Low Carbon Town Development With Multifaceted Support

SHIBATA　Yoshiyuki
Director of Urban Planning Department

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1.Introduction

"Promotion of Urban Low-carbonization Act" being implemented last December, Urban low carbonization is a part of the efforts to reduce CO_2 emissions, and also, the promotion contributing to development of healthy urban environment.

Therefore it is necessary for the central government to support comprehensive efforts by local governments, private companies and citizens for creating and implementing "Low Carbon Town Development Plan" of the municipalities .

In our Urban Planning Department, we have been engaged in developing tools for years, supporting efforts of municipalities regarding low-carbon town development. The characteristic of the tools and the situation in which the tools can be used will be introduced here.

Related research achievements shall gradually be announced, but if anyone is interested in the practical use of the tools along with the studies, inquiries will be welcome and responded to individually.

2. Low Carbon Town Development as a target of urban research fields

The Urban Planning Department has carried out research that give importance to the following related challenges related to the goals stated in Low Carbon City Development Guidance established by the relevant minister.

① Reduction of energy consumption by consolidation of city functions and promotion of public transportation usage.

② Consolidation of necessary city functions for daily life to nearby neighborhood.

③ Reduction of financial costs by efficiency and prioritization of urban infrastructure maintenance and renewal.

④ Formulation of efficient energy system through such as cogeneration and sharing of heat systems in district and town level.

⑤ Moderation of heat-island phenomenon, by improvement of ground level green coverage, and securing of "ventilation paths".

3. Tools to support Low Carbon Town Development

(1) Urban and regional future image assessment tool

Regarding the future urban structure, several alternative proposals composed of planning measure packages such as, urban area expansion types, multicore concentration types and so on have been set, and reasonable selection is possible by assessing objectively and quantitatively QOL, environment and cost in a comparable fashion.

Improvement of practicality has now been addressed through case studies with public entities. It is expected to use when a big directional movement is considered regarding consolidation of urban function including visions about a set of area that is a base of city and cooperation with public transportation facility in the development phase of low carbon town development plan draft. Also, it is thought that alternative proposals such as placement of various citizen service functions and segregation of duties between bases are weighed if several base areas are set.

(2)Land suitability assessment technology towards strategic land management

Traditionally, various condition data that the land has is accumulated by city planning basic survey. Converting it to metrics in mesh unit, assessment point of land suitability is calculated by setting weighting of index by land items such as building use, agriculture and forestry use and so on. It is used as information for making a decision on land use and priority of maintenance. The research has been continued towards coordination of next fiscal year. In the planning process, for example, it is thought that it will be useful to consider challenges

such as abstraction of inefficient area of urban infrastructure improvement and management due to the increase of vacant houses, various disaster hazards information and strengthening of collaboration with land use.

(3)Proper area consideration flow for the adaptation of heat energy face use

To proceed efficiently area-wide energy usage that contributes to the low carbon town development, process of derivation of development work such as proper area selection of area-wide energy usage in local public entities are organized. It is assumed to aggressively adopt area-wide energy usage by extracting high aptitude area of area-wide energy usage adaption such as an area that has high floor-area ratio or is close to unused energy sources, setting up action area, directing and supporting heat provider businesses in the areas. Also even if it is outside of the area, it is thought that to direct individual buildings by establishing requirements of public assistance and presenting support measure in advance regarding heat transferring among buildings or adaptation of DHC.

(4)Heat energy network system simple efficiency assessment program

A program was developed that could approximate the amount of heating necessary per square meter categorized by land use by entering the distance of heat flexibility plumbing and selection of heat system. Use of the program will give people a rough estimate and help to maximize the efficiency of heating systems in the area.

Also, after the project formulation, a planner can suggest using the assessment program to people related to business in the action area for heat transferring among buildings or other systems to get a higher energy saving effect.

(5) Assessment tool of CO2 emissions reduction of urban heat-island countermeasures

A tool for the PC has been developed that can simply calculate thermal environment mitigation effect, air-conditioning load reduction effect and CO2 reduction effect if individual or multiple countermeasures of urban heat island countermeasures are adopted. It is effective to consider target area of measure and combination of measure. Also, it can be used for numerical goal of measure, establishment of assessment index (conversion to CO2 reduction) regarding heat island countermeasures. After the plan formulation, negotiations will proceed to make high CO2 reduction by using the assessment tools regarding development work in the target area of measure. In this case, it is possible to analyze impact to the environment in detail using an assessment tool (Detailed version) that is prepared separately.

(6)Standardization of the urban environment climatic chart

To methodically present as a guideline (draft) of procedure of measure that has “Current state map”, ”Advice map”, ”Effect map” as an urban heat-island countermeasure map to be able to try an efficient measure that fits area characteristic including use of “Kaze-no-Michi(Ventilation Path)”. Regarding the method of announcement, it is being coordinated. In the plan formulation phase, making “Current state map” and “Advice map” is important, and after the plan formulation, “Effect map” will be created based on minute consideration that responds to business plans, and by proceeding negotiations, the effect will ideally be high.

4. Future challenge

Except those tools that were introduced above,

・Smooth procedure of degeneracy of city that responds to progress of population decrease.

・Research, analysis, assessment measure of green in urban space that responds to upgrading of aviation laser measurement.

・Assessment measure of area and city facility by accessibility index.

Research that have been addressed.

Integrated measure development of consolidation of city function and promotion of public transportation facility, restructuring of daily living area around public transportation facility, analysis and assessment of measure effect regarding consolidation, smooth migration program for consolidation, cooperation with public welfare and agriculture measure, and these researches will be addressed regarding important challenge that local public entities face, and it will ideally support efforts to business solution.