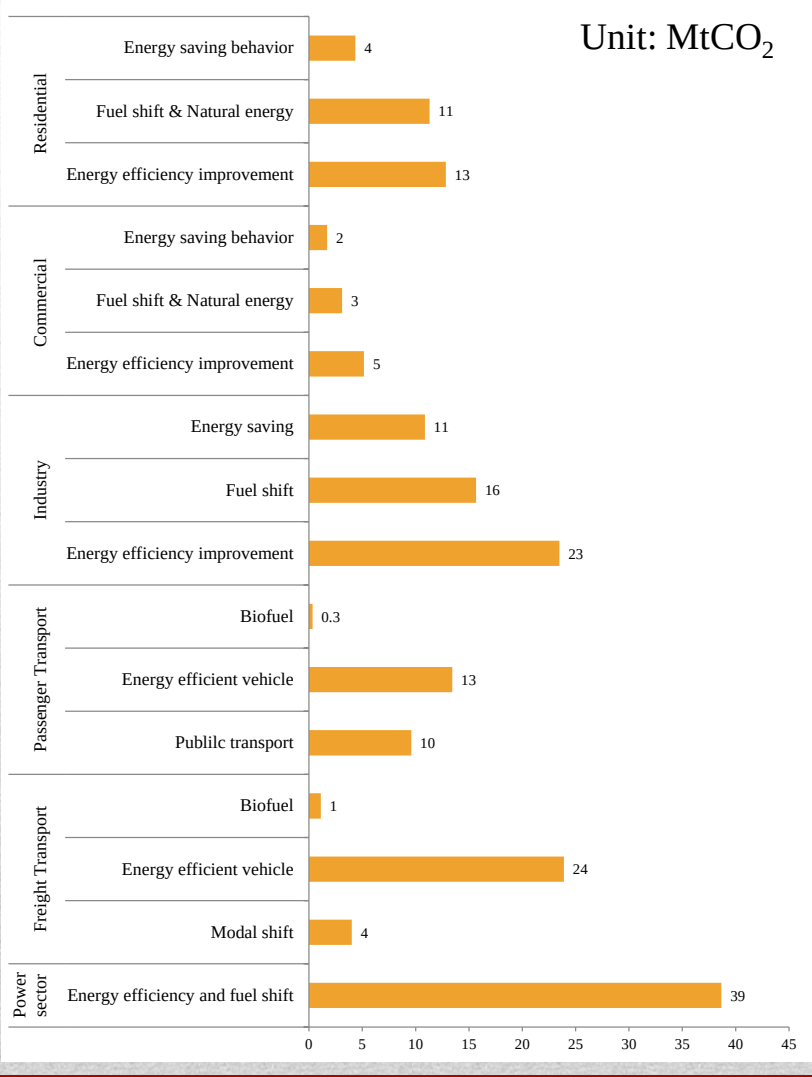
Projected final energy demand by sectors

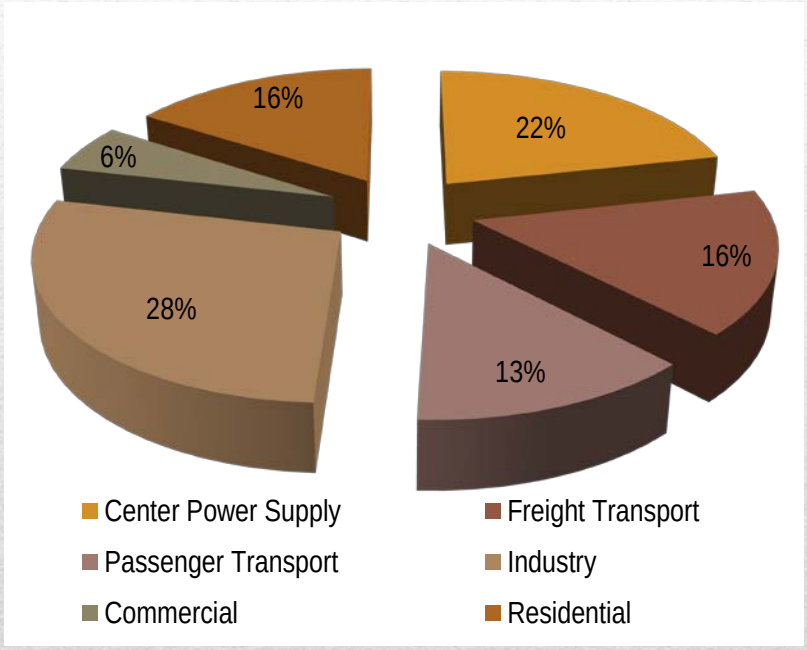


Projected CO_2 emissions from energy sector

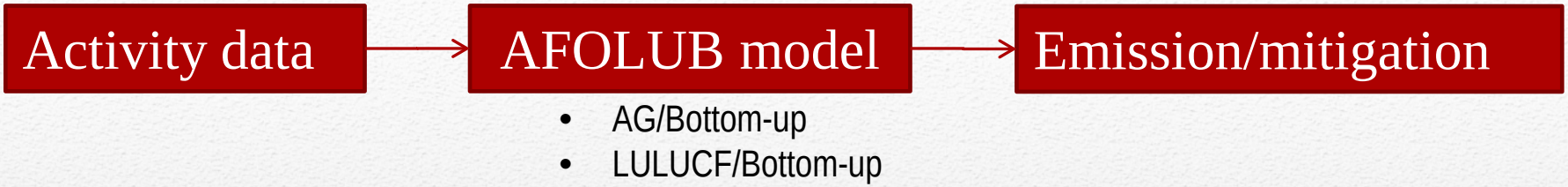


Contribution of low carbon countermeasures



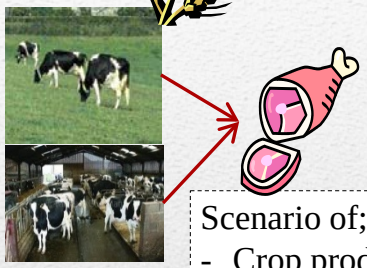


AFOLUB model



- AFOLUB model
  - Bottom-up type model to determine combination and amounts of individual mitigation countermeasures
  - Estimate GHG emissions and mitigations in AFOLU sectors
  - Analyze effect of policies such as carbon tax, energy tax, subsidy etc.
  - Time horizon: mid-term (typically until 2030)
- AGriculture Bottom-up module (AG/Bottom-up)
  - Illustrate behavior of agricultural producers and selection of mitigation countermeasures
  - Maximize producer's profit
- The LULUCF/Bottom-up
  - Illustrate land use and land use change cohort
  - Maximize total accumulated mitigation in the future

Input and output of AFOLUB model



Scenario of;
- Crop production
- Yield of crops and carcass weight of animals
- Number of livestock animals
- Land use, land use change

List of Countermeasure
Characteristics of countermeasure
- Cost
- Reduction effect
- Life time
- Diffusion ratio
- Energy consumption and recovery

Scenario of;
- Fertilizer input
- Price of commodity and energy
- Production technologies
  - Feeding system of livestock
  - Manure management system
  - Share ratio of irrigation area

Policy;
- GHG emission tax rate
- Energy tax rate
- Subsidy

Allowable abatement cost for GHG emission mitigation

AFOLUB model

Emission/mitigation
Types of countermeasures

Exogenous variables | Endogenous variables | Model

Source: Hasegawa and Matsuoka, submitted

Data sources

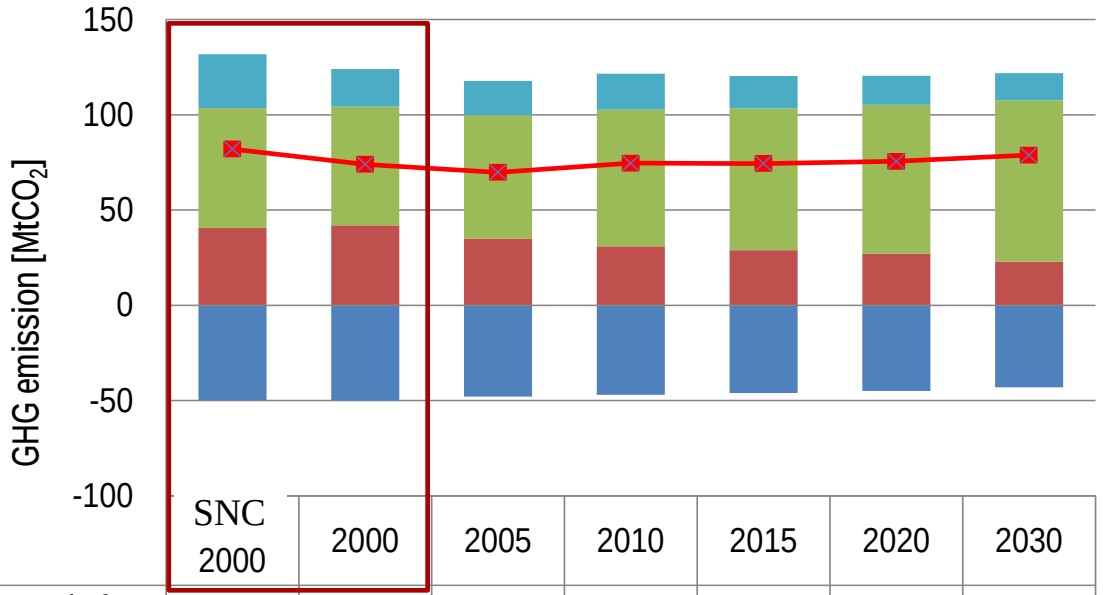
- Present & future Activity data
  - Crops & Livestocks in 2005-2009:
    - Vietnam Second National Communication to the UNFCCC (SNC)
    - Statistical Yearbook (2002, 2007 and 2009)
    - Ministry of Agriculture and Rural Development, 2006
    - FAOSTAT, 2012, download
  - Landuse in 2000, 2005:
    - SNC
    - ResourceSTAT, FAOSTAT, 2011, download
    - Statistical Yearbook 2001(2002)
- Countermeasure data
  - Collected from domestic & international literatures
  - Countermeasures in LULUCF is referred to SCN

Countermeasures in Agricultural sector

Emission sources	Code	Countermeasures	Code	Cost [USD/activity/yr]*	Mitigation [tCO_2eq/activity/yr]*	Reference
Enteric fermentation	3A1	Replacement of roughage with concentrates	RRC	-23	0.45	Bates(1998a), Shibata et al.(2010), Graus et al.(2004)
		High genetic merit	HGM	0	0.32	Bates(1998a)
Manure management	3A2	Dome digester, cooking fuel and light	CFL	44	0.62	USEPA(2006)
		Daily spread of manure	DSM	2.2	0.33	Bates(1998a)
Rice cultivations	3C7	Midseason drainage	MD	0	0.89	USEPA(2006)
		Fall incorporation of rice straw	FIR	0	0.68	USEPA(2006)
		Replace Urea with Ammonium	RAS	20	0.24	USEPA(2006), Graus et al. (2004)
Managed soils	3C4~3C6	High efficiency fertilizer application	HEF	2.2	0.65	USEPA(2006), Hendriks et al. (1998), Amann et al. (2005)
		Slow-release fertilizer application	SRF	2150	0.76	USEPA(2006), Akiyama et al.(2010)
		Tillage and residue management	TRM	5	0.08	IPCC(2007), Smith et al.(2007)

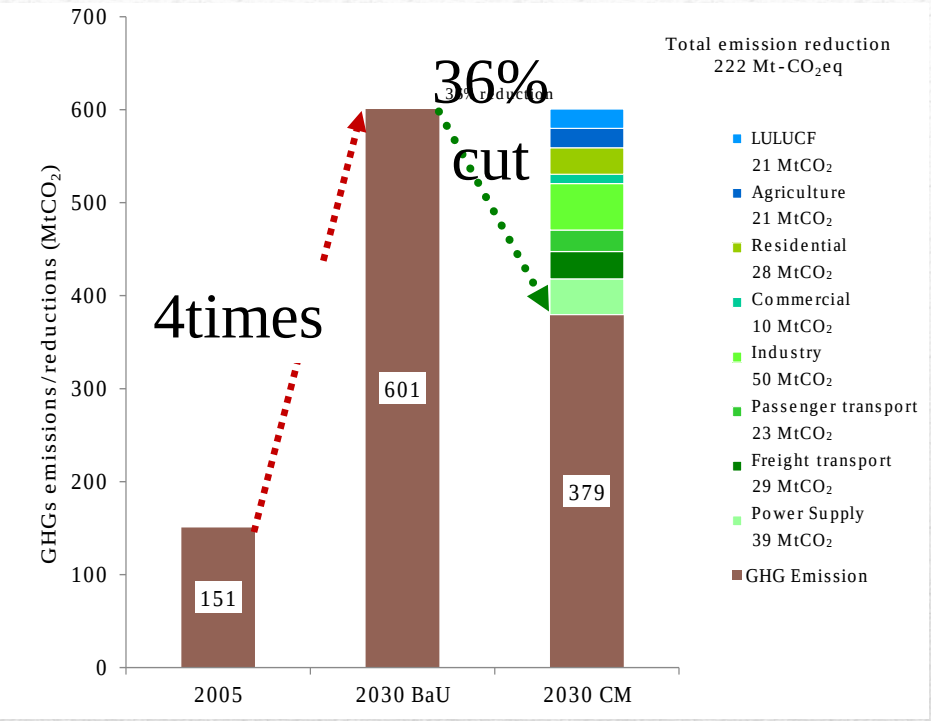
* Activity is area of cropland for crop cultivation and animal numbers for livestocks.

Comparison of total GHG emissions in BaU in AFOLU sectors



	SNC 2000	2000	2005	2010	2015	2020	2030
Emission and removals from soils	28	20	18	19	17	15	14
Emission from agriculture	63	62	65	72	74	78	85
Forest and grassland conversion	41	42	35	31	29	27	23
Changes in forest and other woody biomass stocks	-50	-50	-48	-47	-46	-45	-43
TOTAL	82	74	70	75	74	76	79

GHG emissions/mitigations in Vietnam in 2030



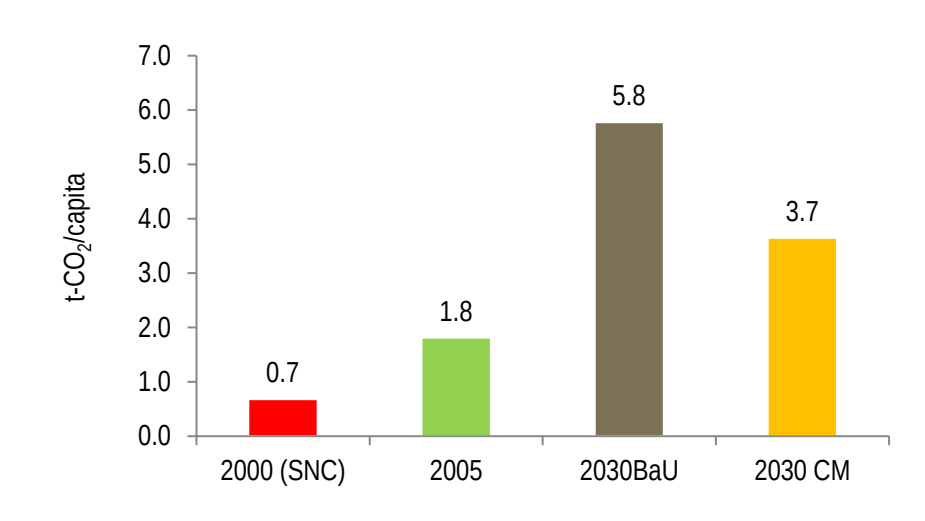
Sector	GHG emissions ($MtCO_2eq$)		GHG emissions reduction ($MtCO_2eq$)
	2030BaU	2030CM	
AFOLU sectors	79	37	42
Agriculture	85	64	21
LULUCF	-6	-27	21
Energy sectors	522	342	180
Residential sector	110	68	42
Commercial sector	41	28	13
Insudtry	257	185	71
Transport	114	61	53
Total	601	379	222

In 2030BaU scenario, GHG emissions were four folds from 2005 from 151 MtCO2 to 601 MtCO2

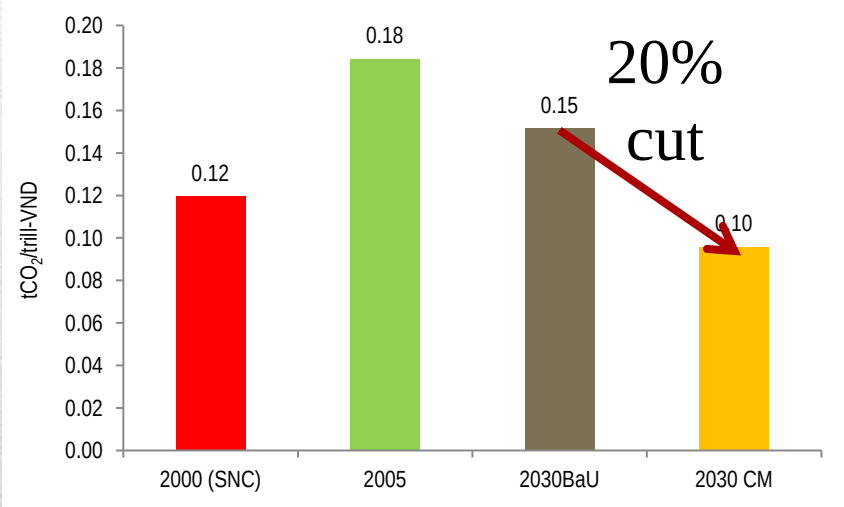
In 2030CM scenario, GHG emission was reduced 36% from 2030BaU.

Projected per capita GHG emissions and emission intensity

Per capita GHG emissions



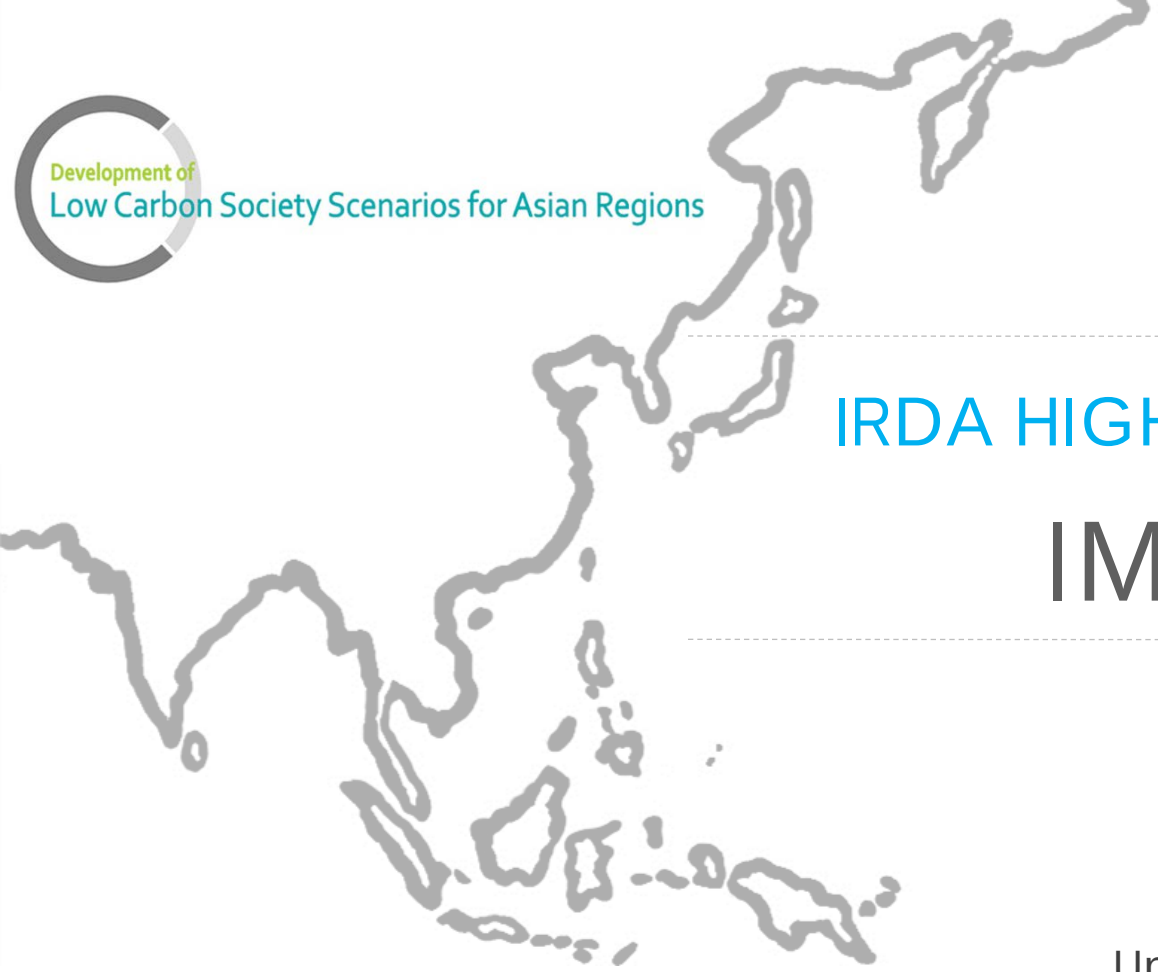
Emission intensity



- Emission intensity was reduced 20%

Malaysia


SATREPS
3rd International Symposium on
Sustainable Low Carbon Asia Research
Policy Dialogue
9 July 2012
The Puteri Pacific Hotel
Johor Bahru, Malaysia
UTM
IGES
JICA
JST
SATREPS



Development of
Low Carbon Society Scenarios for Asian Regions

IRDA HIGH-LEVEL LCS MEETING

IM LCS Actions

10 July 2012
IRDA, Danga Bay, Johor Bahru

Universiti Teknologi Malaysia (UTM)
Chau Loon Wai
Ho Chin Siong

UTM UNIVERSITI TEKNOLOGI MALAYSIA · KYOTO UNIVERSITY FOUNDED 1897 · OKAYAMA UNIVERSITY · NIES · JICA · SATREPS · JST

01 Introduction: Background of Project

Development of Low Carbon Society Scenarios for Asian Regions

FLAGSHIP A

JOHOR BAHRU CITY CENTRE
- Central Business District (CBD) as heritage and cultural city
- Customs, Immigration and Quarantine Complex (CIQ)
- Johor – Singapore Causeway

FLAGSHIP B

NUSAJAYA
- Kota Iskandar
- EduCity
- Medical Park
- International Destination Resort
- Southern Industrial & Logistics Clusters (SiLC)
- Puteri Harbour

FLAGSHIP C

WESTERN GATE DEVELOPMENT
- Port of Tanjung Pelepas (PTP)
- Tanjung Bin Power Plant
- 2nd Link Access to Singapore
- RAMSAR World Heritage Park
- Tanjung Piai – Southernmost Tip of Mainland Asia
- Maritime Centre

FLAGSHIP D

EASTERN GATE DEVELOPMENT
- Tanjung Langsat Industrial Complex
- Johor Port
- Tanjung Langsat Port
- Pasir Gudang Industrial Park

FLAGSHIP E

SENAI-SKUDAI
- Senai Airport City
- Senai High-Tech Park
- Sedenak Industrial Park
- MSC Cyberport City
- Johor Technology Park
- University Technology Malaysia (UTM)

(Source: Iskandar Regional Development Authority)

Study Area: Iskandar Malaysia

Objective:

i. To formulate key policies and strategies to ensure **continuous strong growth and development** of Iskandar Malaysia while **mitigating the economic region's carbon emission**

ii. To transforming Iskandar Malaysia into ***a sustainable, low carbon metropolis by adopting green growth strategies/roadmap***

iii. To respond to the nation's aspiration for **ensuring climate-resilient development for sustainability**.

Target Year: 2025 (2005 – 2025)

01 Introduction: Background of Project

Development of Low Carbon Society Scenarios for Asian Regions

Research Team: Universiti Teknologi Malaysia (UTM), Kyoto University (KU), Okayama University (OU), National Institute for Environmental Studies (NIES)

Joint Coordinating Committee: Iskandar Regional Development Authority (IRDA), Federal Department of Town and Country Planning (JPBD), Malaysia Green Technology Corporation (MGTC)

Sponsorship: Japan International Cooperation Agency (JICA) , Japan Science and Technology (JST)

Period: 2011 - 2016

Research Output:

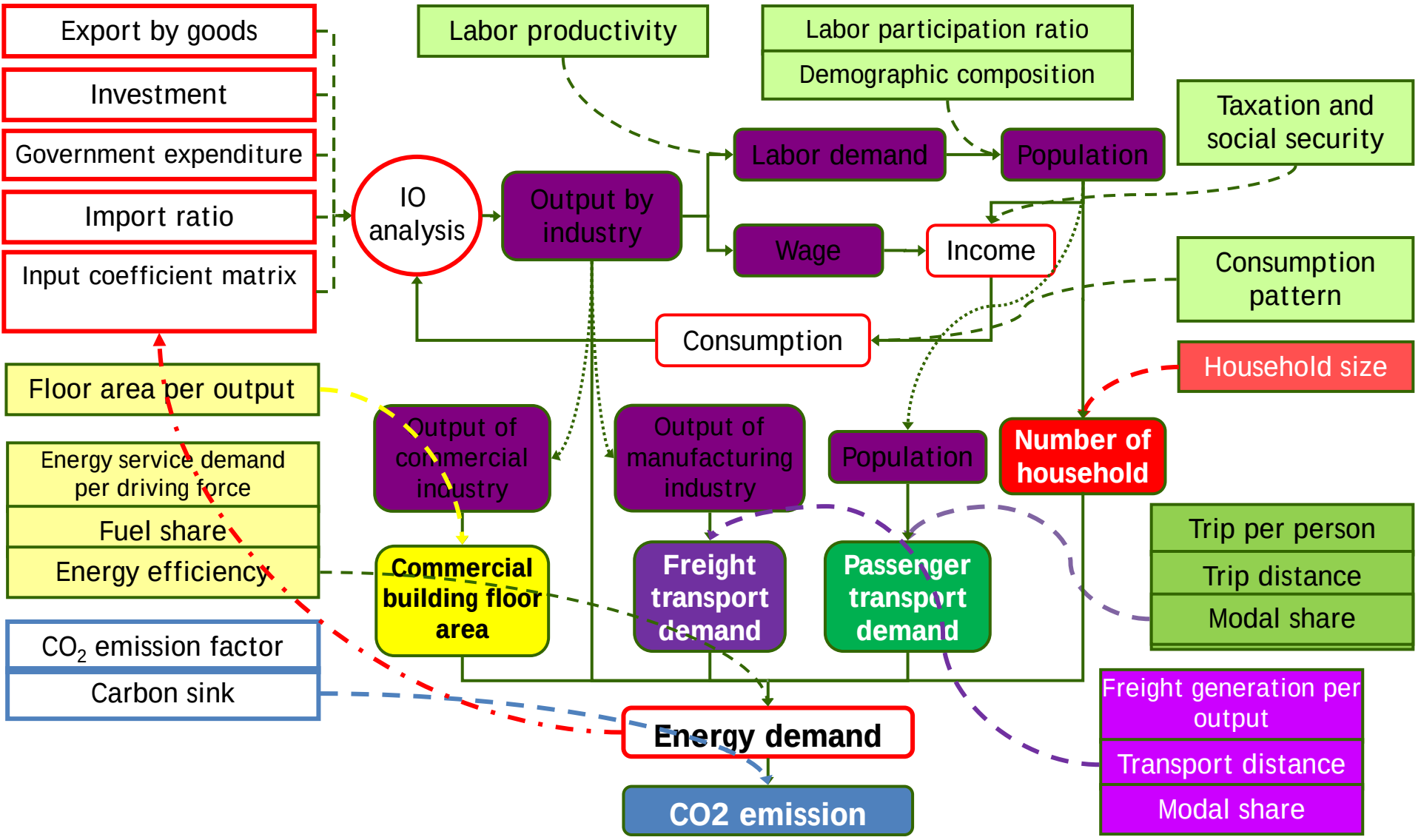
i. **Methodology** to create LCS scenarios which is appropriate for Malaysia is developed.

ii. **LCS scenarios** are created and utilised **for policy development** in IM.

iii. **Co-benefit of LCS policies** on air pollution and on recycling-based society is quantified in IM

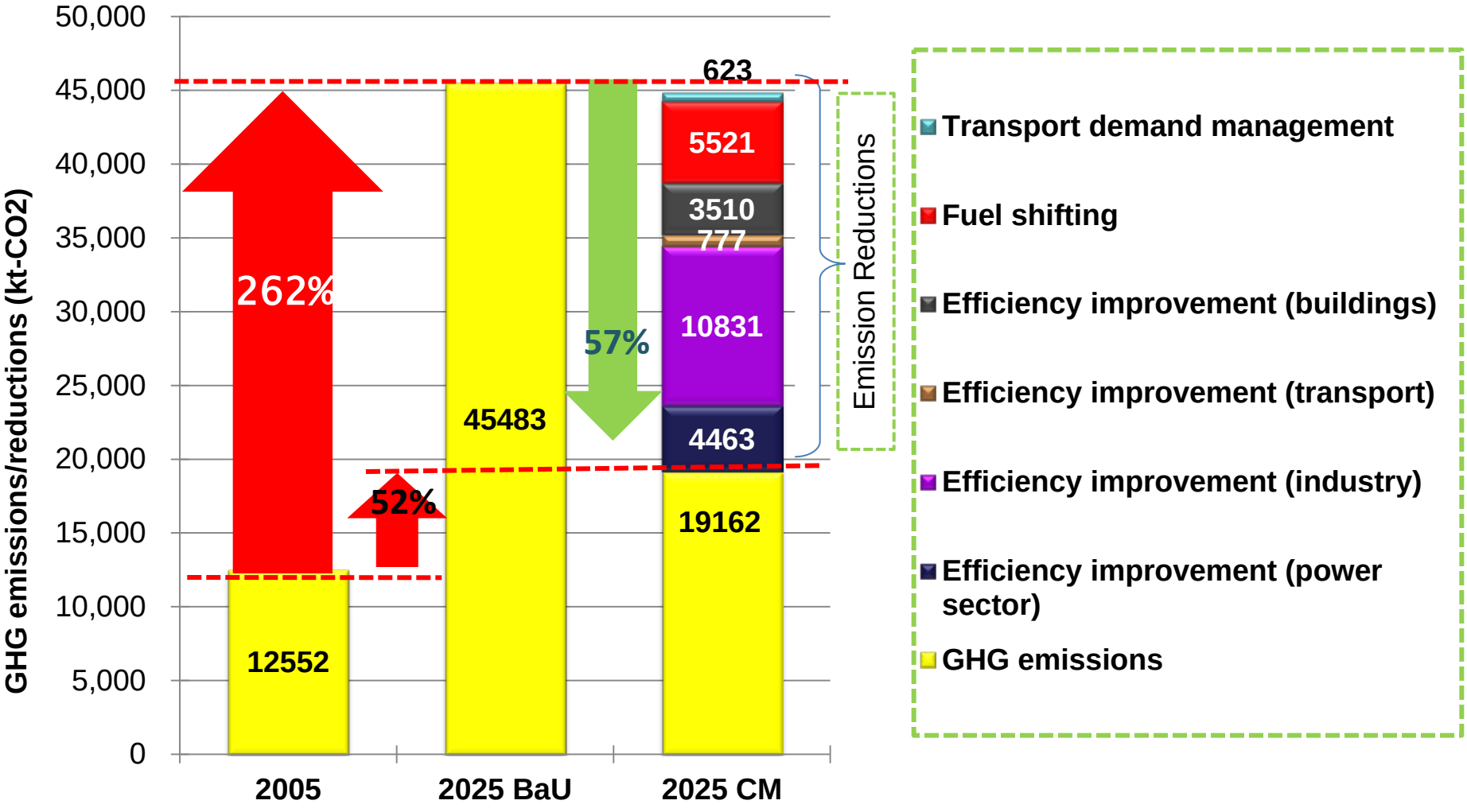
iv. **Organizational arrangement of UTM** to conduct trainings on LCS scenarios for Malaysia and Asian countries is consolidated, and a network for LCS in Asia is established

LCS scenario study using ExSS



Methodology developed by Shimada et.al (2006), Gomi et. Al (2007)

Potential Mitigation in IM

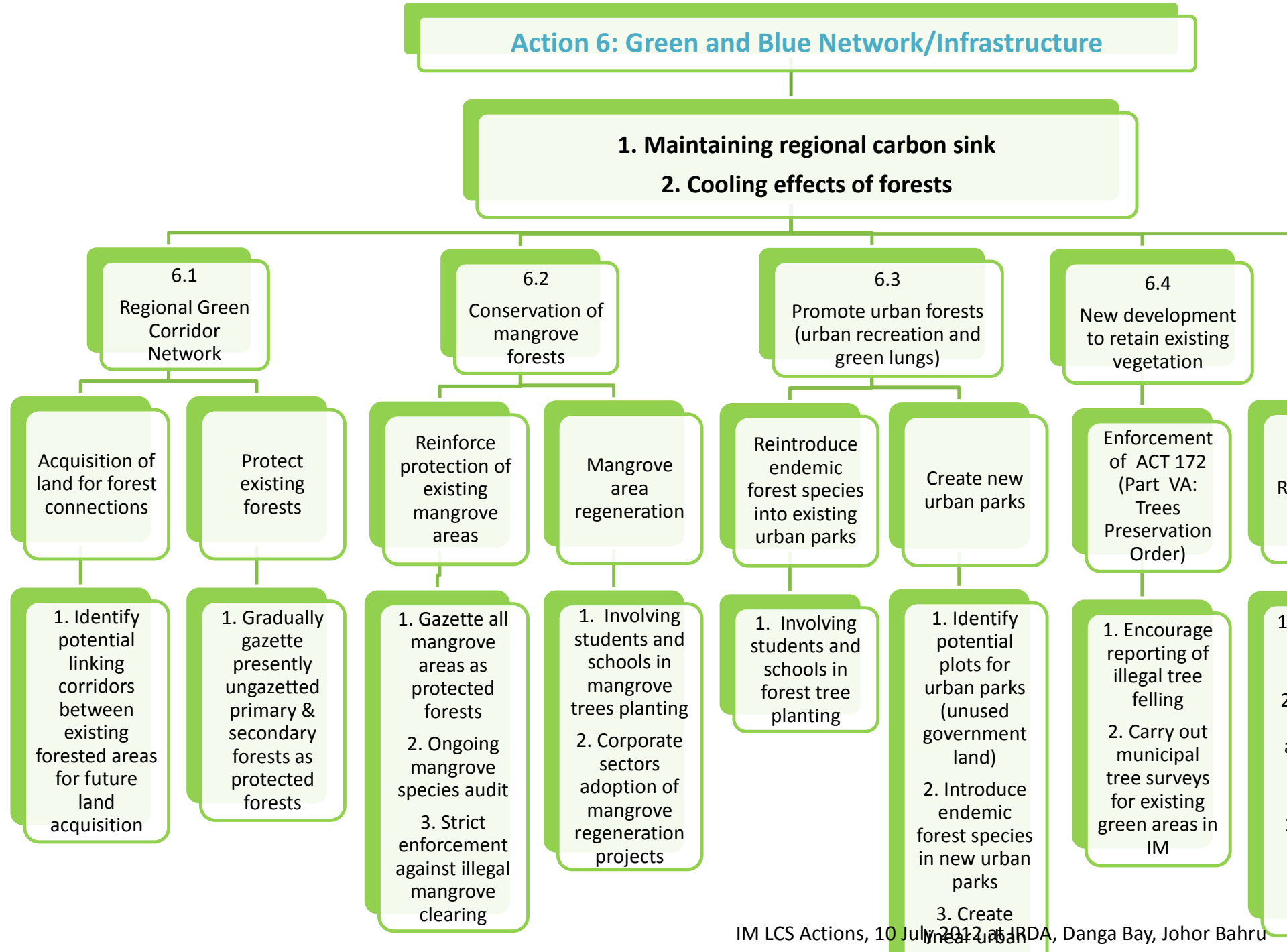


02 LCS Actions for IM: Where We Are Now

Development of Low Carbon Society Scenarios for Asian Regions

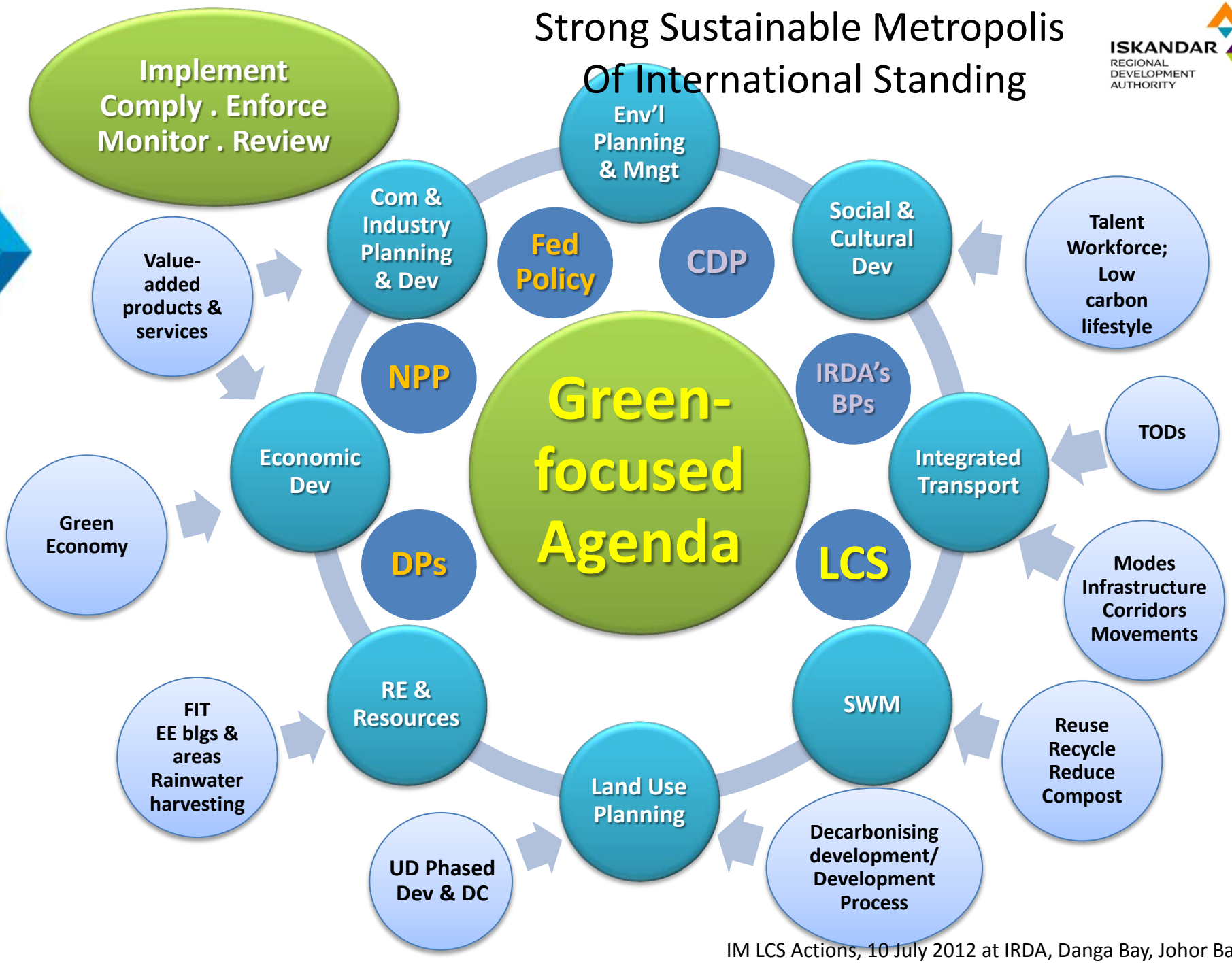
Since 06 July 2012…

	New Action Names	Themes
1	Integrated Green Transportation	GREEN ECONOMY
2	Green Industries	
3	Low Carbon Urban Governance	
4	Green Buildings and Construction	
5	Green Energy System and Renewable Energy	
6	Low Carbon Lifestyle	GREEN COMMUNITY
7	Community Engagement and Consensus Building	
8	Walkable, Safe, Livable City	GREEN ENVIRONMENT
9	Smart Growth	
10	Green and Blue Infrastructure	
11	Sustainable Waste Management	
12	Clean Air Environment	


Action 6: Green and Blue Network/Infrastructure
1. Maintaining regional carbon sink
2. Cooling effects of forests
6.1
Regional Green Corridor Network
6.2
Conservation of mangrove forests
6.3
Promote urban forests (urban recreation and green lungs)
6.4
New development to retain existing vegetation
Acquisition of land for forest connections
Protect existing forests
Reinforce protection of existing mangrove areas
Mangrove area regeneration
Reintroduce endemic forest species into existing urban parks
Create new urban parks
Enforcement of ACT 172 (Part VA: Trees Preservation Order)
1. Identify potential linking corridors between existing forested areas for future land acquisition
1. Gradually gazette presently ungazetted primary & secondary forests as protected forests
1. Gazette all mangrove areas as protected forests
2. Ongoing mangrove species audit
3. Strict enforcement against illegal mangrove clearing
1. Involving students and schools in mangrove trees planting
2. Corporate sectors adoption of mangrove regeneration projects
1. Involving students and schools in forest tree planting
1. Identify potential plots for urban parks (unused government land)
2. Introduce endemic forest species in new urban parks
3. Create
1. Encourage reporting of illegal tree felling
2. Carry out municipal tree surveys for existing green areas in IM

Strong Sustainable Metropolis Of International Standing

ISKANDAR REGIONAL DEVELOPMENT AUTHORITY



Indonesia

Preliminary Quantification of scenarios by Extended Snapshot Tool for Low Carbon Society in Indonesia

Retno Gumilang

Bandon Institute of Technology, Indonesia

Yuzuru Matsuoka, Ryohei Osawa, Kei Gomi

Kyoto University, Japan

"Low Emission Development Scenarios (LEDs) of Energy Sector:
Preliminary Result of Asia-Pacific Integrated Modeling (AIM) exercise"

2012/June/6th, DNPI, Jakarta

- This presentation shows a preliminary result of Indonesia LCS scenario in energy sector in 2020.
- ExSS (Extended Snapshot Tool) was used as a main tool of quantification of the scenarios.
- Objective of this scenario study is to provide useful information for the discussion of low-carbon development of Indonesia by assessing possible emission reduction by mitigation options in 2020.
- Future assumptions are mainly referred to Indonesia Second National Communication, Chapter V, Measures to Mitigate Climate Change.
- The scenarios were prepared by Bandon Institute of Technology and Kyoto University with support of JICA Indonesia and DNPI, the Government of Indonesia.

Framework of the scenarios

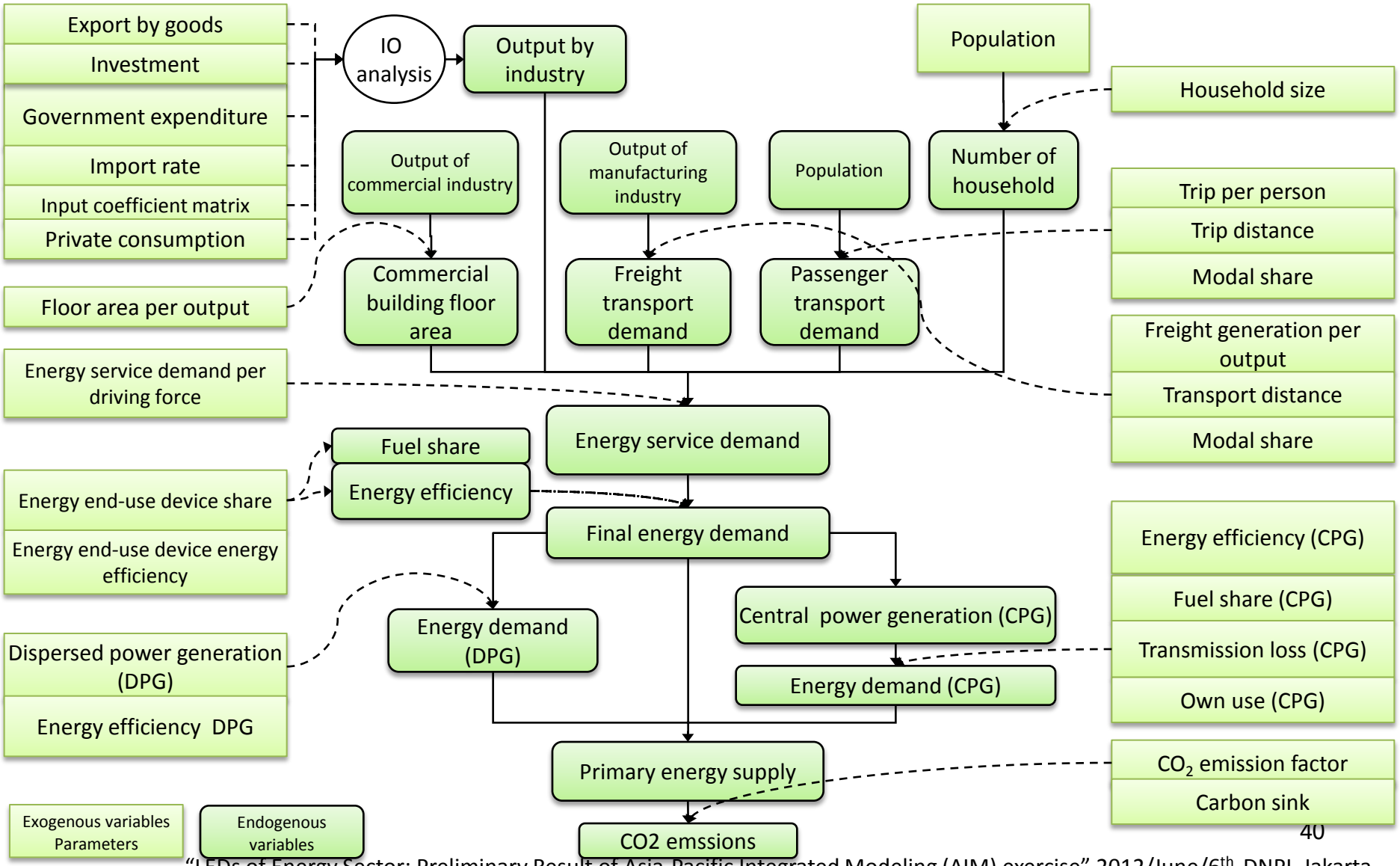
- Scope
  - Energy demand and supply sectors
  - CO2 emissions from fossil fuel combustion
- Base year: 2005
- Target year: 2020
- Two scenarios
  - 2020 Baseline
  - 2020 CM
- CM scenario achieves -26% from baseline

Scenarios in 2020

- **Baseline scenario**: Projection of GHG emission under expected socio-economic development in Indonesia without additional countermeasures to reduce GHG emission from energy.
- **CM scenario**: Projection of GHG emission with mitigation options (low-carbon counter measures) which achieve the official mitigation target of Indonesia in 2020, -26% from the Baseline.

"LEDs of Energy Sector: Preliminary Result of Asia-Pacific Integrated Modeling (AIM) exercise" 2012/June/6th, DNPI, Jakarta

Model structure of ExSS

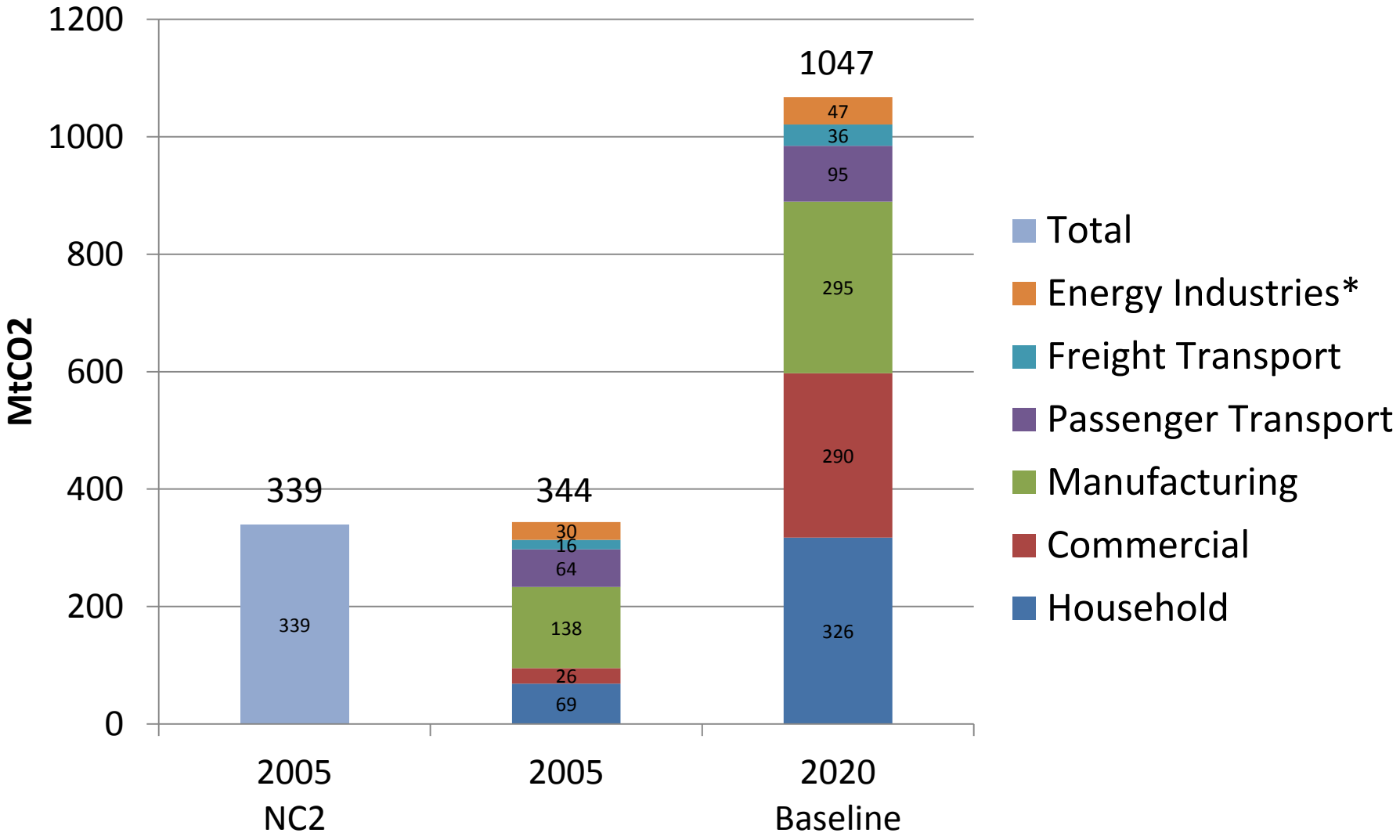


Collection of Information in 2005

Category	Data	Information source
Demography	Population and number of household	Indonesian population census, BPS-Indonesia
Economy	Input-output table	Indonesian Input-Output table, BPS-Indonesia
Transport	Passegenr transport volume	Transportation statistics, Ministry of transportation
	Freight transport volume	AIM database
Energy	Energy demand and supply	National energy balance, Pusdatin-MEMR
	Energy demand by industry	AIM datable

"LEDs of Energy Sector: Preliminary Result of Asia-Pacific Integrated Modeling (AIM) exercise" 2012/June/6th, DNPI, Jakarta

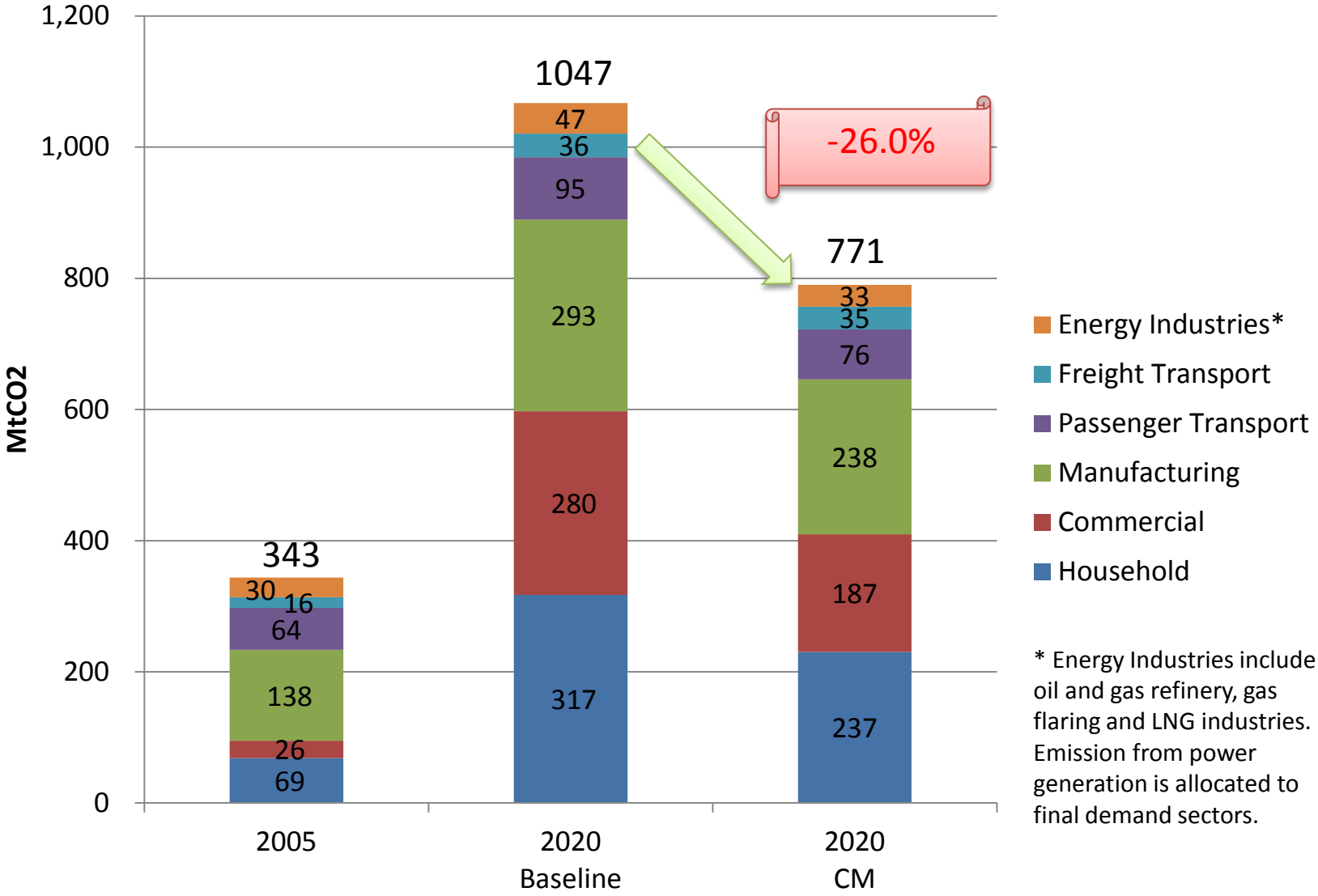
CO2 Emission



Difference of CO2 emissions shown in NC2 and this study in 2005 is considered to be caused by difference of detailed energy consumption and/or emission factor of the fuels.

"LEDs of Energy Sector: Preliminary Result of Asia-Pacific Integrated Modeling (AIM) exercise" 2012/June/6th, DNPI, Jakarta

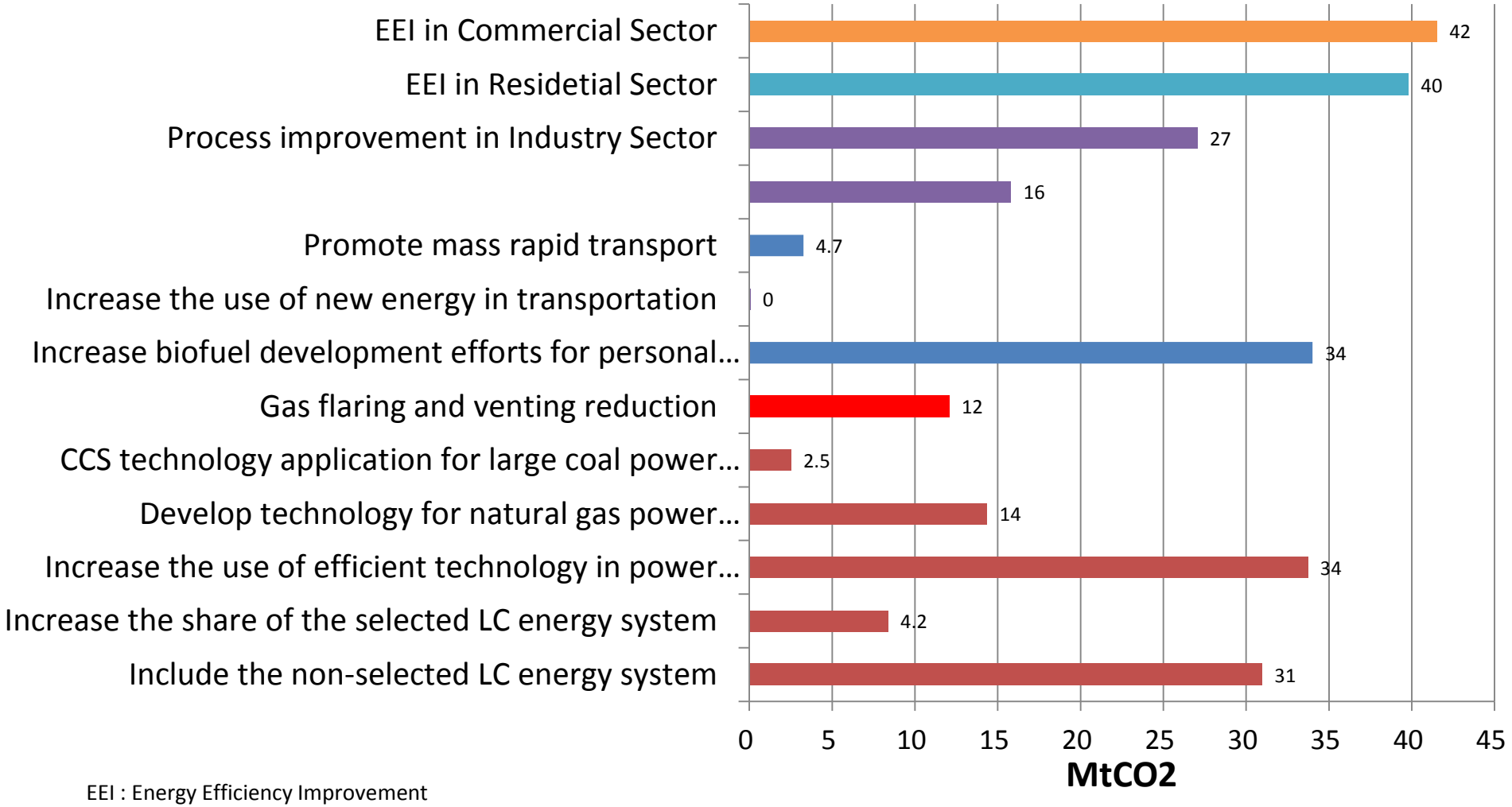
CO2 Emission



* Energy Industries include oil and gas refinery, gas flaring and LNG industries. Emission from power generation is allocated to final demand sectors.

"LEDs of Energy Sector: Preliminary Result of Asia-Pacific Integrated Modeling (AIM) exercise" 2012/June/6th, DNPI, Jakarta

Contribution of measures



EEI : Energy Efficiency Improvement
EE: Energy efficient
CCS : Carbon Capture & Storage
LC : Low Carbon

"LEDs of Energy Sector: Preliminary Result of Asia-Pacific Integrated Modeling (AIM) exercise" 2012/June/6th, DNPI, Jakarta

Japan

Japan's targets in the contexts of climate change

GHG emissions:

→-6% by 1990 compared to the 1990 level

the Kyoto Protocol

→-25% by 2020 compared to the 1990 level

-80% by 2050 compared to the 1990 level

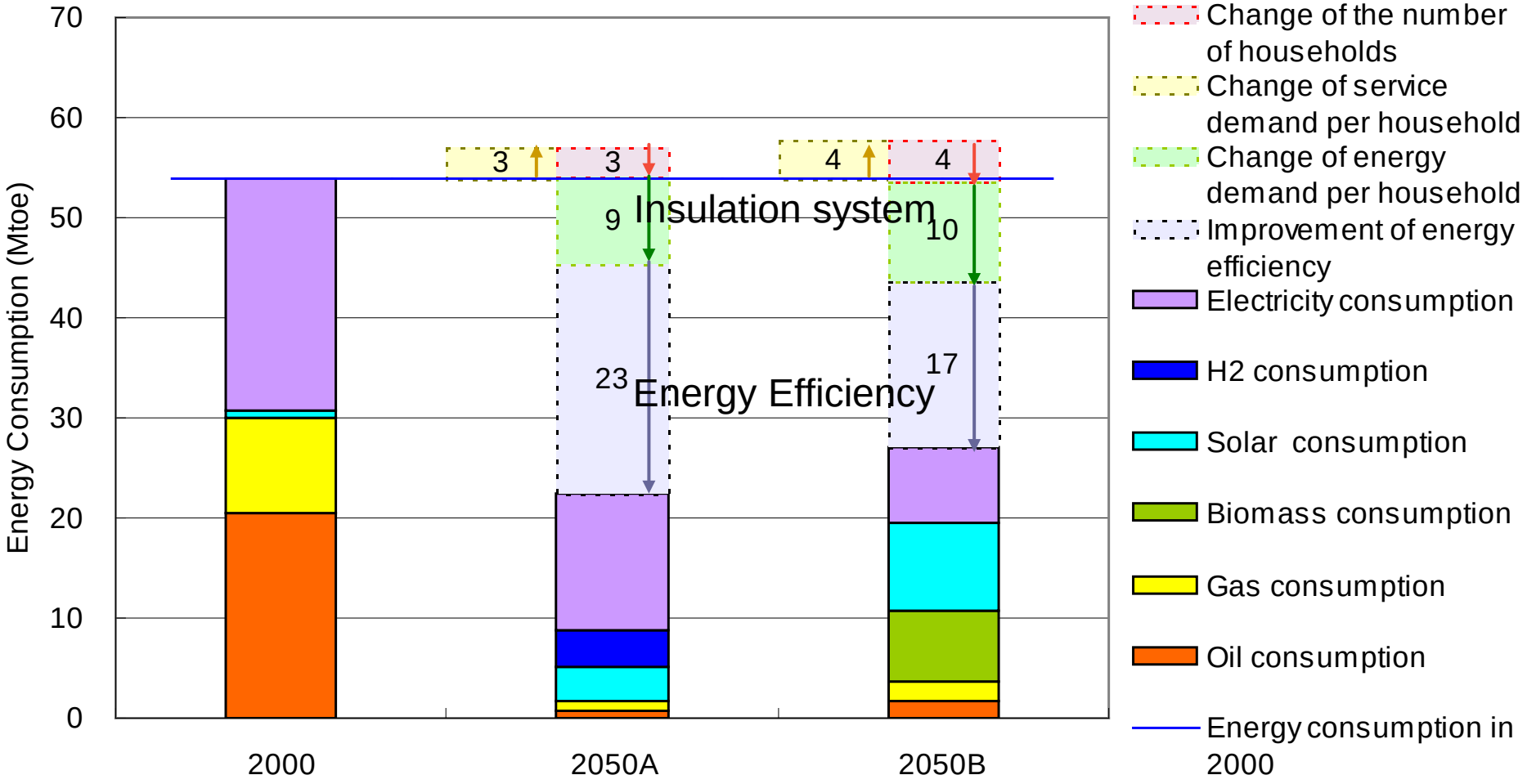
the United Nations Summit on Climate Change


地球温暖化対策に係る
中長期ロードマップ
各WGの現時点での
とりまとめ
平成22年12月21日

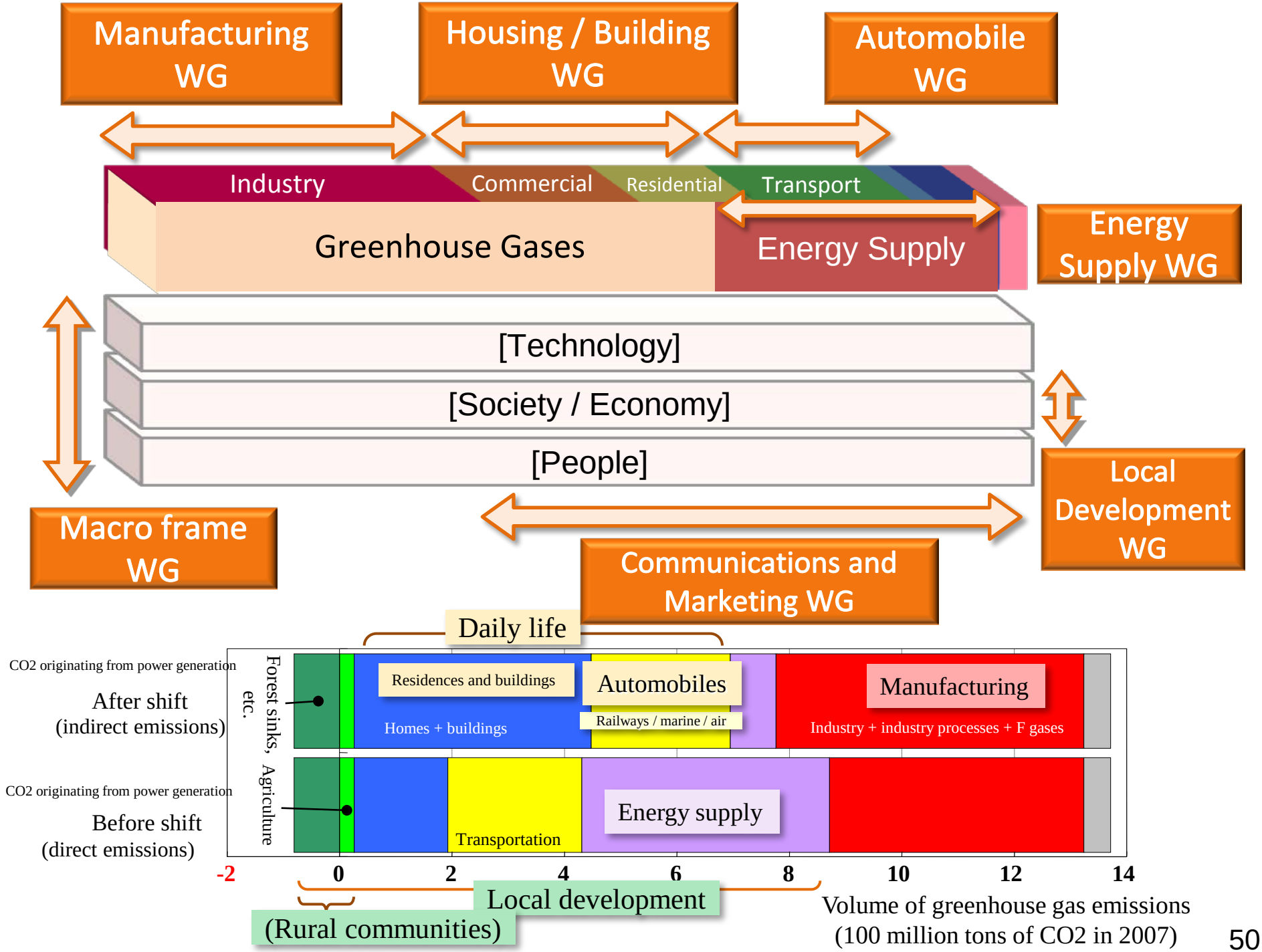
As for LCS visions, we prepared two different but likely future societies

Vision A	Vision B
Vivid, Technology-driven	Slow, Natural-oriented
Urban/Personal	Decentralized/Community
Technology breakthrough Centralized production /recycle	Self-sufficient Produce locally, consume locally
Comfortable and Convenient	Social and Cultural Values
2%/yr GDP per capita growth	1%/yr GDP per capita growth
	

Residential sector
Energy demand reduction potential: 50%

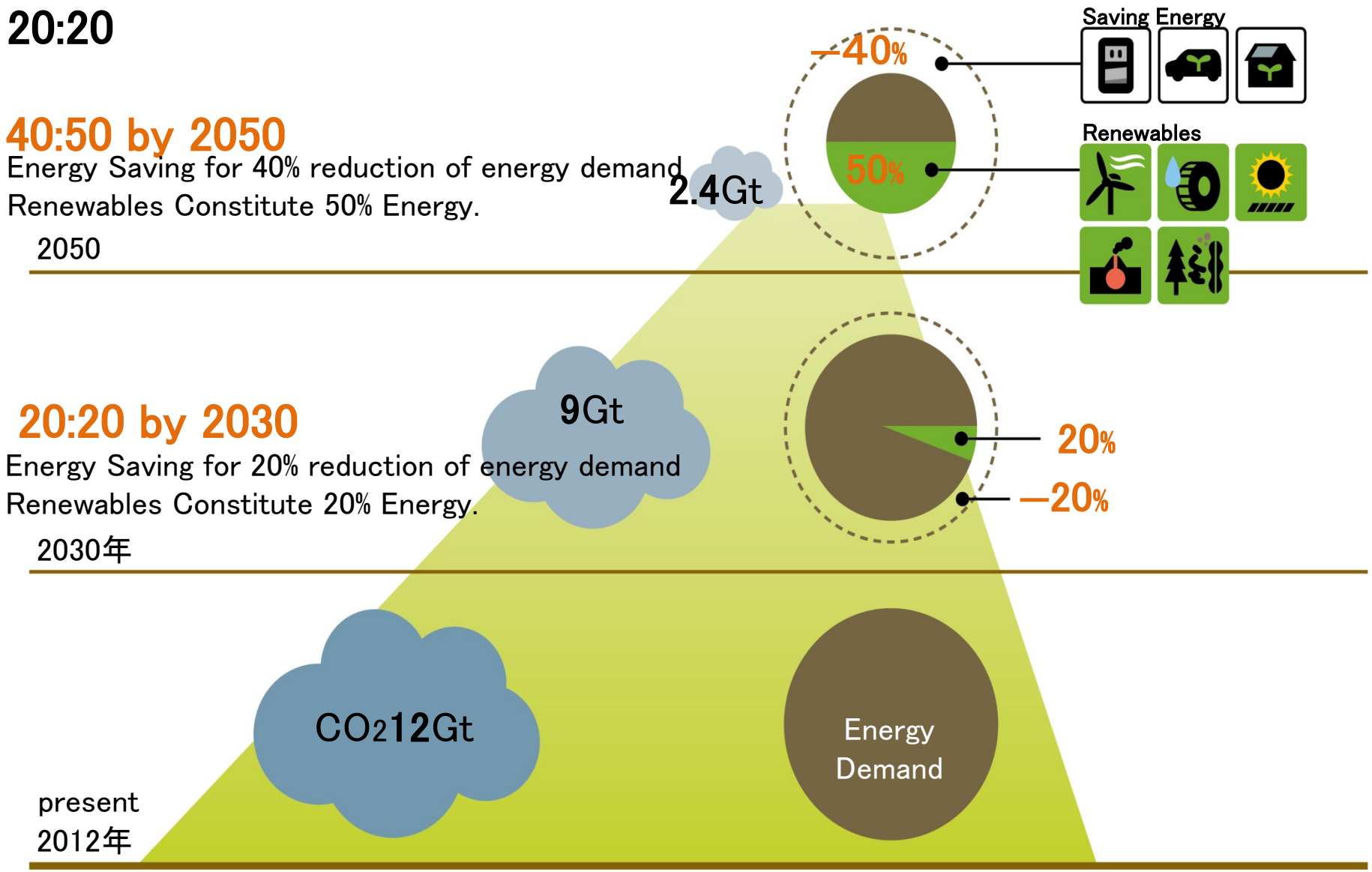


Change of the number of households: the number of households decrease both in scenario A and B
Change of service demand per household: convenient lifestyle increases service demand per household
Change of energy demand per household: high insulated dwellings, Home Energy Management System (HEMS)
Improvement of energy efficiency: air conditioner, water heater, cooking stove, lighting and standby power


Manufacturing WG
Housing / Building WG
Automobile WG
Industry
Commercial
Residential
Transport
Greenhouse Gases
Energy Supply
Energy Supply WG
[Technology]
[Society / Economy]
[People]
Macro frame WG
Local Development WG
Communications and Marketing WG
Daily life
CO2 originating from power generation
After shift
(indirect emissions)
Forest sinks, etc.
Agriculture
Residences and buildings
Homes + buildings
Automobiles
Railways / marine / air
Manufacturing
Industry + industry processes + F gases
CO2 originating from power generation
Before shift
(direct emissions)
Transportation
Energy supply
-2
0
2
4
6
8
10
12
14
Local development
(Rural communities)
Volume of greenhouse gas emissions
(100 million tons of CO2 in 2007)

Towards Low Carbon, Green Economy

Energy Saving, Renewables Reduce GHG by 80% through 40:50 & 20:20



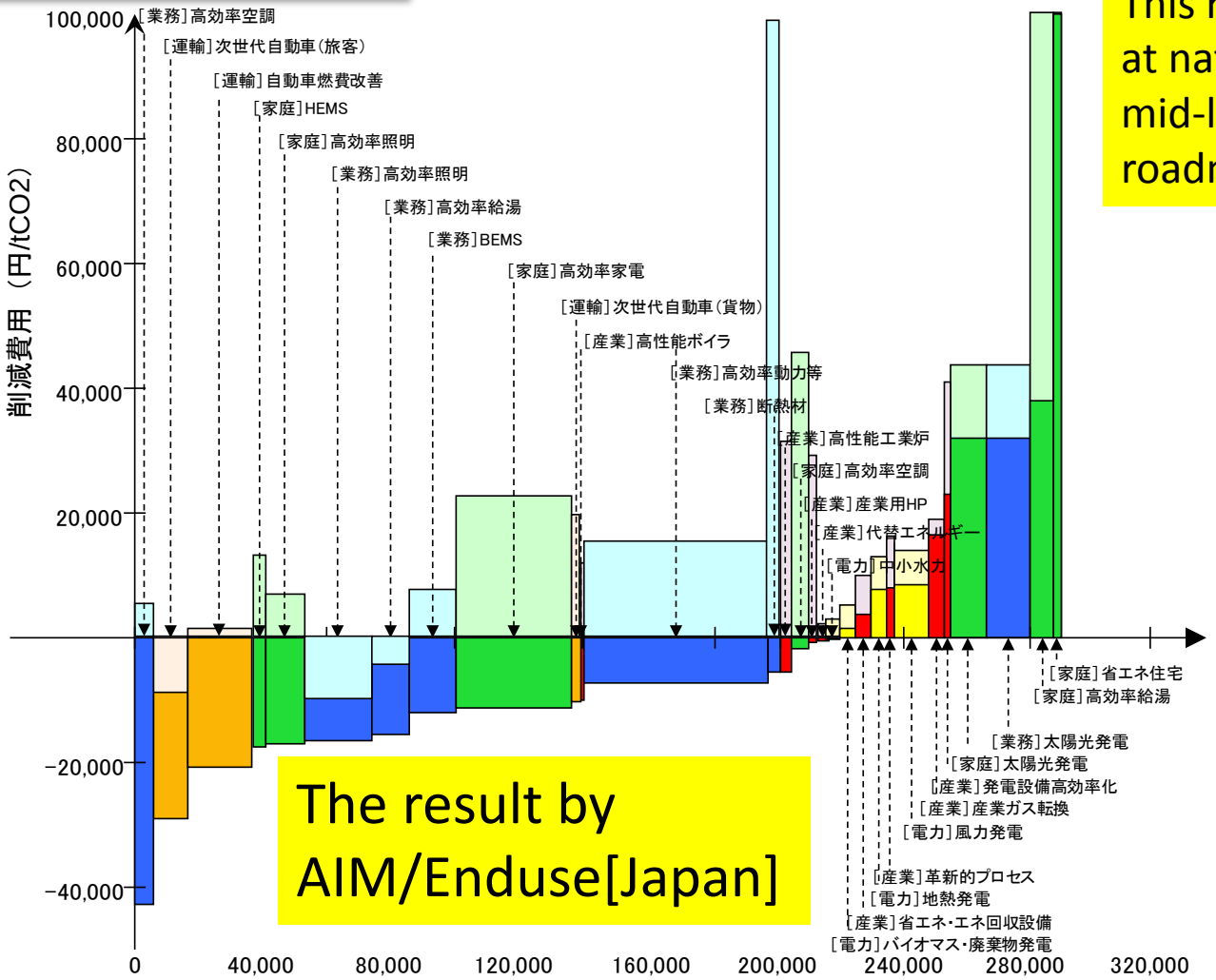
Proposed in June 2012 by Central Council of Environment, as alternatives of low carbon policy after Fukushima

Mitigation cost curve in Japan to achieve 25% GHG emissions reductions by 2020 compared with 1990 level

各主体に任せ
加味して変容

社会費用も

削減費用と削減量の関係



The result by AIM/Enduse[Japan]

This result was reported at national committee on mid-long term GHG mitigation roadmap on 21st Dec, 2010

家庭部門・投資回収年数 3年
業務部門・投資回収年数 3年
運輸部門・投資回収年数 5年
再エネ発電・投資回収年数 9年

社会的観点

産業部門・投資回収年数 12～15年
家庭部門・投資回収年数 8年（*1）
業務部門・投資回収年数 8年（*2）
運輸部門・投資回収年数 8年
再エネ発電・投資回収年数 12年

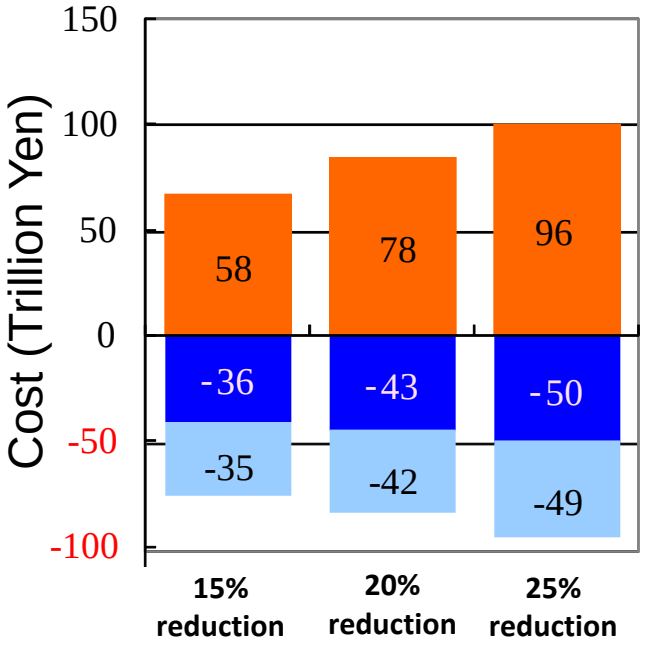
*1 住宅は17年，*2 建築物は15年

参考
- 事務所用建物 22～50年
- 鉄鋼業用設備 5～14年
- 家庭用冷暖房機器 6年
- 建物附属 冷房・暖房設備 13～15年
- 自動車　3～5年
- 汽力発電設備 15年
- その他発電設備17年

Relationship between low-carbon investment and energy reduction expense

- As for the investment amount for global warming, half of the overall investment amount will be collected by 2020 and an amount equal to the investment amount will be collected by 2030 based on energy expenses that can be saved through technologies introduced.

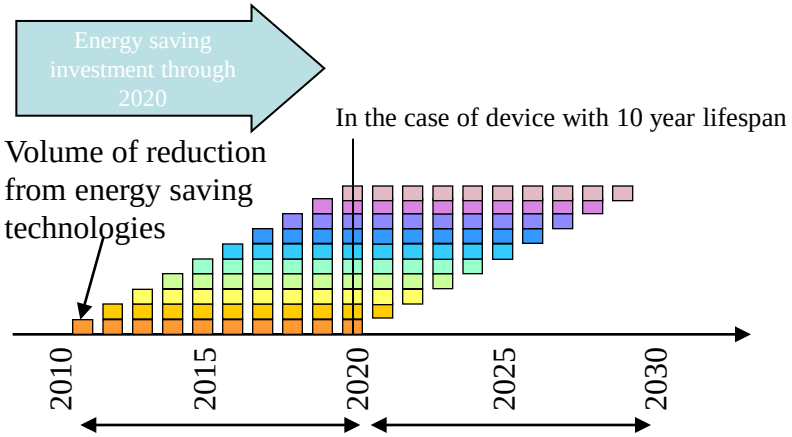
<Low-carbon investment amount and energy reduction expense>



Additional investment ('11 – '20 total)

Energy reduction expense ('11 – '20 total)

Energy reduction expense ('21 – '30 total)



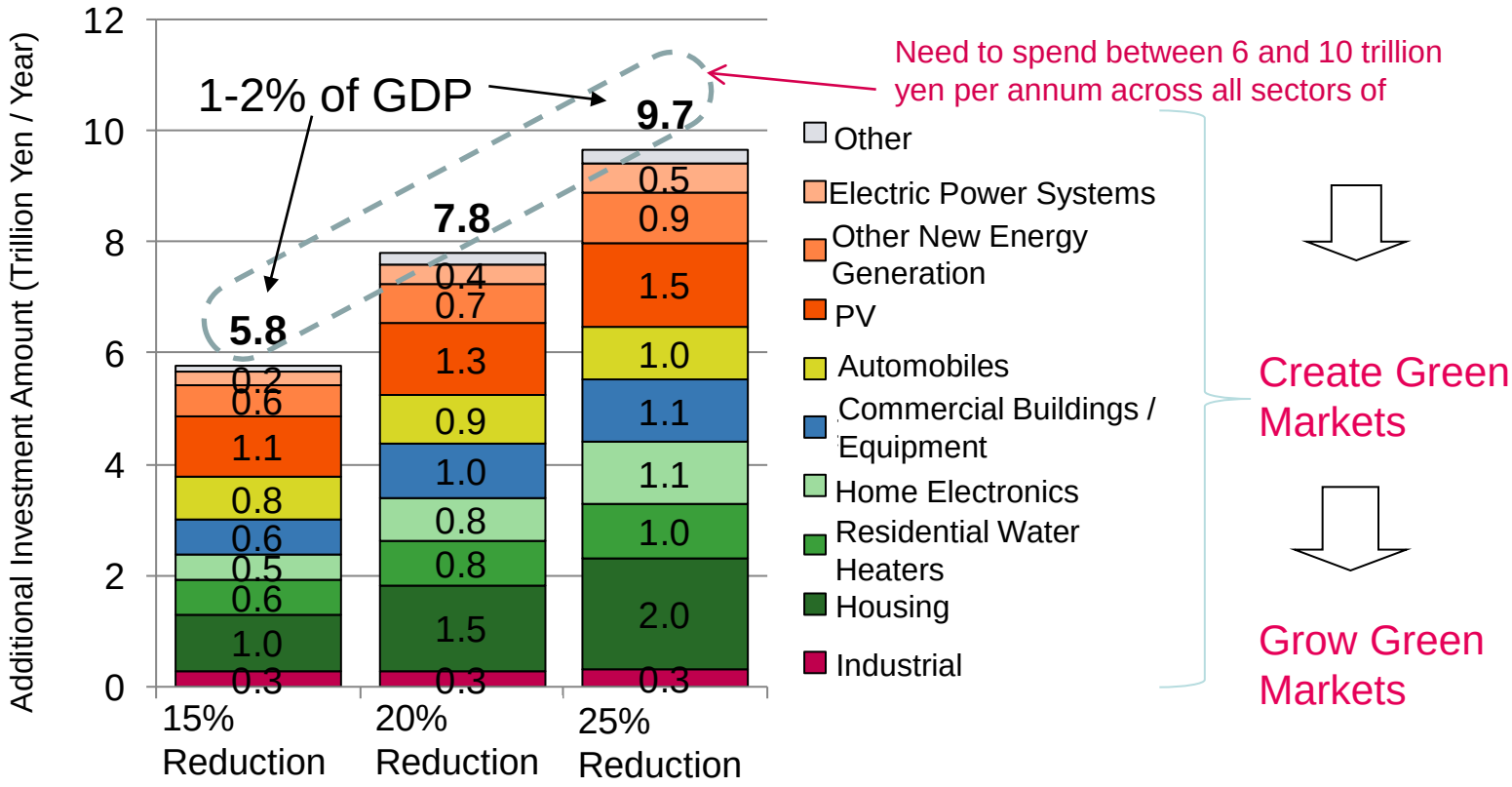
Energy reduction expense from energy saving investment = approx. 50 trillion yen (25% reduction)

Energy reduction expense from energy saving investment = approx. 49 trillion yen (25% reduction)

Huge green business opportunity accompanied by transition to low carbon society

Japan needs to invest on average 6 to 10 trillion yen per annum in additional funds to achieve a ▲15% to ▲25% by 2020. If this spending is not spread across all sectors of society, Japan will face difficulty in implementing the necessary countermeasures to achieve this target. Yet, this also means Japan will need to create new markets on par with this spending.

[Additional Investments Required to Achieve CO2 Reduction Target]

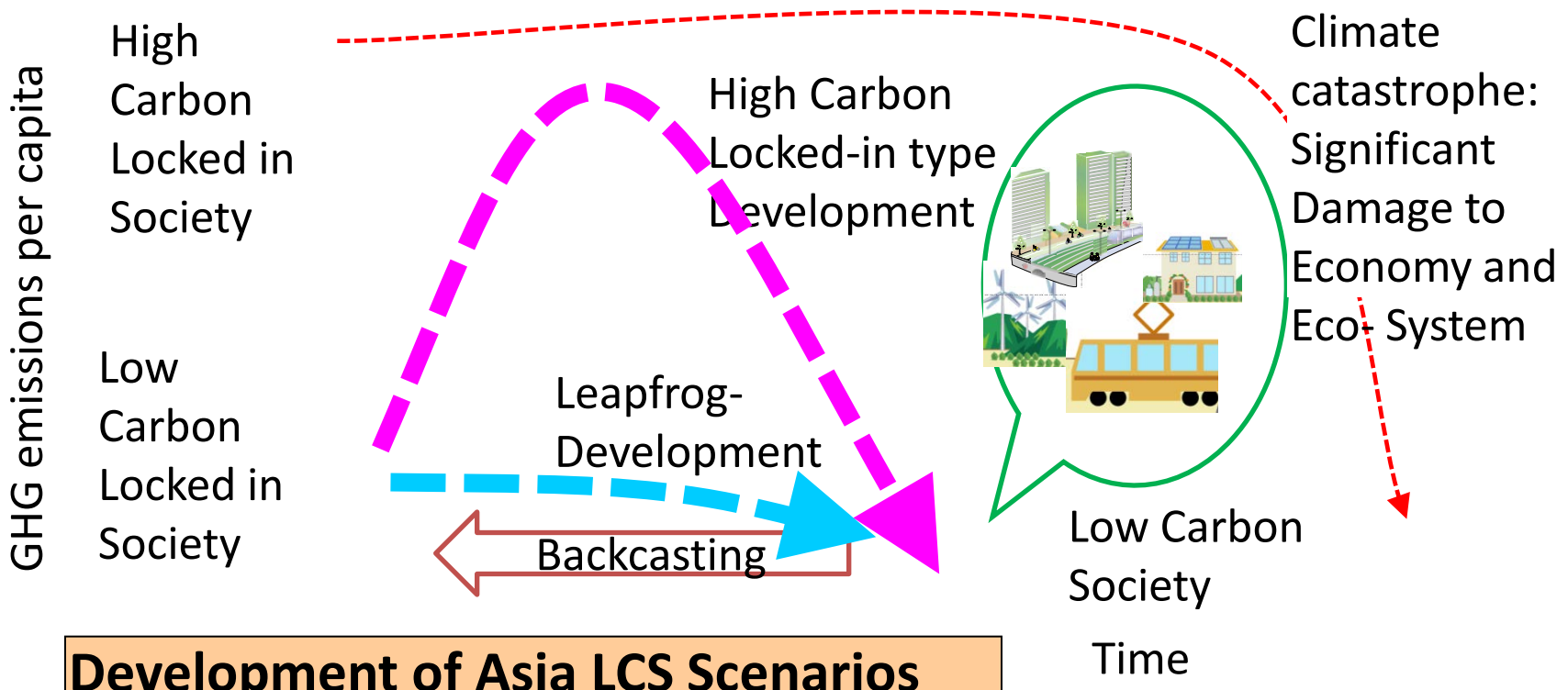


Comments from the Roadmap Subcommittee

- Japan needs to develop policies that reward consumers who chose and companies that manufacture low-carbon products.
- Japan needs to proactively move forward with investments that contribute to green innovation.

Asia

How to reach to Low Carbon Society in Asia ?



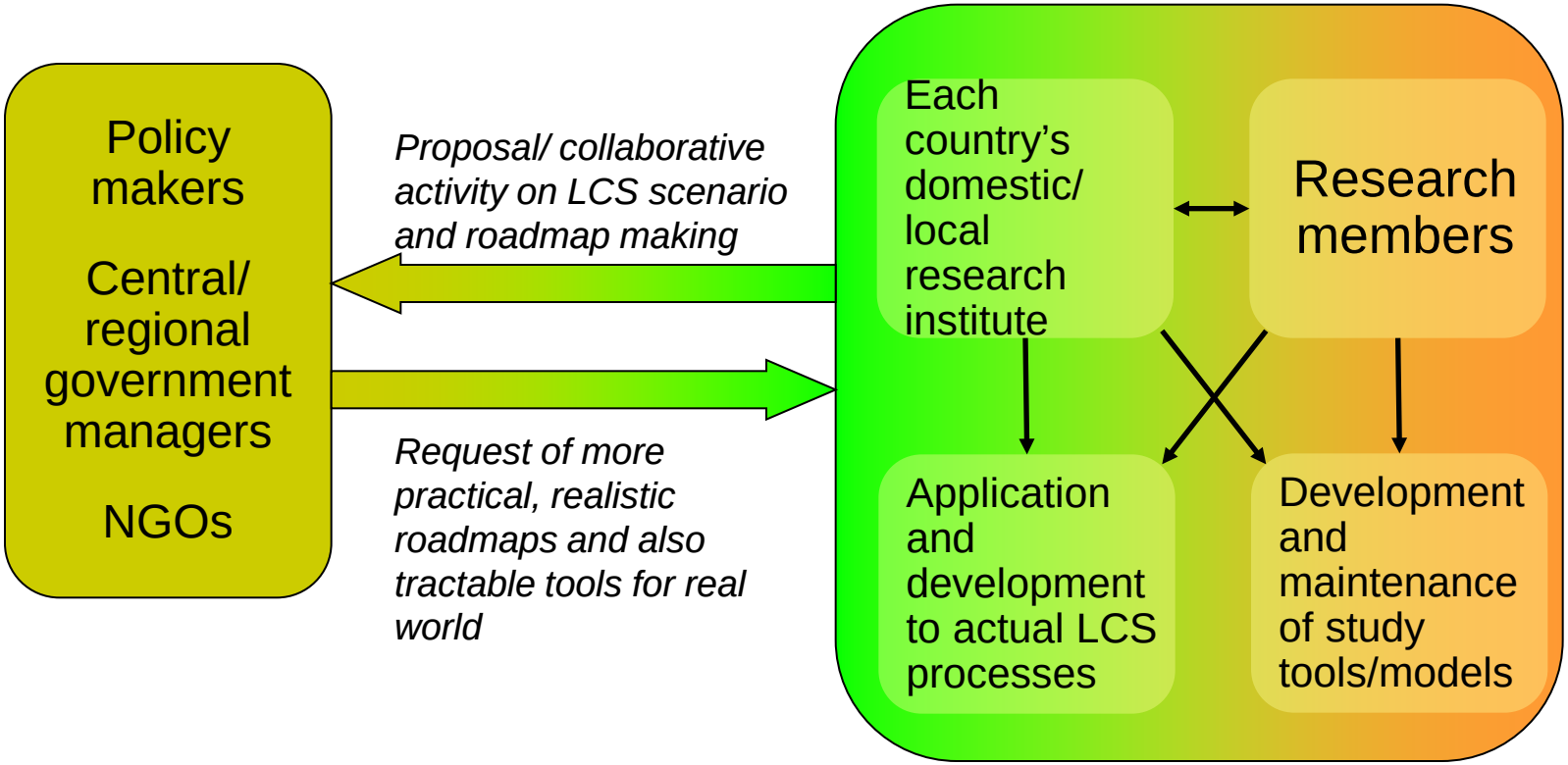
Development of Asia LCS Scenarios

(1) Depicting narrative scenarios for LCS
(2) Quantifying future LCS visions
(3) Developing robust roadmaps by backcasting

Policy Packages for Asia LCS

Funded by Ministry of Environment, Japan (GERF, S-6) and NIES

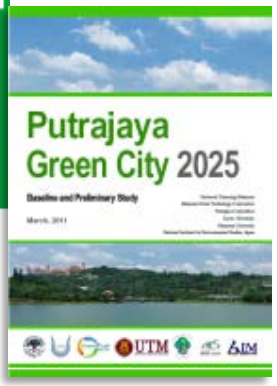
Collaborating with Asian colleagues

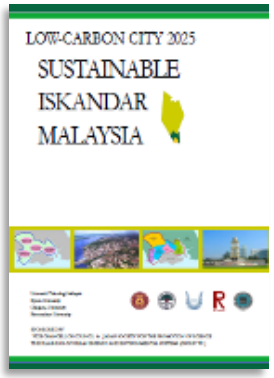


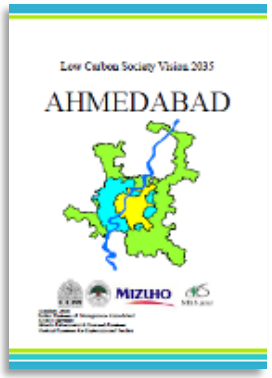
3 Establishing Low Carbon Society Scenario

On Going Low Carbon Society Research Project at Asia

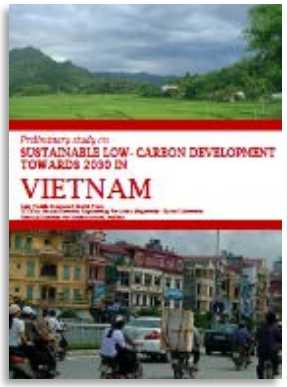
City and Region

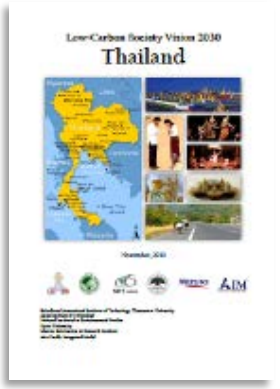






National





(Source: National Institute of Environment Studies, Japan)

LoCARNet: Low Carbon Asia research Network
Research Institutions/ researchers' network dedicating directly in LCS policy making process

LoCARNet

Mohamad Bin SA'ELAL
Malaysia

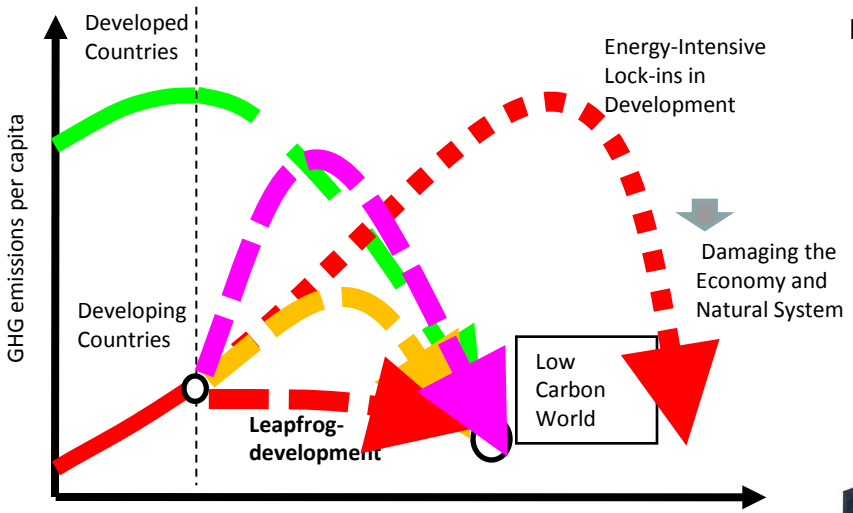
Sirintornthep TOWPRAYOON
Thailand

Rizaldi BOER
Indonesia

Ho Chin SIONG
Malaysia

Mikiko Kainuma
Japan

Bundit LIMMEECHOKCHAI
Thailand



Yutaka MATSUZAWA
Japan

Hak MAO
Cambodia

Jiang KEJUN
China

NIES JAPAN

国家发展和改革委员会能源研究所
Energy Research Institute National Development And Reform Commission

환경부 국립환경과학원

IGES

JGSEE
The Joint Graduate School of Energy and Environment

環境省
Ministry of the Environment

UTM
UNIVERSITI TEKNOLOGI MALAYSIA

ISKANDAR REGIONAL DEVELOPMENT AUTHORITY

Launching the

"Low Carbon Asia Research Network (LoCARNet)"

as a central core for providing knowledge

- LCS-RNet/IGES/NIES has been conducting workshops that promote dialogues between policy-makers and researchers in Indonesia, Thailand, Cambodia, Vietnam and Malaysia, as well as networking among researchers in this region, to encourage low-carbon growth in Asia.
- During the course of these workshops, the growing importance of research society for low-carbon growth in Asia was strongly recognized.
- Japan proposed the establishment of "Low Carbon Asia Research Network (LoCARNet)" at ASEAN+3 EMM held in October 2011 in Phnom Penh.
- The launch of the LoCARNet was declared by Minister of Environment at the "East Asia Low Carbon Growth Partnership Dialogue" held in April 2012 in Japan as an element of East Asia Knowledge Sharing Platform for Low Carbon Growth
- Organization in process now

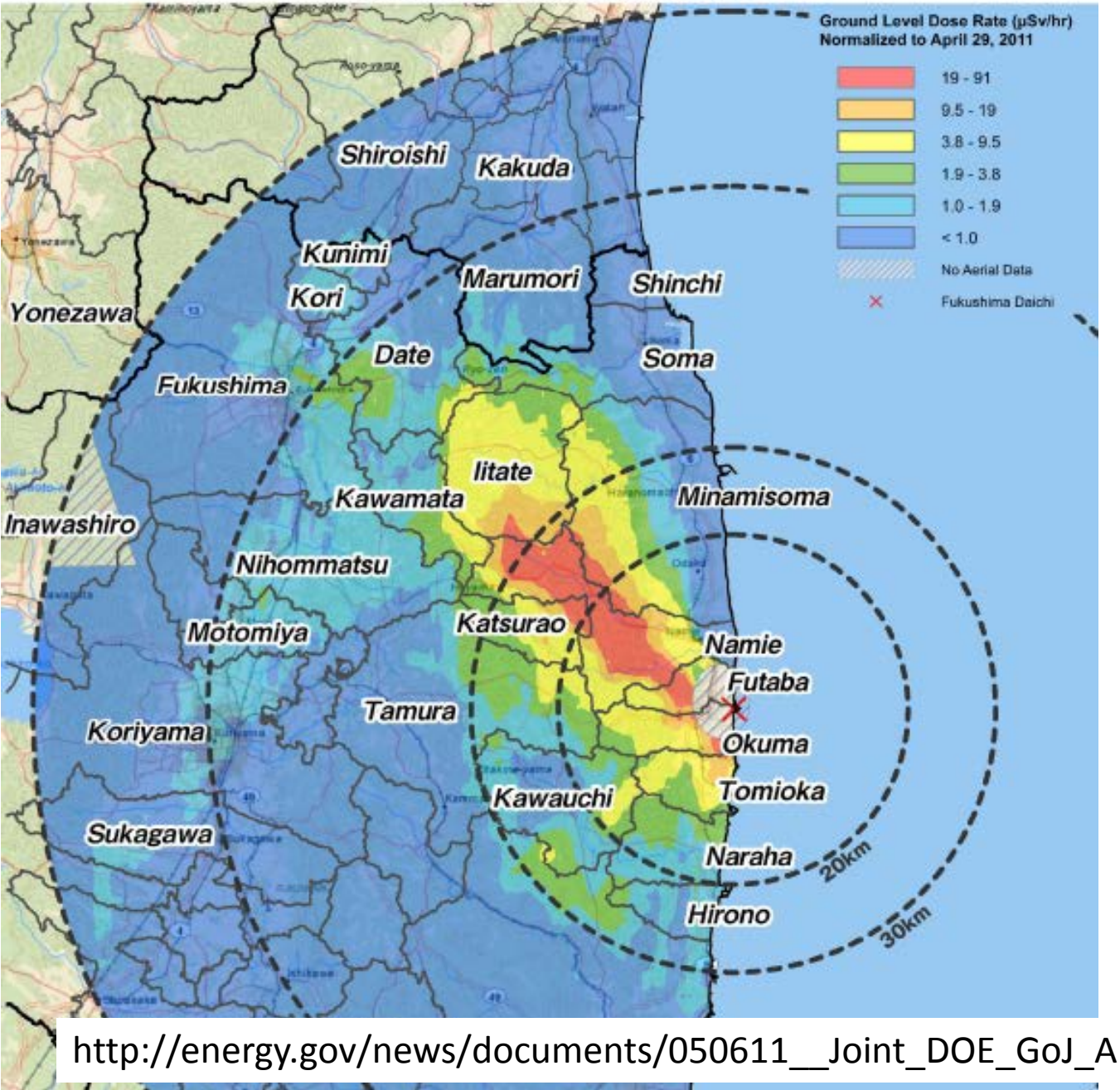
Why we need network?

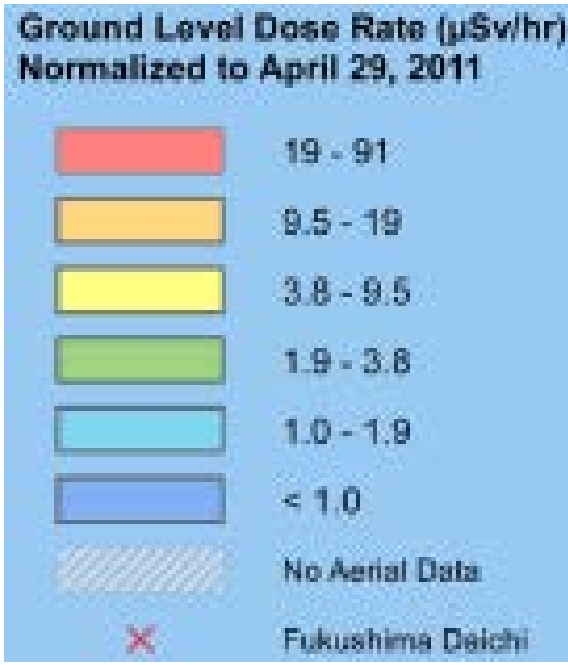
- Urgent needs of science-based climate policy
- Necessity of integration of knowledge
  ⇒organization of research community
- Communication between research and policy
  ⇒Dialogue and participation
- Specific and common research fields in the region
  ⇒S-S co-operation
- Still, lack of local capacity and ownership of knowledge

Fukushima

Aerial Measuring Results

Joint US / Japan Survey Data





Disaster Wind

http://energy.gov/news/documents/050611__Joint_DOE_GoJ_AMS_Data_v3.pptx

Blessing Wind

What I have learned from 311

- Fukushima/Tohoku:
  - Always behind from so-called “development”
    send human resources, food, energy to Tokyo
  - Enrichment of humanity/nature, but…
- Huge challenges on local management
  - Importance of mayor’s leadership at urgency
  - Lack of “City Continuity Plan”
  - Lack of self-independent policy making capacity and financing mechanism (too much subsidized…)

Towards “Future City”
=> to be self-sufficient city

Respond to “Inevitable” necessity

1) Setting goals

Develop urban system design based on locality such as history, culture and environment

2) Roadmaps

Apply the latest knowledge + Create open space with local consultant and global pro bono support

3) Ownership

Local leaders’ initiative + local capacity development

=> And to be inspiring city

Yes!

GIO + AIM

=

MRV + NAMAs!!!

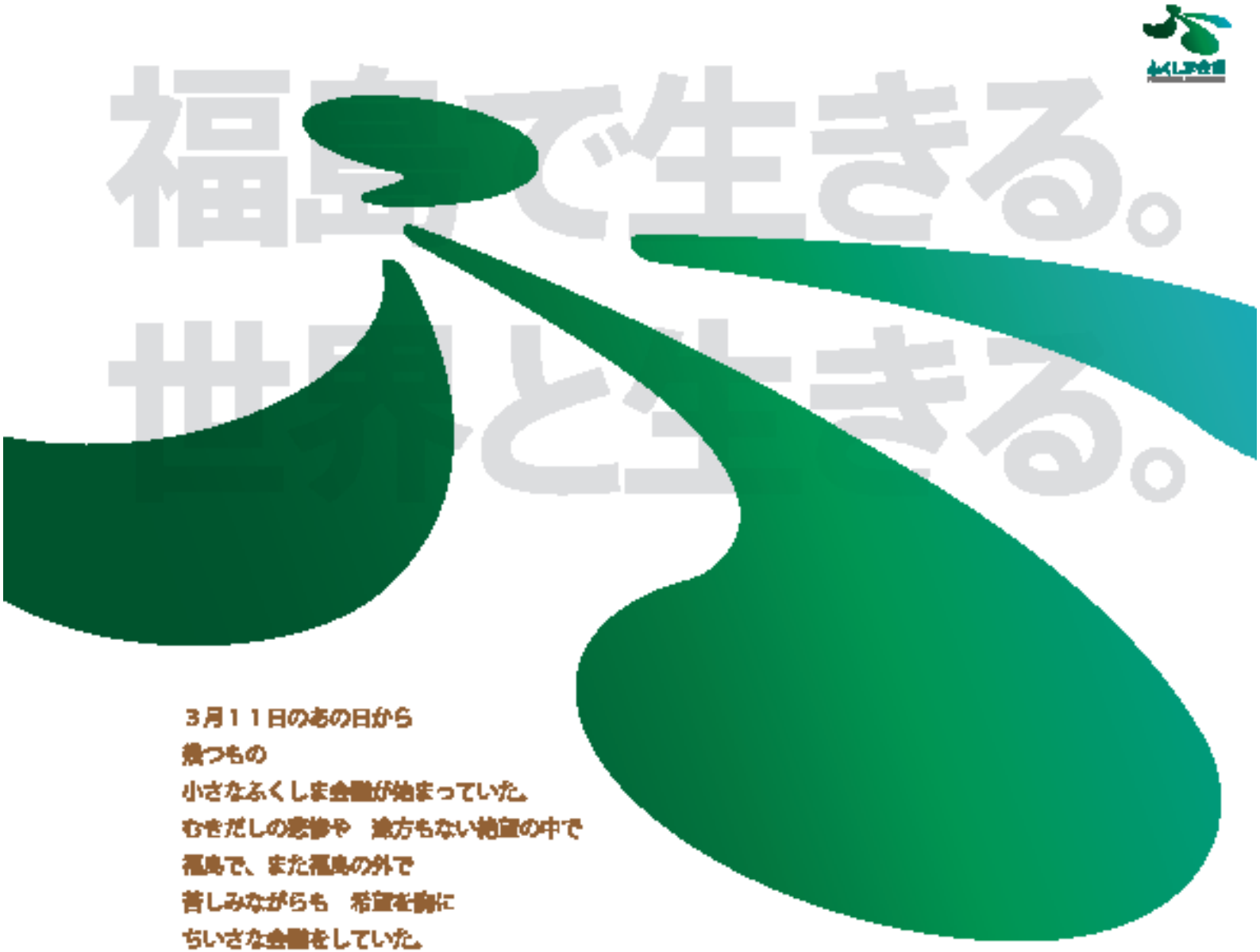
Sustainable Low-Carbon Asia comes from design and co-working…

Let’s work together!

Asia LCS

藤野　純一

Junichi Fujino



3月11日のあの日から
幾つもの
小さなふくしま会議が始まっていた。
むきだしの悲惨や　途方もない絶望の中で
福島で、また福島の外で
苦しみながらも　希望を胸に
ちいさな会議をしていた。
ふくしま会議をしよう…
いつしかそれが合い言葉になって

Fukushima Conference 2012 will be held on 10th(Sat) and 11th(Sun) November in Fukushima