

From National Decarbonization Scenario to Regional Decarbonization Scenario

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Yuko KANAMORI and Kei GOMI

National Institute for Environmental Studies

Japan's reduction target

Japan's reduction target : 2030 46% 2050 Carbon neutrality(CN)

■ Is it possible to realize CN in Japan by 2050?

- ✓ To achieve significant GHG reductions, it is necessary to promote energy conservation and electrification, introduce hydrogen and H₂-based fuel and large amounts of renewable energy.
- ✓ Appropriate social transformation will increase the feasibility of a decarbonized society.

■ Decarbonizing the region to achieve CN Japan

- ✓ Declaration of net zero CO₂ emissions: 46 prefectures, 1066 basic municipalities
 - Few municipalities have quantitative analysis.
- ✓ There are not many studies or mechanisms targeting prefectures for decarbonization.

■ Specific measures for CN and their impact

- ✓ Municipality-specific measures:
 - Obligation to install PV in detached houses (Tokyo)
 - Transition to electric vehicles (Tokyo)
- ✓ Concerns about implementation of measures :
 - Ecosystem impact, resource issues

What should be considered now to achieve CN

- Each region (municipalities, prefectures) has set reduction target to realize CN by 2050. Rather than each region aiming for CN, it would be more efficient to cooperate based on regional characteristics and aim to realize CN for Japan as a whole.
- A specific roadmap is needed according to the difficulty in spreading measures by 2050.
- Research on the relationship between decarbonization and other related local issues is also needed.

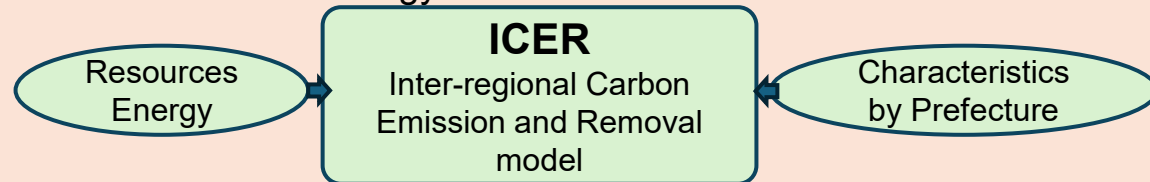
Analysis of Japan's decarbonization scenarios considering prefecture level measures

(FY2023~FY2025, NIES, TMRIEP, LBERI)

How should prefectures work toward decarbonization consistent with Japan's decarbonization vision?

(1) Decarbonization analysis of 47 prefectures (NIES)

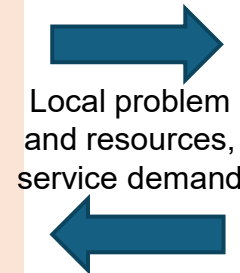
Quantitative analysis of the introduction of measures consistent with Japan's decarbonization plan, based on the social and economic structure of each prefecture and the development of local resources such as renewable energy and forests.



ICER : Snapshot tool for hybrid (top-down and bottom-up) local decarbonization analysis

Barriers to adoption of measures

Power supply configuration, Service demand, Negative emission technology

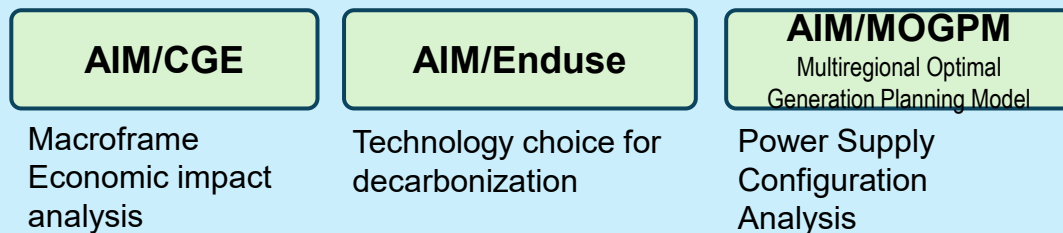


Local problem and resources, service demand

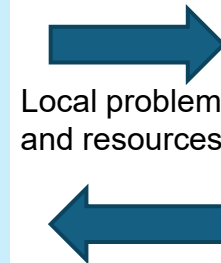
Sharing IO table by prefecture

(2) Japan's decarbonized society analysis(NIES)

Analyzing Japan's path to a decarbonization using AIM



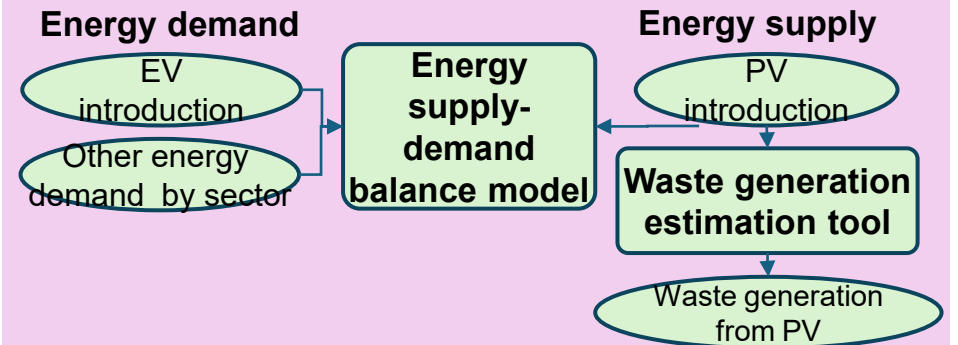
- ✓ Analysis based on the latest plans
- ✓ A Roadmap to decarbonized society (2030-2050)



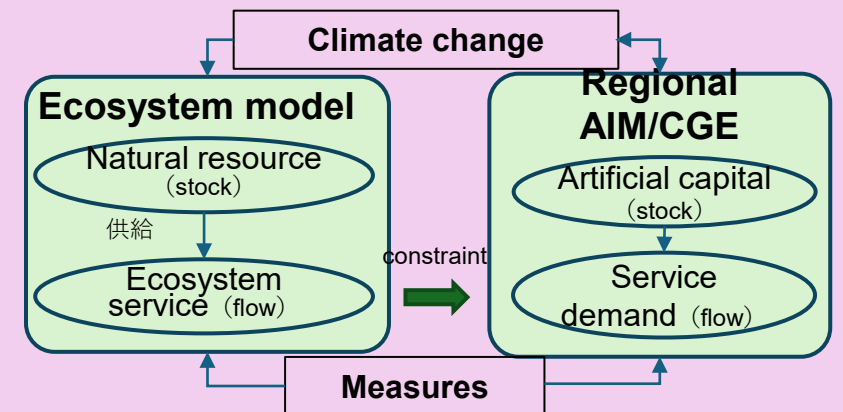
Local problem and resources

(3) Integrated analysis of local decarbonization and other issues (TMRIEP, LBERI)

(a) Analysis of electricity supply-demand balance and waste generation associated with mass introduction of PV and EVs in the Tokyo metropolitan area (Tokyo)



(b) Analyzing the compatibility of a natural symbiotic society and a decarbonized society with a focus on local resources in Shiga Prefecture



New research project: Analysis of Japan's decarbonization scenarios considering prefecture level measures

Period	FY2023-FY2025
Member	<p><i>NIES</i></p> <p>Dr. Kanamori: project leader</p> <p>Dr. Hibino, Dr. Ashina, Dr, Masui: Decarbonization analysis in Japan</p> <p>Dr. Gomi: Decarbonization analysis of 47 prefectures</p> <p><i>Lake Biwa environmental research institute</i></p> <p>Dr. Kawase: Analysis of decarbonization and local resources in Shiga</p> <p><i>Tokyo Metropolitan research institute for environmental protection</i></p> <p>Dr. Katano, Dr. Okuno, Dr. Yamasaki, Dr. Koyano: Analysis of measures to decarbonize Tokyo</p>

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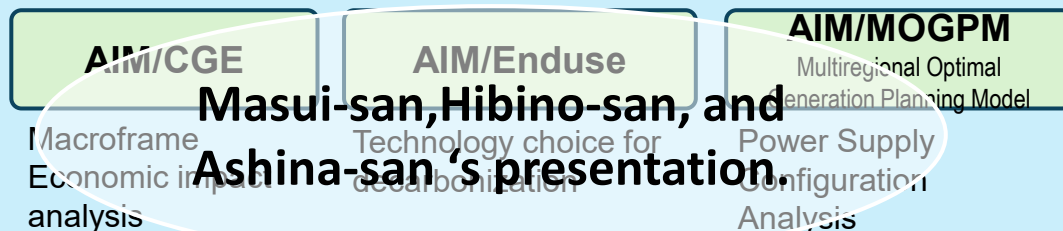
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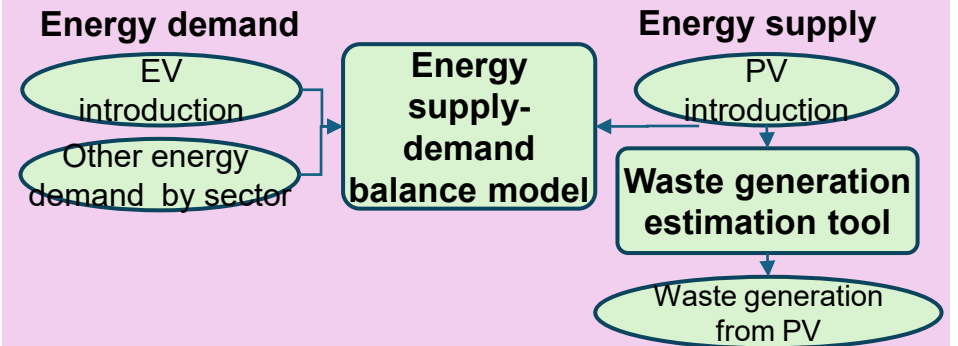


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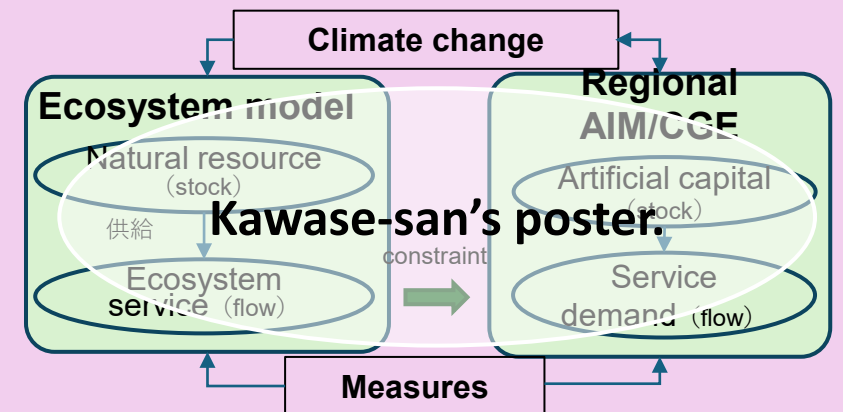


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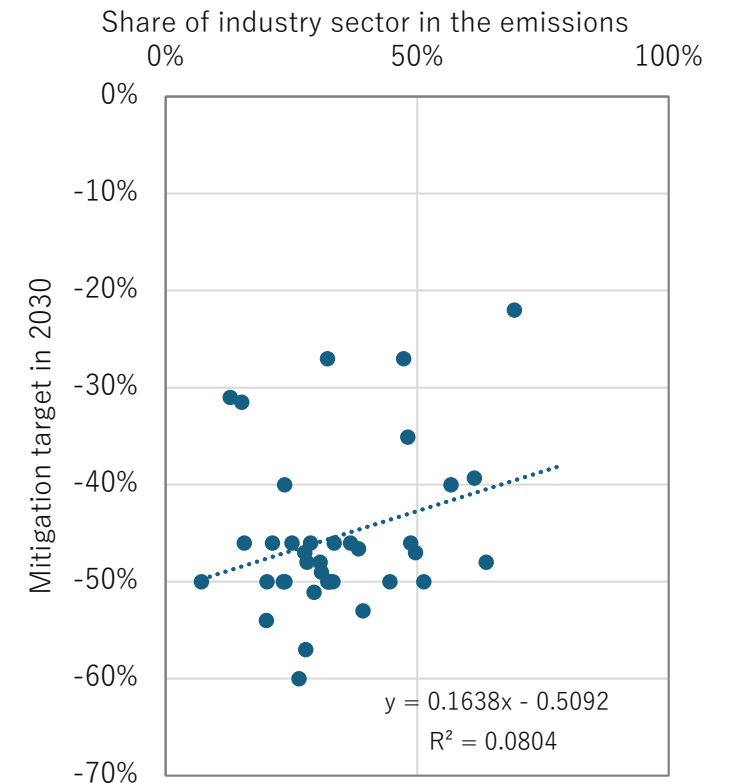
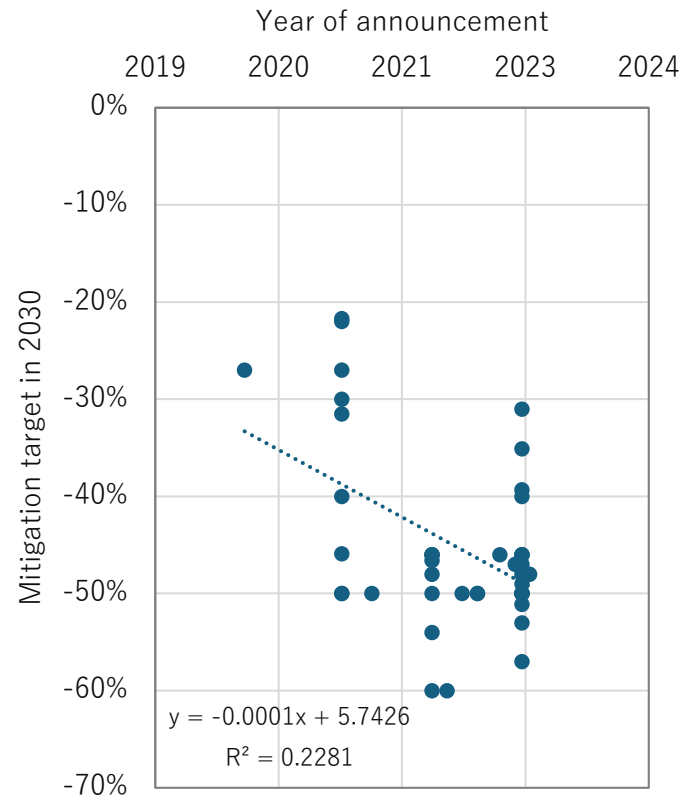
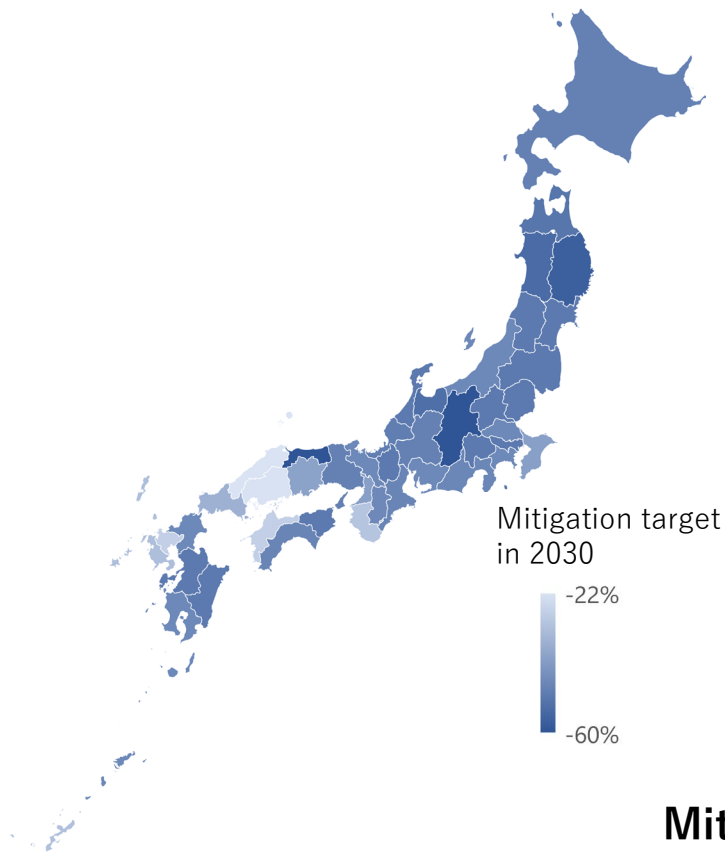


Kawase-san's poster.

ICER* – Background of model and scenario development

*Inter-regional Carbon Emission and Removal model

- Despite the carbon neutral declaration by many local governments, only three out of 47 prefectures have concrete plans by 2050 (Fukushima, Yamagata, Nagano).
- There is a significant difference in the 2030 mitigation targets.



Mitigation target of prefectural governments in 2030

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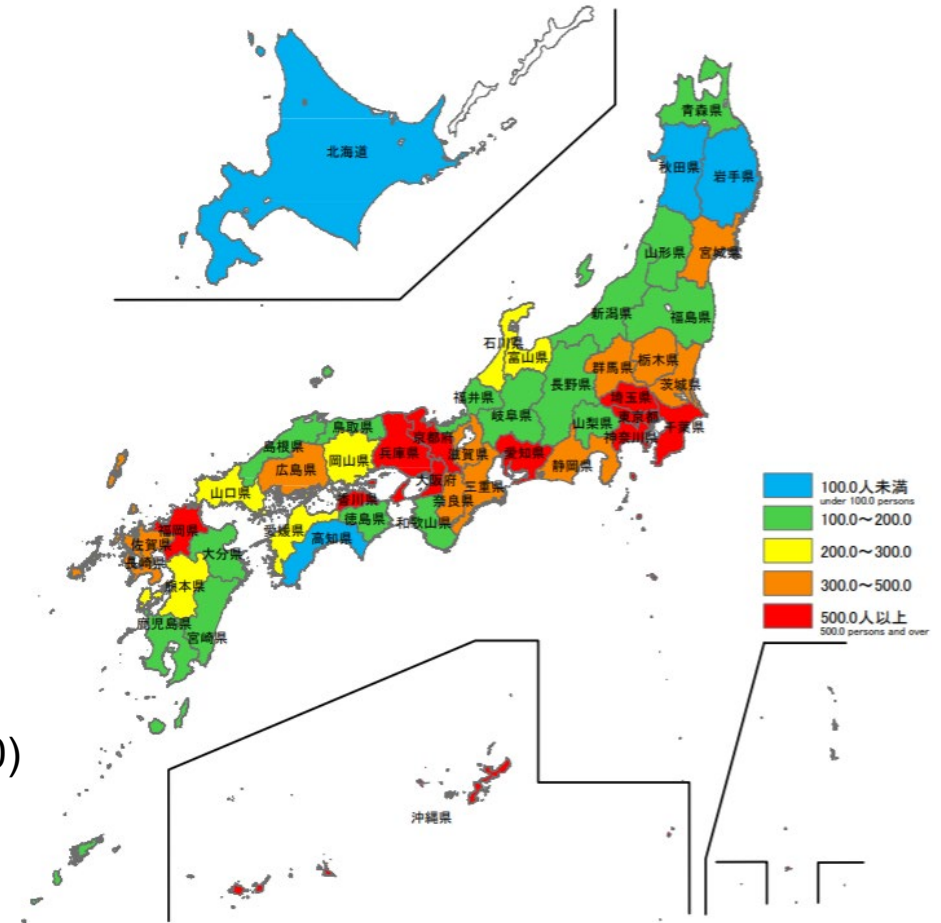
- Each prefecture has a different climate, land-use structure, population density, and industrial structure; hence, it has different energy demand structure, RE potential, and carbon sink potential
- Achieving the same CN target independently in each prefecture is almost obviously not reasonable.
- For Japan to be carbon neutral in a reasonable way, each prefecture will be required to make different contribution (energy saving, RE supply, forest management, etc.)

Population density by prefectures (2020)

Max. Tokyo 6400 km⁻¹

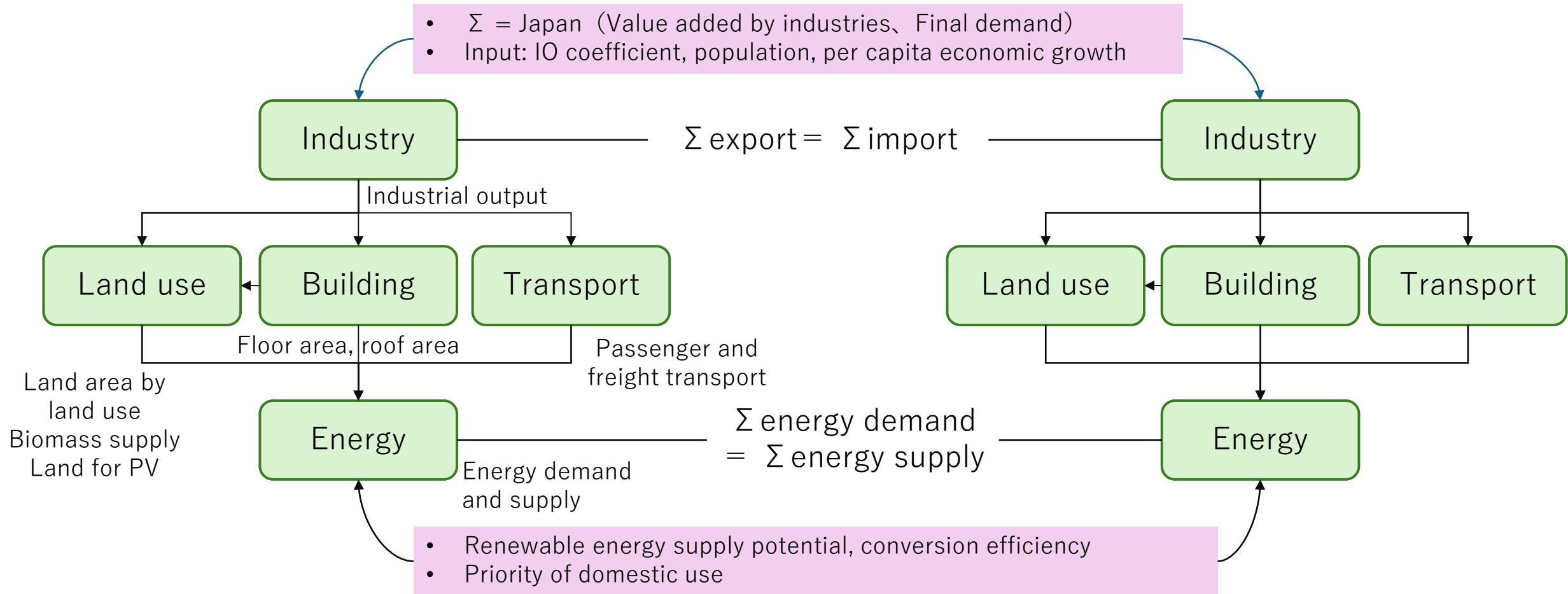
Min. Hokkaido 65 km⁻¹

From: Statistics Bureau of Japan



Objective, design and structure of ICER

- ICER is to develop CN scenarios of all prefectures, which is consistent with Japan's national scenario, including socio-economic activities, energy demand, and supply, the introduction of mitigation actions, CO2 emissions, and carbon sink.
- ExSS (extended snapshot tool) is extended to the inter-regional version. Key points of development: (1) Sum of 47 prefectures equal to given Japan national scenarios (2) Inter-prefectural trade of goods and RE.



Progress: BaU scenario

- Data collection and formatting
 - The IO table of 47 prefectures was converted to a standard format.
 - Energy demand by prefecture was estimated using a common data source and formula.
 - Forest data (age and species of the trees) was collected and analyzed.
- Scenario setting
 - Base year 2015 (because of IO table availability)
 - Target year 2050
 - Economic growth (Japan's scenario) and population decline (gov. projection)
 - No change in energy demand and supply technologies
 - Continuing current forestry management

Summary and next step

- Large regional disparities were projected for energy demand versus renewable energy and CO2 emissions versus carbon sink.
- It shows the necessity of coordination and collaboration (with carbon accounting rules) between urban prefectures and large rural prefectures.
- Mitigation scenarios are being developed
 - ① Achieving CN targets independently in each prefecture
 - ② Introducing an equal level of mitigation actions in all prefectures to achieve the national CN target
- Projection of intermediate targets in 2030, 2035 etc. which is consistent with the national 2030 target and the 2050 target of each prefecture.