

TWI2050 Seminar at UNU, 9th October, 2018



Future Outlook on the
“The World in 2050” Initiative (TWI2050)

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Outline

1. The relationship with IIASA
2. The contribution to TWI2050 report
 - 2-1. The development of socioeconomic pathways for cities
 - 2-2. Tokyo SSPs
 - 2-3. Bhutan SSPs
3. Future collaborations with TWI2050 consortium

1. The relationship with IIASA

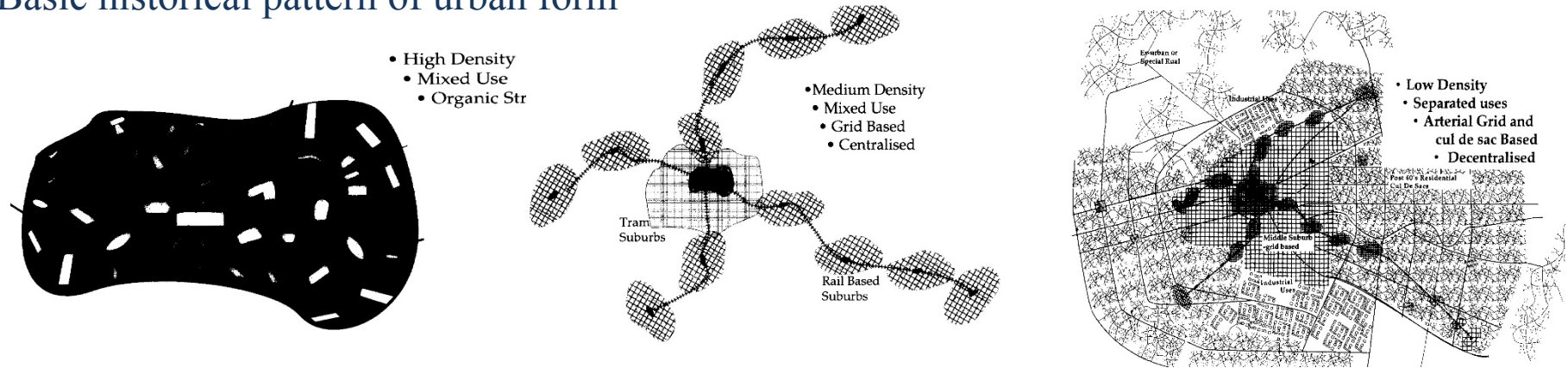
The great experience of Young Scientists Summer Program (YSSP) in 2014.

- Participation of Ph.D. candidates from all over the world
- Collaborations with IIASA's ongoing research on issues of global environmental, economic and social change
- Support from IIASA National Member Organizations (NMO)



The research during YSSP (urban transitions and energy consumption)

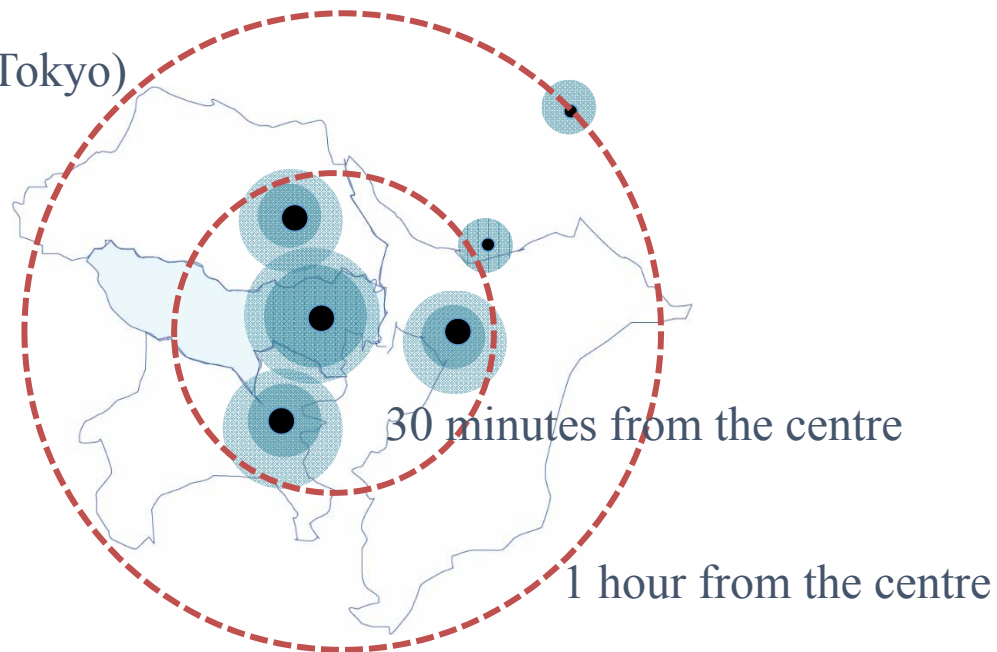
Basic historical pattern of urban form



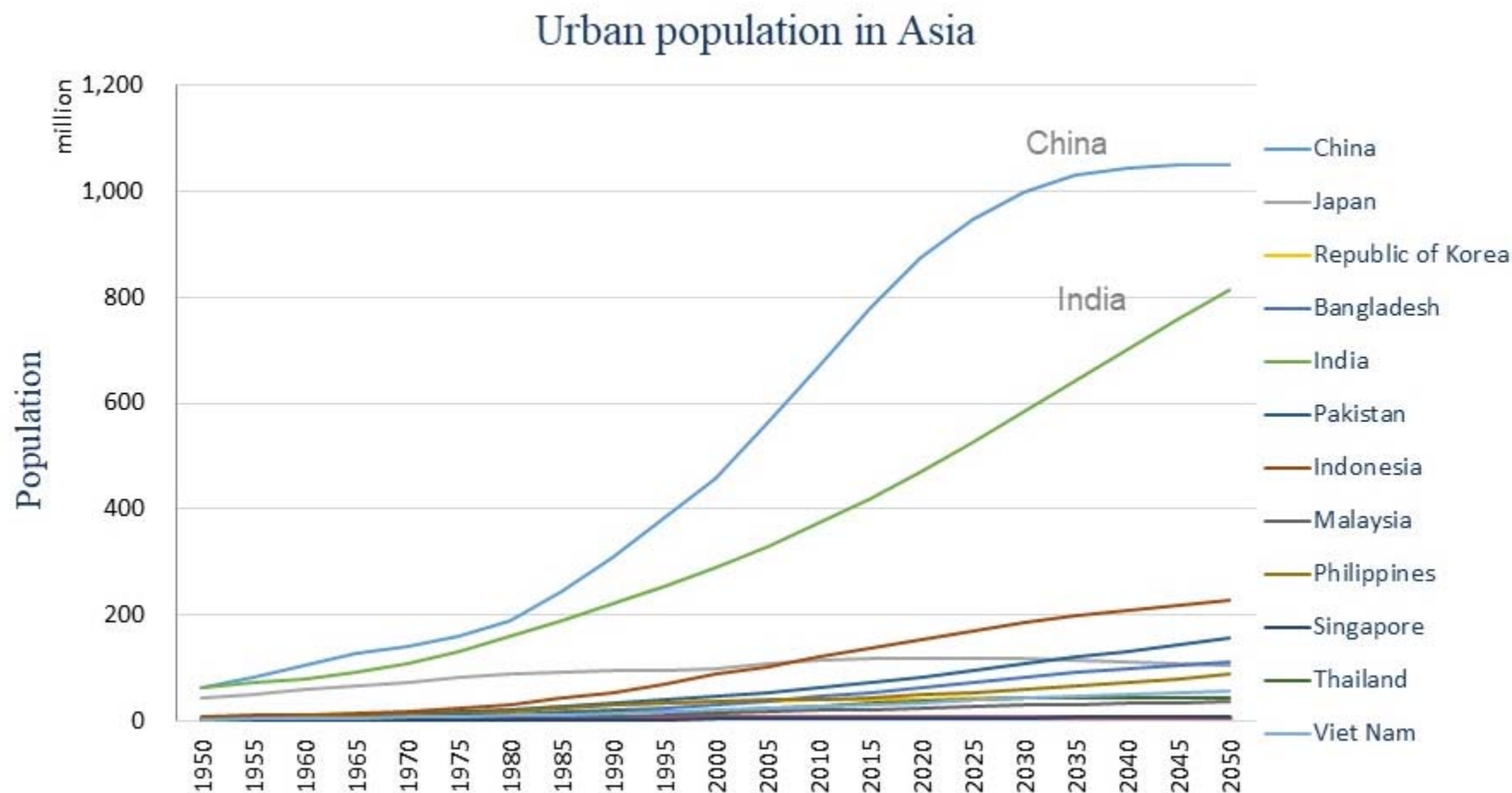
The historical patterns of urban forms (Source: P. Newman and J. Kenworthy, 1996)

Urban Form (Megacity region Tokyo) and Travel time budget

*Travel time budget:
Theory from Marchetti, 1994.



The research during YSSP (urban transitions and energy consumption)

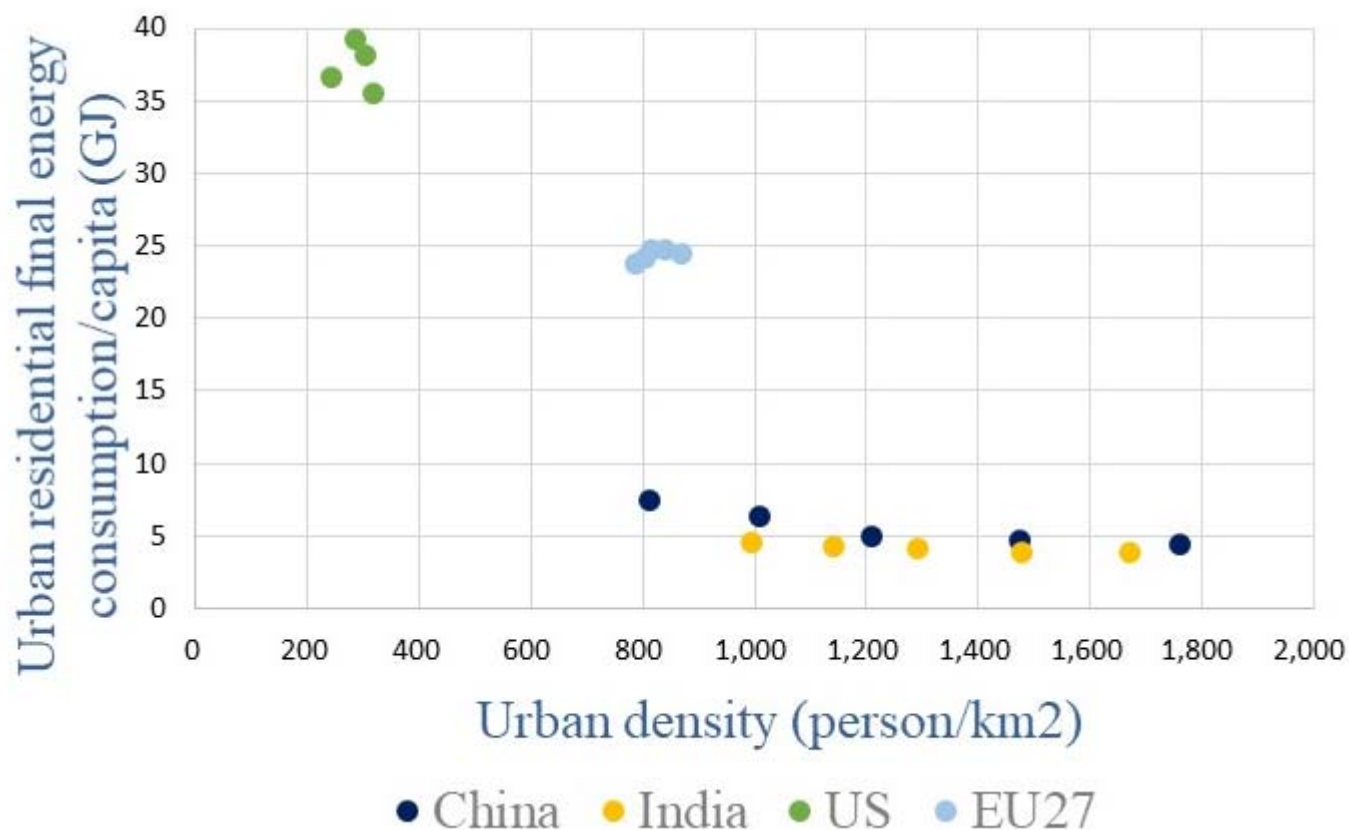


Author made/ Data source: UN World Urbanization Prospects 2014 revision

Source: Miho Kamei, YSSP Report, IIASA, 2014, and in *Devising a Clean Energy Strategies in Asian Cities*, 2018

The research during YSSP (urban transitions and energy consumption)

Urban Residential Final Energy Consumption per capita vs Urban Density – COMPARISON OF 4 REGIONS (1990-2010)



Analysed by author in 2014: Data source: UN World Urbanization Prospects 2014 revision and Eurostat (Urban population data), SEDAC, CIESIN and Eurostat (Geographical information), IEA and Eurostat (Residential Final Consumption data), urban energy consumption ratio: IEA 2008

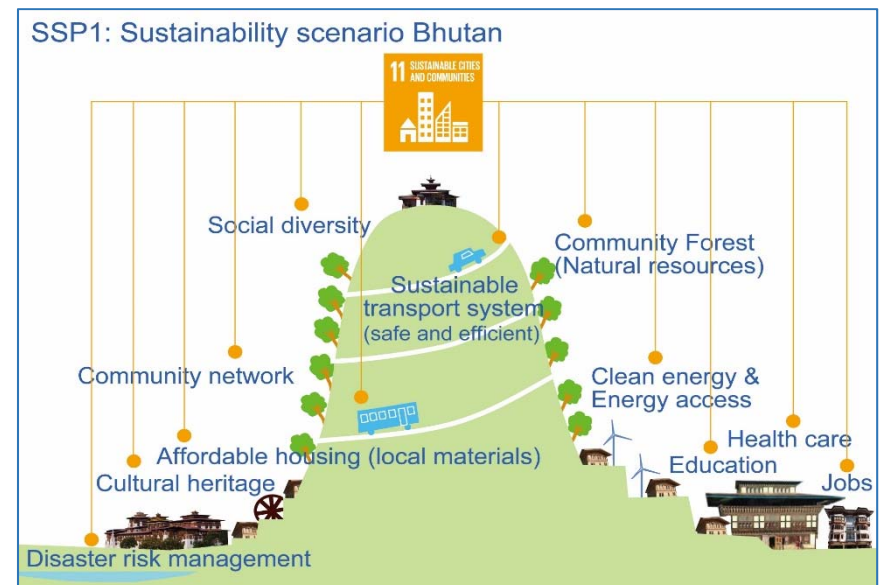
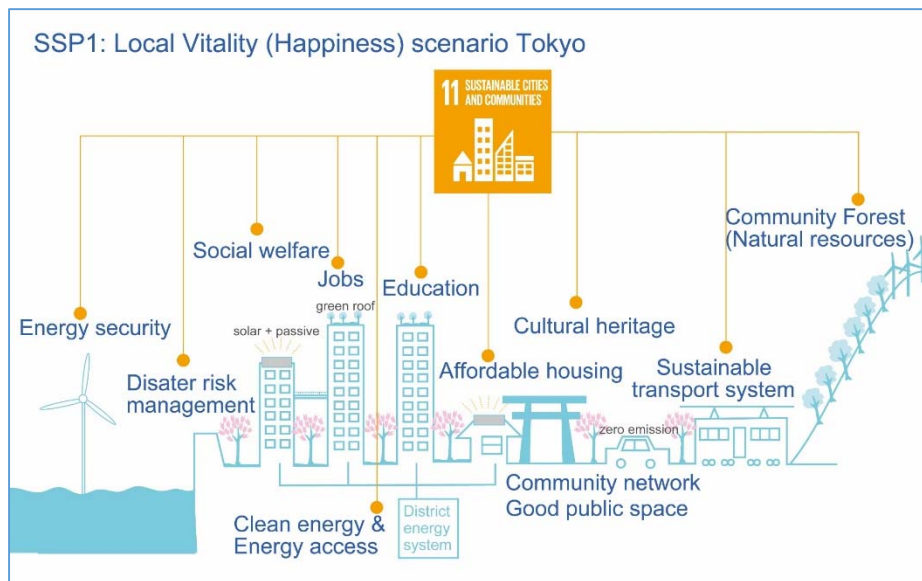
Source: Miho Kamei, YSSP Report, IIASA, 2014 and in *Devising a Clean Energy Strategies in Asian Cities*, 2018

2. The Contributions to the TWI2050 report

Chapter3: Sustainable Development Pathways

SDG11: Sustainable Cities and Communities

- Review of long-term pathways to realize SDG11
- Case study: Tokyo SSPs interlinked with SDG11
- Case study: Bhutan SSPs interlinked with SDG11



Source: Miho Kamei in *TWI2050*, 2018

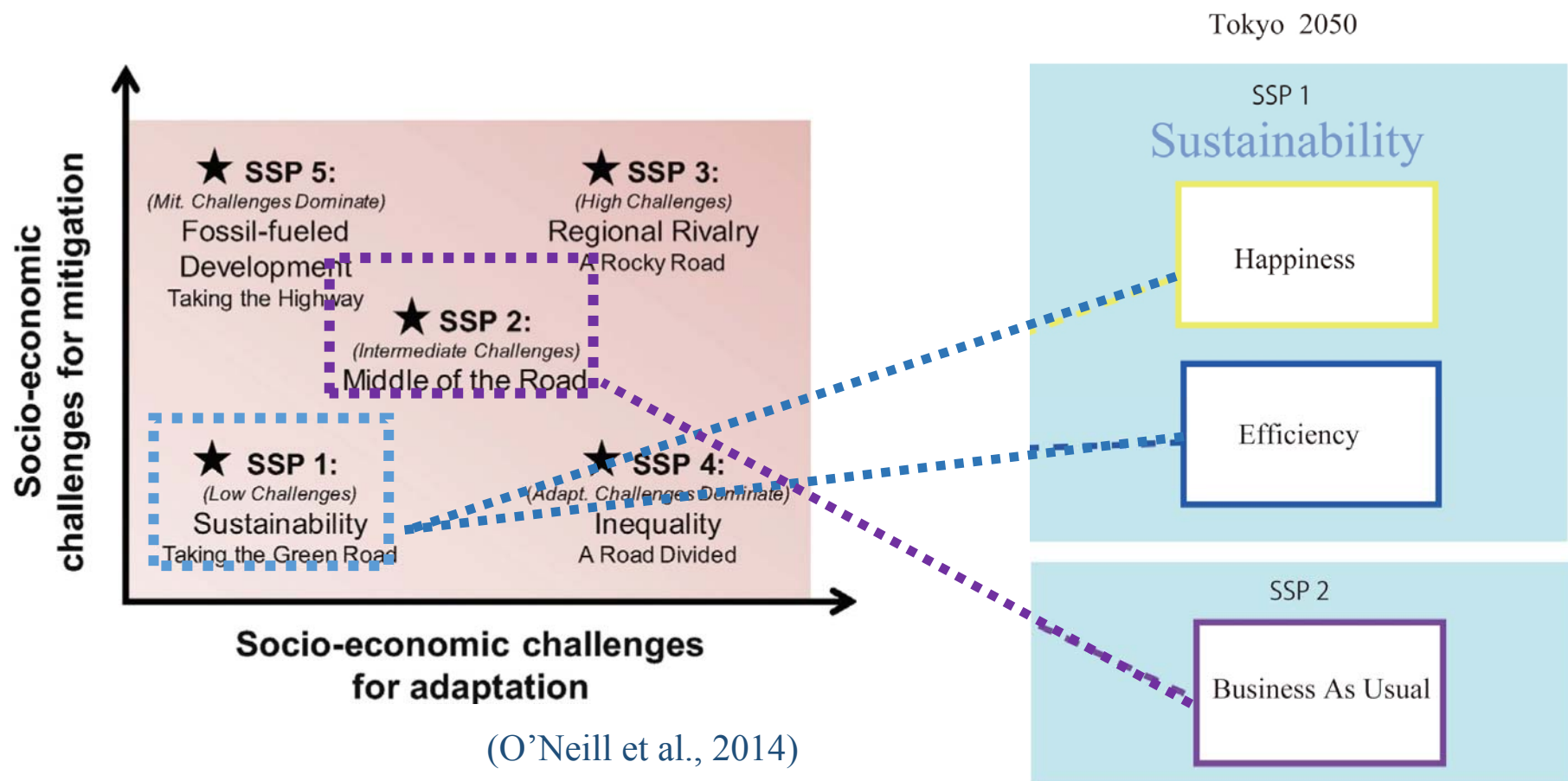
2-1. The development of socioeconomic pathways for cities

Downscale shared socioeconomic pathways (SSPs) to city scale

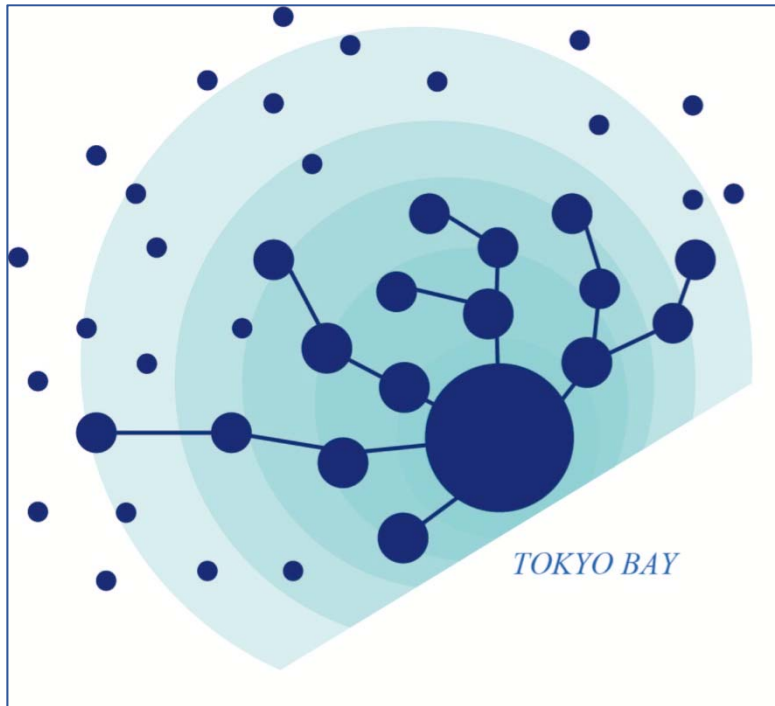
Shared Socioeconomic Pathway (SSPs):

Global socio-economic scenario describing the possible alternative pathways.

(Moss et al., 2010; Van Vuuren et al., 2014; O'Neill et al., 2014; Kriegler et al., 2014; Riahi et al., 2017)



Tokyo Business As Usual Scenario (SSP2)



Urban Form Concept: Sprawl + functionally shrink

Social Factor

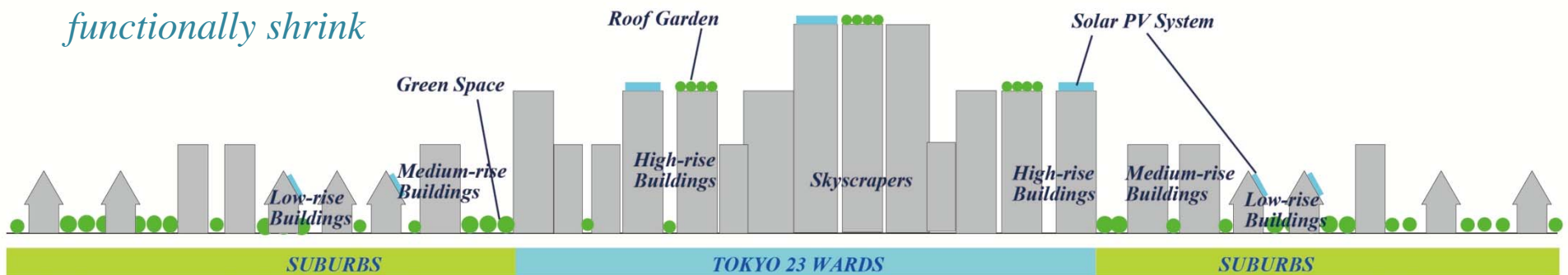
Aging populations and infrastructures cause serious expansions of social costs.. Social communications decrease and are replaced with IT communication technologies. Therefore, social separation is increased between communities and nations.

Economic Factor (economic growth rate 1%)

The tertiary industry is the main industry. However, labour intensive industries continuously increase social inequality.

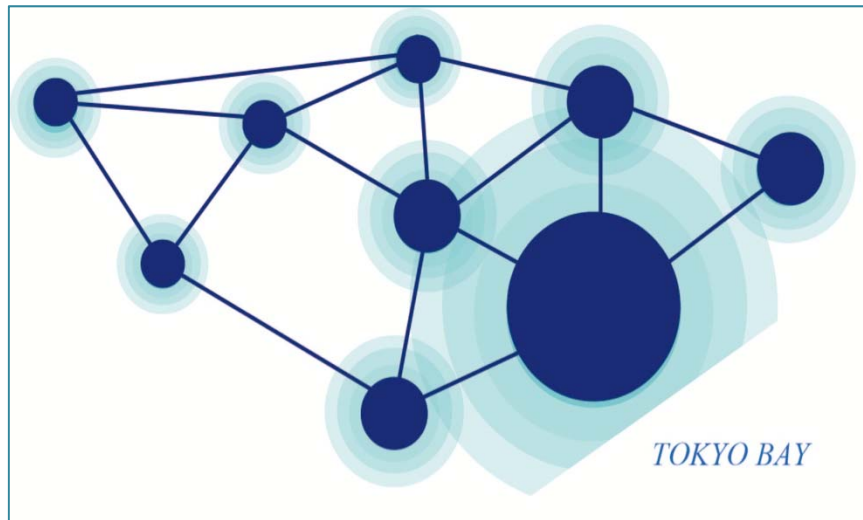
Urban Form

The sprawling edge is gradually modified. However, elderly people remain in suburbs with old infrastructures that are in fragmented condition. The city centre lacks comfortable urban open spaces. Each urban cluster increases inequality and leads to social separation.



Building Typology

Tokyo Local Vitality (Happiness) Scenario (SSP1: Sustainability)



Urban Form Concept: Polycentric Form

Social Factor

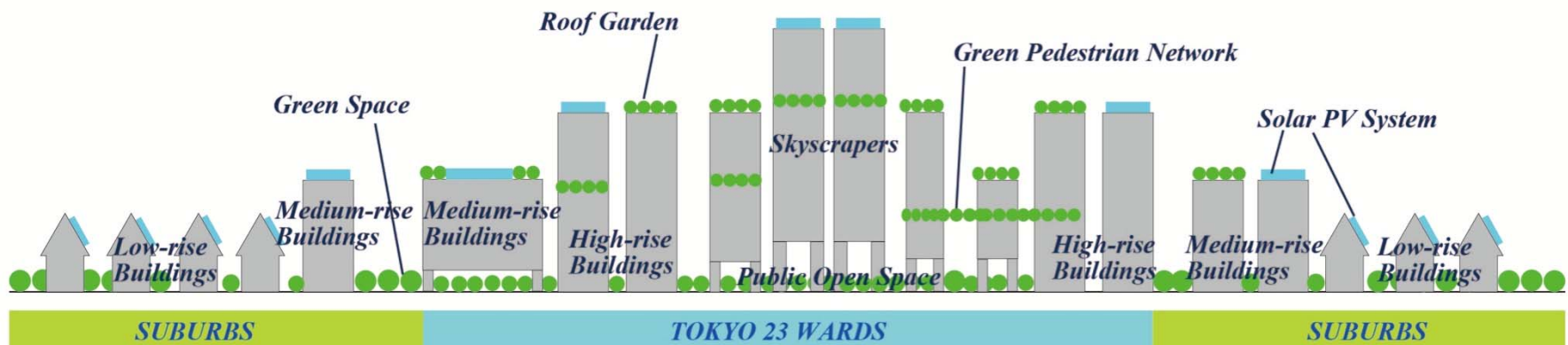
Urban amenities are strongly emphasised. All living residents can access clean, safe, and beautiful neighbourhoods as well as basic services. Diversity is an important feature. The environmental awareness is high,

Economic Factor (economic growth rate 2%)

The tertiary industry will be the main industry, specifically knowledge-based industries will flourish. The work conditions of labour-intensive industries can be improved and social inequality decreased.

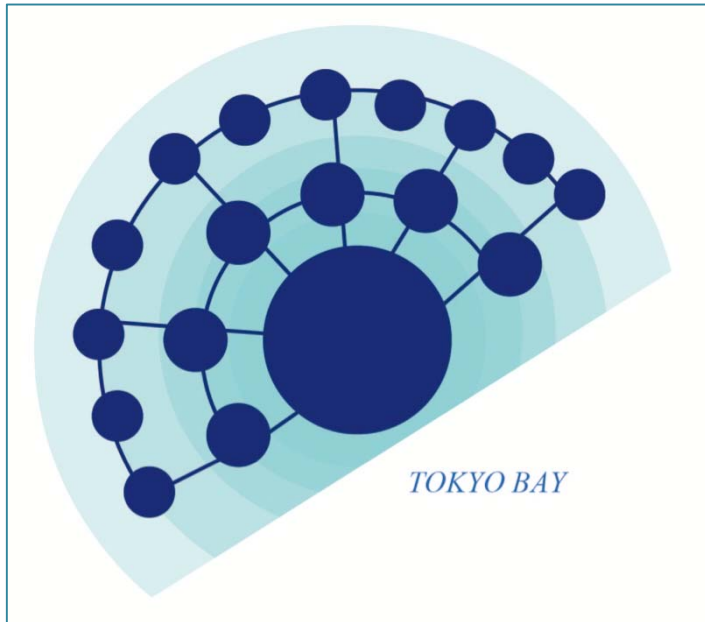
Urban Form

The centre area (Central Business District; CBD) has the highest density. Most of the old buildings and infrastructures are being renovated, and neighbourhoods are also regenerated while preserving local identities



Building Typology

Tokyo Efficiency Scenario (SSP1: Sustainability)



Urban Form Concept : Monocentric Form

Social Factor

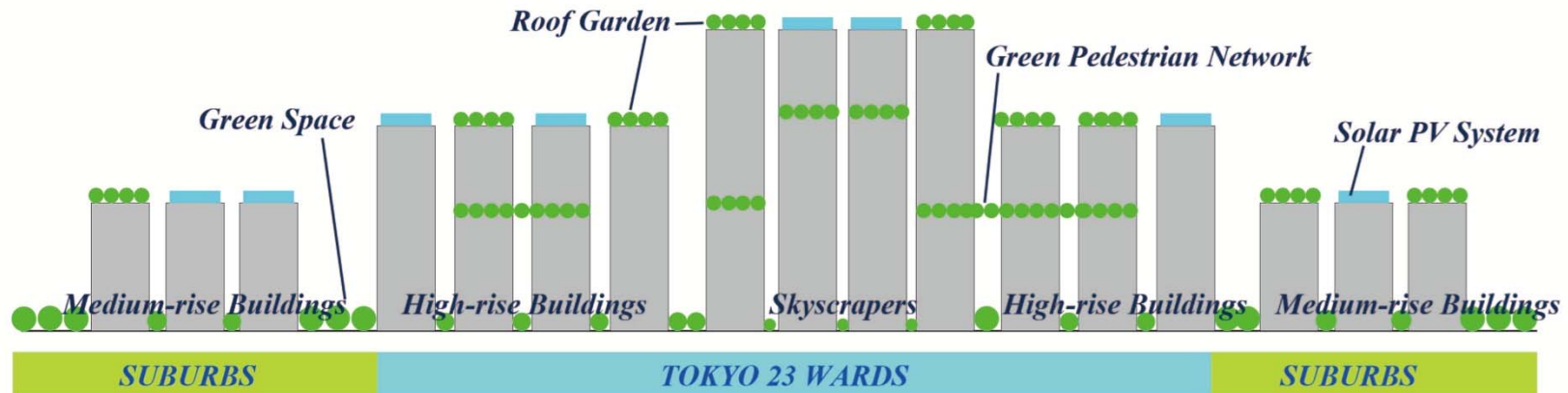
Political control is effectively emphasised. New technologies are introduced and adopted successively. People are likely to choose energy efficient lifestyles through intelligent consumer choices. Active policies can decrease this inequality.

Economic Factor (economic growth rate 2%)

The tertiary industry (Mainly IT, (R&D), and healthcare). Tokyo can showcase of advanced technologies in the global market. Some workers in labour intensive industries can be replaced by robots to reduce social inequality.

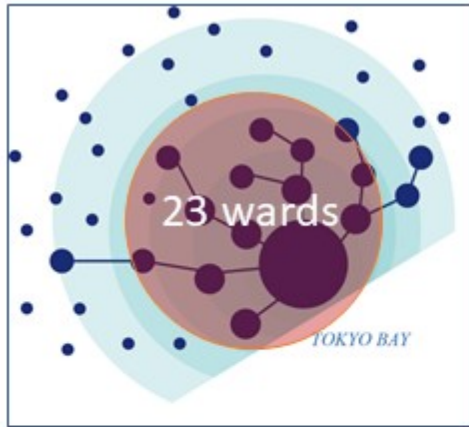
Urban Form

The population density of the centre area (23 wards) increases as suburbs decrease and some areas are abandoned. Large scale area developments are promoted rather than renovated. Old infrastructures can be effectively replaced with more efficient ones.

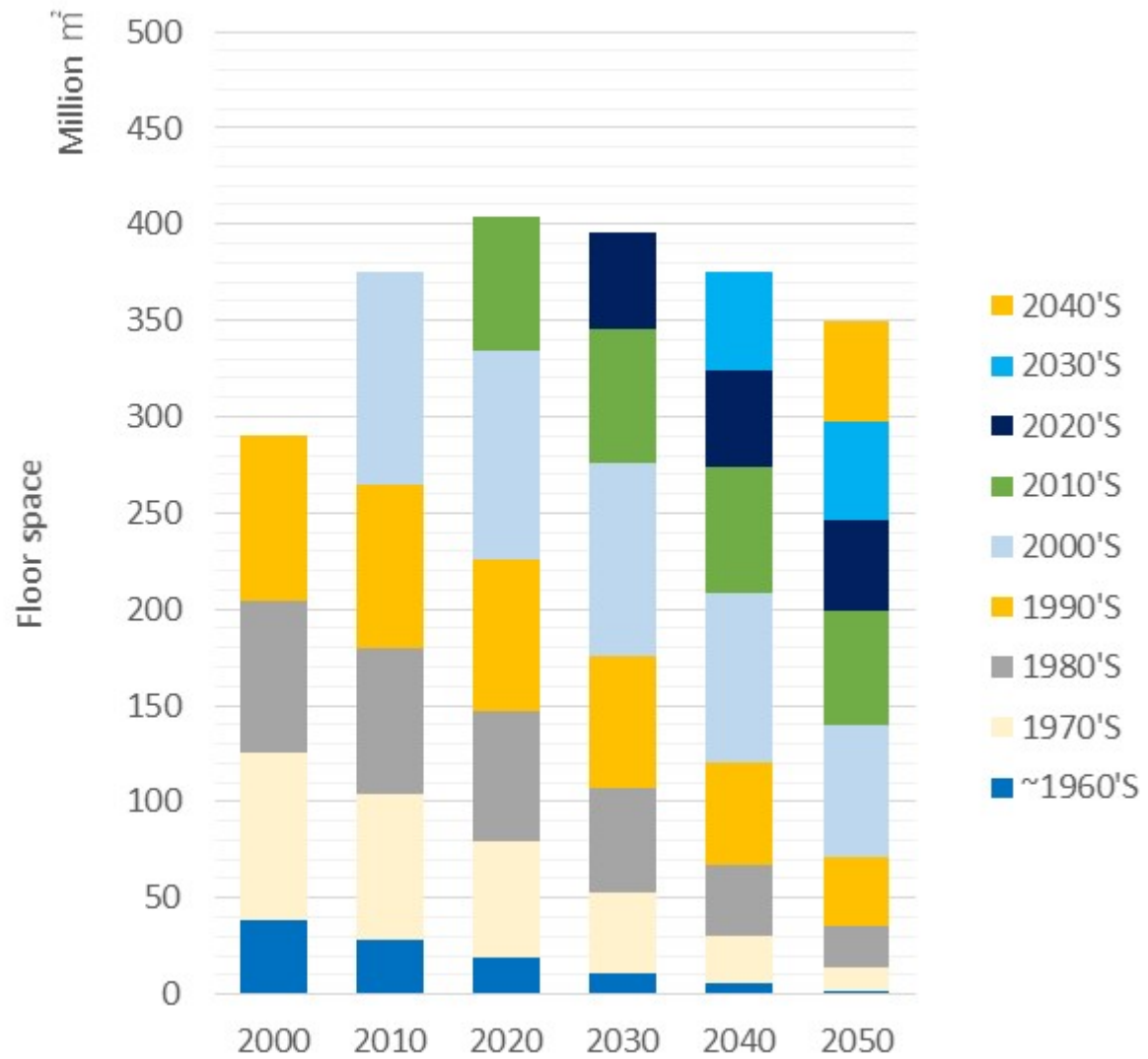


Building Typology

Building Stock Change by Built Age : BAU Scenario (SSP2): Non-wooden Economic Growth rate 1% : Tokyo 23 Wards

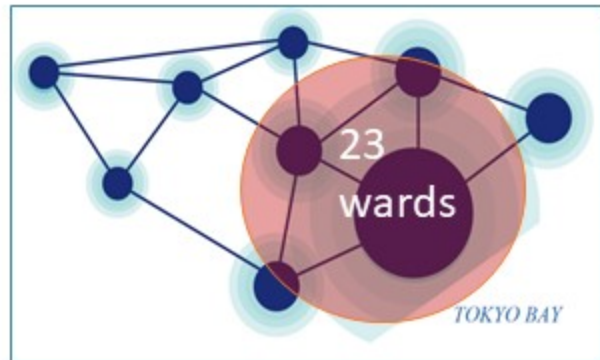


Population in 23 wards
(concentration = 70%)

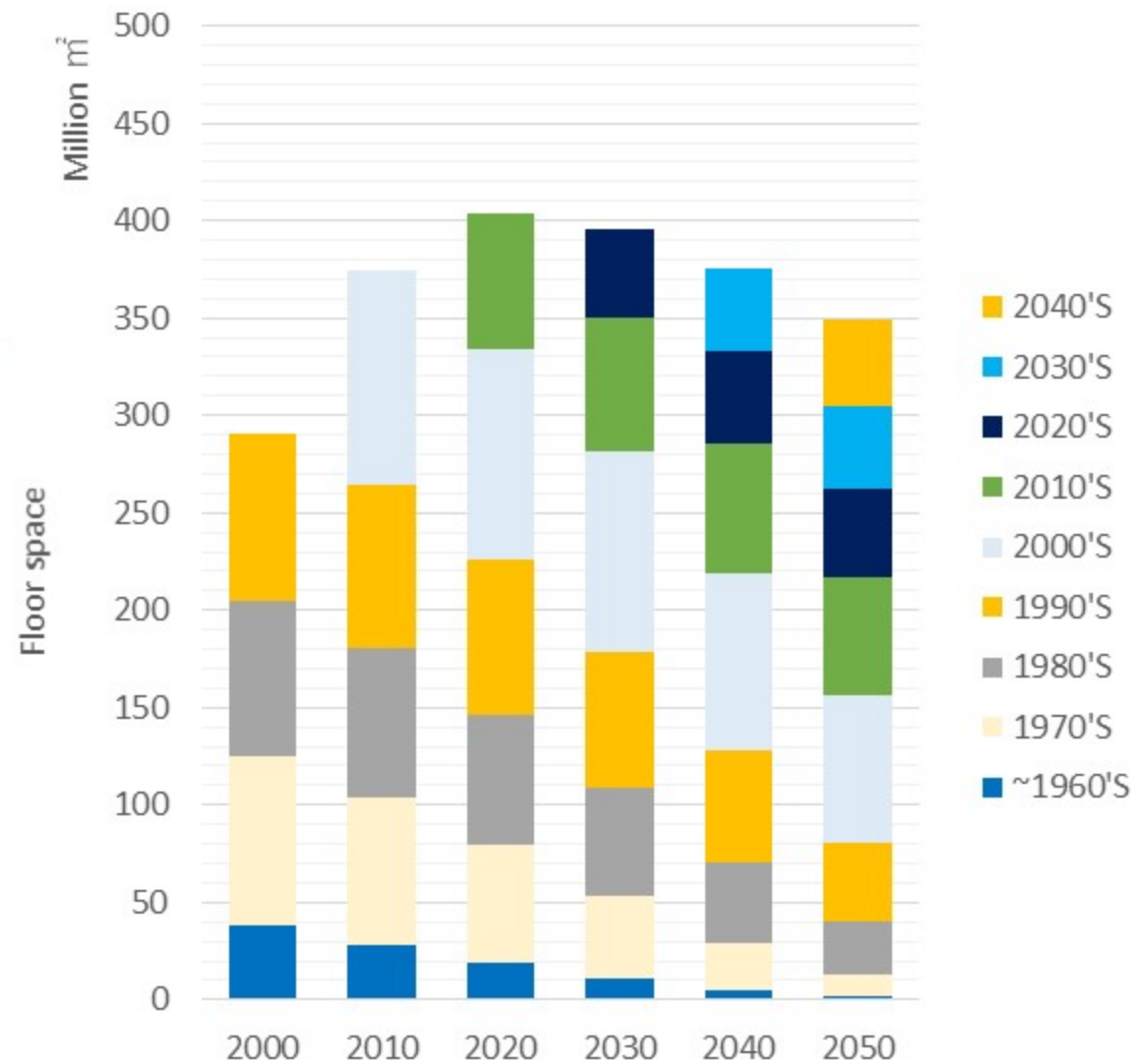


Source: Miho Kamei, Kiyo Kurisu, Keisuke Hanaki, submitted, 2018

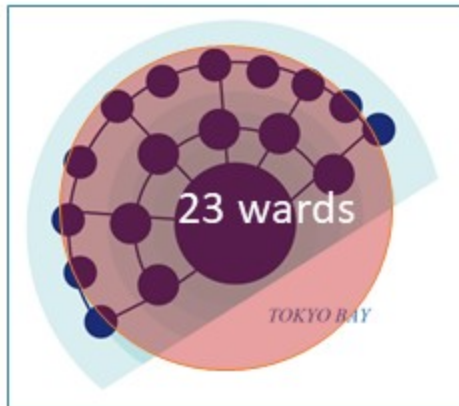
Building Stock Change by Built Age : **Local Vitality Scenario (SSP1)** : Non-wooden
 Economic Growth rate **2%**: Tokyo 23 Wards



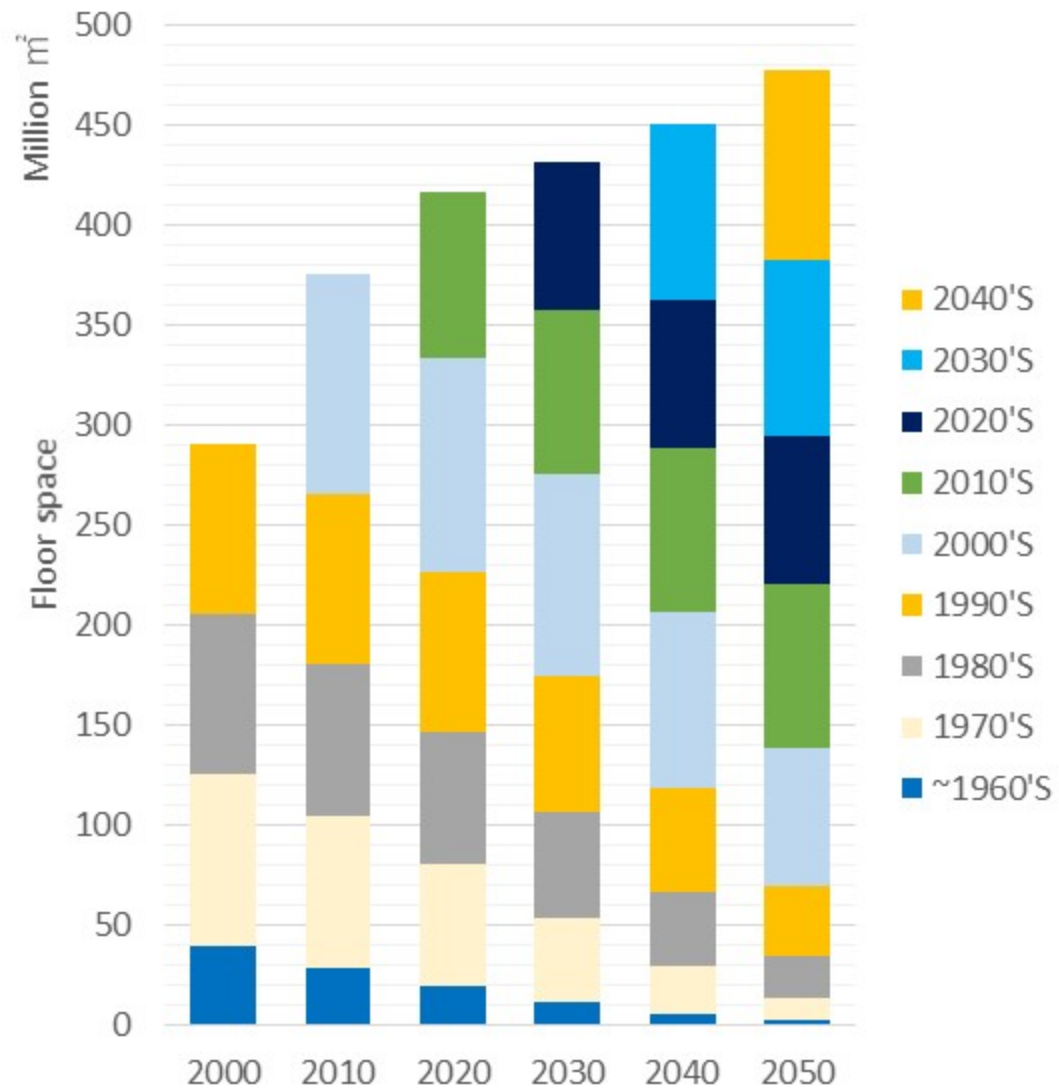
Population in 23 wards
 (concentration = 70%)



Building Stock Change by Built Age : Efficiency Scenario (SSP1) : Non-wooden Economic Growth rate 2% : Tokyo 23 Wards

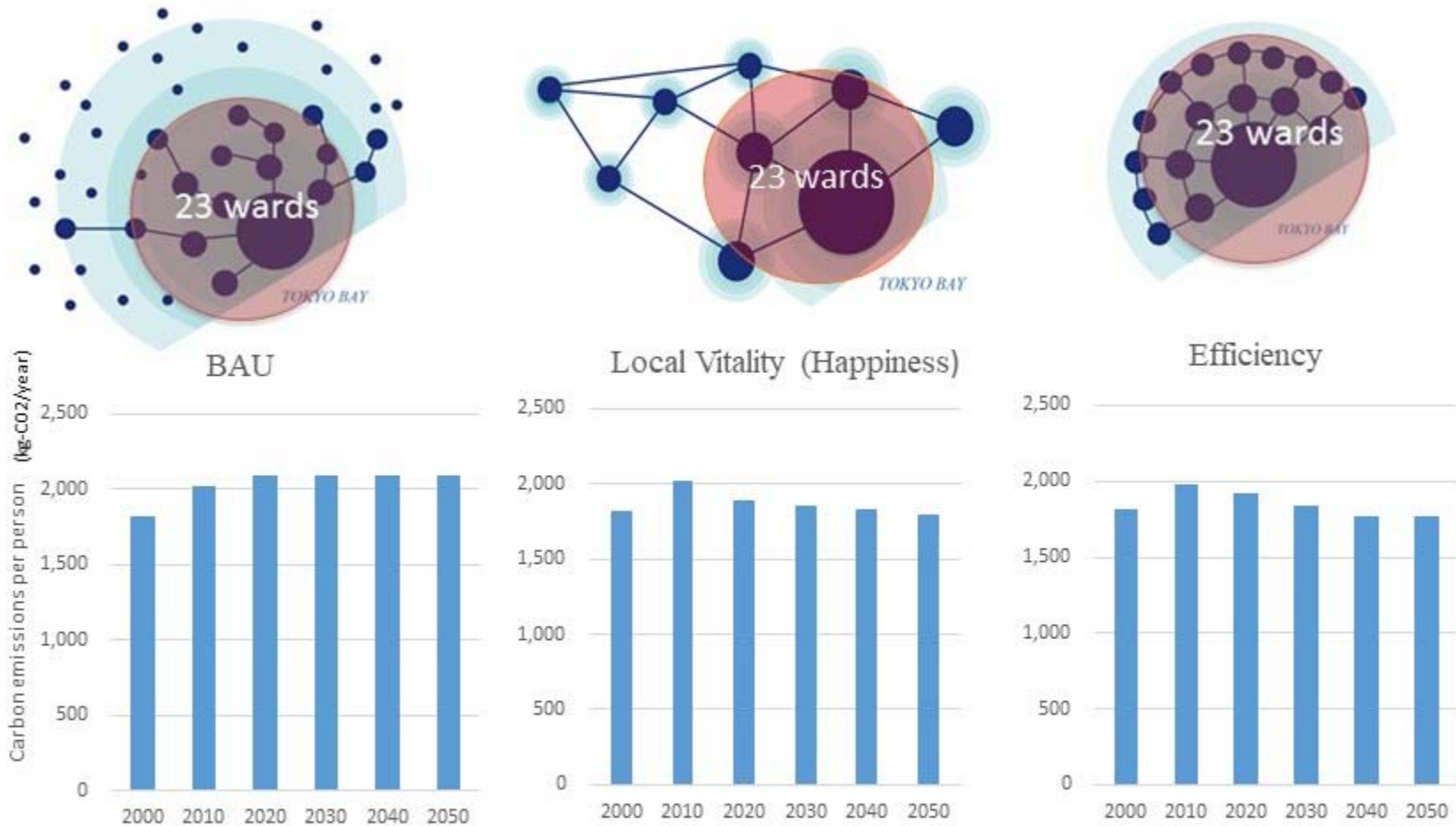


Population in 23wards
(concentration = 90%)



Source: Miho Kamei, Kiyo Kurisu, Keisuke Hanaki, submitted, 2018

Carbon emission per person (Tokyo 23 Wards) by 2050 in building sector



Both sustainability pathways (Local Vitality & Efficiency) can achieve more than 15 percent carbon reductions by 2050 compared to BAU case with applying different urban transitions.

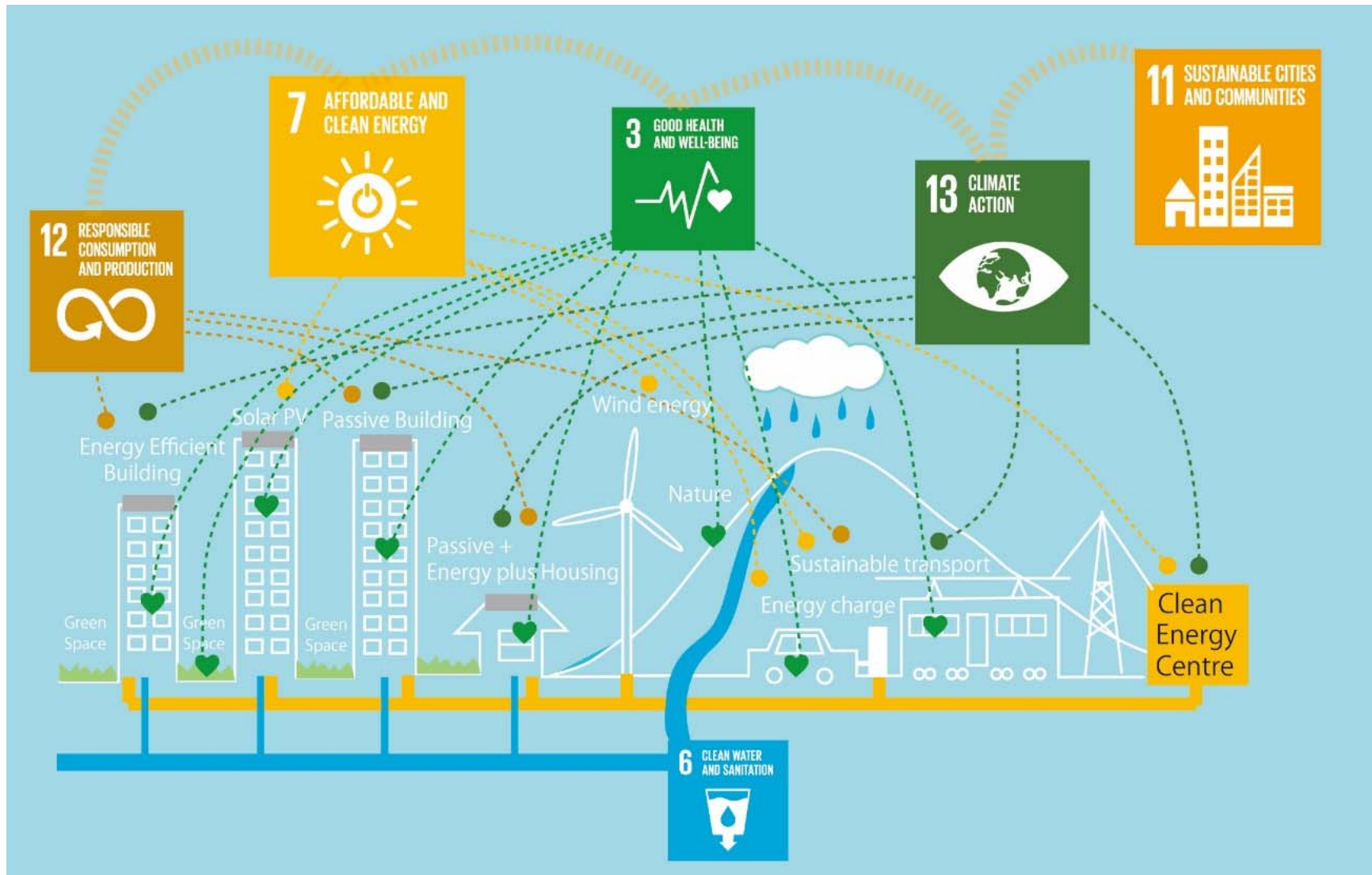
⇒ Synergies and trade-offs discussions can be developed based on the scenario story lines.

⇒ Analysis of other factors is essential. (SSPs can be a platform of analysis and discussions.)

SSP1: Local Vitality (Happiness) scenario Tokyo



The interaction with other SDGs



Source: Miho Kamei in *Devising a Clean Energy Strategies in Asian Cities*, 2018

2-3. Fundamental Happiness of Bhutan : Bhutan SSPs

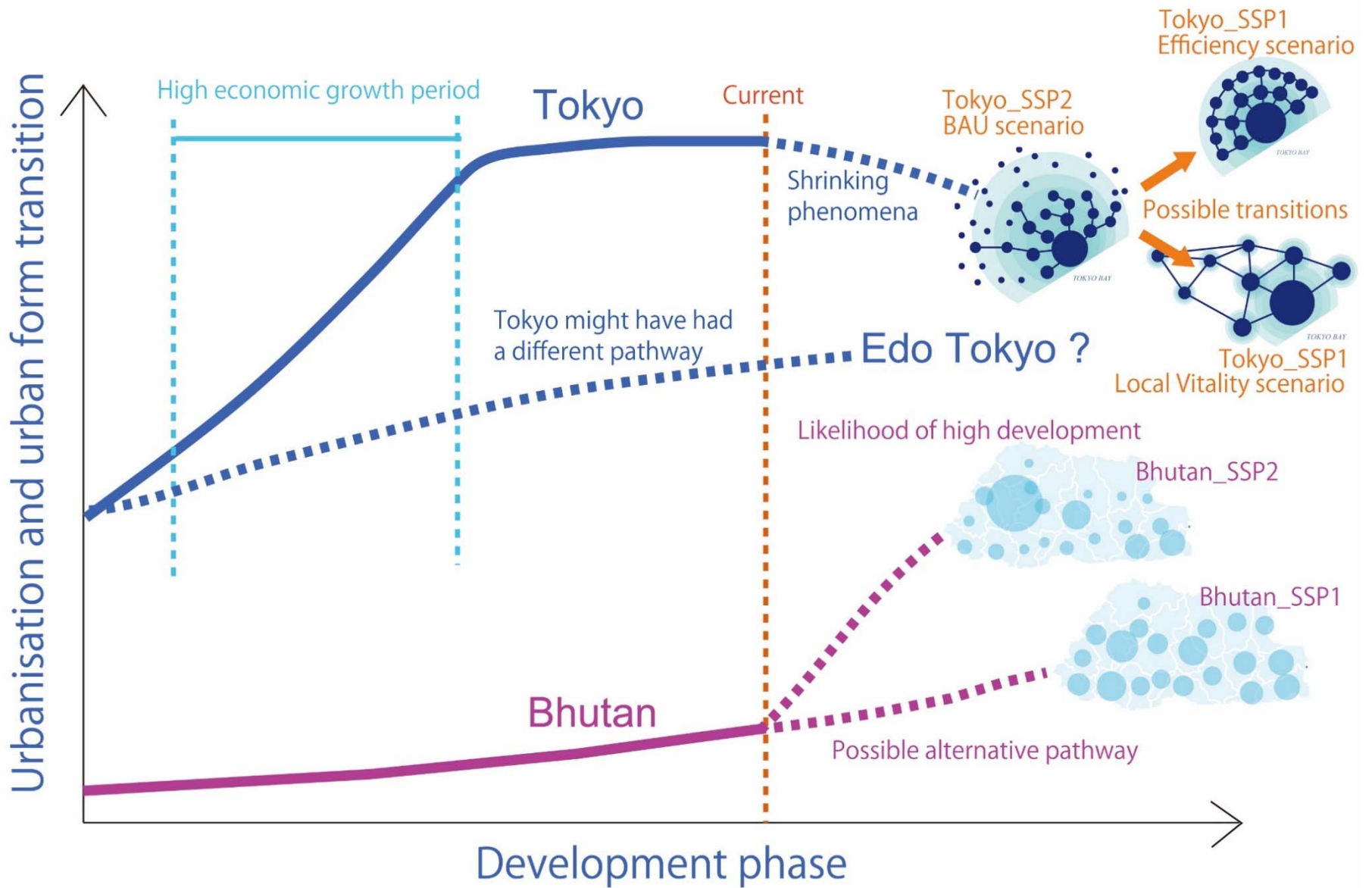


All pictures were taken by Miho Kamei

- Bhutan is literally popular in terms of developing and adopting a unique Gross National Happiness (GNH) index for national policy strategies.
- However, rapid urbanization is beginning to occur, which may lead to a number of large developments and densely populated areas. This may also cause the expansion of social disparity and social segregation, along with the destruction of natural resources and local identities.



Long-term urbanization pathways



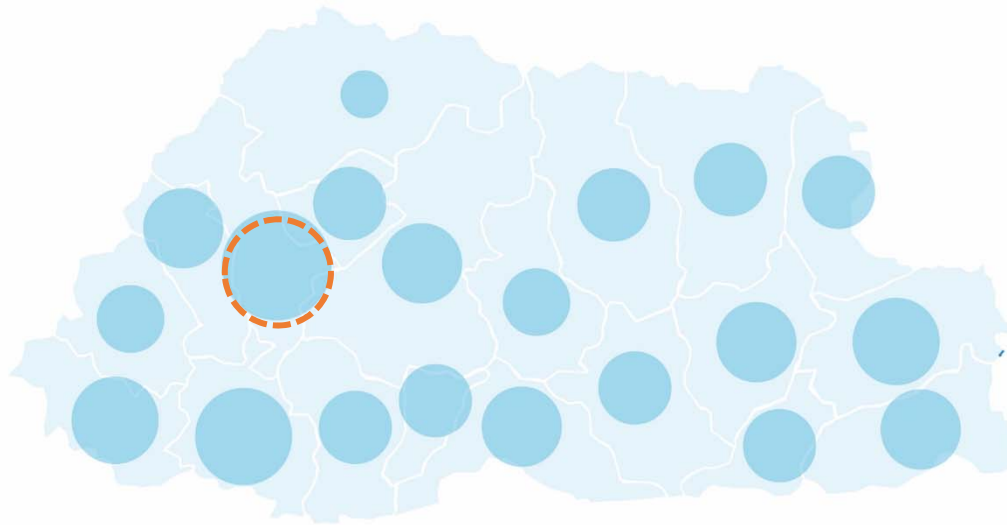
Bhutan BAU scenario (SSP2)

Generic Urbanisation



Bhutan BAU scenario (SSP2)

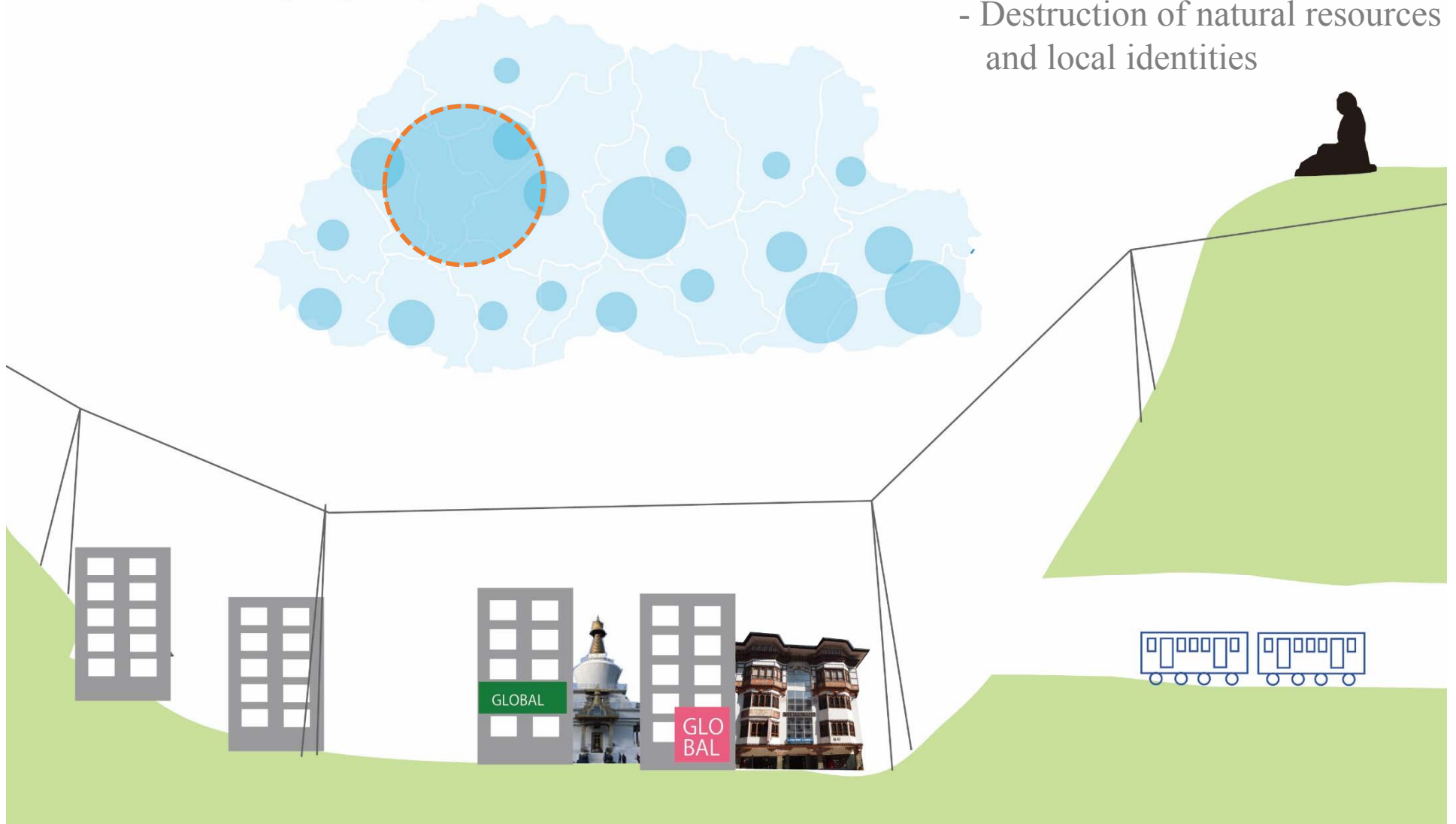
BAU Bhutan (Capital)



Bhutan BAU scenario (SSP2)

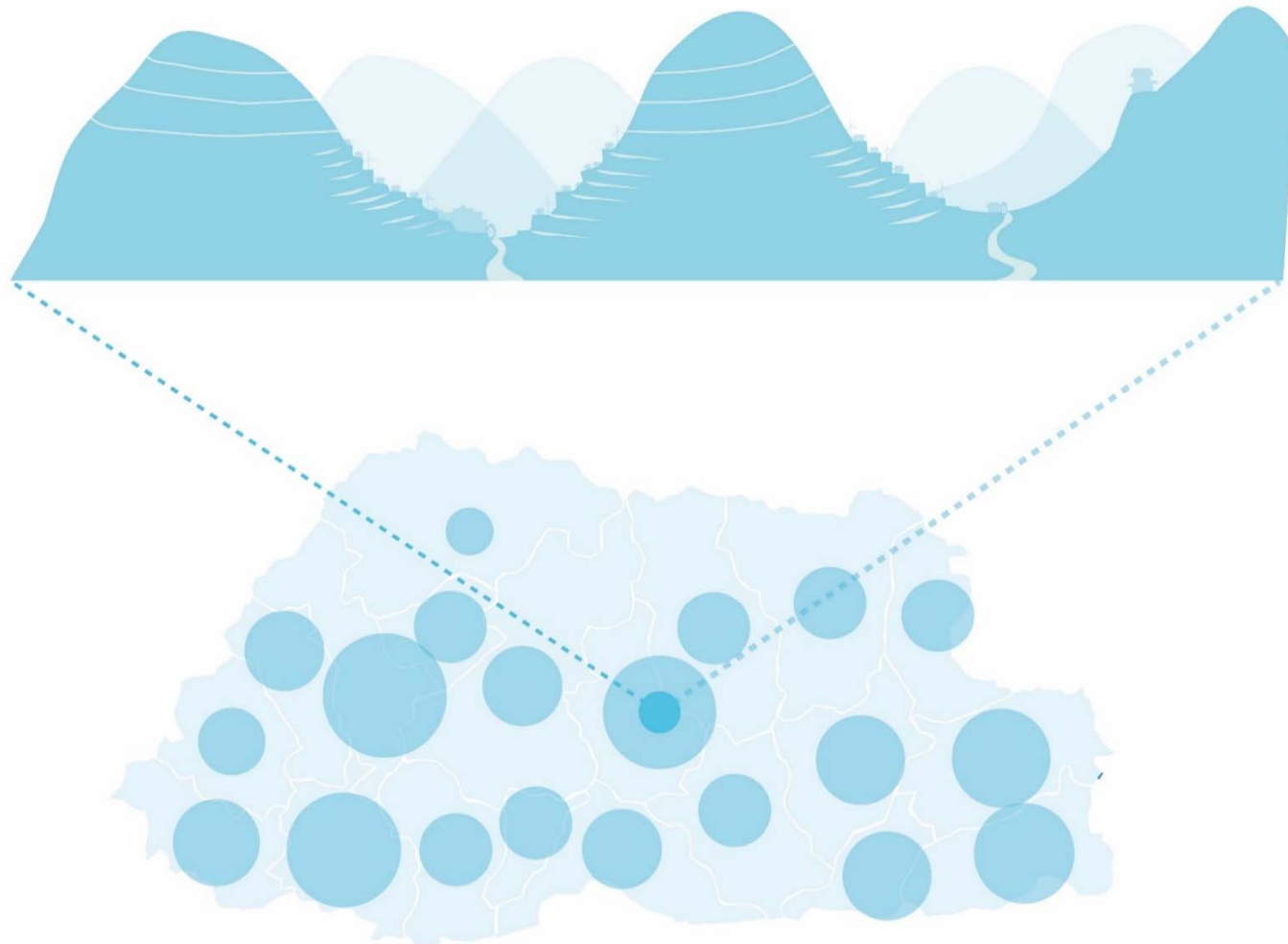
BAU Bhutan (Capital)

- might cause ...
- Expansion of social disparity
 - Social segregation
 - Destruction of natural resources and local identities

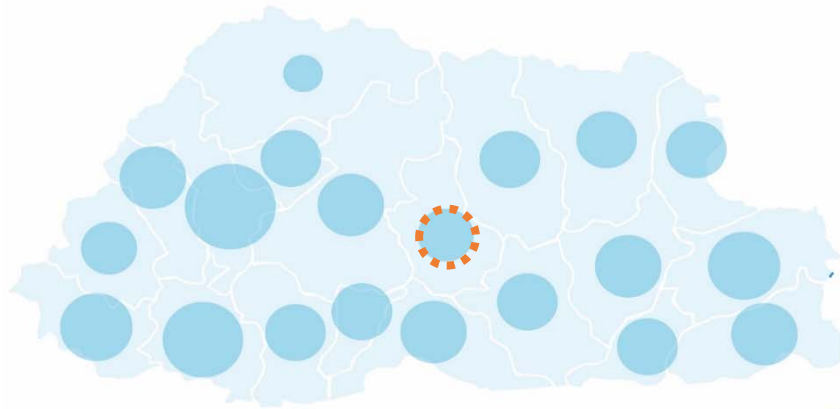


Bhutan Sustainability scenario (SSP1)

Fundamental Local Happiness



Bhutan Sustainability scenario (SSP1)

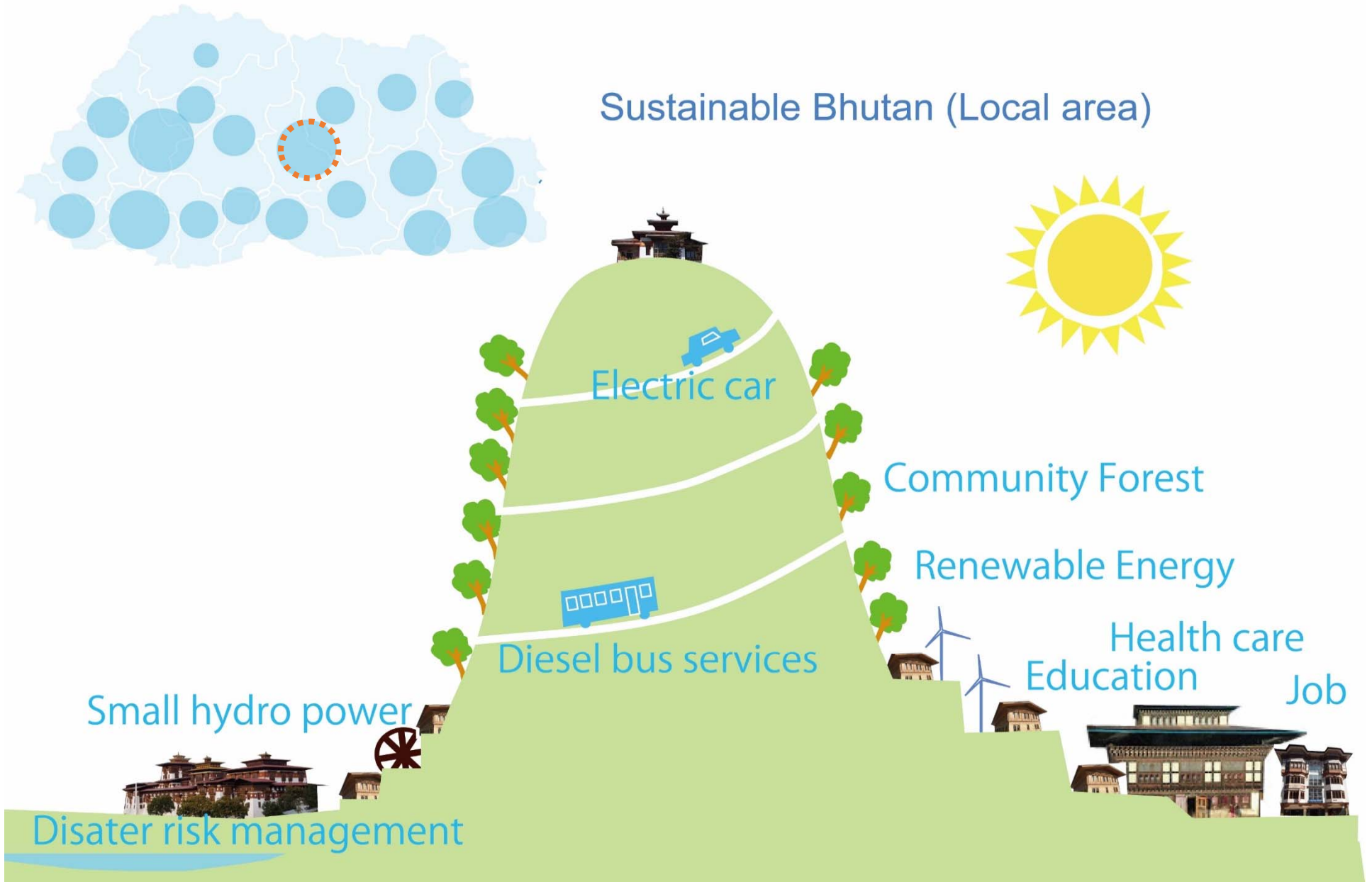


Current Bhutan (Local area)



Bhutan Sustainability scenario (SSP1)

Sustainable Bhutan (Local area)



SSP1: Sustainability scenario Bhutan



Disaster risk management

3. Future collaborations with TWI2050 consortium



Extension of SSPs and SDGs analysis for global cities



Current team members: IGES, CIRED (France), University of Texas, Austin (US), EGV/EAESP (Brazil)

3. Future collaborations with TWI2050 consortium



A number of ongoing researches
for the implementation of SDGs



Please visit our website !

<https://www.iges.or.jp>

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Thank you for listening.

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