

# **TBD: Toward Building and Demonstrating a Regional Circular and Ecological Sphere**

---

Shuichi Ashina

Manager, International Coordination Office

Senior Researcher, Center for Social and Environmental Systems Research

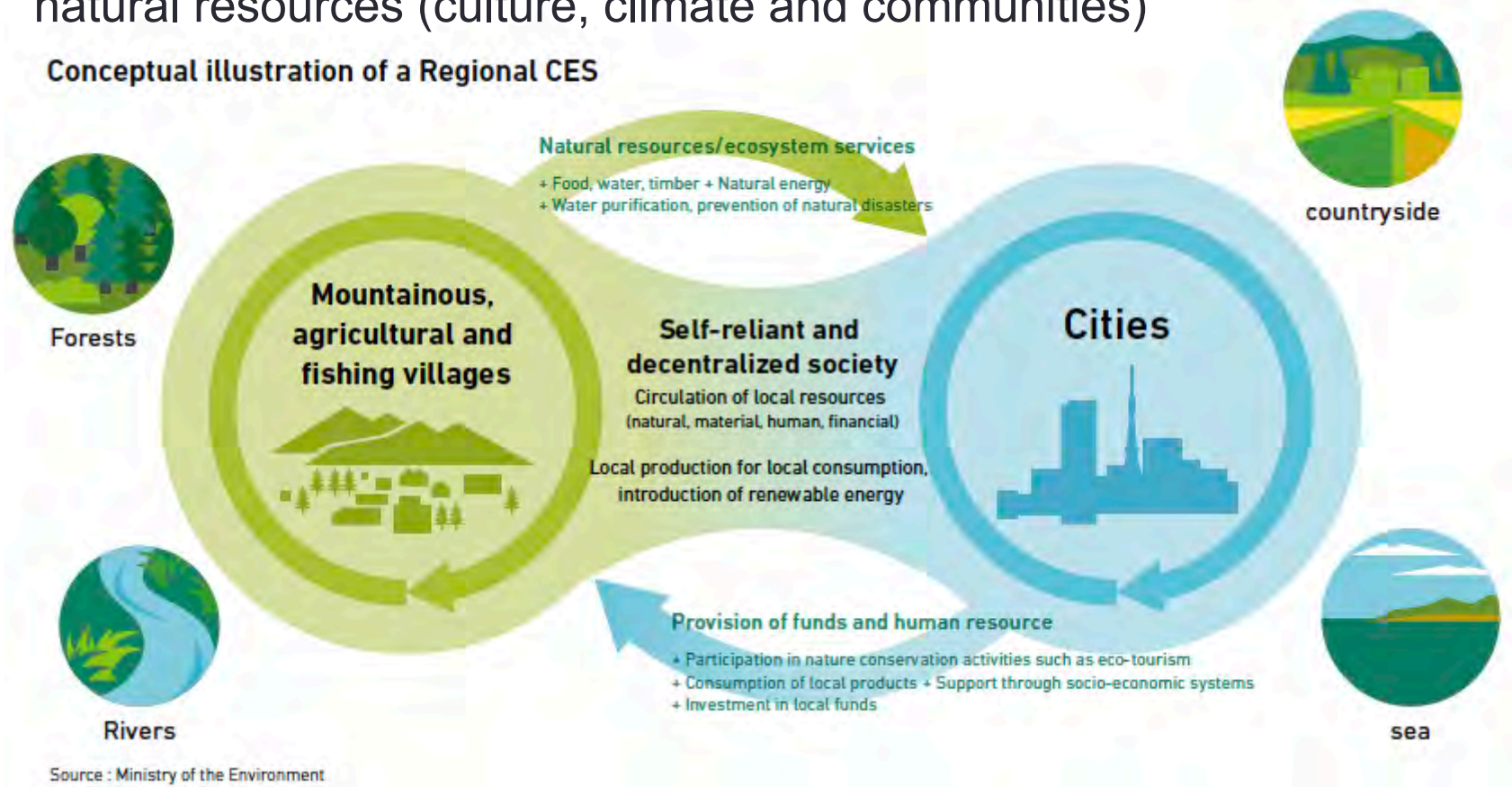
National Institute for Environmental Studies

E-mail: [ashina.shuichi@nies.go.jp](mailto:ashina.shuichi@nies.go.jp)

# Concept of a Regional Circular and Ecological Sphere (CES) – Local SDGs

- Aims to enhance **utilization of regional resources** for building a sustainable society not only **within a region but also with neighboring regions**.
- Regional resources including energy (solar and wind), social and natural resources (culture, climate and communities)

## Conceptual illustration of a Regional CES



# Schema of The Regional CES: Mandara

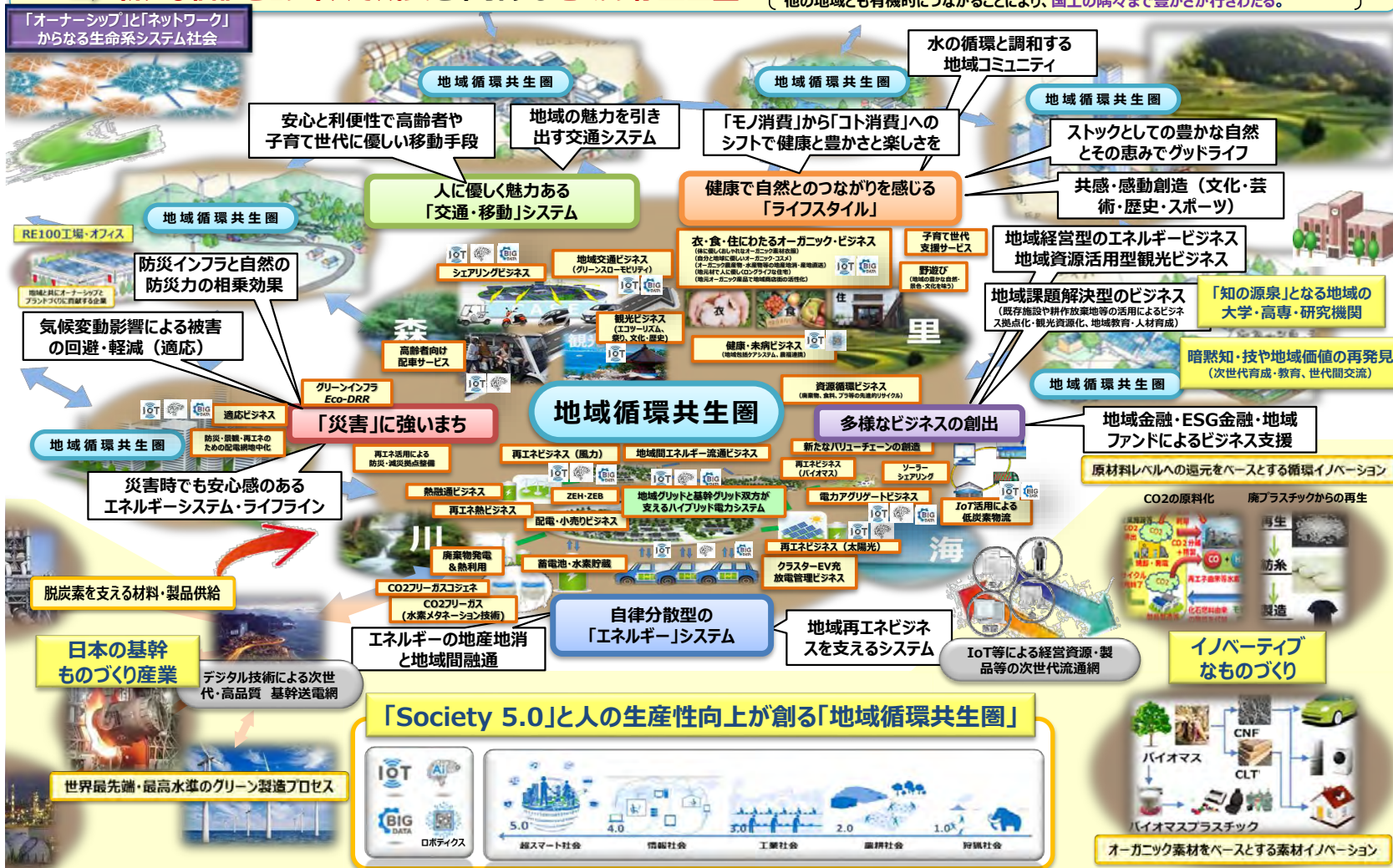
## 地域循環共生圏（日本発の脱炭素化・SDGs構想）

— サイバー空間とフィジカル空間の融合により、地域から人と自然のポテンシャルを引き出す生命系システム —

「自立分散」×「相互連携」×「循環・共生」= 活力あふれる「**地域循環共生圏**」⇒「**脱炭素化・SDGsの実現、そして世界へ**」  
「オーナーシップ」「ネットワーク」「サステナブル」「人間の安全保障、次世代・女性のエンパワーメントを基盤に」

➡ **新たな価値とビジネスで成長を牽引する地域の存立基盤**

人々が健康で生き生きと暮らし幸せを実感することで、地域が自立し誇りを持ちながらも、他の地域とも有機的につながることにより、**国土の隅々まで豊かさが行きわたる。**





# Schema of The Regional CES: Mandara

## 地域循環共生圏（日本発の脱炭素化・SDGs構想）

— サイバー空間とフィジカル空間の融合により、地域から人と自然のポテンシャルを引き出す生命系システム —

「自立分散」×「相互連携」×「循環・共生」= 活力あふれる「地域循環共生圏」⇒「脱炭素化・SDGsの実現、そして世界へ」  
「オーナーシップ」「ネットワーク」「サステナブル」「人間の安全保障、次世代・女性のエンパワーメントを基盤に」

⇒ **新たな価値とビジネスで成長を牽引する地域の存立基盤**

人々が健康で活き活きと暮らし幸せを実感することで、地域が自立し誇りを持ちながら、他の地域とも有機的につながることで、国土の隅々まで豊かさが行きわたる。

「オーナーシップ」と「ネットワーク」  
からなる生命系システム社会

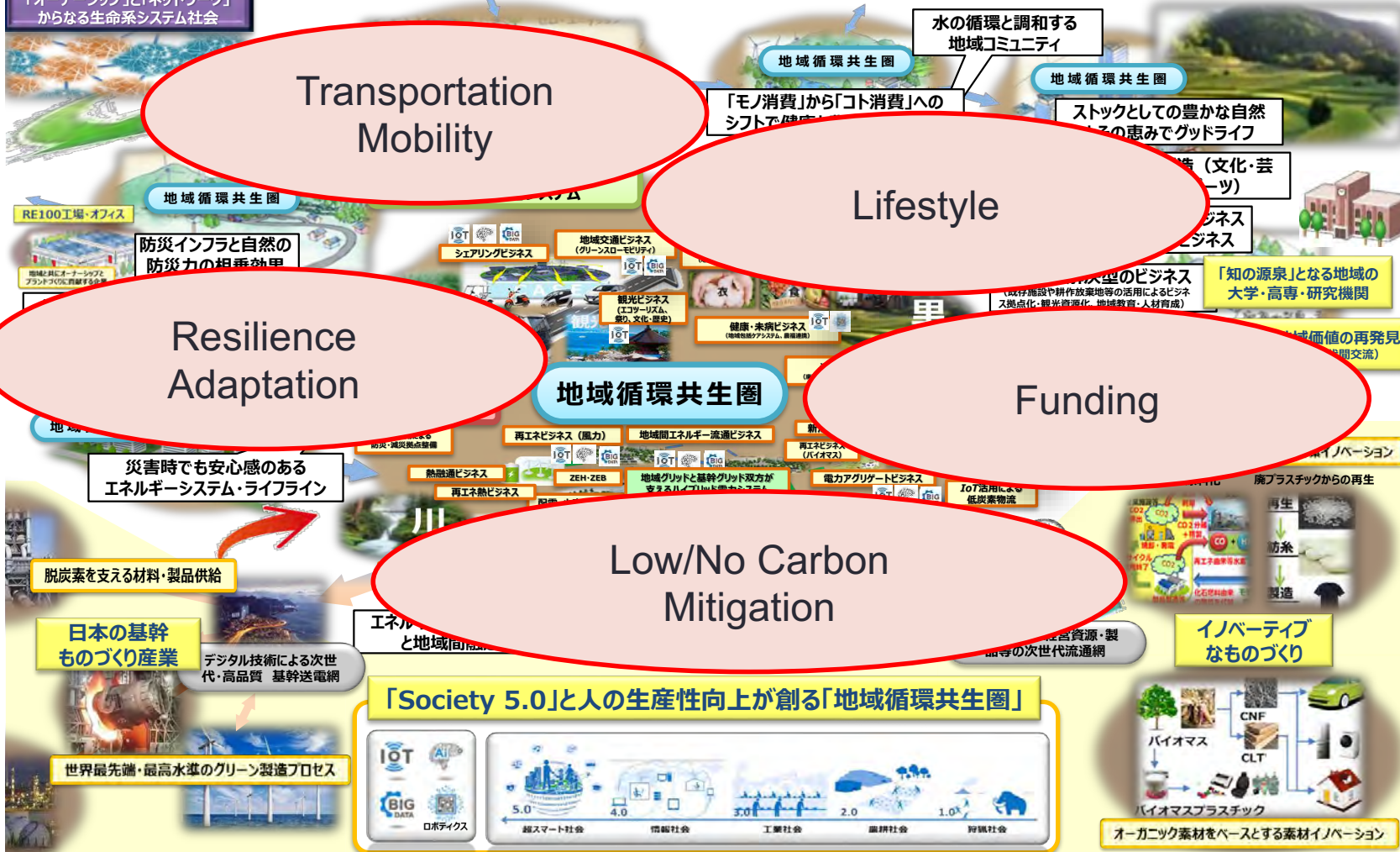
Transportation  
Mobility

Lifestyle

Resilience  
Adaptation

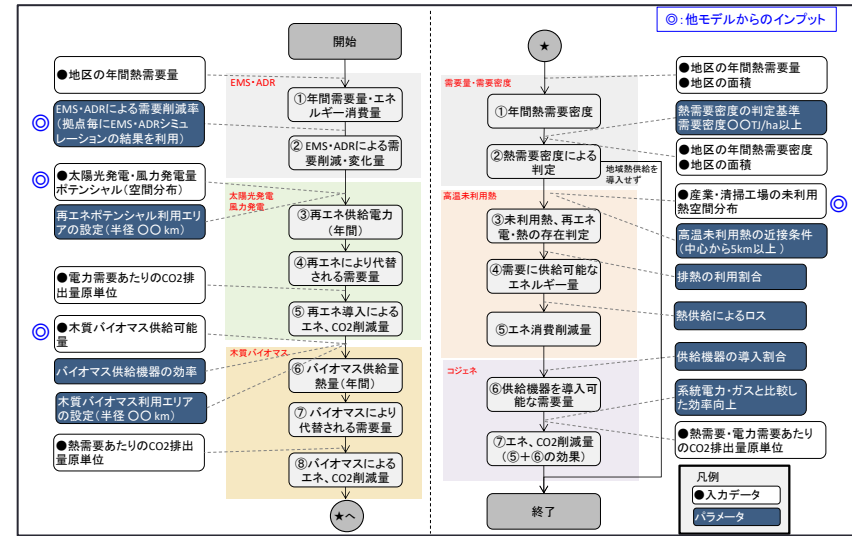
Funding

Low/No Carbon  
Mitigation



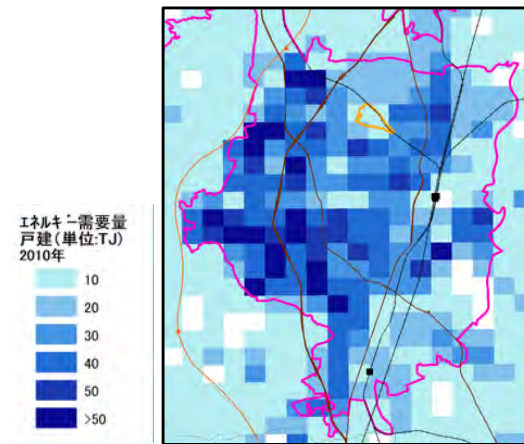
# Regional Low Carbon Scenario: AIM with Spatial Info.

- Developed Regional AIM/Enduse could analyze GHG reductions and mid-/long-term scenarios in region in consideration with spatial distribution of energy demand and supply.

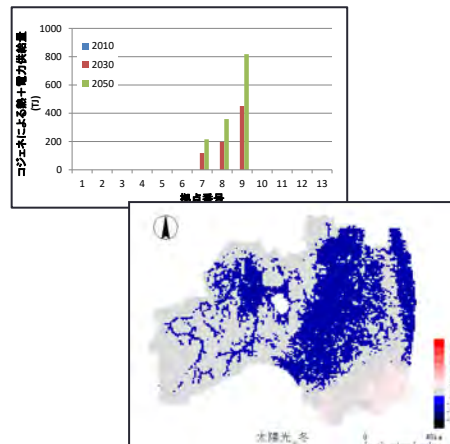


Analysis Flow of Regional Enduse

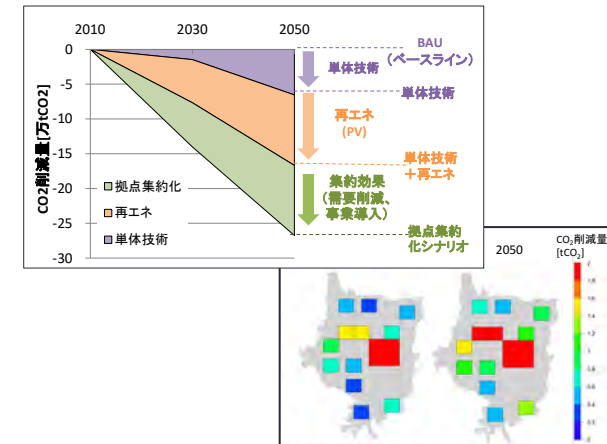
## Energy Demand → Energy Resource → GHG reductions



Spatial Distribution of Energy Demand



Energy Resources (CHPs, Renewables)

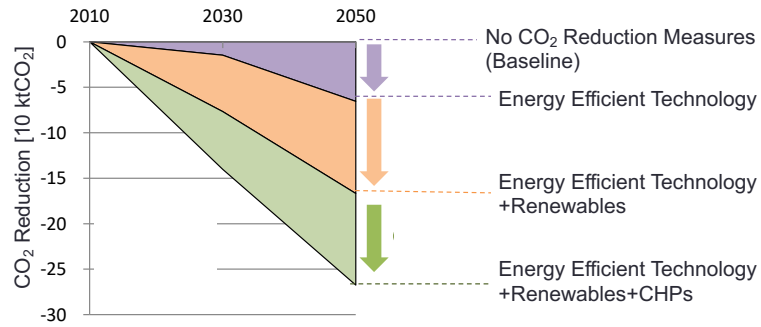


GHG reductions in region

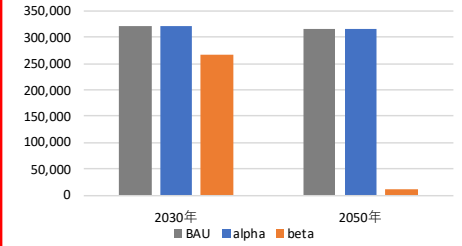
# Impacts of National Actions to Regional GHG reduction

- Assumptions: - Technology scenario is same as national one  
 - Transition to Compact city is included ( $\alpha$ ,  $\beta$  (more compact))

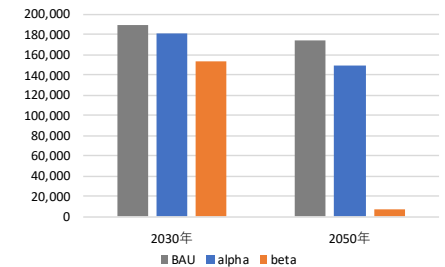
## Koriyama



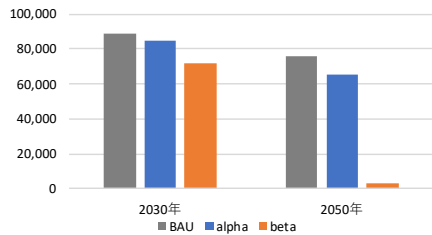
## Asahikawa



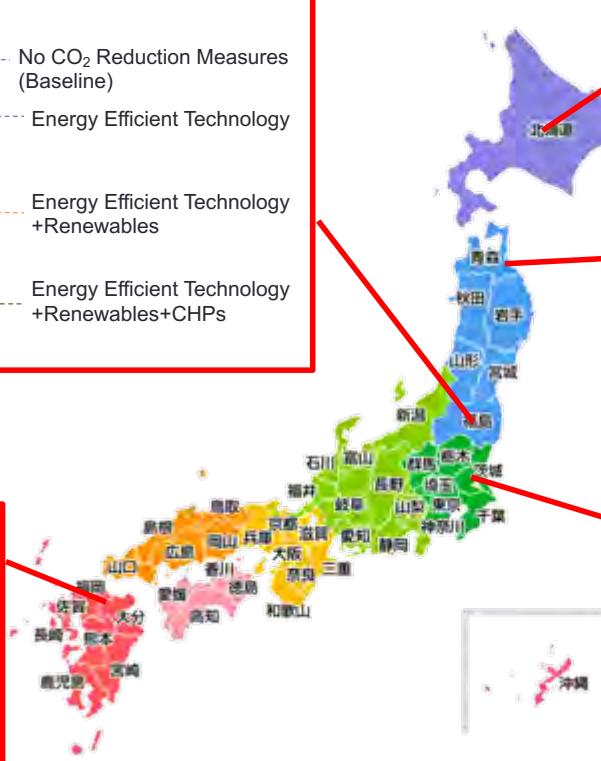
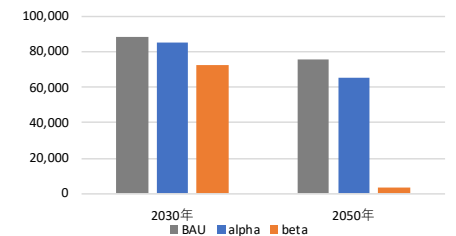
## Hachinohe



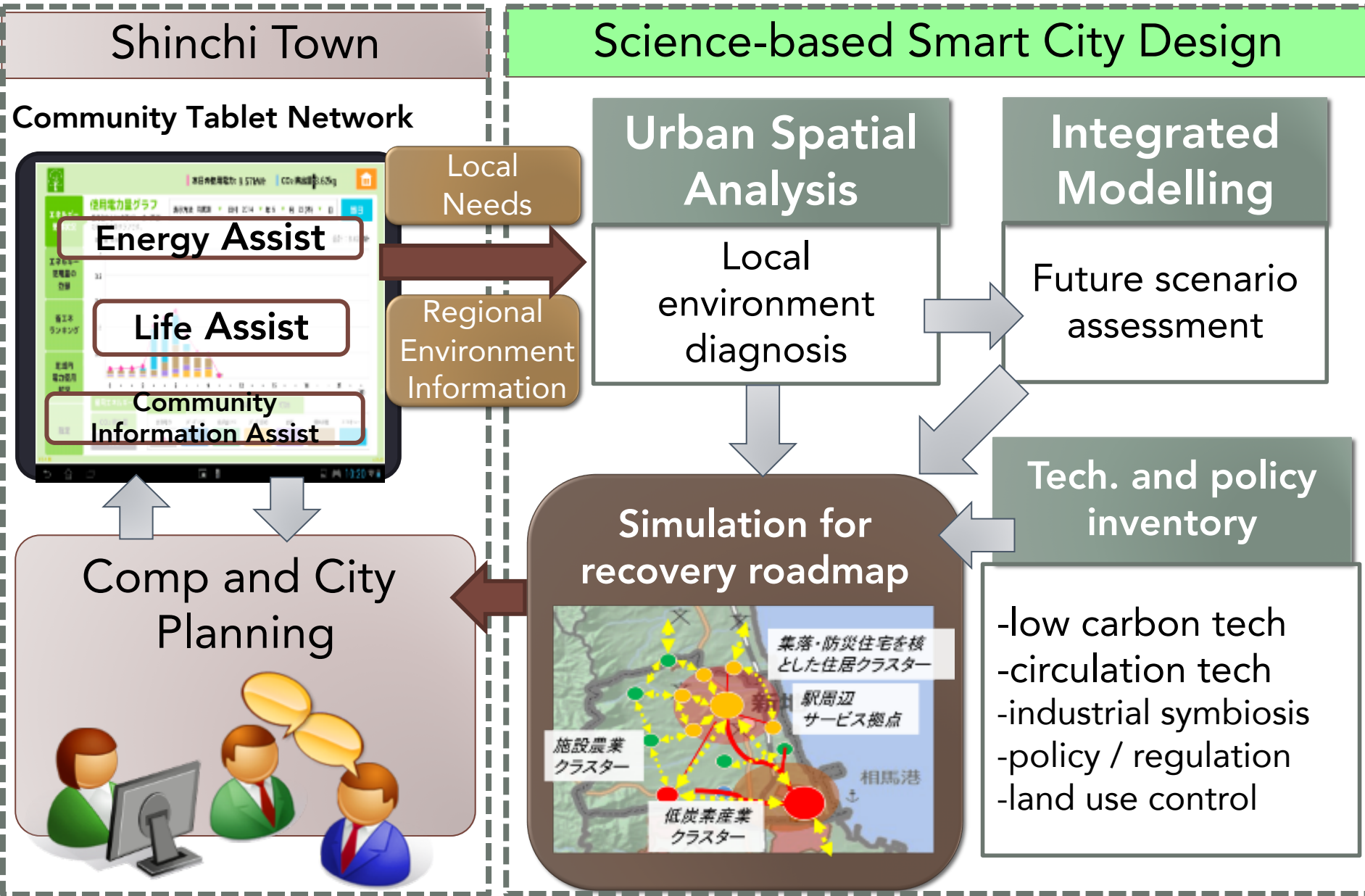
## Kitakyushu



## Tsukuba



# Model to Movements: Collaborative City Design in Fukushima





# Newest Smart Community underway in Fukushima



**Shinchi Town,  
Soma-Futaba Region, Fukushima Prefecture**  
 Population: 8,247 / Households: 2,754 /  
 Area: 46.35 km<sup>2</sup> (As of Jan. 1st, 2017)

**SDGs from Local Energy Business**  
 Sustainable rebuilding projects through collaborative planning among town planning, industrial development and local energy system

**施設農業** (Facility Agriculture) - Includes images of tomatoes and a greenhouse.

**Multi sectoral energy management /housing/commercial/agriculture**

**Energy Center**  
 • Smart thermal and electricity management

**Strategic land use transition targets**

**都市** (City)

**熱電** (Thermal Power) - Legend with red and yellow arrows.

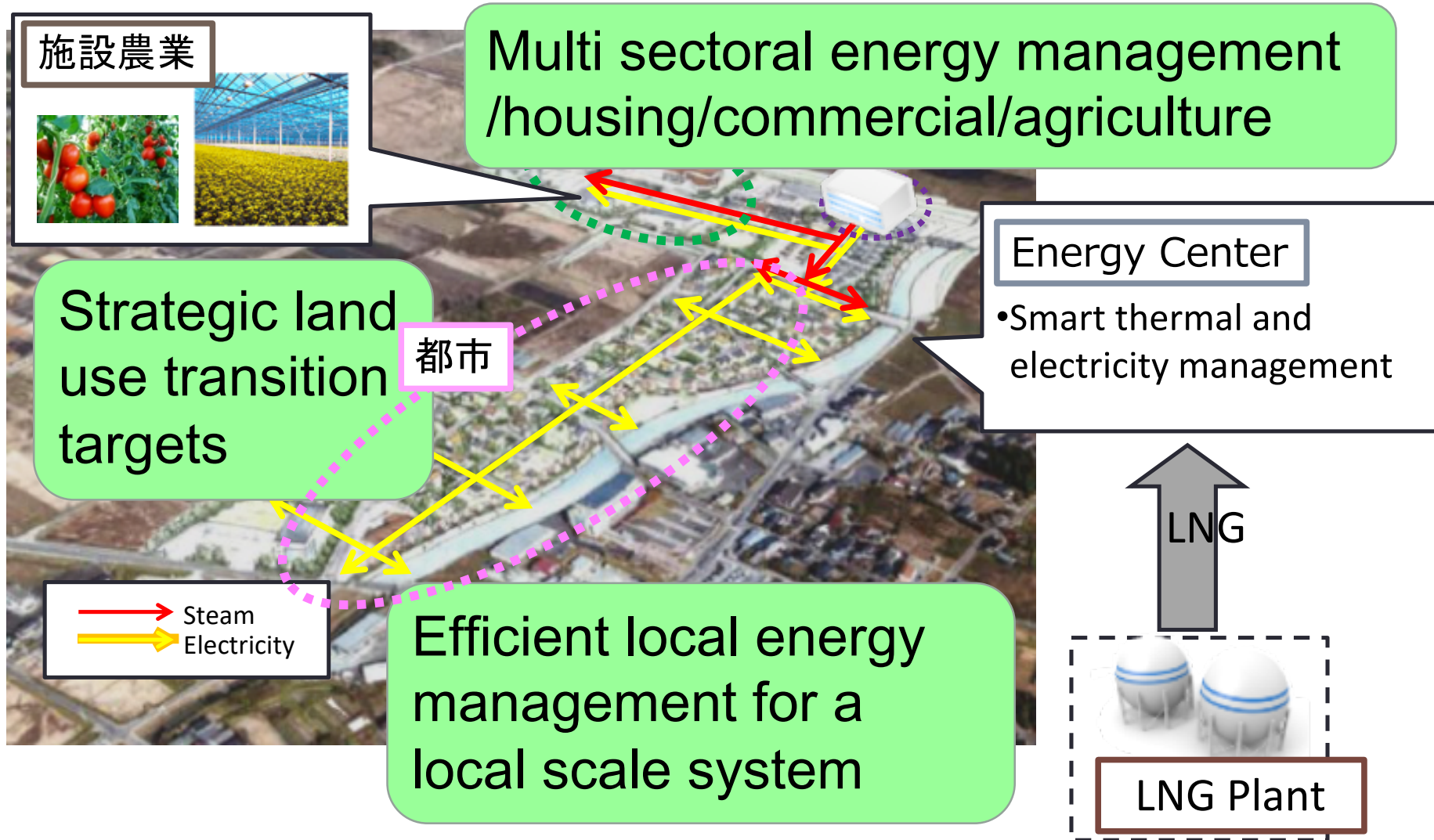
**Efficient local energy management for a local scale system**

**LNG Plant** - Includes images of LNG storage tanks and an upward arrow labeled 'LNG'.



# Local Energy Based Urban Rebuilding Project in Fukushima

Sustainable rebuilding projects through collaborative planning among town planning, industrial development and local energy system



# Local Energy Based Urban Rebuilding Project in Fukushima





# Local Energy Network in Shinchi



Energy Center (Supplier)



Futsal Dome (Electricity)



Hotel (Heat and Electricity)



Shopping Complex (Heat and Electricity)





## Center of Excellence in Shinchi: UDC Shinchi

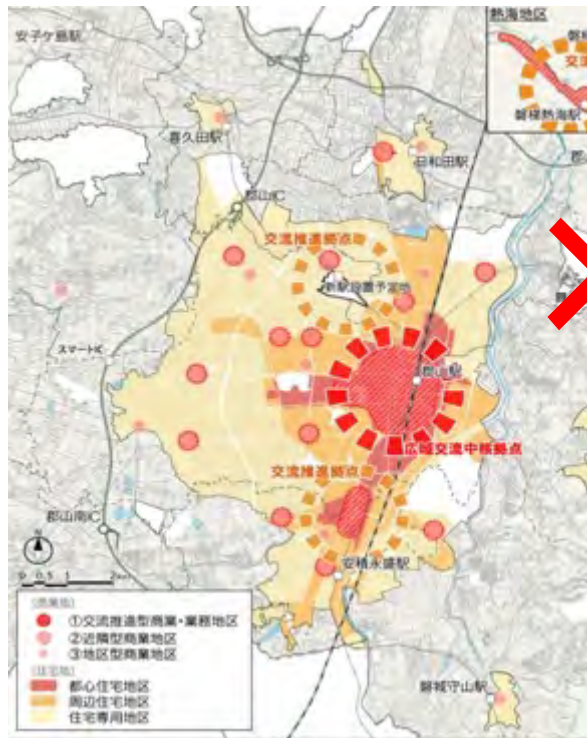
- Graduate School of Frontier Sciences of The University of Tokyo, Shinchi town and NIES jointly established the Shinchi Urban Design Center (UDC Shinchi).
- Opening Ceremony was held on 15<sup>th</sup> Nov, 2019.
- In UDC Shinchi, researchers and students conduct researches for efficient energy systems and regional development.



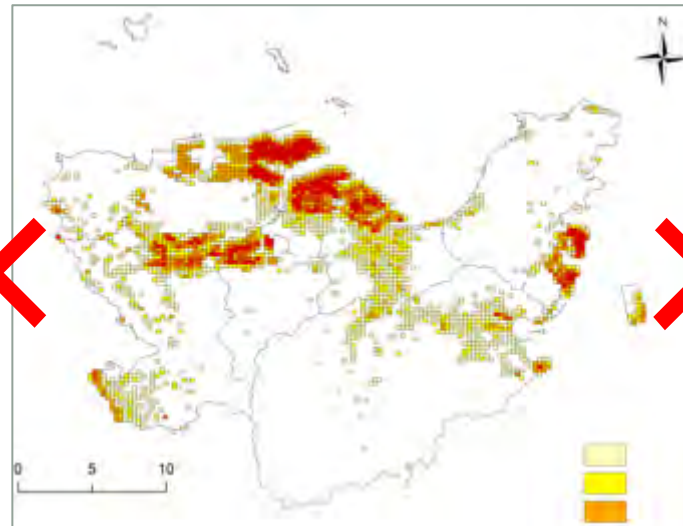
# City Planning in consideration with Climate Change

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

City Planning



Regional Low Carbon Actions



Risk of Flood

