

## Regional CC Responses Strategies (A+M) and Sustainable Development in Japan and Asia

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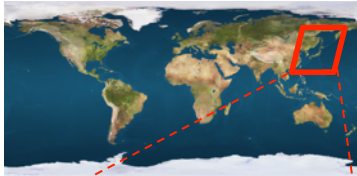
The presentation includes research outcomes from The Environment Research and Technology Development Fund (ERTDF, S-6, S-8, 2-1402, 2-1404, 2-1702 and 2-1711), the "Project to Advance MRV and Related Techniques in Indonesia for the Promotion of a Joint Credit Mechanism (from FY2014-2017)", the "Project to Promote CO2 Technology Assessment (from FY2014-2017)" of Ministry of the Environment, Japan, and Japan and the Science and Technology Research Partnership for Sustainable Development (SATREPS) by JST/JICA (the Japan Science and Technology Agency and the Japan International Cooperation Agency).

IPCC Expert Meeting on Assessing Climate Information for the Regions  
ICTP, Trieste, Italy, 16-18 May 2018

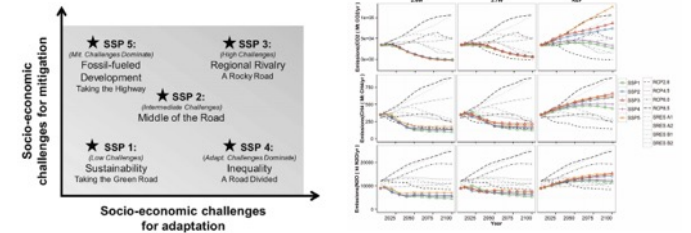
# A Multi-Resolution Approach in AIM

- Different scales but interactive approaches are employed in AIM

## Global



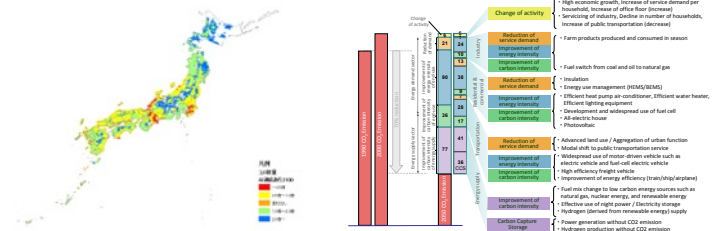
- Representative Concentration Pathways (RCPs)
- Shared Socio-Economic Pathways (SSPs)
- Food hunger risk



## National



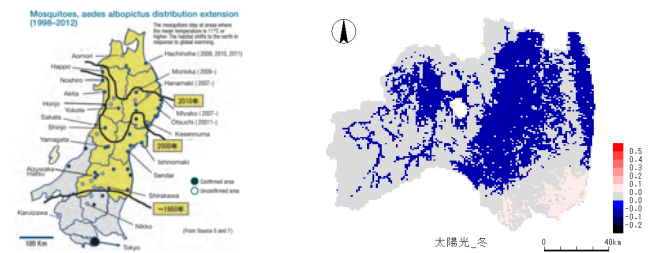
- Low Carbon Scenario
- Adaptation Strategy
- Nationally Determined Targets (NDC)
- Greenhouse Gas Inventory



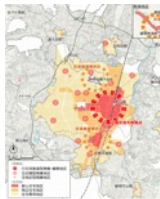
## Regional



- Low Carbon Development Plan
- Low Carbon Actions
- Adaptation Strategy
- Regional Energy Potential



## City



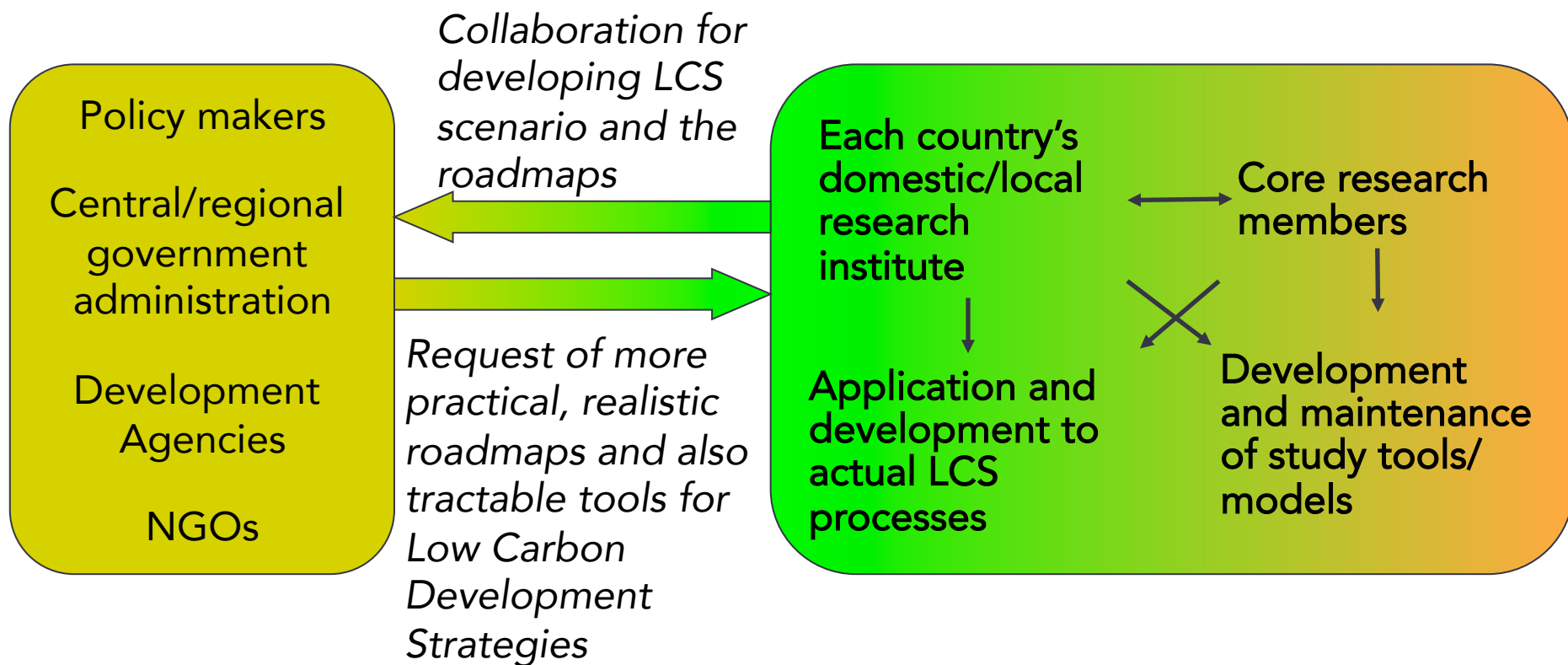
- Low Carbon Town Planning
- Compact city
- Project Design
- Stakeholders Involvement
- Social Monitoring



## Past Experiences of CC Responses Strategies at Regional Scale: Designing Regional LCS Scenario by using AIM



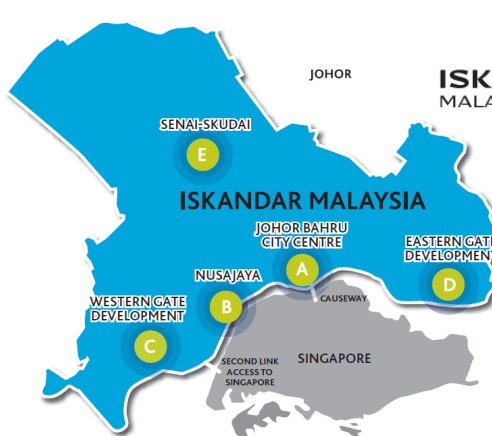
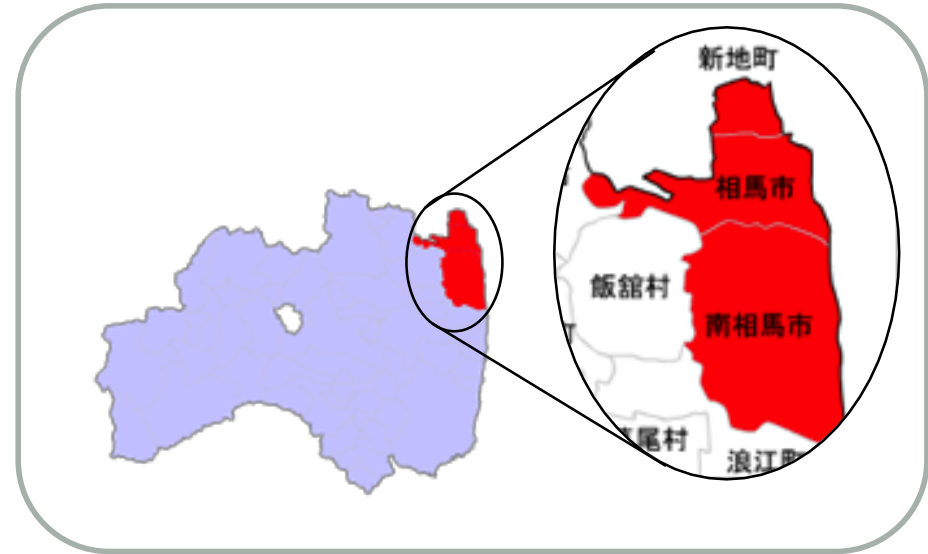
## Collaboration with Stakeholders: Scenario Design Scheme towards Low Carbon Society in Asia





# Designing Strategies at Regional Scale in Japan and Asia

- Japan: So-so area in Fukushima prefecture
  - South part of the area are connected to Fukushima Daiichi Site
  - Target year: 2050
- Asia: Iskandar Malaysia
  - Just north of Singapore
  - Target year: 2025



## 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

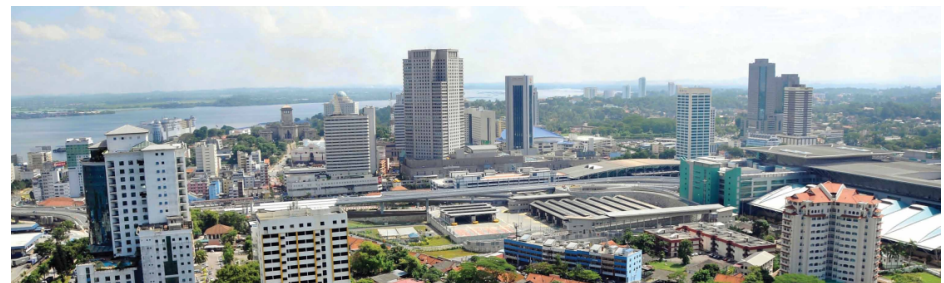
- WESTERN GATE DEVELOPMENT**
- Port of Tanjung Pelepas (PTP)
  - Tanjung Bin Power Plant
  - 2nd Link Access to Singapore
  - RAMSAR World Heritage Park
  - Tanjung Piai – Southernmost Tip of Mainland Asia
  - Maritime Centre

## FLAGSHIP D

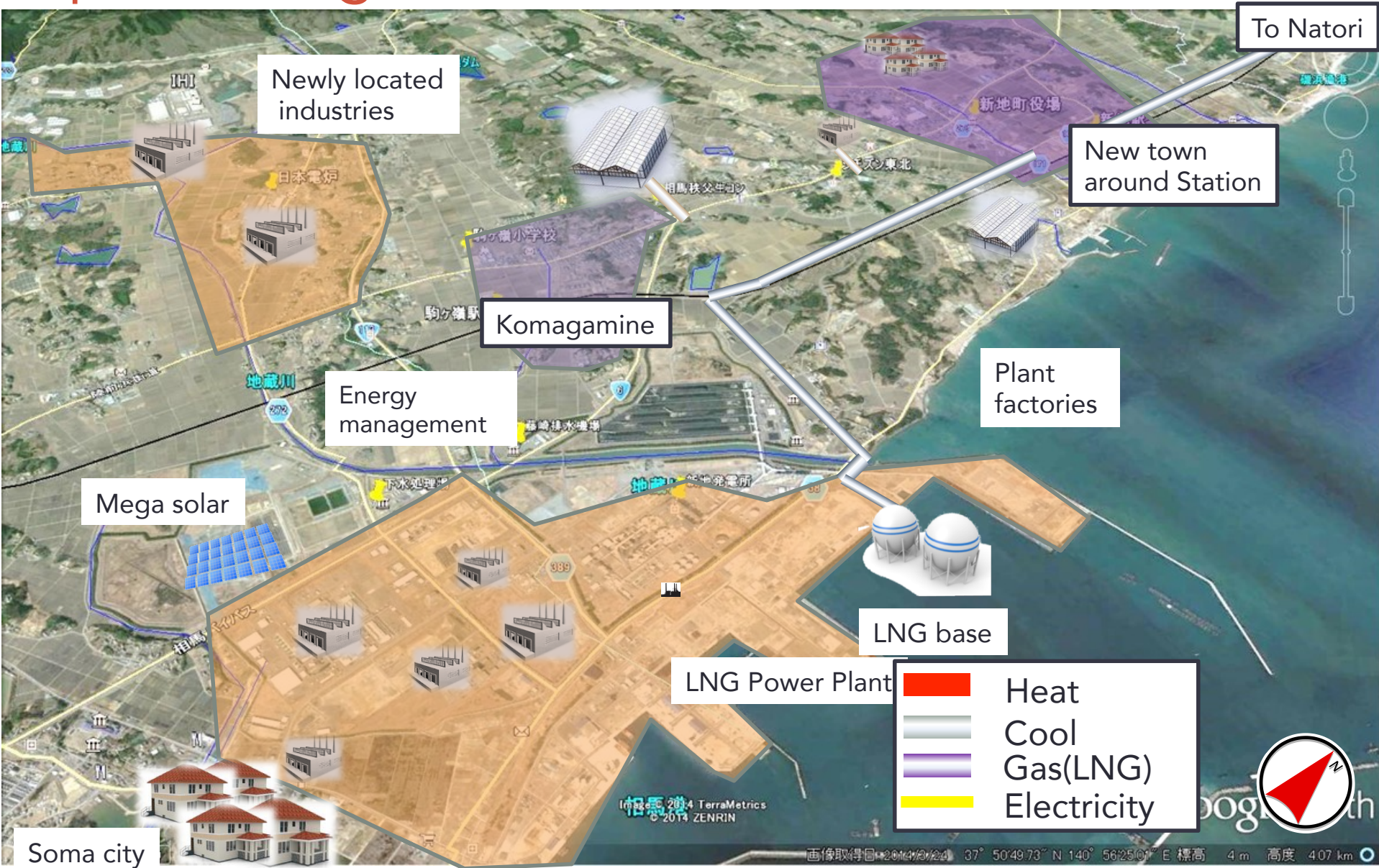
- EASTERN GATE DEVELOPMENT**
- Tanjung Langsat Industrial Complex
  - Johor Port
  - Tanjung Langsat Port
  - Pasir Gudang Industrial Park

## FLAGSHIP E

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

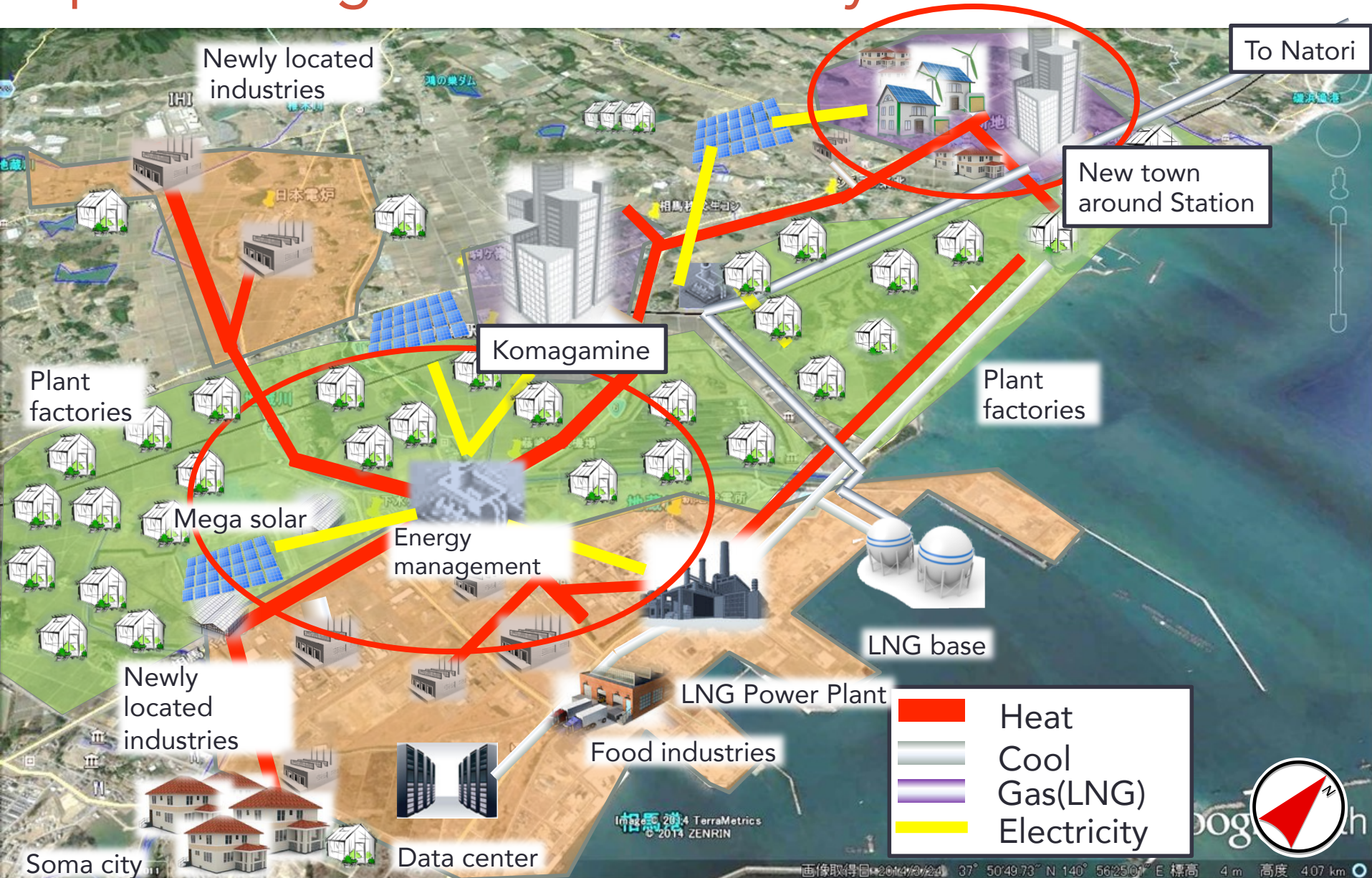


# Spatial Design under the BaU scenario in 2030





# Spatial Design for the Smart City in 2030



# Evaluation of Impacts on Smart City

## Alternative Spatial Scenario

## Quantification of Impacts and Costs

BAU



+Compact  
City

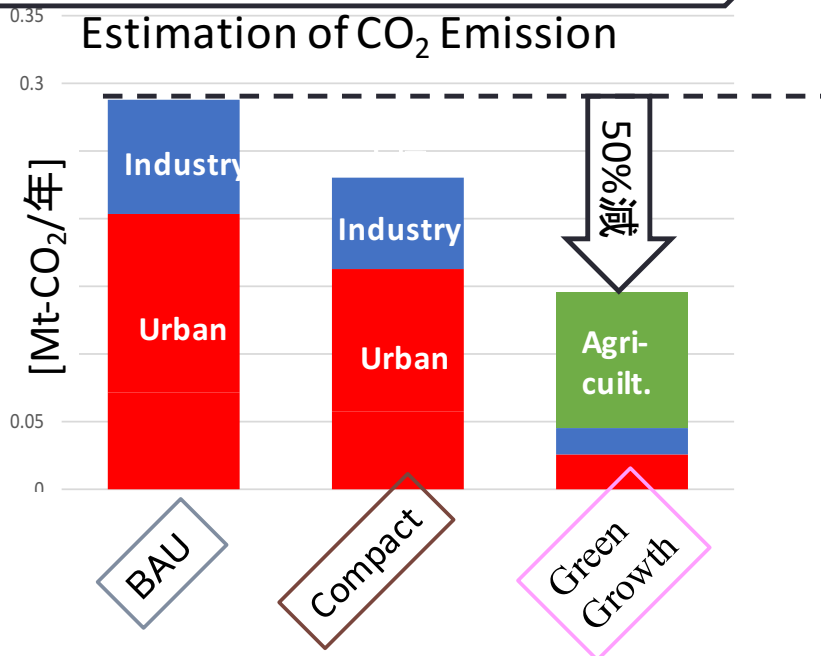


+Green  
Growth



Effects of Local  
Energy Management

### Estimation of CO<sub>2</sub> Emission



Green growth can double the Carbon Efficiency



# Background

## Iskandar Malaysia: Key Challenges



Size: 2,216.3 km<sup>2</sup> Indian Ocean

Population: 1.3 mil. (2005) | 3.0 mil. (2025)

GDP: 35.7 bil. RM (2005) | 141.4 bil. RM (2025)



CO<sub>2</sub> Reduction target in Malaysia:

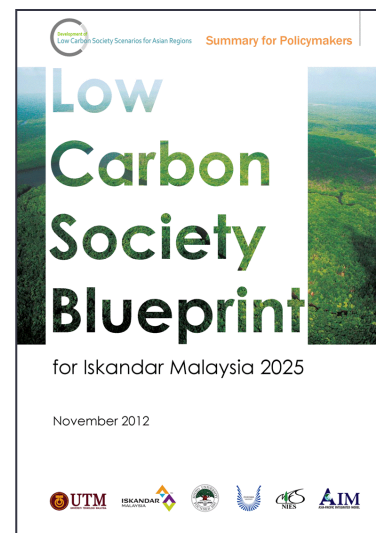
Voluntary 40% reduction of CO<sub>2</sub> emission intensity by 2020

### Issues

Rapid urbanization and industrialization

Higher energy demand and CO<sub>2</sub> emission

Decouple economic growth and emission on fossil fuel

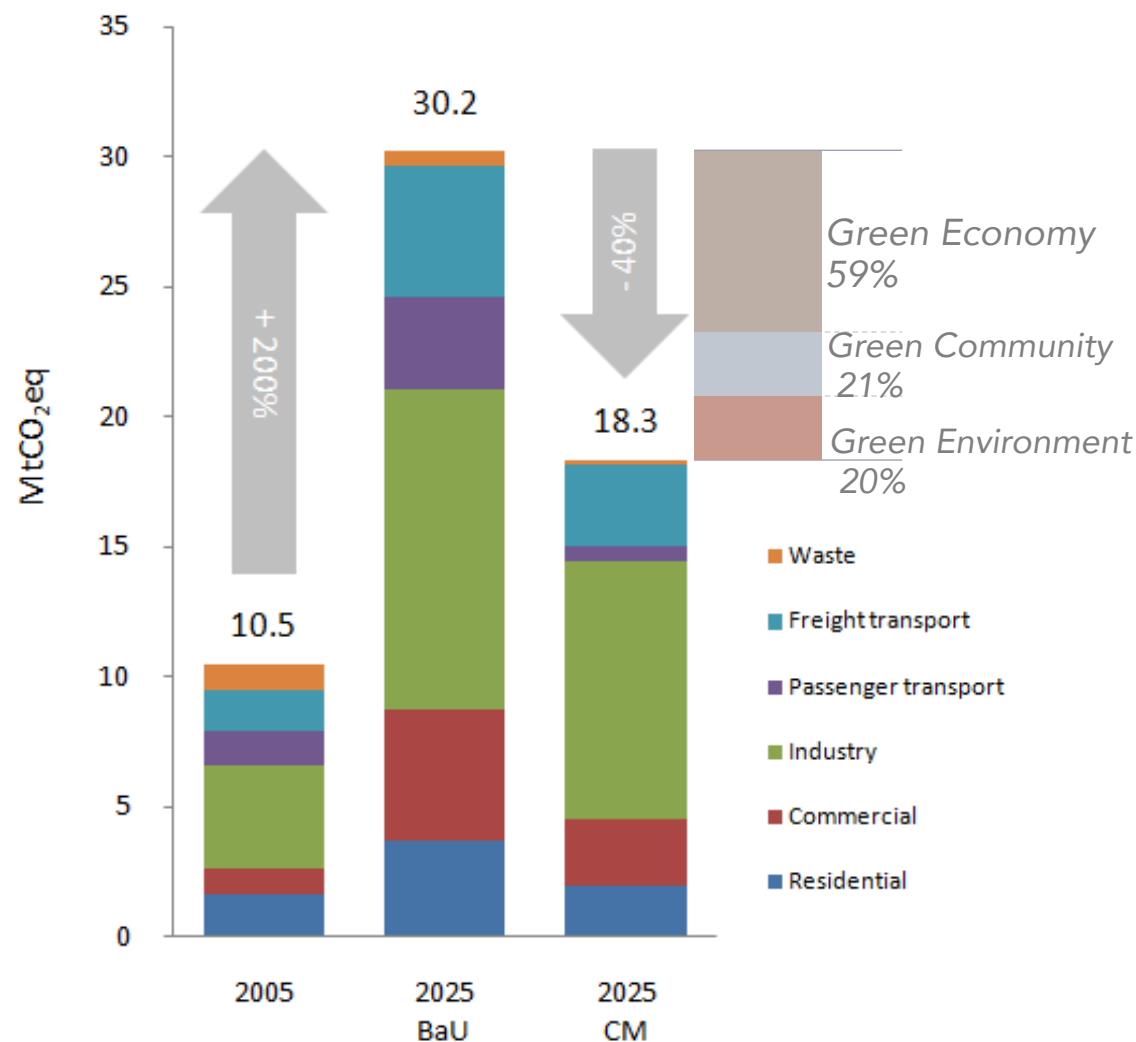


Blueprint – 3 main thrusts – Green economy, community and environment.  
= 12 actions

Joint collaboration work of UTM, KU, NIES under SATREPS program

# Potential Mitigation Options for Iskandar Malaysia

## Green Economy, Green Community and Green Environment



Unit	2005	2025 BaU	2025 CM	2025Ba U /2005	2025CM /2005
Final Energy Demand (Mtoe)	2.5	7.6	5.2	3.11	2.14
GHG emissions (MtCO <sub>2</sub> eq)	10.5	30.2	18.3	2.88	1.74
Per Capita CO <sub>2</sub> Emissions (tCO <sub>2</sub> eq)	7.7	10.1	6.1	1.30	0.78
GHG Intensity (kgCO <sub>2</sub> eq/RM)	0.29	0.21	0.13	0.73	0.44

### Green Economy

- 1 Integrated Green Transportation
- 2 Green Industry
- 3 Low Carbon Urban Governance
- 4 Green Building and Construction
- 5 Green Energy System and Renewable Energy

### Green Community

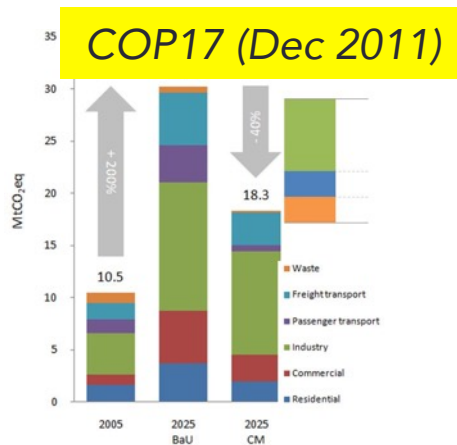
- 6 Low Carbon Lifestyle
- 7 Community Engagement and Consensus Building

### Green Environment

- 8 Walkable, Safe and Livable City Design
- 9 Smart Urban Growth
- 10 Green and Blue Infrastructure and Rural Resources
- 11 Sustainable Waste Management
- 12 Clean Air Environment



# Bridging Research and Policy in Iskandar Malaysia



Identifying Low Carbonizing Potential in IM

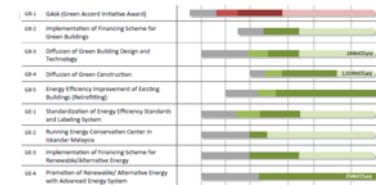
Approval by PM (Dec 2012)



PM approved Dozen Action as official program in IM

Continuous Discussion with Stakeholders including researcher, policymaker, business, NGOs

Roadmap towards Low



**COP19 (Nov 2013)**



1. Integrated Green Transportation – Mobility Management System
  2. Green Economy Guidelines
  3. Eco-life Challenge Schools Project
  4. Portal on Green Technology
  5. Trees for Urban Parks
  6. Responsible Tourism and Biodiversity Conservation
  7. Bukit Batu Eco-Community
  8. CAIA – Green Accord Initiative Award
  9. Low Carbon Village FELDA Taib Andak
- Special Feature: Smart City-Nias Bara Pasir Gudang: Green and Healthy City

Proposal of 10 Actions by IRDA



March 2014  
Approvals and Implementation Committee (AIC) in IRDA endorsed the BP and Roadmap as *formal government plan*

## Steps for National Adaptation Planning (NAP) in Japan

**Fourth Environment Basic Plan** (Cabinet Decision, April 2012) decided to assess impacts of climate change and to promote adaptation measures

**"Expert Committee on Climate Change Impact Assessment"** was established under Central Environment Council (2 July, 2013)

- Projection of climate change and its impacts in Japan
- Reviews for more than 500 papers by 57 experts
- Assessment for 56 items in 7 thematic areas
- Expert judgement on significance, urgency and confidence levels

**Report on Climate Change Impact Assessment in Japan** (10 March, 2015)

**Inter-Ministry Meeting** for Climate Change Adaptation (11 September, 2015)

National Adaptation Plan was draft by the Inter-Ministry Meeting, and called for **public comments** (23 October, 2015)

**National Adaptation Plan** was formulated (Cabinet decision, 27 November 2015)

**National Climate Change Adaptation Law** will be enacted in near future

# Promoting Adaptation in Local Governments and International Cooperation

## Chapters of NAP

### III. Basic measures and international measures

- i. Observation and Monitoring, Research and Studies
- ii. Sharing and providing information related to climate risk
- iii. Promotion of adaptation in region
- iv. International measures

**A-PLAT**

気候変動適応情報プラットフォーム

Adaptation for the future.

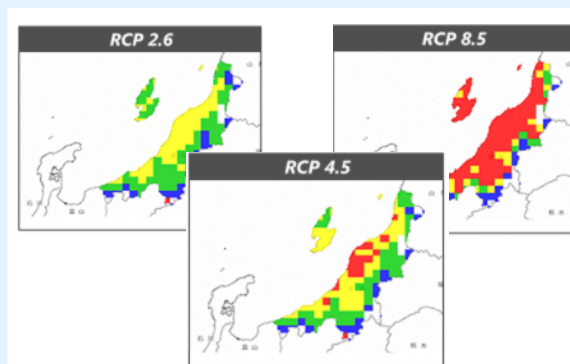
CLIMATE CHANGE  
ADAPTATION  
PLATFORM, JAPAN**AP-PLAT**

Asia-Pacific Climate Change Adaptation Information Platform

# Outline of A-PLAT

- **A-PLAT** (Climate Change **A**daptation **Plat**form) is a “**One-stop**” online resource for adaptation to climate-change impacts in Japan.
  - Aims at being a basis for adaptation actions of local governments, businesses, and citizens.
  - Collects and provides climate risk information and best practices; develops tools to promote adaptation actions.
  - Operated by NIES with cooperation of relevant ministries.

## Provide climate risk information



## Stakeholders:



Local  
Government



Private Sectors



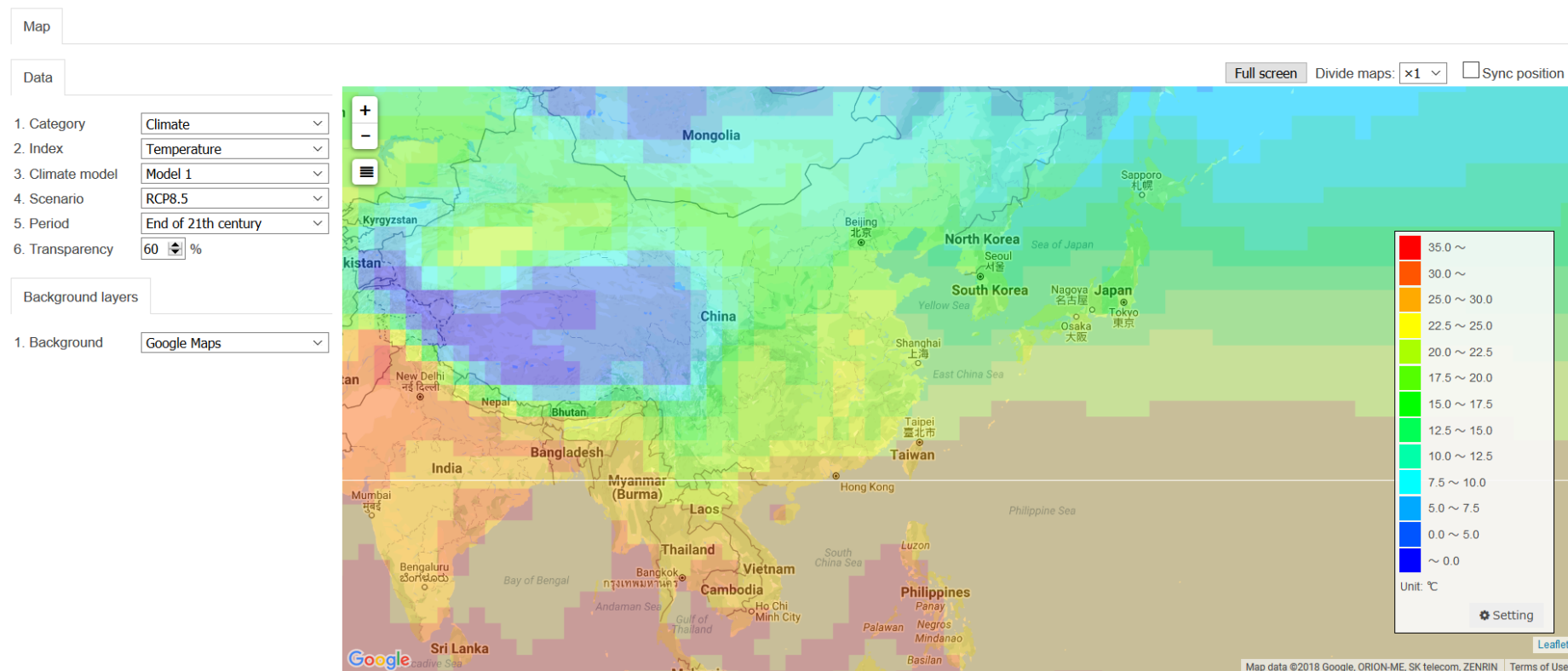
Individuals &  
Communities



## CLIMATE IMPACT VIEWER



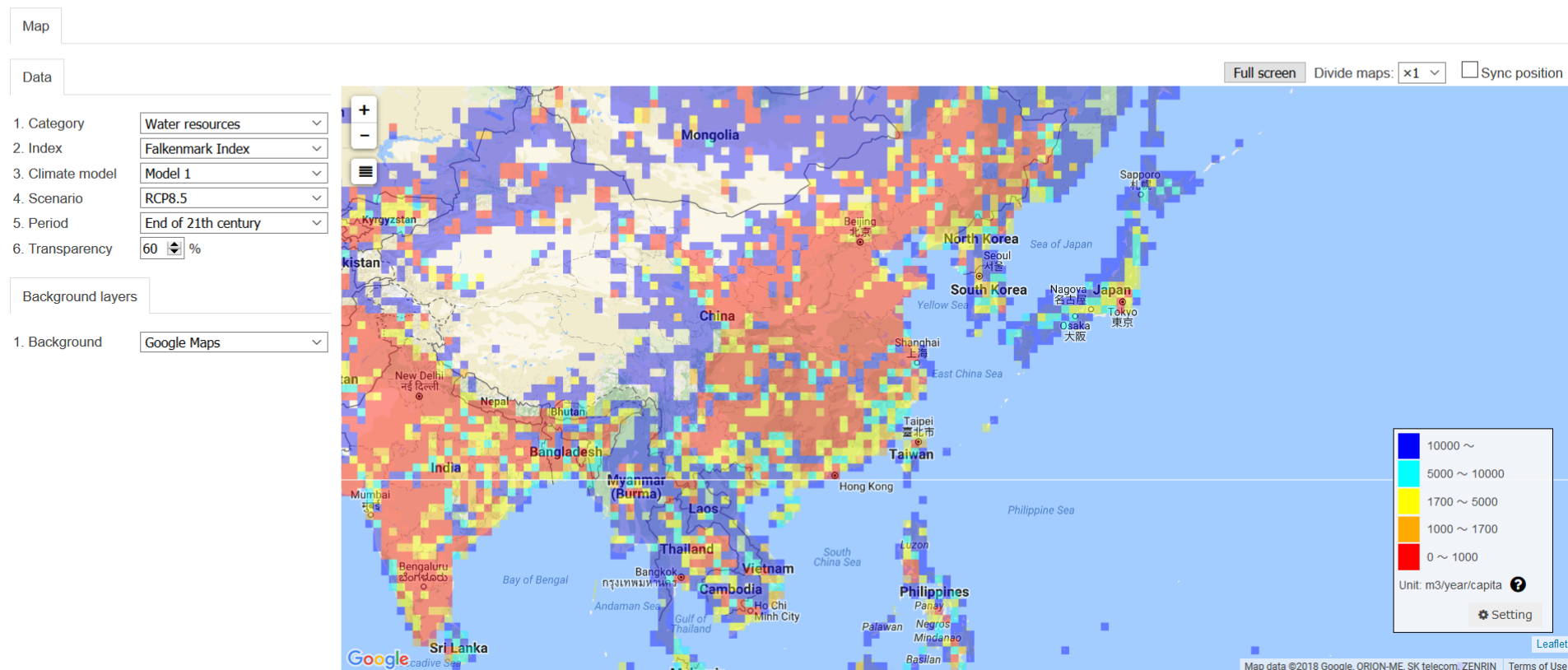
\*\* The data presented here are for demonstration purposes only. \*\*



**Annual mean temperature** in the end of 21th century predicted by MIROC-ESM-CHEM which has been cooperatively developed by the University of Tokyo, NIES, and JAMSTEC with Representative Concentration Pathways 8.5 (RCP8.5)



\*\* The data presented here are for demonstration purposes only. \*\*



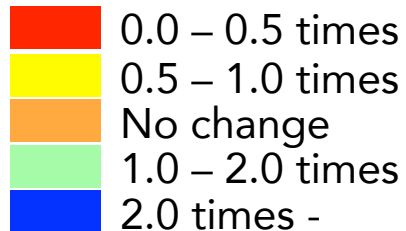
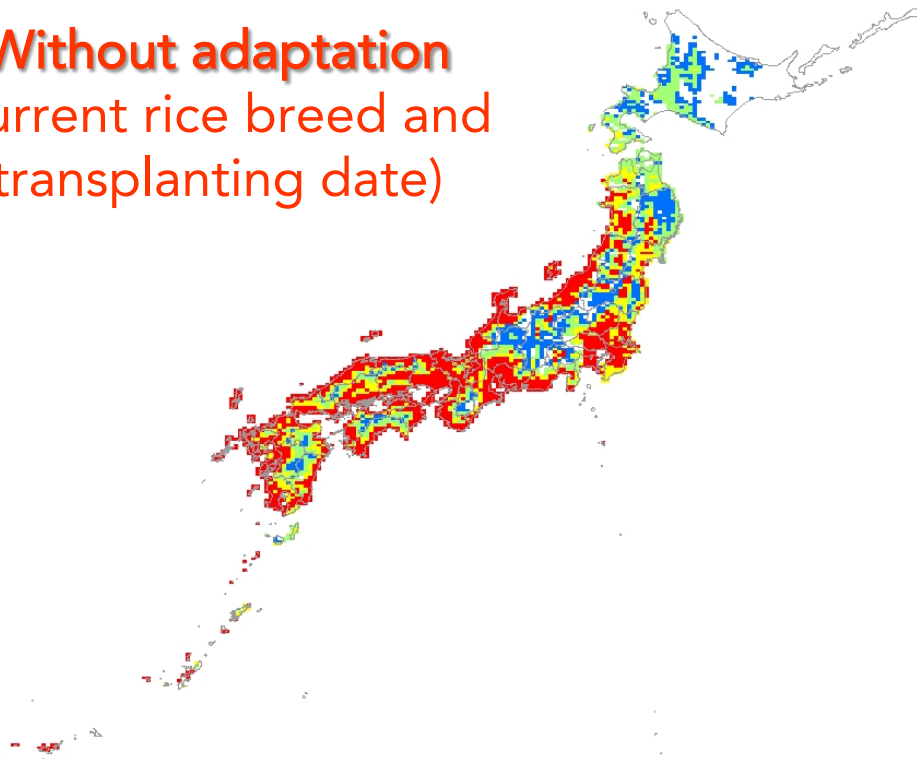
**Water-stressed population** based on the Falkenmark indicator (water resources per capita: m<sup>3</sup>/year/capita) in the end of 21th century used MIROC-ESM-CHEM climate prediction output with Representative Concentration Pathways 8.5 (RCP8.5).



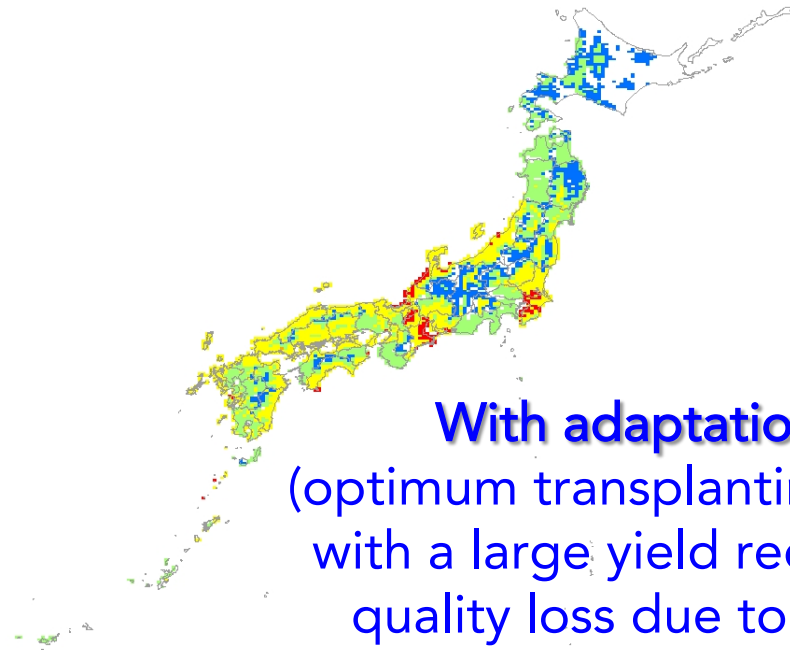
# Regional CC Information is a key for Impact/Adaptation

## Rice yield considering quality (RCP8.5, MIROC5)

**Without adaptation**  
(current rice breed and  
transplanting date)

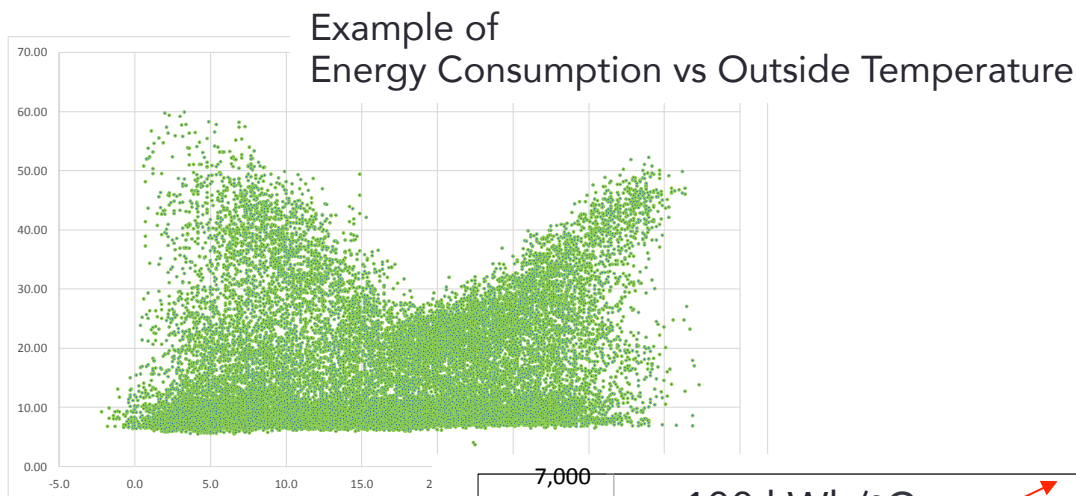


**With adaptation**  
(optimum transplanting date  
with a large yield reducing  
quality loss due to high  
temperature)

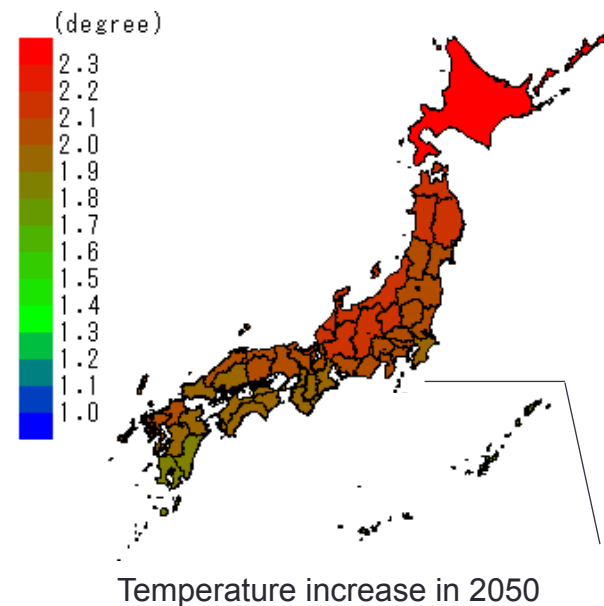
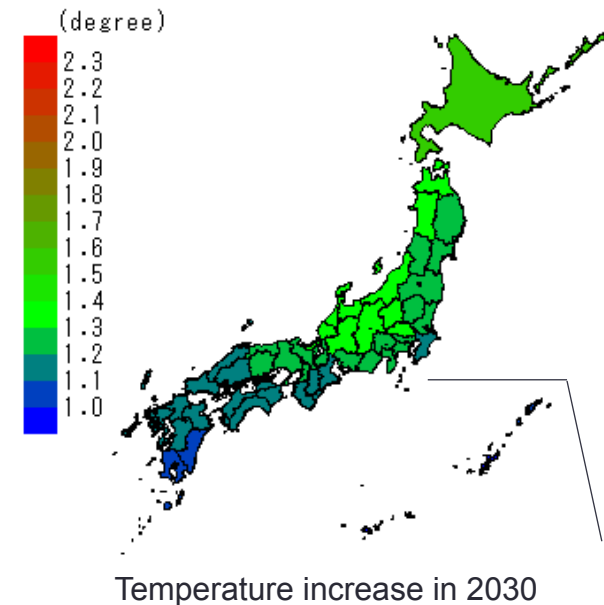
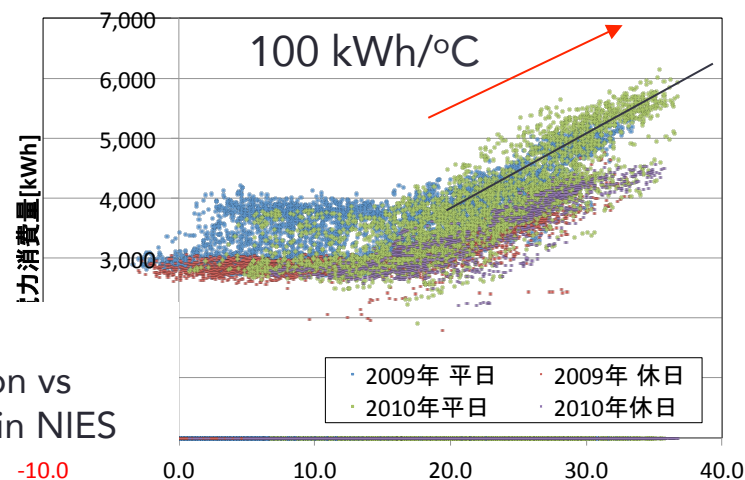


## ...and Mitigation

- Energy demand varies according to temperature.
- 2 degree increase in Fukushima will lead to 8.5% increase in cooling demand and 3.0% decrease in heating demand.



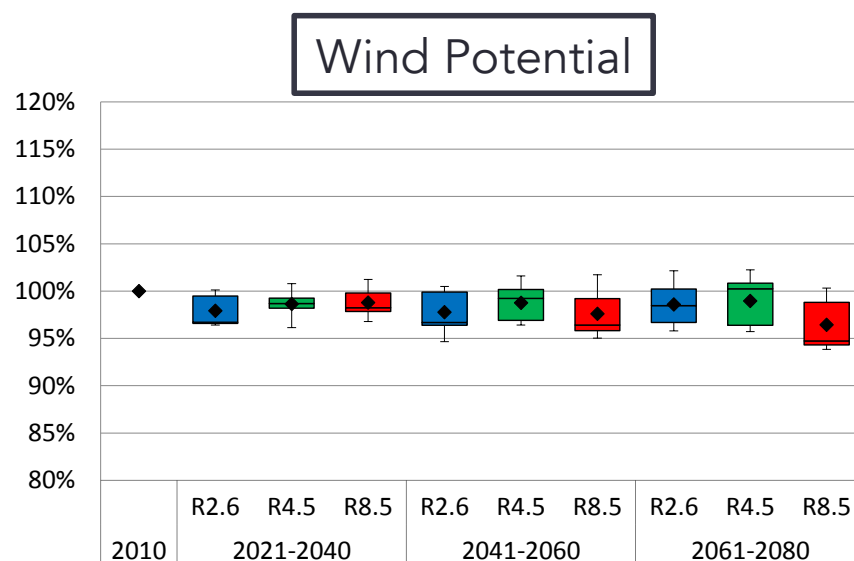
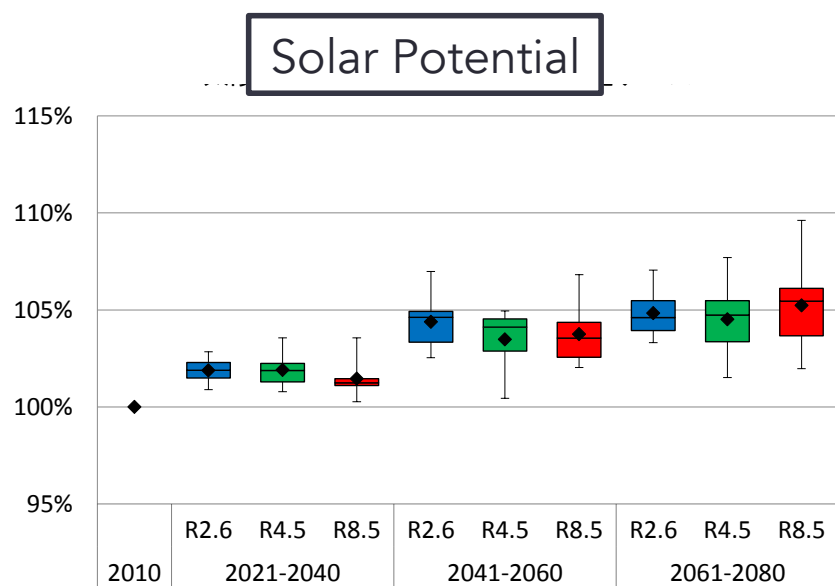
Example of  
Electricity Consumption vs  
Outside Temperature in NIES



# Climate Change affects Solar and Wind Outputs

## Renew-able but Vari-able over the Period

- Solar potential tends to increase from current level.
- Wind potential may decrease over the period even in RCP2.6 scenario.



7 GCMs are used for future climate change: GFDL-CM3, GFDL-ESM2M, IPSL-CM5A-LR, HadGEM2-ES, MIROC-ESM-CHEM, MIROC5, MRI-CGCM3.0

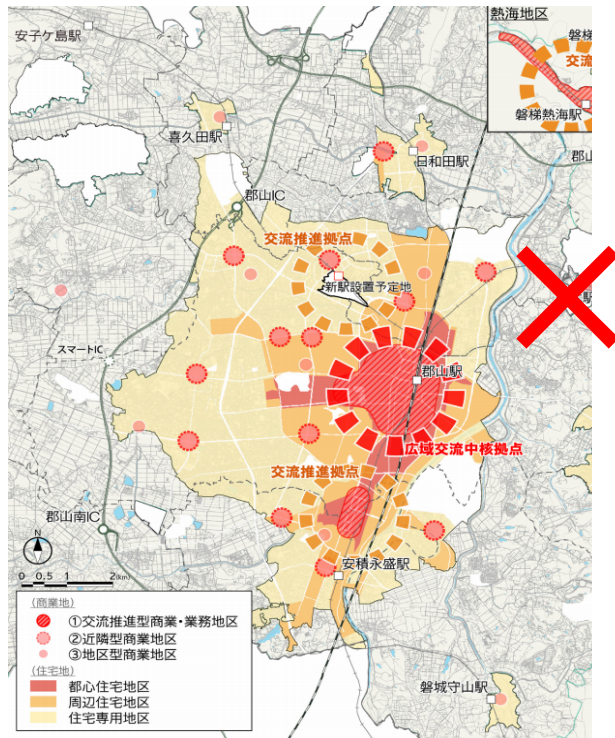
Regional climate information created by downscaling.

Target area: Fukushima Prefecture, 1km resolution DEM

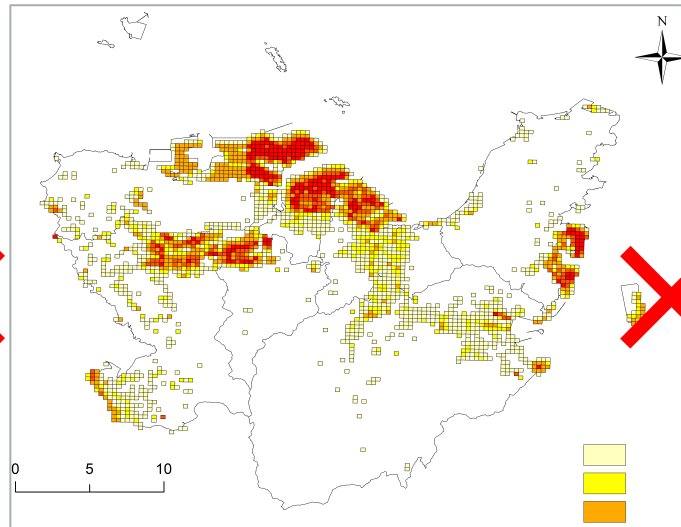
# Low Carbon City Planning with Climate Change Risk Management

- City planning may adjust with consideration for regional climate change risk, such as flood, landslides and tsunami.
- Take risk or avoid risk?

## City Planning



## Renewable Potential



## Risk of Flood

