Japan's INDC and International Cooperation for Low Carbon Society through SATREPS

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Low Carbon Asia Research Network (LoCARNet) 4th Annual Meeting
International Conference of Low Carbon Asia
Stabilizing climate through low carbon actions in Asia
- Road to COP21 and beyond -

Double Tree Hotel, Johor Bahru, Malaysia
October 11-13, 2015

Reference Documents for Japan's INDC

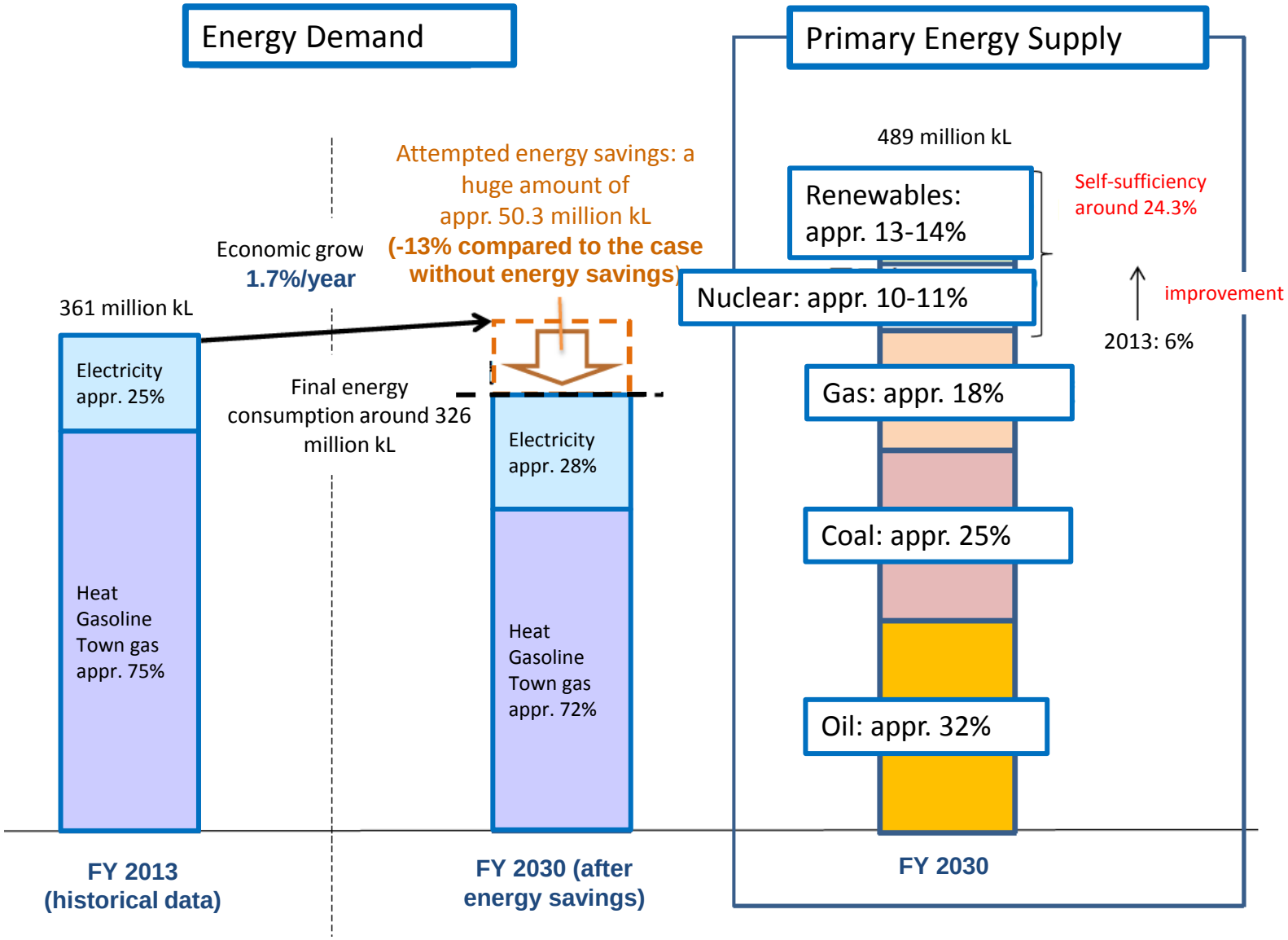
1）Systems Analysis Group, RITE：Assessment of Japan's Energy Mix and INDCs
Homepage of RITE http://www.rite.or.jp (posted on August 18, 2015)

2）Kenji Yamaji: How ambitious is the GHG reduction Target of Japan?
ICEF (Innovation for Cool Earth Forum) Report (posted on August 7, 2015)
http://www.icef-forum.org/platform/article_detail.php?article_id=47

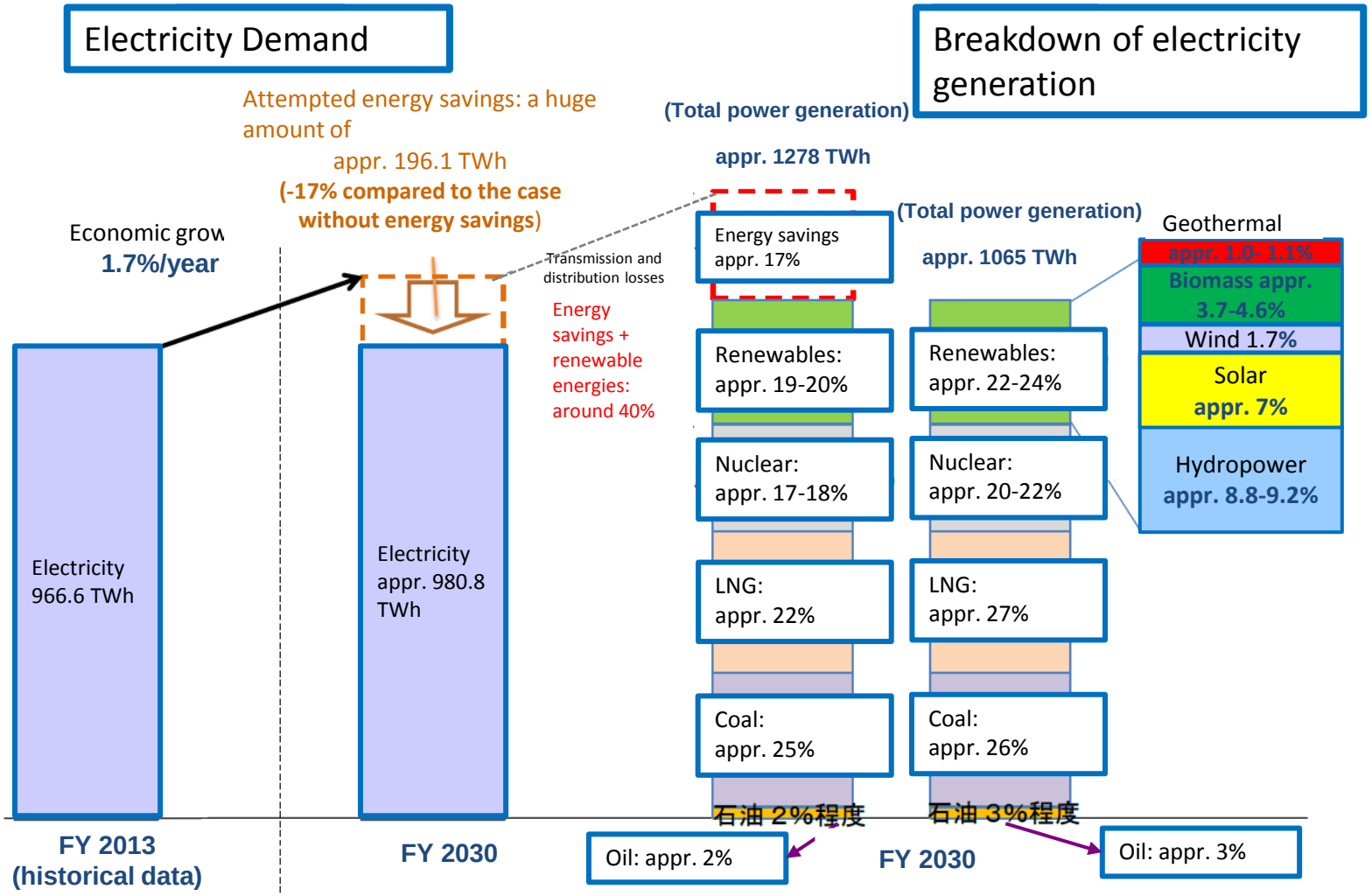
Following slides are excerpted from "Assessment of Japan's Energy Mix and INDCs " posted on RITE homepage:
http://www.rite.or.jp/Japanese/labo/sysken/about-global-warming/download-data/E-Energymix_INDCs_20150818.pdf

The energy mix and INDCs proposed by the Government

The drafted energy mix for 2030



The drafted energy mix in 2030 – the composition of the power generation mix



In the standard case without energy savings, the GDP elasticity of electricity demand is 0.68. This elasticity is consistent with the one assessed in the RITE analysis, which is around 0.8 for the 2013-2020 period, and 0.6 for 2020-2030, and also consistent with that of the 'Current Policies' scenario in IEA WEO2014. As a result, the estimate by the government seems a reasonable one. However, in the energy savings case, a significant reduction of electricity demand (17%) is assumed (the elasticity then being 0.05), this point will be further examined in our analysis.

Japanese government's proposition for INDCs (2030)

Since GHG emissions are strongly dependent on energy mix issues, policy making and technology development for post-2020 targets need to take careful consideration of technical constraints and costs in order to set achievable goals. Based on this, the Japanese INDCs commit to reduce emission levels in 2030 by 26% compared to 2013 (which corresponds to 25.4% compared to 2005), including national emissions reduction and absorption (GHG emissions in 2030 would be about 1,042 million tCO_2 in total).

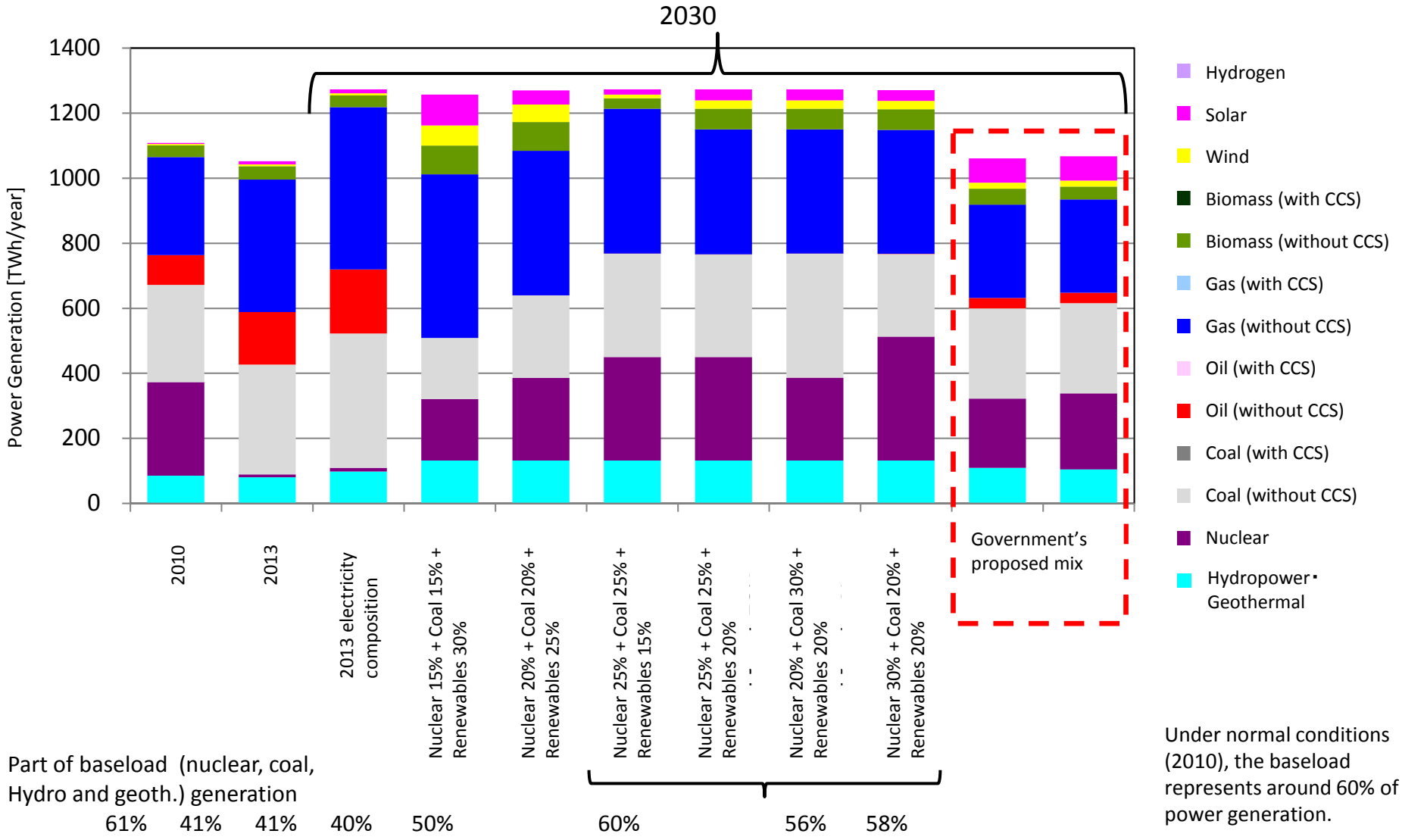
	Compared to 2013 (compared to 2005)
Energy-related CO2	-21.9% (-20.9%)
Other GHGs	-1.5% (-1.8%)
Reduction by absorption (LULUCF)	-2.6% (-2.6%)
Total GHGs	-26.0% (-25.4%)

Comparison of RITE's analysis results* and government's proposition

*** published on the RITE website on March 31 and April 14, 2014**

Power Generation in 2030

(Estimates by using DNE21+ model under the carbon prices of WEO2014 New Policies Scenario* and the Government's drafted mix)



Part of baseload (nuclear, coal, Hydro and geoth.) generation

61% 41% 41% 40% 50% 60% 56% 58%

Under normal conditions (2010), the baseload represents around 60% of power generation.

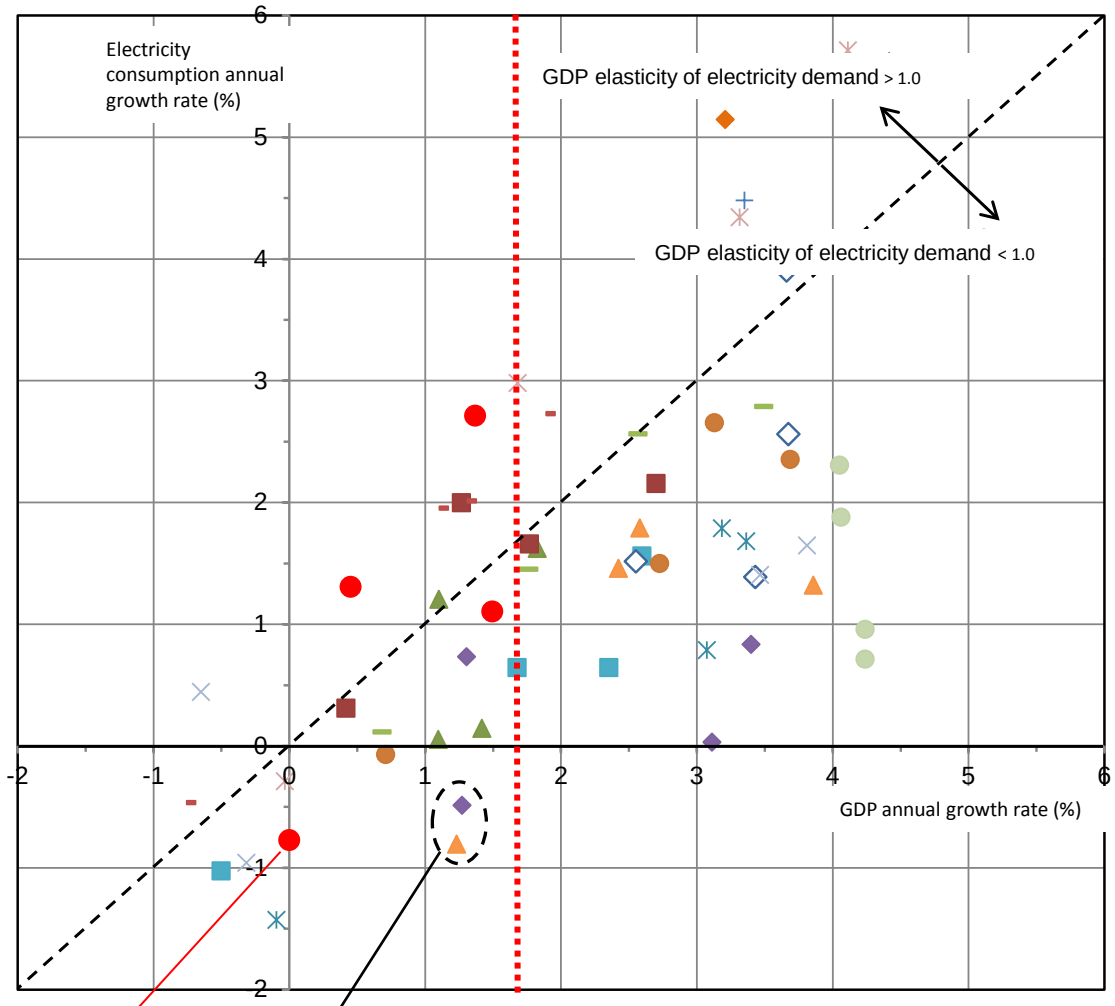
* Carbon price of 37 $/tCO2 (in 2013 price) for the WEO2014 New Policies Scenario (which corresponds to 23$/tCO2 (in 2000 price)) was assumed.

Assessment of electricity demand assumptions

Assessment of electricity demand outlook

- As we indicated, in the government's proposition, despite a high GDP growth rate (1.7%/year) projection, the power generation after GHG reduction measures is anticipated to increase rather modestly. Here are the results of a more detailed analysis conducted in order to assess the government's anticipations.
- First, we checked the relationship between GDP change and electricity demand variation (GDP elasticity of electricity demand) in the government's proposition against past values of electricity elasticity in OECD countries.
- Second, we took a look at past occurrences of high increases of electricity costs in major European countries (Germany, Italy, UK) and the cost increase effects on electricity demand.
- Last, we used past research by Prof. Nomura et al. (Keio University) that analyzed how the electricity cost increase in Germany and Italy affected the industry and related sectors' growth.

GDP elasticity of electricity demand for OECD countries (5-year average)



Electricity elasticity > 1.0

- Japan
- Germany
- France
- Italy
- United Kingdom
- Netherlands
- Denmark
- Sweden
- Spain
- United States
- Canada
- Australia
- Korea
- Hungary
- Poland
- Turkey

Variation rate on a 5-year span for 4 periods :

(1990-92)～(1995-97)
(1995-97)～(2000-02)
(2000-02)～(2005-07)
(2005-07)～(2010-12)

(We take 3-year averages in order to avoid singularities that may be caused by particular circumstances at one time point, such as natural catastrophy or financial crisis)

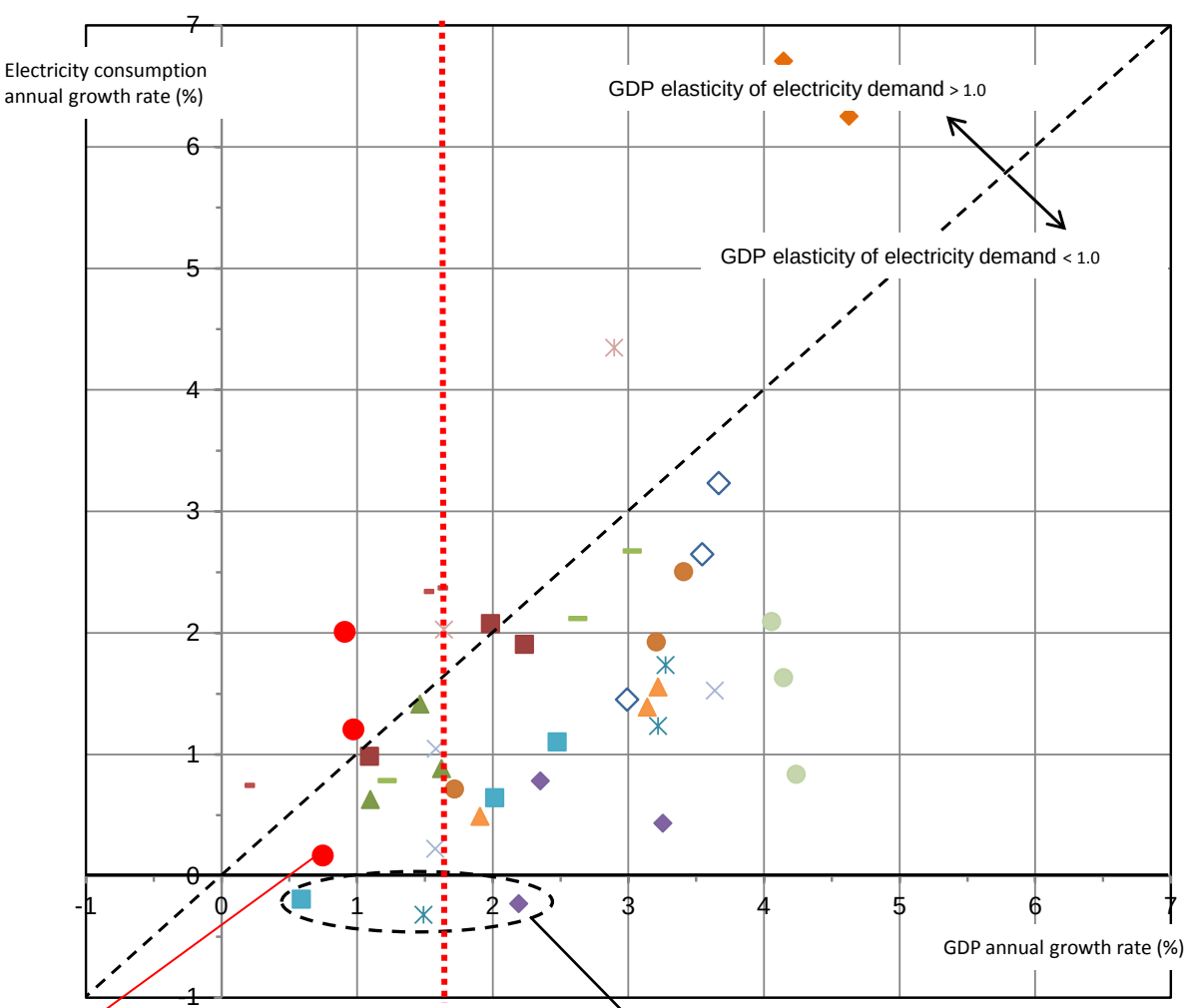
Effect of the Great Earthquake on electricity supply

Cases of negative elasticity are very rare

Government's energy mix GDP's assumed level(1.7%)

GDP elasticity of electricity demand is a little less than 1.0 in most OECD countries

GDP elasticity of electricity demand for OECD countries (10-year average)



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- United States
- Canada
- Australia
- Korea
- Hungary
- Poland
- Turkey

Variation rate on a 10-year span for 3 periods

(1990-92)～(2000-02)
(1995-97)～(2005-07)
(2000-02)～(2010-12)

(We take 3-year averages in order to avoid data distortion that may be caused by singularity at one time point, such as natural disaster or financial crisis)

Effect of the Great Earthquake on electricity supply

Government's energy mix GDP's assumed level(1.7%)

Cases of negative elasticity are very rare

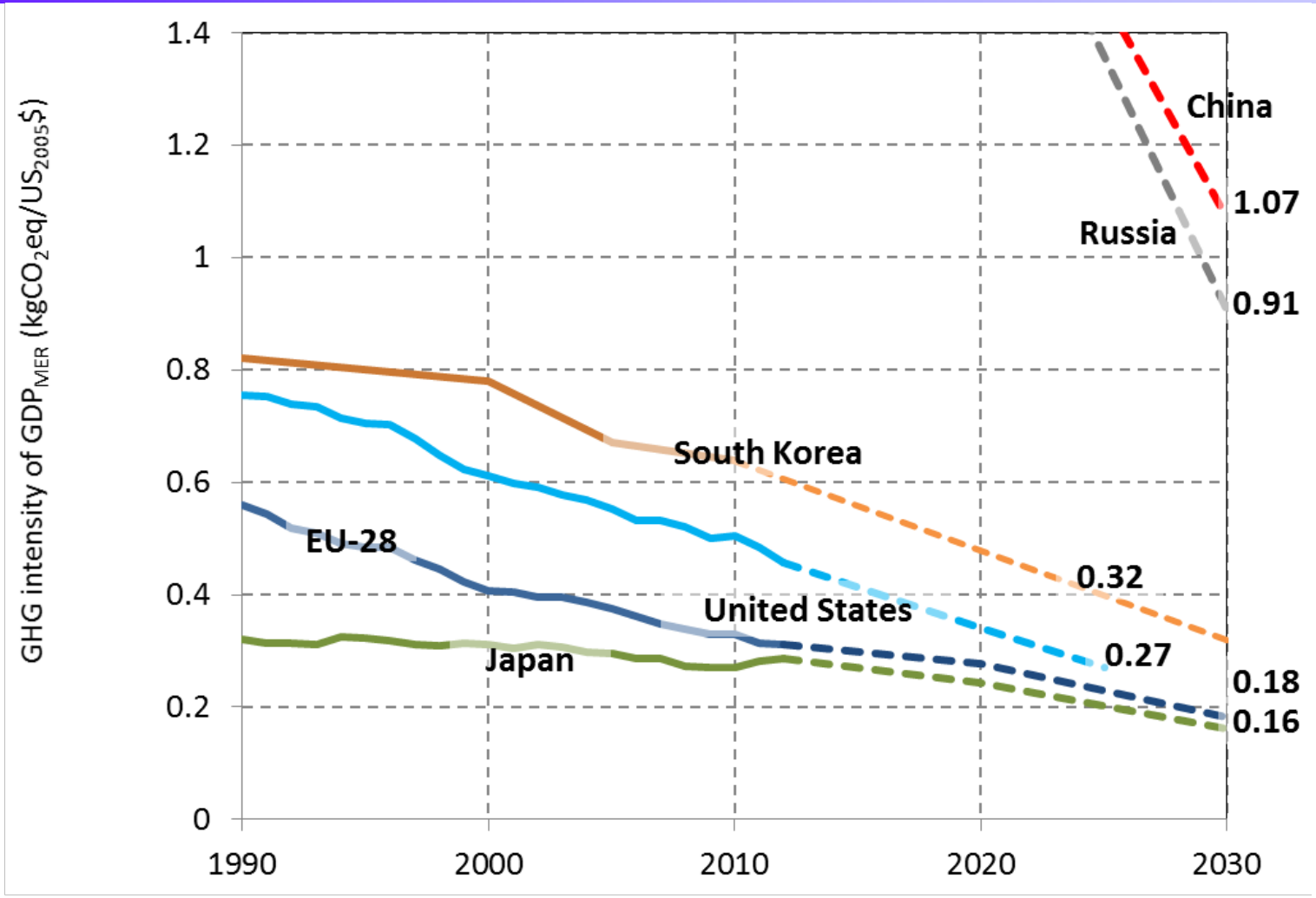
Assessment of INDCs (emissions reduction targets for 2030) –Focus on international fairness and ambition level–

Emissions reduction rate from base year of INDCs for Japan and other major countries

	Emissions reduction rate from base year		
	From 1990	From 2005	From 2013
Japan：in 2030, -26% from 2013 levels	-18.0%	-25.4%	**-26.0%**
US： in 2025, about -26 to -28% from 2005 levels	-14 to -16%	**-26 to -28%**	-18 to -21%
EU28： in 2030, -40% from 1990 levels	**-40%**	-35%	-24%
Russia： in 2030, -25% to -30% from 1990 levels	**-25 to -30%**	+10 to +18%	—
China： in 2030, -60% to -65% of CO_2 intensity from 2005 levels	+329 to +379%	+105 to +129%	—

If we take 2013 as the base year, the Japanese targets are more ambitious in the emissions reduction rate than the US or European ones.

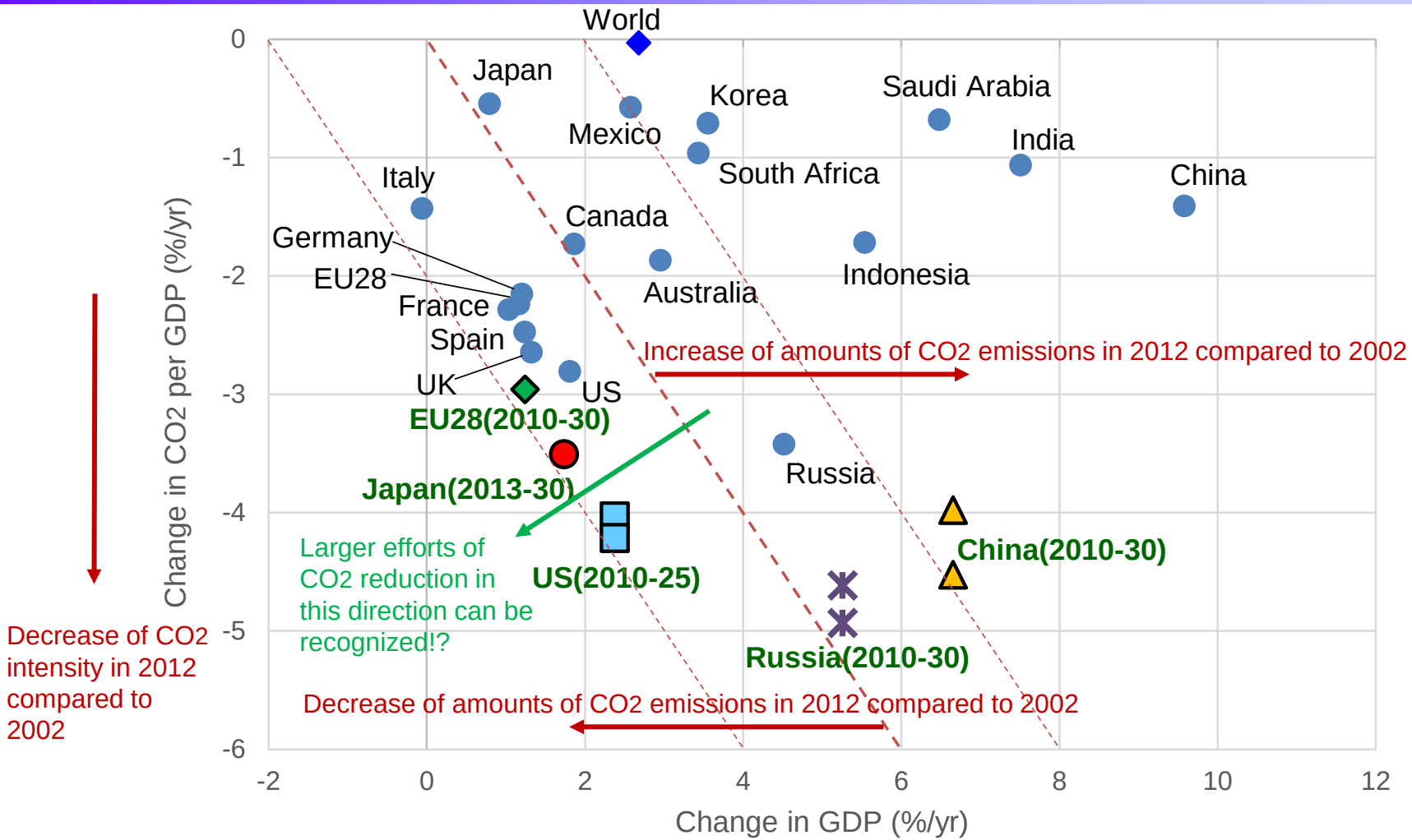
GHG intensity of GDP (MER)



Note) The lower range of emission targets are shown for the countries submitting their INDCs with ranges.

Even from the GHG intensity, the Japan's INDC sets a more demanding target than the US or the EU.

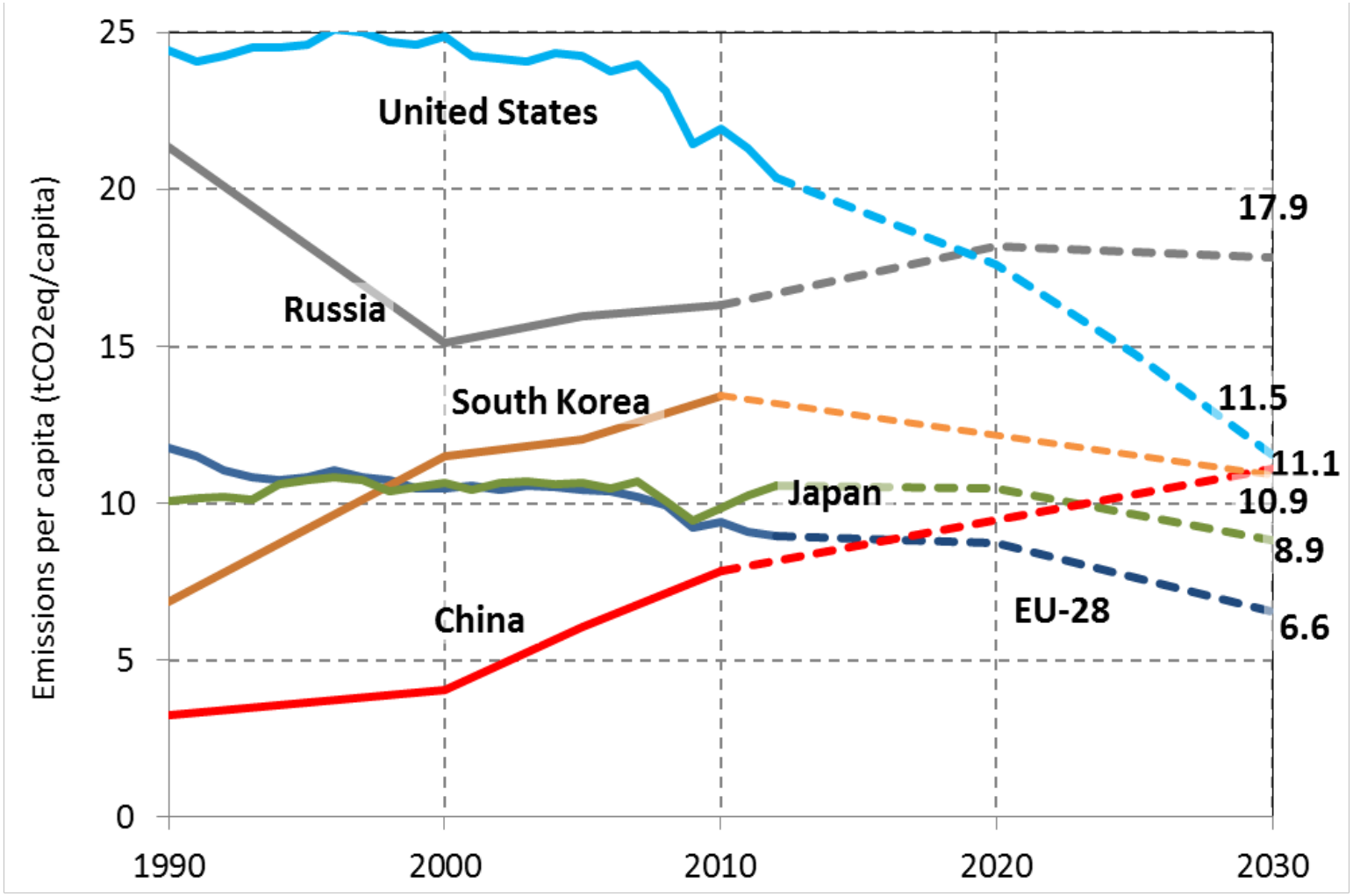
Changes in GDP and CO_2 intensity
–Records for the 10-year period from 2002 to 2012 and INDCs–



Note 1: The CO_2 intensity in 2012 for Japan was strongly impacted by the shut down of all nuclear reactors.
Note 2: The assumed CO_2 intensity improvement of China is 62-66% compared to 2005, which is nearly consistent with the official INDCs of China submitted to the UNFCCC on June 30, 2015 (60-65% improvement compared to 2005).

Even based on the relationship between GDP growth rate and emissions intensity changes, the Japanese INDCs appear as ambitious emissions reduction targets.

GHG emissions per capita



Note) The lower range of emission targets are shown for the countries submitting their INDCs with ranges.

CO_2 marginal abatement costs for the INDCs of Japan and other major countries (RITE DNE21+ estimate)

	Marginal abatement cost ($/tCO2eq)	
	Low case	High case
Japan: in 2030, -26% from 2013 levels	**About 380** (for the target of energy-related CO2 only, the estimate is about 260)	
US: in 2025, about -26 to -28% from 2005 levels	**60**	**69**
EU28: in 2030, -40% from 1990 levels	**166**	
Russia: in 2030, -25% to 30% from 1990 levels	**0**	**6**
China: in 2030, -60% to -65% of CO_2 intensity from 2005 levels	**～0**	**～0**

Note 1: All the costs do not consider LULUCF measures.
Note 2: The assumed CO2 intensity improvement of China is 62-66% compared to 2005, which is nearly consistent with the official INDCs of China submitted to the UNFCCC on June 30, 2015 (60-65% improvement compared to 2005).

The marginal abatement cost for the Japan's INDCs is estimated to be substantially higher than in other countries, because high energy savings are expected in the INDCs despite of good performances in energy efficiency in Japan (see References).

Conclusions for Japan's INDC

Conclusions (1/2)

- Considering the need to answer in a balanced way to the national energy polycy goals known as the 3E+S, namely: controlling electricity costs, reducing CO2 emissions, ensuring energy security and stability of supply, the government's proposition for the energy mix is generally assessed as appropriate.
- However, the government's energy outlook anticipates a GDP growth of 1.7% per year, and simulteanously, a growth of electricity demand of 0.1% only (the GDP elasticity: 0.05). The electricity in Japan is estimated close to 1.0 if we set aside the time right after the Great Earthquake when electricity savings were endeavored at all costs; since many OECD countries have an elasticity between 0.5 and 1.0, the government projection is small compared to historical records.
- Even among countries where the GDP elasticity seems low, in many of them electricity demand is constrained through the effects of rising electricity costs on prices. On the other hand, in many countries where we observe a low price elasticity, keeping the demand in control requires considerably high electricity prices.
- In the government's outlook for long-term energy demand, the basic policy intends to "decrease prices under current levels". According to the above-mentioned facts, given the strong correlation between GDP and potential electricity demand, decreasing electricity demand substantially thourgh electricity savings while "decreasing prices under current levels" – even a little – is a challenge which has not yet been addressed anywhere in the world.

Conclusions (2/2)

- As for GHG emissions targets, the comparison of the INDCs of major countries through several indicators leads to high evaluation of Japan's INDCs. However, since these ambitious targets are based on high expectations from the energy savings policy (corresponding marginal abatement costs in Japan are exceedingly high compared to other countries), it will not be easy to achieve such ambitious target. The international competition in the industry is also a concern.
- Regarding long-term targets (the "2°C" target), the range for emission pathways to achieve the 2°C target is very wide; the INDCs are likely to be on the track of the pathways of 2°C target if more than 50% achievability for the target is adopted and the median value of equilibrium climate sensitivity is 2.5 °C. (The climate sensitivity was changed from 2.0-4.5°C in the IPCC AR4 to 1.5-4.5°C in the IPCC WG1 AR5.)
- Moreover, we evaluated the burden sharing of emissions reduction costs between 2030 and 2050 in Japanese target: for now, the long-term target consists in cutting emissions by half compared to 2005. The Japanese intergenerational emissions reduction efforts for 2030 and 2050 in terms of the ratio of emission reduction costs to GDP are estimated to be roughly the same and rather than passing the costs to future generations, they offer a really good intergenerational balance of burden sharing.

Japan's GHG emission reduction target is set as the sum of domestic emission reductions and removals,

But, It is also mentioned in Japan's INDC that Japan will also actively contribute internationally towards human resource development and the promotion of development and diffusion of technologies related to emission reductions in developing countries.

SATREPS For the Earth, For the Next Generation

= Science and Technology Research Partnership
For Sustainable Development

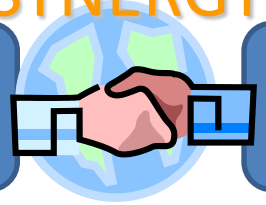
SYNERGY

Creation of SATREPS

Created by the strong policy directive from
the Council for the Science and Technology Policy (CSTP)
chaired by the Prime Minister

SYNERGY

Utilization of S&T
for diplomatic purposes



Utilization of diplomacy for the
further development of S&T

" To link S&T with foreign policy for mutual development"

"Strengthening S&T cooperation with developing countries for resolving the global issues" "in the areas of the environment and energy, disaster prevention … and infectious diseases"

From "Toward the Reinforcement of S&T Diplomacy"
(by Council for Science and Technology Policy; May 19, 2008)

Aims of SATREPS

1. Enhancing Cooperation in Science & Technology
   ～Building win-win relationships between Japan and counterpart countries～

2. New Technology, New Knowledge, Innovations
   ～ Addressing global issues and advancing science ～

3. Capacity Development
   ～ Boosting self-reliant R&D capacity and sustainable research systems, training human resources and coordinating networking between researchers ～

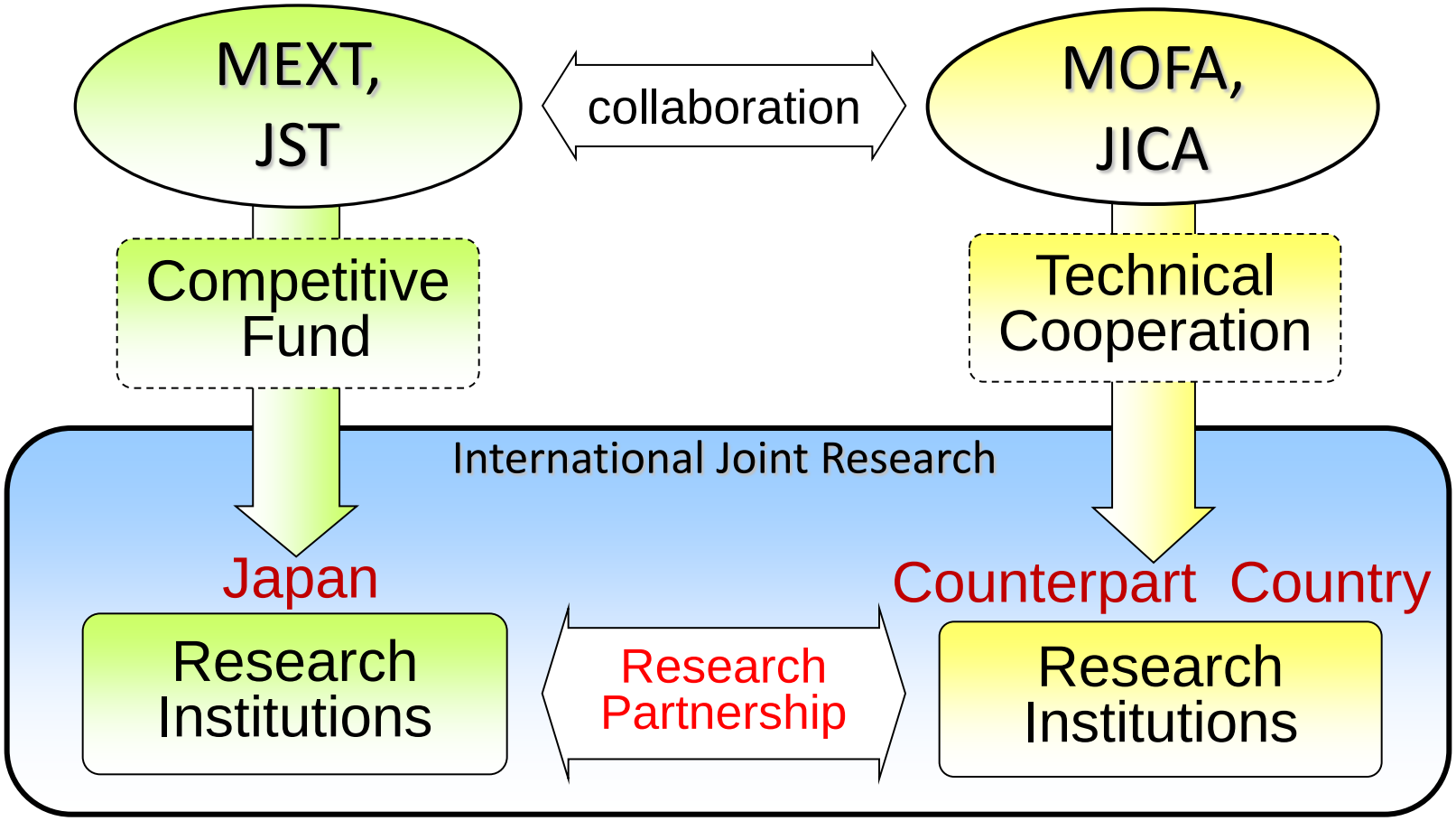
Practical Utilization/Implementation
of research outcomes

～Expecting outcomes to make a real contribution to society ～

Science & Technology × Official Development Assistance（ODA）

Science and Technology Promoting science and technology, encouraging innovation	×	**International Cooperation** ODA, development assistance
Meeting Global Needs Resolving global issues and contributing to the science and technology community	×	**Meeting Local Needs** Capacity development to address issues emerging as local needs in developing countries
Japan's Capabilities ·World-leading technology, proven research capacity ·Soft power	×	**Developing Countries' Capabilities** ·Direct experience, knowledge, and data needed for research on global issues ·Potential to contribute to the global economy through new markets and industries

SATREPS program structure



MEXT: Ministry of Education, Culture, Sports, S&T
JST: Japan Science and Technology Agency

MOFA: Ministry of Foreign Affairs
JICA: Japan International Cooperation Agency

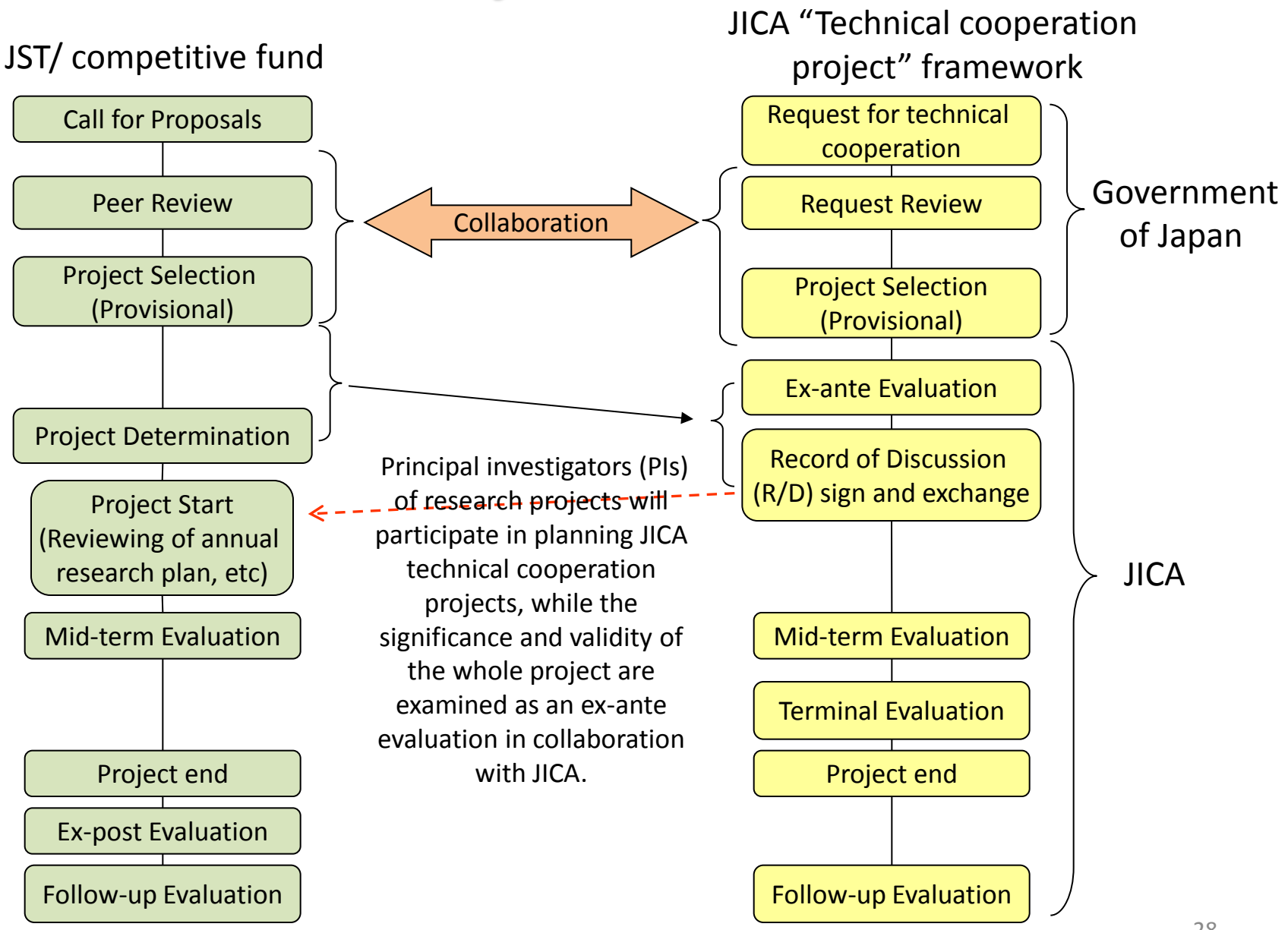
Research Period : 3-5 years *USD1 = 120JPY

Research Funding

Approx. JPY96 million / project / year (USD* 800,000)

Funding split: JST: Approx. JPY36 million (USD* 300,000)
JICA: Max. JPY60 million (USD* 500,000)

Project Flow



Research Areas

4 fields 5 areas

☐Environment and Energy

・Global-scale Environmental Issues

Climate change mitigation & adaptation, Safe water supply, Biodiversity conservation..

・Low-carbon Society/energy

Biomass energy, Energy efficiency, Renewable energy..

☐Bioresource Utilization

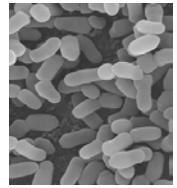
Breeding and cultivation technology, Bioresource management..

☐Disaster Prevention and Mitigation

Natural disaster mechanisms (Earthquakes, Volcanic..), Disaster mitigation..

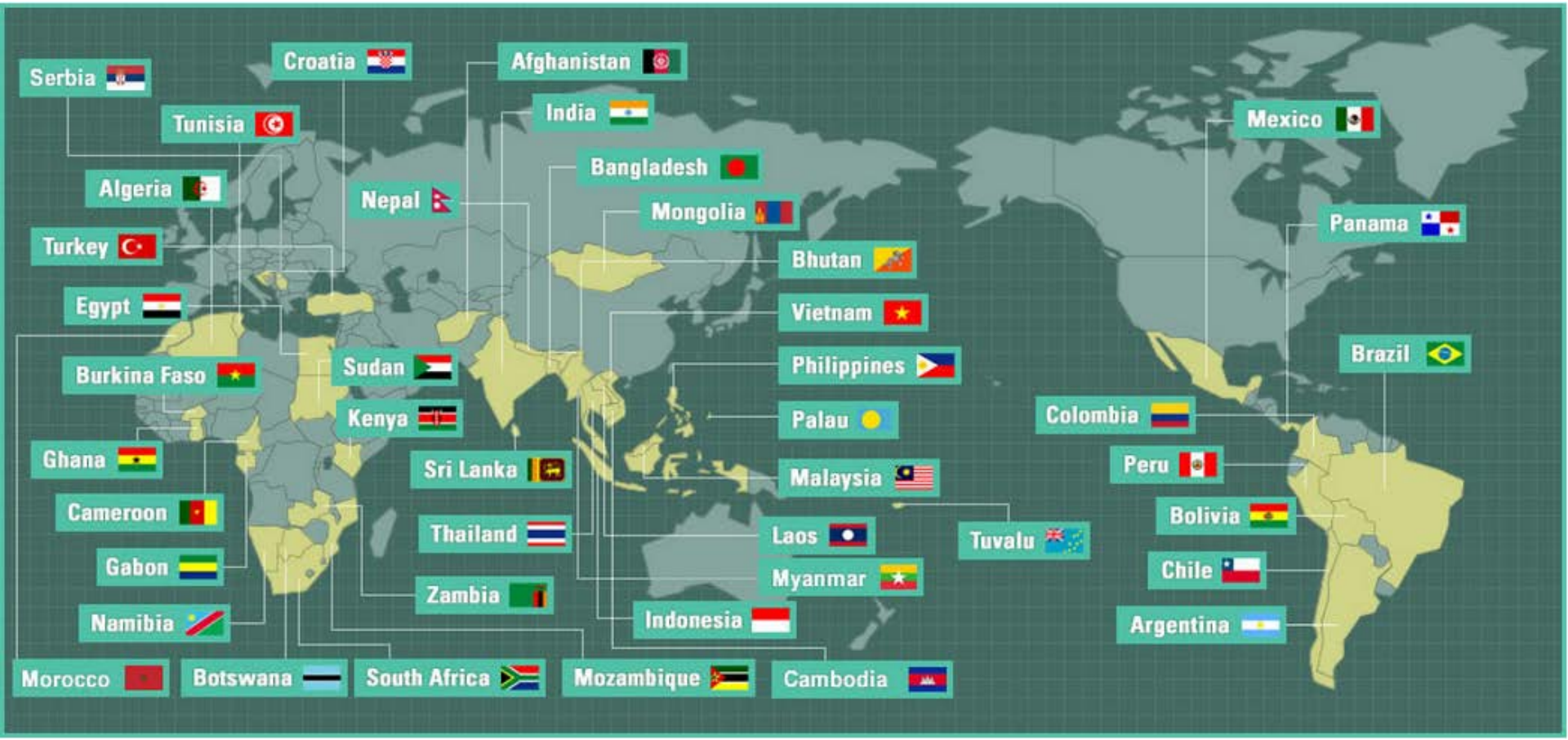
☐Infectious Diseases Control

Diagnostic tool, Vaccines, Therapeutic products development
(Avian influenza, HIV/AIDS, Dengue fever..)



FY2015～ JST → AMED

※AMED：Japan Agency for Medical research and Development



In total (since 2008) : 101 projects in 43 countries:

Area	Number of eligible countries	Number of projects
Asia	15 countries	54 projects
Africa	15 countries	26 projects
Latin America/Caribbean	8 countries	16 projects
Other regions	5 countries	5 projects

Case of Iskandar Malaysia

Project Background

FLAGSHIP A	FLAGSHIP B	FLAGSHIP C	FLAGSHIP D	FLAGSHIP E
JOHOR BAHRU CITY CENTRE • Central Business District (CBD) as heritage and cultural city • Customs, Immigration and Quarantine Complex (CIQ) • Johor – Singapore Causeway	NUSAJAYA • Kota Iskandar • EduCity • Medical Park • International Destination Resort • Southern Industrial & Logistics Clusters (SiLC) • Puteri Harbour	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	EASTERN GATE DEVELOPMENT • Tanjung Langsat Industrial Complex • Johor Port • Tanjung Langsat Port • Pasir Gudang Industrial Park	SENAI-SKUDAI • Senai Airport City • Senai High-Tech Park • Sedenak Industrial Park • MSC Cyberport City • Johor Technology Park • University Technology Malaysia (UTM)

Site: Iskandar Malaysia

(Iskandar Regional Development Authority)

Objective:

i. To draw up **key policies and strategies** in guiding the development of Iskandar Malaysia in **mitigating carbon emission**. *Transforming Iskandar Malaysia into* ***a sustainable low carbon metropolis by adopting green growth strategies/roadmap.***

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

Target Year: 2025 (2005 – 2025)

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 utilized **for policy development** in IM.

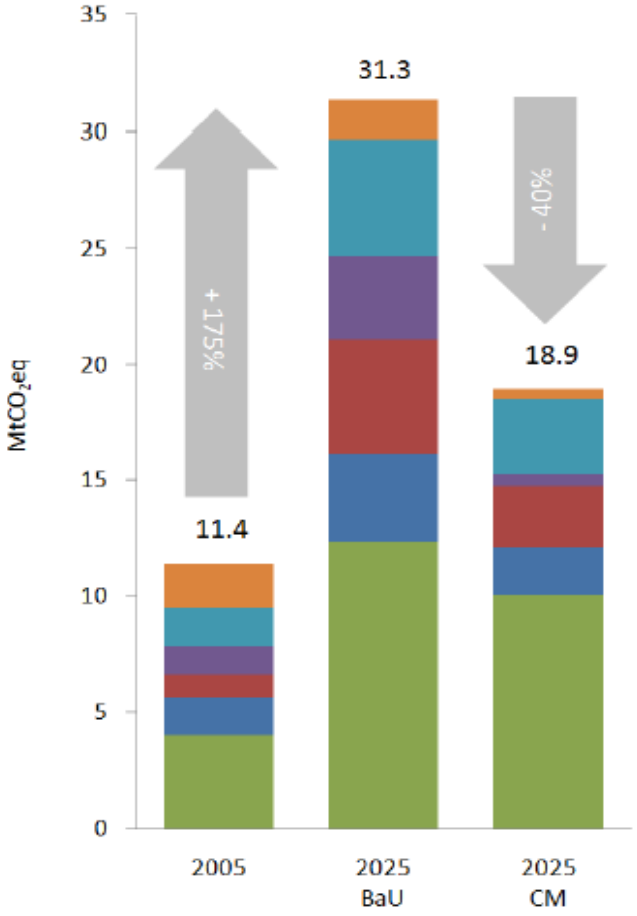
iii. **Co-benefit of LCS policies** on air pollution and on recycling-based society is quantified in IM

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

The 10th SATREPS progress meeting, Oct 12-14, NIES

Supported by JICA/JST during FY2011 and 2015

AIM simulation models can identify Greenhouse Gas Emission Reduction Potential in Iskandar Malaysia



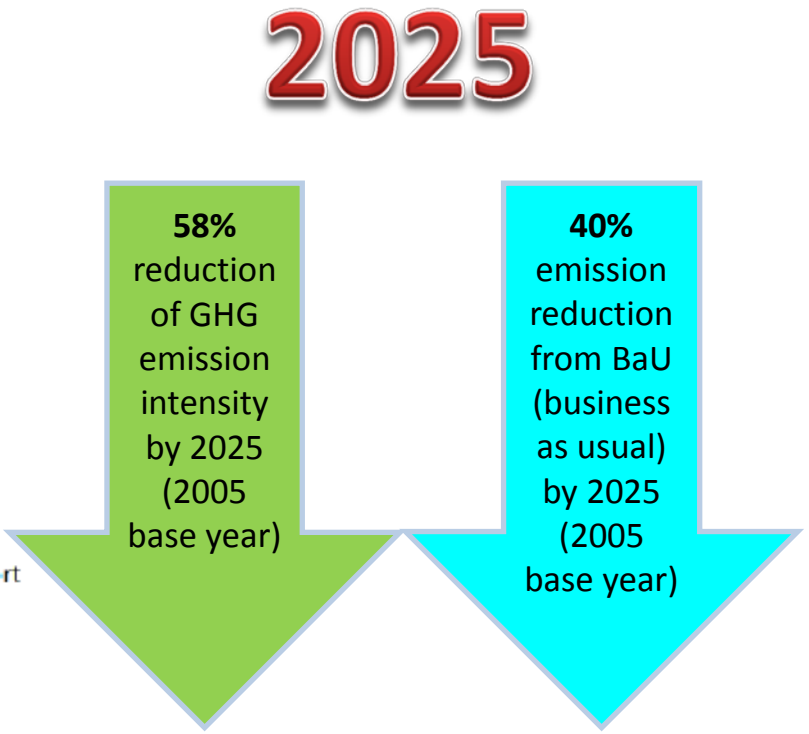
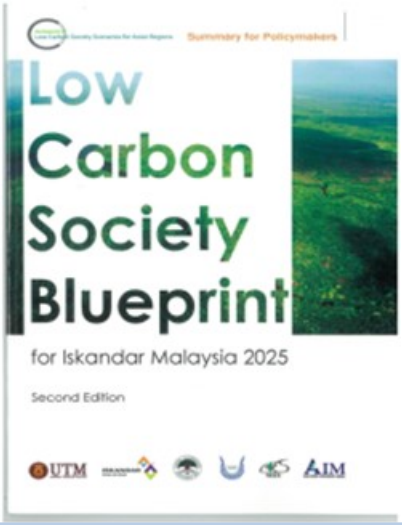


Figure 1: GHG emissions by sectors

Iskandar Malaysia Low Carbon Society Blueprint proposes 12 actions to reduce 40% by 2025



- The LCSBPIM– a quick reference for all policy-makers in both public and private sectors as well as IRDA;
- 12 Actions grouped in 3 parts namely: (Green Economy), (Green Community), and Green Environment);281 programmes;
- Each Chapter contains an analysis, list of programmes and the potential GHG emissions reduction;
- IRDA launched its Low Carbon Society Blueprint for Iskandar Malaysia 2025 on 30 November 2012 at the United Nations Climate Change Conference in Doha, Qatar. The ultimate goal is to reduce Iskandar Malaysia's carbon intensity emissions by 50 per cent by 2025.
- The Blueprint was subsequently endorsed by the Prime Minister of Malaysia in December 2012

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

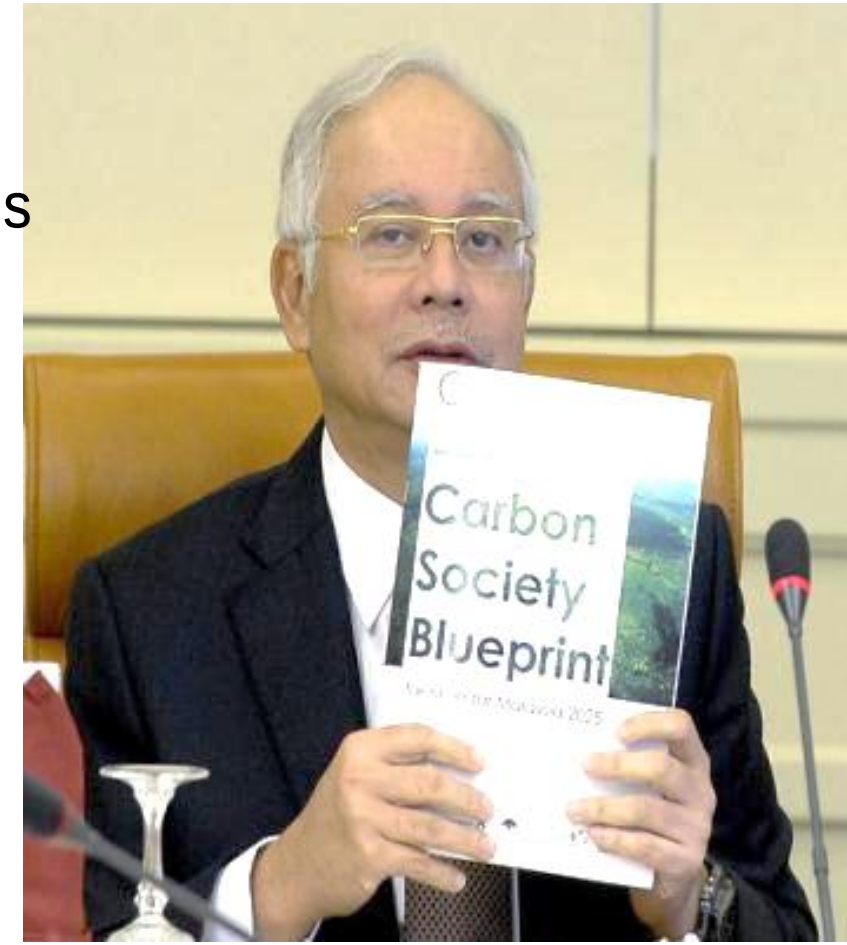
+ 281 programs

Launching of the LCSBPIM - COP18 Doha, 2012

"Development of Low Carbon Society Scenarios for Asian Regions"
In the case of "Iskandar Malaysia"

Japanese experience on
Low Carbon Scenarios & Roadmaps
+
Malaysian challenge on
Implementation of Low Carbon Visions

Premier of Malaysia provided permission in the 13th IRDA Steering Committee to start the Iskandar Low Carbon Society planning
（December 11th, 2012）



Research to Policy: Policymakers launch LCS implementation plan based on scientific scenario study on Nov 2013

The LCSBPIM Booklet: "Actions for a Low Carbon Future"

1. Mobile Management System	2. Green Economy Guidelines	3. Eco-Life Challenge Project for Schools
4. Portal on Green Technology	5. Trees for Urban Parks/Forests	6. Responsible Tourism and Biodiversity Conservation
7. Bukit Batu Eco-Community	8. GAIA – Green Accord Initiative Award	9. Low Carbon Village FELDA Taib Andak
10. Special Feature: Smart City – Pasir Gudang 'NAFAS BARU': CLEAN AND HEALTHY CITY		

In "Actions for Low carbon Future" 10 priority projects selected from 281 programs for the 2011-2015 by IRDA (implementation agency)

Environment Division newly founded in IRDA at Jan 2014

Field Visit to Education Activities in Japan towards LCS (Sep 2012)

Join “Eco-Life Challenge” program in Kyoto primary school

Iskandar Malaysia Eco Life Challenge Program

STREETS JOHOR **YOUR STORY**

12, 2014

Carbon Fighters win Kyoto trip

YOUNG MODELS: SK Kempas primary school is winner of the second Iskandar Malaysia Eco Life Challenge

PEGGY LOH
KUALA LUMPUR
streets@mst.com.my

THE team from SK Kempas primary school came out tops in the grand finals of the second Iskandar Malaysia Eco Life Challenge after beating 14 other schools in Iskandar Malaysia, on Nov 10.

Calling themselves Carbon Fighters, the team of five students and two teachers clinched a study trip to Kyoto, Japan.

SJK (C) Masai was the runner up while SJK (C) Foon Yew 1, took third place.

The Iskandar Malaysia Eco Life Challenge is a student version of the energy household accounting scheme to help households record and evaluate energy usage such as electricity, water and gas, with the aim of reducing consumption to contribute towards a low carbon society (LCS).

Modelled after a Kyoto City programme based on the original works of Kiko Network, a Kyoto-based non governmental organisation (NGO), the Malaysian version is a joint development by University Teknologi Malaysia, Johor State Education Department, Kiko Network, Japanese National Institute for Environmental Studies and Iskandar Regional Development Authority (Irda).

Kyoto is a natural destination for the winners' study trip as it was the birthplace of the Kyoto Protocol, the world's first international agreement on the reduction of greenhouse gases.

The visit to Kyoto will let the students observe and experience the Kyoto lifestyle as their citizens are exemplary of an eco-sensitive society.

As the students bridge the concept and application, they will be convinced that the eco-lifestyle can be defined, measured and is attainable over time, and should return to share their knowledge with others.

Irda's vision to implement the Eco Life Challenge as an extra curriculum activity in all schools based in Iskandar Malaysia by next year is being realised as the schools are promoting activities and counter measures to bad habits with the aim to develop an LCS, starting with the students.

Since the inaugural event last year, the schools which took part in this year's finals pulled out all the stops to impress the panel of judges with their presentations.

Armed with creative props made of recycled materials, models of proposed eco-friendly townships, interesting presentations and articulate responses to the judges' questions, the winning teams deserved the merit.

The panel of judges must have been delighted to hear the SJK (C) Foon Yew 1 team's reply to a judge's question, that students understood the reasoning for adopting habits to live in a LCS and are motivated to become Eco Life Warriors like the judges.

Similarly, the team from SKJ (C) Masai sent a clear message in their presentation that "small changes make a big difference".

Guest judge Keichi Shiba of Kiko Network was particularly impressed with the slogan presented by the team from SKJ (C) Cheow Min, Pontian, which reads: "Caring and sharing, Practice together, Do it together".

Shiba was at the event with City of Kyoto Global Environment Policy Office Environment Policy Bureau representative Takuya Matsuura and the National Institute for Environmental Studies Junior Research Associate Maiko Suda.

Shiba and Matsuura observed that most of the school teams made good presentations and appear to have a strong grasp of the subject.

They were pleased to share with their counterparts in Iskandar Malaysia the information and experience garnered since 2009 when Kyoto City made the commitment to become an LCS and was selected as the Kyoto Eco-Model City.

While the judges deliberated on the results, Matsuura made a brief presentation to share information on the Kyoto Eco-Model City experience with the audience while Suda helped with the English translation.

Using photos, charts and interesting visuals, his presentation helped to reinforce the students' understanding of what it means to develop an LCS.

As the information helped the audience to realign their thoughts and ideas for a unanimous commitment to adopt an eco lifestyle, he emphasised that it is important to apply them in daily life.

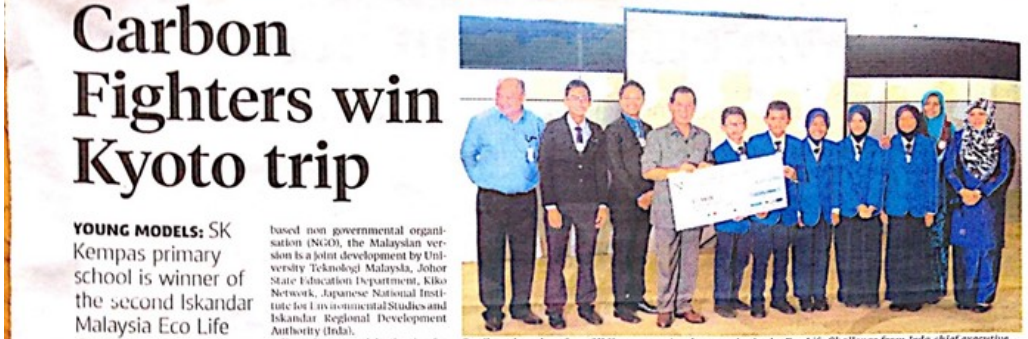
"Iskandar Malaysia is your future," said Irda Social Development Division head Nor Hisham Hussein, as he challenged the students to adopt an eco lifestyle.

From their enthusiastic responses to his questions, the students were motivated to change and adopt better daily habits to save water and electricity at home and in school.

They were encouraged to change their attitudes and model them after the Japanese people, and to care for the environment.

The schools also took part in two other challenges for Recycling and Energy Saving. SK LKKP Pasir Raja was awarded the top prize of RM1,000 for collecting 4195kg of recycled material, while SK Kota Masai 2 and SJK (C) Kulai Besar took second and third place, respectively.

SK Taman Damai Jaya was awarded the RM1,000 top prize while SK Bandar Pontian took second place, and SK Kempas came in third.



Pupils and teachers from SK Kempas receive the top prize in the Eco Life Challenge from Irda chief executive Prof Datuk Ismail Ibrahim (fourth from left). **Pix by Peggy Loh**

The team from SK Kota Masai 2 ***gives a step-by-step demonstration*** *in making compost.*

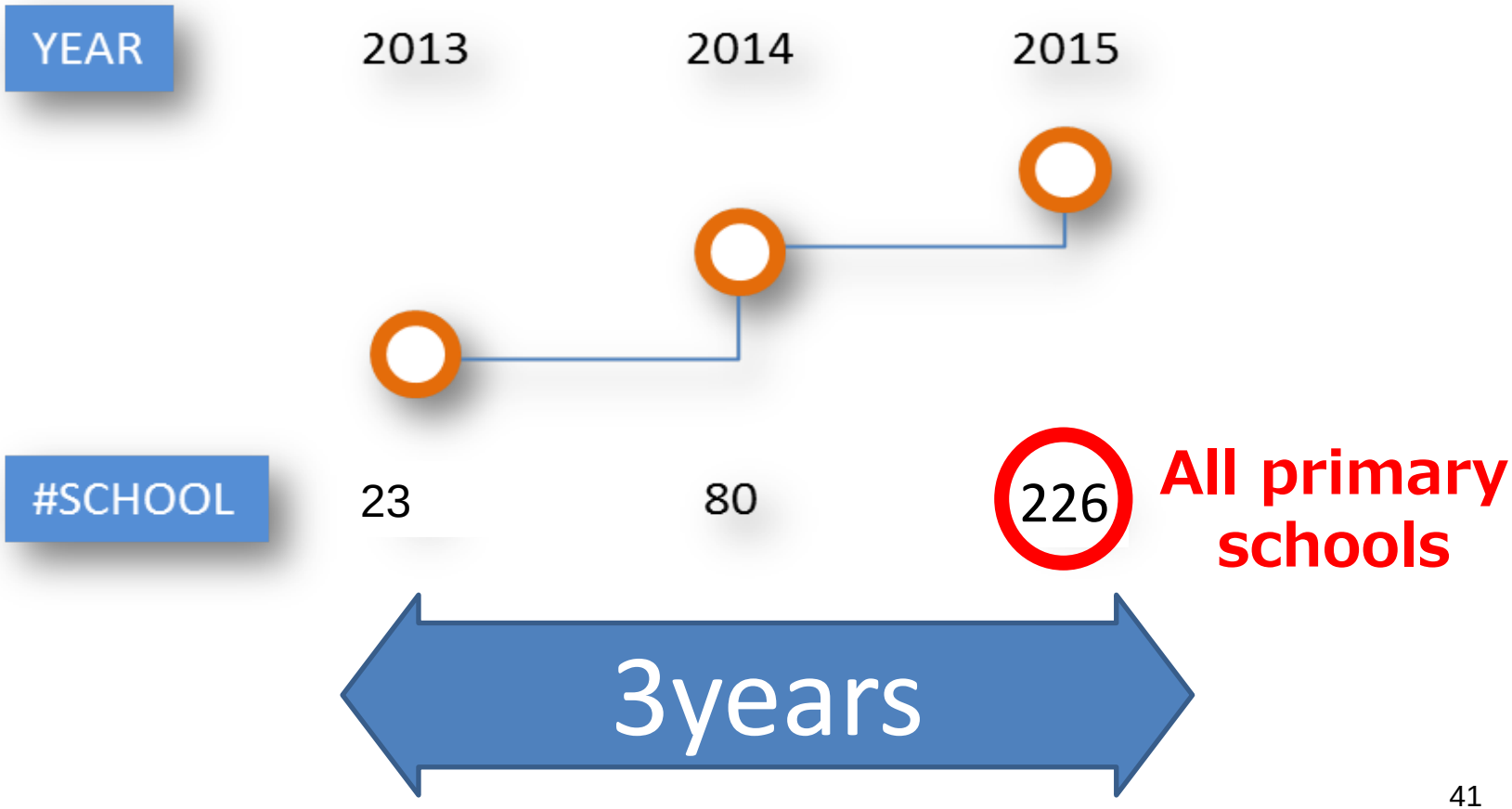
A well-researched PowerPoint presentation, a model of a building with eco-friendly features and effective presentation skills, helped the SK Kempas team win the Eco Life Challenge.

11th Nov, 2014, Malaysian New Strait Times

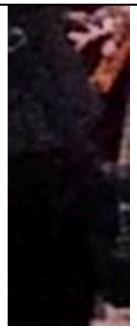
Result

Iskandar Malaysia Eco-Life Challenge
Twenty Fourteen

PLANNED COVERAGE FOR ECO-LIFE CHALLENGE IN ISKANDAR MALAYSIA PRIMARY SCHOOLS



Iskandar Malaysia Sustainable and Low Carbon Schools Exhibition 2015 & Launching Ceremony of RCE Iskandar @UTM, 7th Feb 2015



RCE is Regional Centers of Expertise on ESD (Education for Sustainable Development) promoted by UNU (United Nations University). There are around 140 RCEs in the world.

International Symposium on "FutureCIty" Initiative **In Malaysia** @Johor Bahru, Feb 8th 2015

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