

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

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# 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

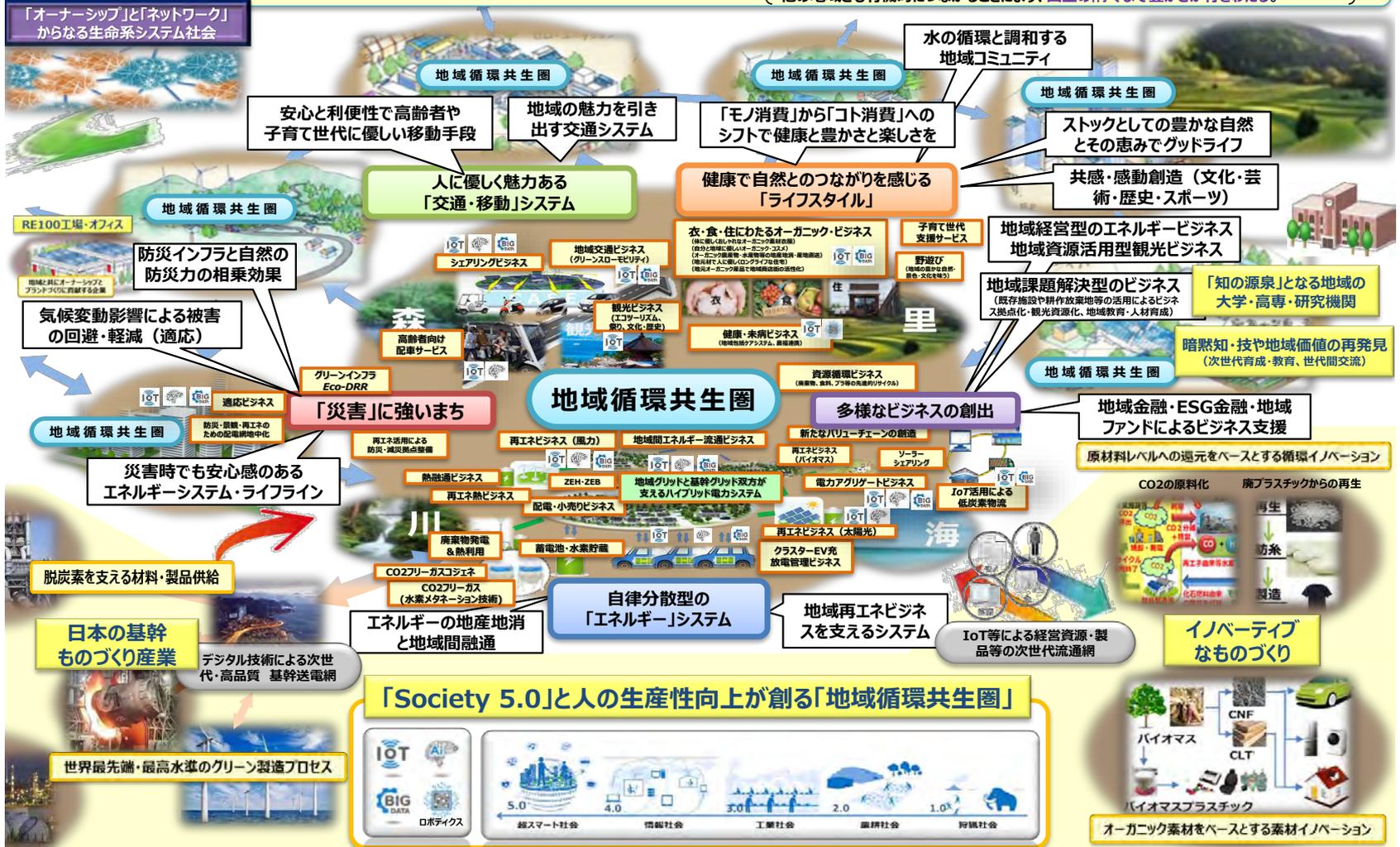
## 地域循環共生圏（日本発の脱炭素化・SDGs構想）

— 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。**



「Society 5.0」と人の生産性向上が創る「地域循環共生圏」



# Schema of The Regional CES: Mandara

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「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

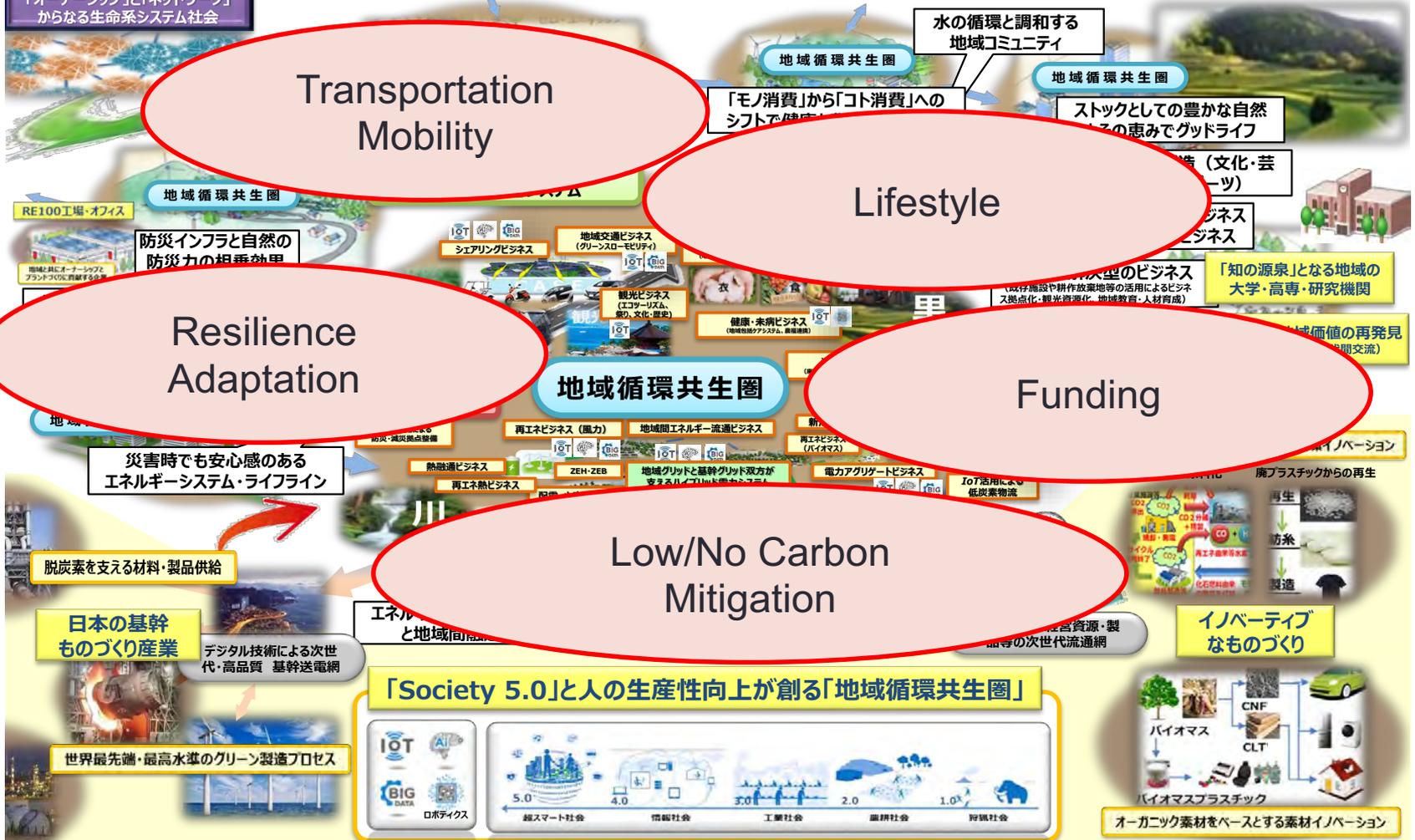
Transportation  
Mobility

Lifestyle

Resilience  
Adaptation

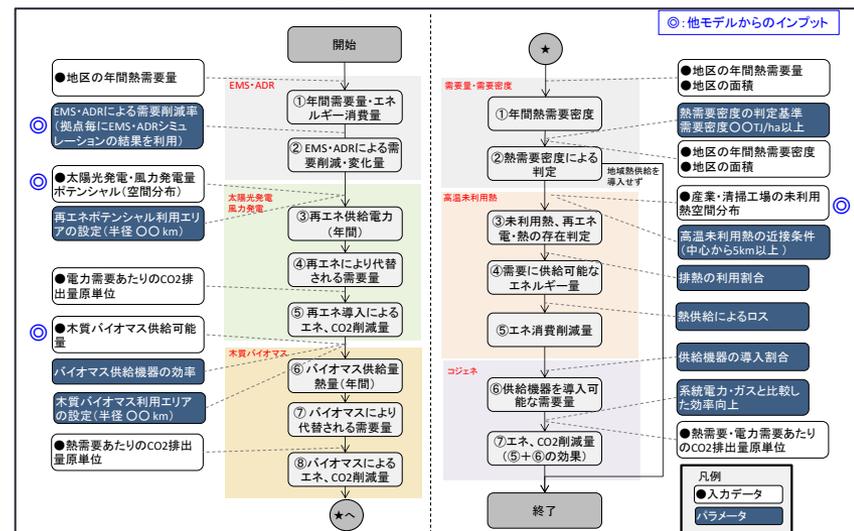
Funding

Low/No Carbon  
Mitigation



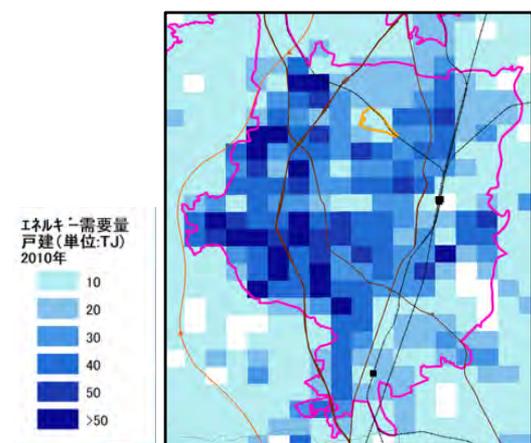
# Regional Low Carbon Scenario: AIM with Spatial Info.

- 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.

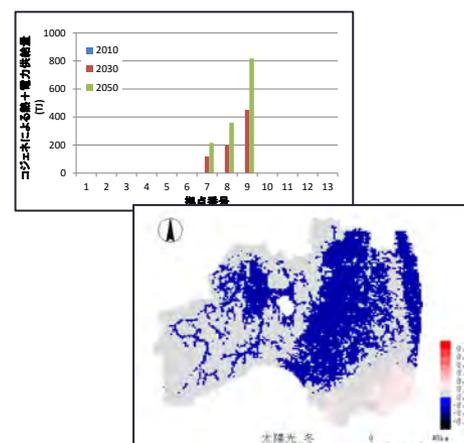


Analysis Flow of Regional Enduse

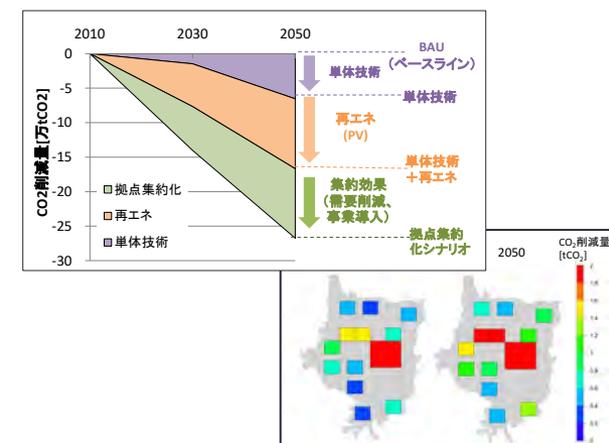
## Energy Demand → Energy Resource → GHG reductions



Spatial Distribution of Energy Demand



Energy Resources (CHPs, Renewables)

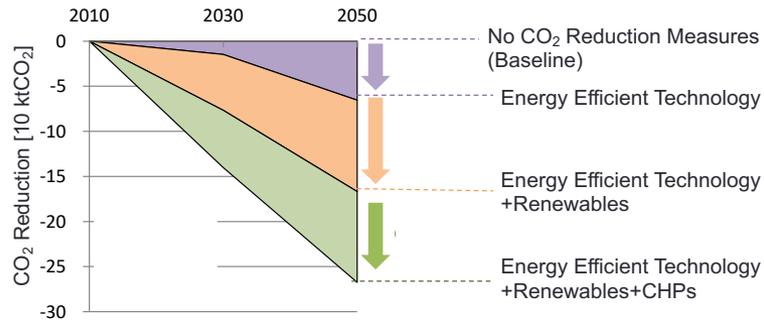


GHG reductions in region

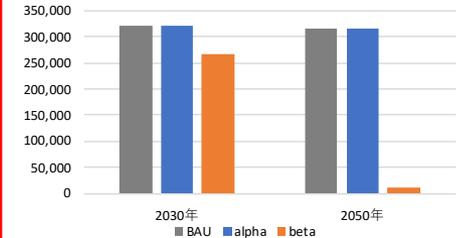
# Impacts of National Actions to Regional GHG reduction

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

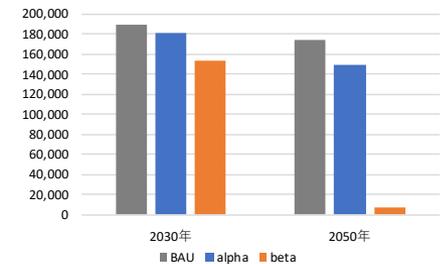
## Koriyama



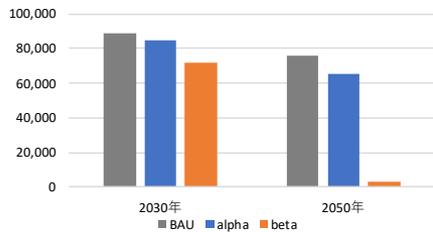
## Asahikawa



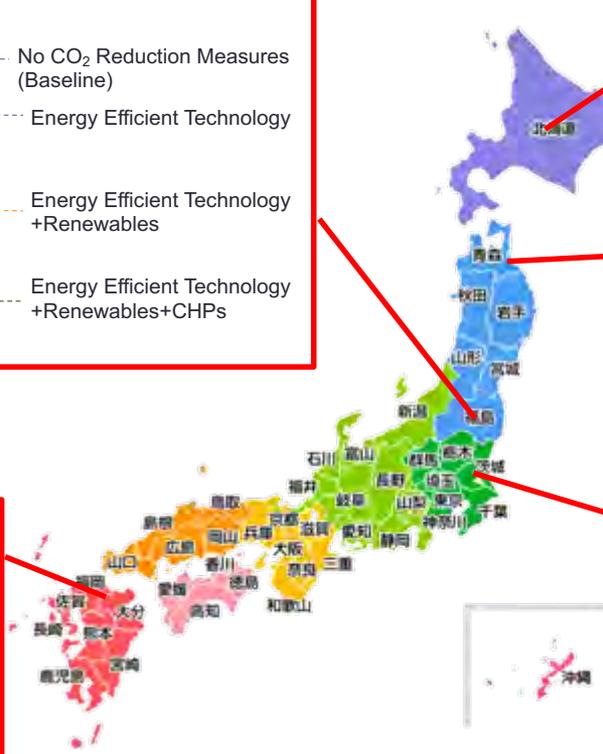
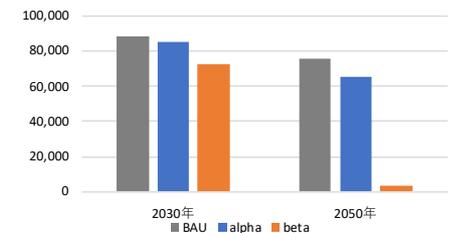
## Hachinohe



## Kitakyushu



## Tsukuba

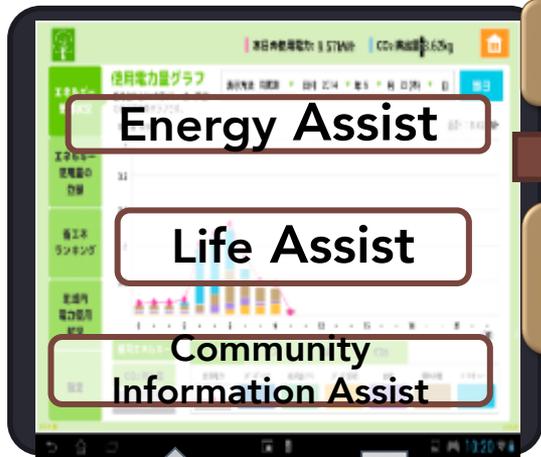


# Model to Movements: Collaborative City Design in Fukushima

Shinchi Town

Science-based Smart City Design

Community Tablet Network



Local Needs



Regional Environment Information

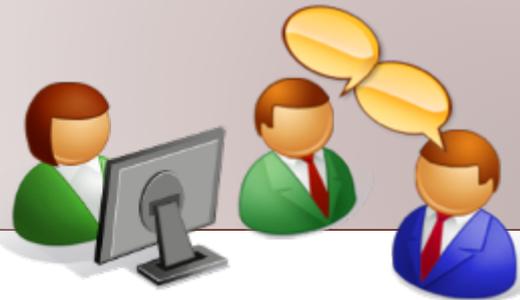
Urban Spatial Analysis

Local environment diagnosis

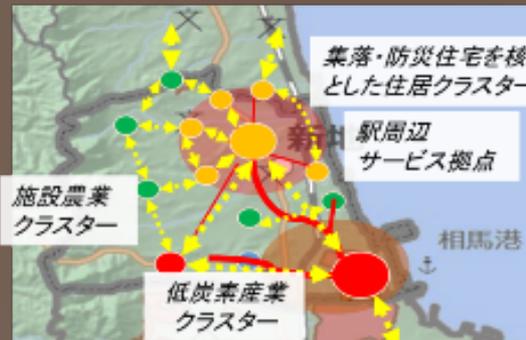
Integrated Modelling

Future scenario assessment

Comp and City Planning



Simulation for recovery roadmap



Tech. and policy inventory

- low carbon tech
- circulation tech
- industrial symbiosis
- policy / regulation
- land use control

# 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**

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

**Strategic land use transition targets**

**都市**

**Energy Center**

- Smart thermal and electricity management

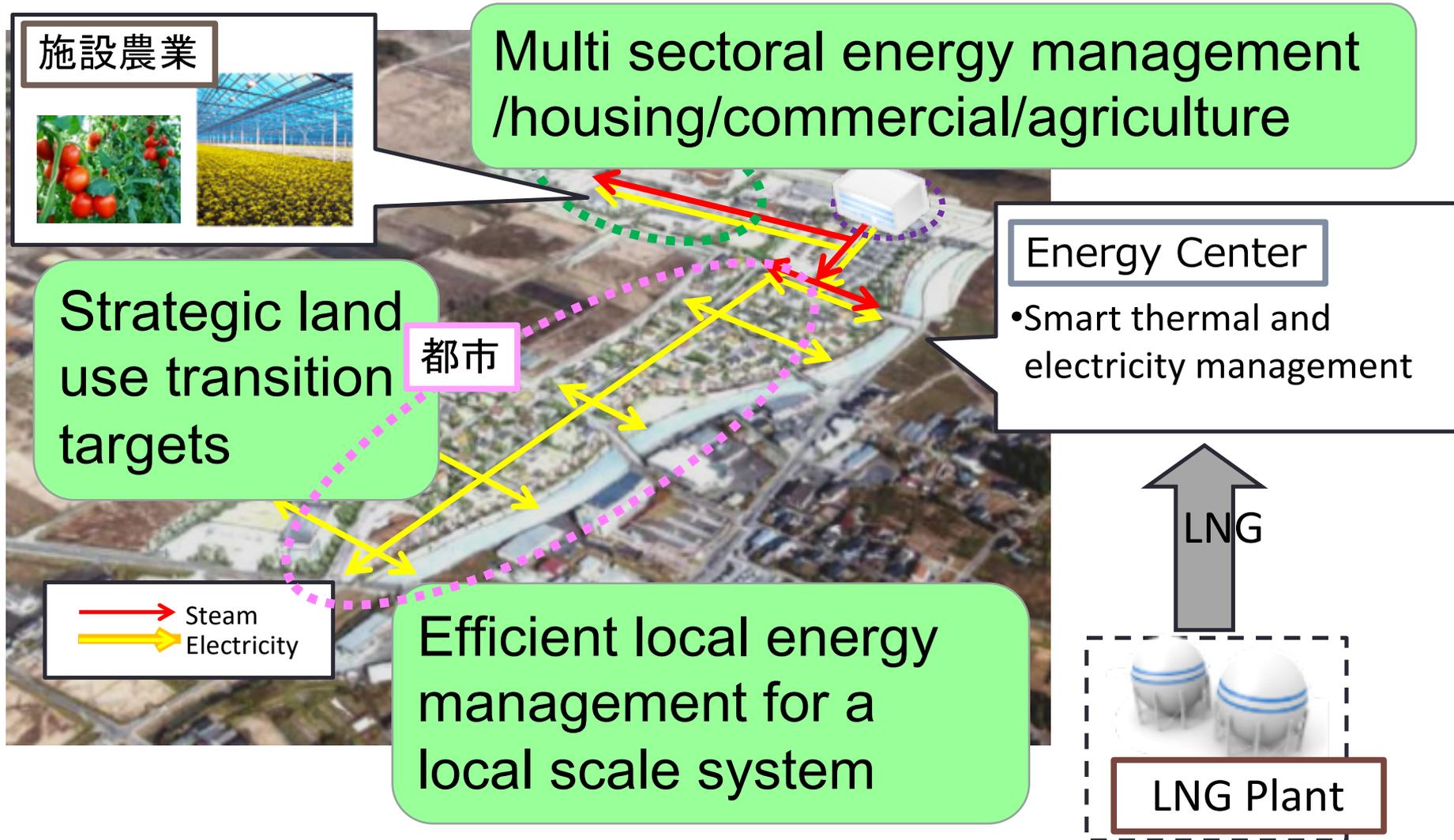
**Efficient local energy management for a local scale system**

↑ LNG

**LNG Plant**

# 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

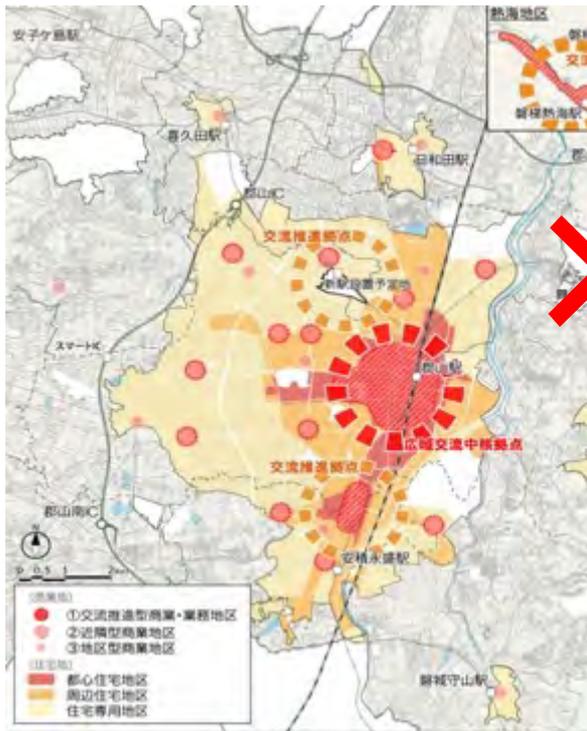
- Graduate School of Frontier Sciences of The University of Tokyo, Shinchi town and NIES jointly established the Shinchi Urban Design Center (UDC Shinchi).
- Opening Ceremony was held on 15<sup>th</sup> Nov, 2019.
- In UDC Shinchi, researchers and students conduct researches for efficient energy systems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



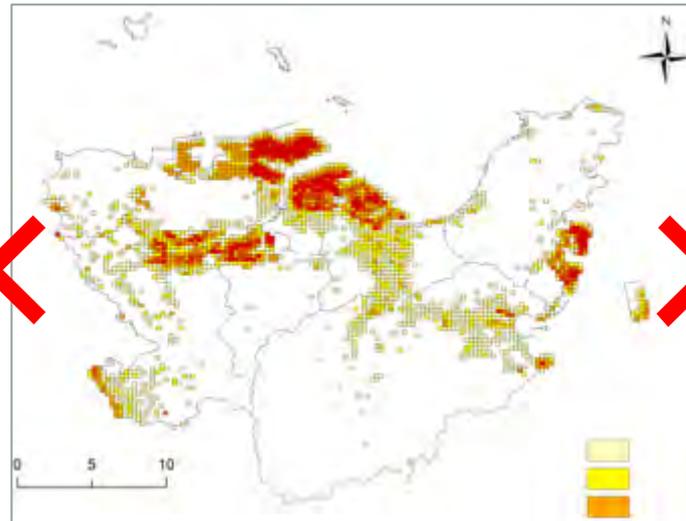
# City Planning in consideration with Climate Change

- 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

