

Research on Effective Simulation towards a Model City for Low Carbon Society

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[Abstract]

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The purpose of this research is proposing strategies for halving CO₂ emissions by 2050, actually realizing urban low carbon society, and providing municipalities with guidance for environmental policies. Practical proposals for enhancing local community and identity, coping with shrinking and aging of population, and agenda and policies for realizing ideal images are included.

Certain common issues within the sub-themes and case-studies were identified as offering general solutions, applicable at various municipal scales, to set trends in the development of green technology, and in society's goals and urban development policies.

Basic principles are following.

To create sharing communities and self-reliant settlements, circulatory, open-ended, and appropriate for the low-carbon shrinking-population era, where locality is cherished, there needs to be a switch from the mentality that takes continuous growth and development for granted, to symbiosis with Nature and concepts of "resilience" and "mottainai".

On self-reliant settlements and buildings with open systems connected to the outside world; aspirations for eco-lifestyles with low CO₂ emissions; local supply and circulation of energy (solar, thermal heat storage and geothermal heat); land-use systems that loosen urban-rural boundaries, remove restrictions between residential and farming land to allow effective use of vacant plots for urban farming; switch from individualism to community sharing; these are among the examples to be emulated.

Comprehensive strengthening of prevention of disaster at the town planning levels, both "soft" and "hard", and integrating them into zoning and community planning is integral to ensure local resilience.

Thirteen guidelines for realization of ideal low carbon cities for 2050 have been introduced as follows.

Concerning Cities and Transportation

1. Polycentric cities that make the most of existing urban structures for long-term CO₂ emissions reductions.
2. Reorganizing low-carbon-cities so as to provide satisfactory public transport to support the

more vulnerable members of society.

Concerning Towns and Districts

3. Towns with their own characteristic landscapes.
4. Towns with human scale.
5. Towns with ample water and greenery, comfortably adapted to local micro-climate.

Concerning Buildings and Spaces

6. Autonomous, resilient long-life buildings making the most of local geographical characteristics.
7. Space planning and configuration based on zero-carbon architecture.

Concerning Livelihood and Community

8. Locally produced and locally consumed energy and food; livelihood patterns linking town and country.
9. Livelihood patterns linking people together in mutual support.

Concerning Evaluation Methods

10. Communities that aspire to create low-carbon urban villages.
11. Assessment methods for forecasting environmental load and comfort.
12. Visualization techniques as citizen-oriented communication tools.
13. Scientific predictions, collaborative road maps and comprehensive policy methods.