CASBEE® for Cities

Comprehensive Assessment System for Built Environment Efficiency

●Technical Manual (2011 Edition)

The Committee for the Development of
an Environmental Performance Assessment Tools for Cities

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Introduction

In view of the global trend in environmental issues and with the Conference of Parties (COP) “Countermeasures against greenhouse gases and promotion of a society-wide effort toward a low-carbon future” as a yardstick, many countries are facing serious policy challenges. In order to deal with these challenges, a method for a comprehensive assessment of environmental performance at the municipal level is considered effective, but such a method has yet to be established.

In Japan, the government-led Eco Model City Project began in 2008. In addition to the eco model cities, other motivated communities and related organizations have also participated in the establishment of the Promotion Council for the Low Carbon Cities in December 2008, in which individual cities and communities are seeking a way toward eco-friendly future development while demonstrating their own potential. In this regard, a framework for measuring and evaluating the effectiveness of the policies and activities taken by the individual cities would be very helpful for the many people who are involved in activities relating to citizens, public administration and other cities, in order to share a sense of purpose in creating the ideal future city.

Consequently, the Committee for the Development of an Environmental Performance Assessment Tools for Cities was launched in November 2008 for the purpose of contributing to the improvement of city-wide comprehensive environmental performance by developing and utilizing an environmental performance assessment tool tailored to cities, in which a framework for a city evaluation suitable for the era of the global environment will be studied.

The Committee adopted the principle and method of the Comprehensive Assessment System for Built Environment Efficiency (CASBEE) for the basic assessment tool in view of clarity, fairness, reliability and usefulness. CASBEE is a unique Japanese system that is widely known among people engaged in construction-related businesses as an environmental performance assessment tool for buildings.

The next city assessment tool will also focus on evaluating cities from two perspectives; quality inside a city (Q = quality) and environmental load emitted from a city on the external environment (L = load), in accordance with the principle of the conventional CASBEE. Assessment items are carefully studied from various aspects in a comprehensive manner, whereas, in light of the urgent and important task of promoting a low-carbon society, L consists of items particularly focusing on a clear assessment of low-carbon policies of individual cities. Upon development of this new tool, the Committee has, since May 2009, been in close cooperation with the WG for Promotion of Measures for Low-carbon City or Region established under the aforementioned Promotion Council for the Low Carbon Cities, in order to scrutinize issues relating to application of the tool.

The “CASBEE-City (2011 Edition)” assessment manual is herewith compiled and released as a technical description of the results of its development. We hope that this tool will be utilized in various fields and will help enhance urban environmental improvement in harmony with global environmental issues.

March 2011
Shuzo Murakami
Chairman of the Committee for the Development
of an Environmental Performance Assessment Tools for Cities

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PART Ⅰ Outline of CASBEE-City

1. What is CASBEE?

CASBEE is a method of assessing and rating the environmental performance of a built environment. Assessment tools for CASBEE were developed in accordance with the following three concepts: (1) Evaluating a built environment through its entire lifecycle, (2) Evaluating a built environment from the two aspects of environmental quality (Q) and environmental load (L) and (3) Evaluating a built environment according to the "Built Environment Efficiency (BEE)," an assessment index, which was newly developed based on the idea of eco efficiency. The rating system has five grades; Excellent (S), Very Good (A), Good (B^+), Fairly Poor (B^-) and Poor (C), with each grade represented by a certain BEE value. CASBEE, for which development began in 2001, used to consist of environmental performance assessment tools used for individual buildings including "CASBEE-New Construction." However, it now has a wide variety of building assessment tools tailored to different needs, such as "CASBEE-Urban Development" which is for the assessment of a group of buildings, all of which make up the "CASBEE Family."

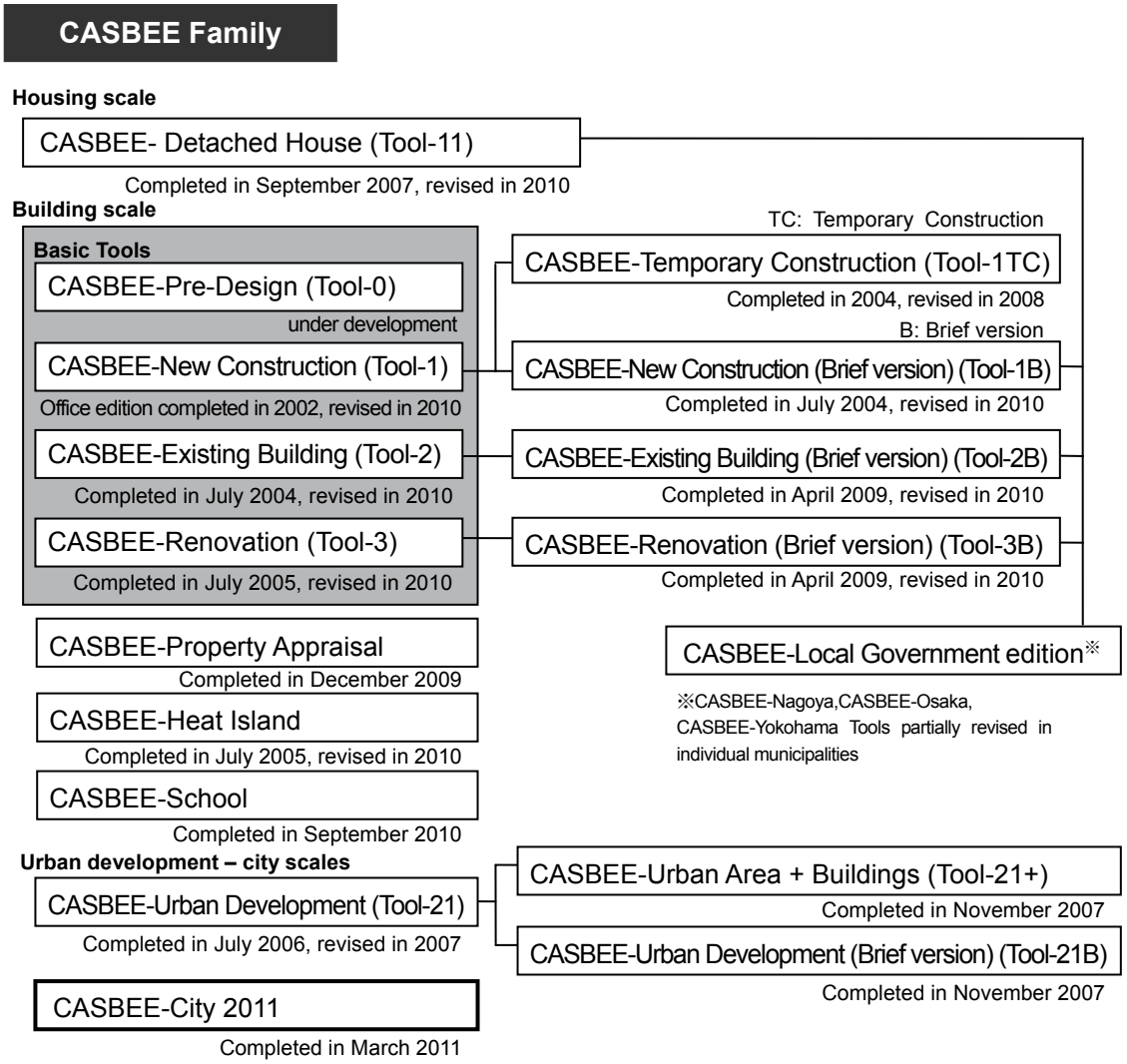

Figure Ⅰ.1.1 Structure of the CASBEE Family

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2. Framework of CASBEE-City

2.1 Basic policy for tool development

CASBEE-City is a system that comprehensively evaluates the environmental performance of a city. When evaluating environmental performance, environmental concern is a major perspective, but ensuring a convenient and comfortable life for city dwellers and the development of the local economy should not be overly restricted, simply due to the higher priority on the reduction of environmental burden. Accordingly, CASBEE-City looks multilaterally at the quality and performance of a city from a triple bottom line perspective of the environment, society and the economy.

The assessment is conducted at the municipal level, the foundation of a society. In order to clearly define the assessment target, a hypothetical boundary is set around the city (municipality) to be evaluated, so that a hypothetical closed space in three dimensions is created around the city. The higher the Q value representing quality and the lower the L value representing environmental load on the external environment are, the higher the BEE (the Built Environment Efficiency=Q/L) value becomes, which indicates that the city is highly regarded for its excellent environmental efficiency.

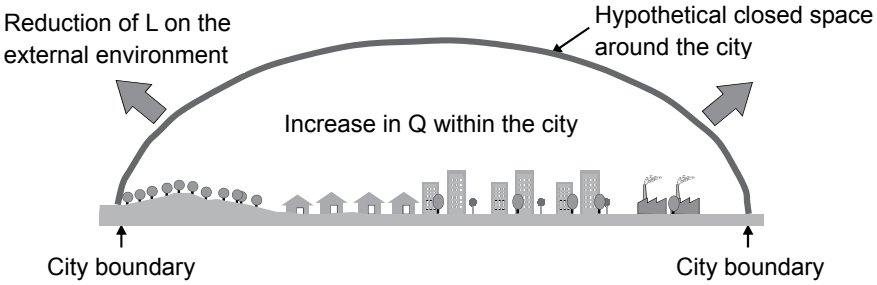

Figure I.2.1 Concept of a hypothetical closed space in CASBEE-City

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2.2 Assessment structure

The assessment procedure consists of the following five major steps:

(1) Current assessment of Load and Quality

Environmental load (L) on the external environment of the hypothetical enclosed space and quality (Q) within the space are each clearly defined, and the assessment is carried out from both the L and Q sides. It is also based on multiple assessment items set according to the individual characteristics of L and Q. Results are expressed as scores rated and counted in line with a certain method and standard.

(2) Comprehensive assessment of environmental performance by BEE

The BEE value with the concept of environmental efficiency is derived from the results of step (1) by dividing Q by L, in order to express the environmental performance of the city in a comprehensive manner. To start the calculation, the total scores of L and Q are first converted into a scale of 0 to 100, respectively. BEE is expressed as the gradient of a straight line on a graph having L plotted on the x axis and Q on the y axis as shown in Figure I.2.2. According to the value corresponding to the gradient, the degree of the environmental performance is labeled and color-coded in five grades; S rank, A, B+, B- and C. Even if the gradient is 3.0 or higher, the BEE value will not be ranked as S, the highest grade, unless the Q value is 50 or higher. The lower the L value and the higher the Q value, the higher the BEE value becomes, indicating that the city is highly regarded in the assessment in terms of the overall environmental performance.

Because of the calculation systems, the BEE value may be close to +∞ (infinity). However, from a practical perspective of the assessment, the BEE value can be as high as 10 (even when the value of Q/L far exceeds 10, the result is shown as BEE = 10).

(3) Assessment of the future estimated value and target value for L and Q

(Please refer to 2.3 regarding purposes of future assessment.)

(4) Calculating the future BEE value

(5) Understanding the possibility of improvement of the city for the future by comparing the current value obtained in steps (1) and (2) with the future value obtained in steps (3) and (4) regarding L, Q and BEE

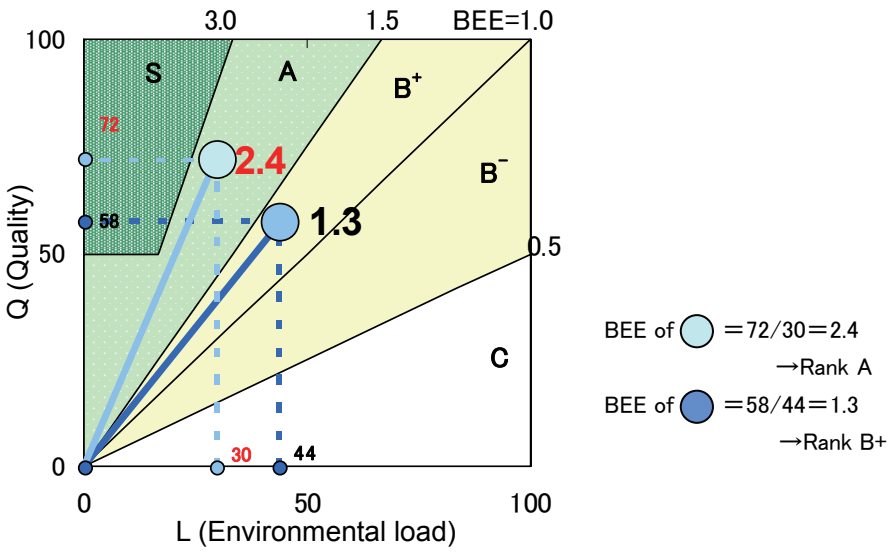

Figure Ⅰ.2.2 BEE chart

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2.3 Current assessment and future assessment

As seen in arguments made in conferences including COP, individual countries have been seeking a way to substantially reduce CO_2 emissions over the medium and long term, while implementing measures having an immediate effect on the current situation. CASBEE-City adopts an assessment method focusing of future prediction in consideration of a proper response to arguments on the framework of the Kyoto Protocol and the Post-Kyoto Protocol. Specifically, CASBEE-City is a system designed to evaluate the current situation with absolute accuracy, while also estimating the future environmental performance in order to evaluate the effectiveness of measures (i.e. the degree of future expectations) in a visible manner by comparing the current situation with future projections. Figure I.2.3 shows this assessment system covering the current and future situations expressed on a BEE chart.

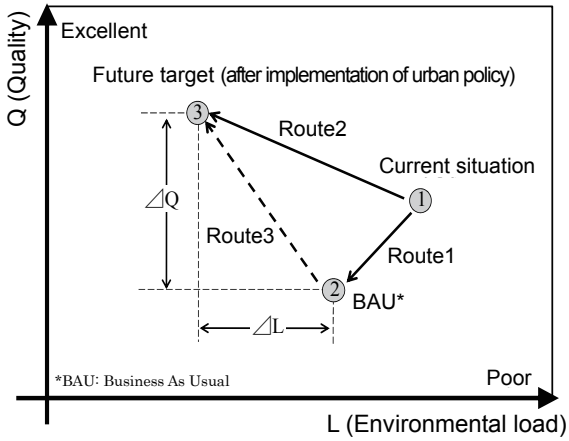

Figure Ⅰ.2.3 Positions of the current assessment and future assessment on a BEE chart

(1) Current assessment value: The Q, L and BEE values on this point represent the current assessment of the city.
(2) Tendency value: Future assessment in cases when no special additional measures are taken (BAU = Business As Usual)
(3) Future assessment value in cases when appropriate measures are taken: The Q, L and BEE values on this point represent the future assessment of the city.
On the BEE chart, Route 1 represents the change from the current situation to the BAU, and Route 2 is for the change from the current situation to the future, whereas Route 3 leading from (2) to (3) via the BAU represents the policy effect. Consequently, the difference between (2) and (3) in values on the x axis and the y axis respectively indicate the reduction of environmental load (⊿L) and the improvement in qulity (⊿Q), which represent the policy assessment. Therefore, the two-dimensional display with L and Q enables the assessment of an urban policy effect from two separate aspects of L and Q.

The following are formula expressing the above chart:

Estimated future value of $L \rightarrow L_{\text{Future value}} = L_{BAU} + \Delta L$
Estimated future value of $Q \rightarrow Q_{\text{Future value}} = Q_{BAU} + \Delta Q$

L_{BAU}, Q_{BAU}: Future values in cases when no special additional measures are taken (BAU)
ΔL: Expected increase or reduction in environmental load by implementing urban policies
ΔQ: Expected increase or reduction in quality by implementing urban policies

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3. Assessment method

3.1 At the time of assessment

In order to conduct a predictive assessment of the effect of future measures, policies and efforts, as well as the current assessment of the city, in CASBEE-City, as described above, it is necessary to obtain estimated future values of L and Q and the estimated difference between the respective future value and the BAU value (ΔL and ΔQ).

Assessment items, as described after, usually focus on the amount of accumulation generated by an activity over a certain period of time in a city. Therefore, the assessment is basically conducted annually.

3.1.1 Year of the current assessment

The “current situation” in this case means the recent situation of the city, however, the year of the current assessment also serves as the base year of the entire procedure in view of future assessment. Accordingly, the year of the current assessment can be set as appropriate by the body conducting the assessment depending on the circumstances in each city.

3.1.2 Year of future assessment

The year of future assessment should be set as appropriate by the body conducting the assessment approximately between 2020 and 2030, in the future medium term.

Note 1: Please refer to 3.3 regarding how to address current and future situations in terms of population data.

Note 2: Please refer to 3.4 and 3.5 regarding the BAU value, and follow the operational procedure of the assessment software because the method of setting the BAU value may vary depending on the assessment items.

3.2 Degree of operability used for future assessment

Whether the future target value is actually achieved or not is thought to be varied depending on to what extent the individual municipalities work on the implementation system toward the future target. Accordingly, CASBEE-City adopts an index expressing the degree of operability.

As mentioned above,

$$L_{\text{Future value}} = L_{BAU} + \Delta L$$

$$Q_{\text{Future value}} = Q_{BAU} + \Delta Q$$

Further,

$$\Delta L = \Sigma \Delta Li \times Xi$$

$$\Delta Q = \Sigma \Delta Qj \times Xj$$

- i : A number corresponding to individual items ranging from L1.1.1 to L3
- ΔLi : Target increase (a negative value for target reduction) in Item i, an assessment item of L, set by individual cities
- Xi : Degree of operability of a measure regarding Item i (0-1.0)
- j : A number corresponding to individual items ranging from Q1.1.1 to Q3.3.2
- ΔQj : Target increase (a negative value for target reduction) in Item j, an assessment

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item of Q, set by individual cities

Xj : Degree of operability of a measure regarding Item j (0-1.0)

The value of the degree of operability (Xi or Xj) is determined within the range of 0.0 to 1.0 depending on the number of corresponding items on a list of prepared check items in terms of measure, policy and approach. The actual procedure for L differs from that for Q, the details of which will be described later in sections 3.4 and 3.5.

3.3 Population data

Many assessment items in CASBEE-City are expressed by an index on a per-capita basis in order to ensure neutrality of the assessment in spite of the differences in scale among various cities.

Conventionally, the various performances and greenhouse gas (GHG) emissions of a city are expressed as the product of the amount of activity and a basic unit per activity. The amount of activity and the basic unit per activity are based on a variety of indices including the population, number of households, product output, gross floor area and duration of activity, depending on each field. Strictly speaking, there is another possible method using different indices for each field and totaling the amount of activity calculated separately for each field with the weighting coefficient in mind, but the method used in CASBEE-City uses the population as a representative value for the amount of activity in view of simplicity and feasibility.

3.3.1 Adjusted population

When using an index on a per-capita basis, it is necessary to take account of the fact that, if the total population (= the nighttime population) is used, the values calculated per capita will be extremely high in inner urban areas of large cities with a large day and nighttime population ratio. On the other hand, the various activities of a city are obtained as a sum of economic activities mainly conducted during the day and everyday activities mainly in the nighttime. In order to define the amount of activities representing the day and nighttime activities in a simple manner, the daytime population and the nighttime population are obtained separately, and the adjusted population is defined as shown in the formula below, which is the basis of per-capita emissions.

[Adjusted population] = ([Daytime population] + [Nighttime population])/2

Currently, the most recent available data for the daytime population is as of 2005, as it is determined by the national population census in Japan.

The various indices for the numerator used in the calculation of a per-capita value of the adjusted population for each assessment item are not always based on the 2005 census data, however, in order to give priority to practical convenience in the procedure, it is acceptable to uniformly define the adjusted population based on the 2005 census data as the population used in the assessment.

3.3.2 Estimated future population

The future estimate of the total population is based on the estimated future population (the average variant) of the year for individual municipalities calculated by the Japanese National Institute of Population and Social Security Research. The future estimate of the daytime population is obtained by multiplying the future estimate of the total population by the current day and nighttime population ratio based on the most recent census data (i.e. the 2005 census data).

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However, a unique calculation method of the city may be used under certain conditions including cases in which the city has set its own future population target.

3.3.3 Setting the type of city according to the size of population

When assessing the quality (Q) of a city, different assessment standards are used for various assessment items according to the size of population. For details, please refer to 3.5.4.

3.4 Assessment items for L

3.4.1 Basic idea regarding L

CASBEE-City limits the assessment of greenhouse gases in terms of environmental load (L). All greenhouse gases are converted into carbon dioxide, and are assessed in terms of annual emissions per capita (t-CO_2/Year/Person) in order to ensure neutrality of the index in spite of the difference in the size of populations among individual cities. The population in this case means the adjusted population.

Assessment items are selected in view of the policy trend of the government regarding GHG emissions including the following:

(1) Midterm goals for the government in reducing GHG emissions
(2) Kyoto Protocol Target Achievement Plan
(3) Eco-Model City Project by the Cabinet
(4) Ministry of the Environment “Manual for planning local government’s action plan to address the issue of global warming (Regional policies), First edition,” June 2009.
(Hereinafter referred to as the “New action planning manual”)

3.4.2 Structure of Assessment items

This tool is basically in accordance with the new action planning manual, as shown in Table I.3.1. Please refer to 3.4.3 regarding the “Beneficiary-pays principle” in the Table.

Table Ⅰ.3.1 Assessment items for L

Main category	Middle category	Minor category	Beneficiary-pays principle items
L1 GHG emissions	L1.1 CO_2 from energy sources	L1.1.1 Industrial sector	○
		L1.1.2 Residential sector	
		L1.1.3 Commercial sector	
		L1.1.4 Transportation sector	
		L1.1.5 Energy conversion sector	○
	L1.2 Industrial processes	—	○
	L1.3 Waste disposal sector	—	
	L1.4 Agricultural sector	—	○
	L1.5 Other greenhouse gases (HFCs, PFCs, SF6)	—	
L2 Environmental load reductions and CO_2 absorption	L2.1 Low-carbon energy sources	—	
	L2.2 CO_2 sinks	—	
L3 Support to other regions for reducing CO_2 emissions	L3.1 Domestic trade, etc.	—	

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3.4.3 “Emitter-pays principle” and “Beneficiary-pays principle”

When evaluating environmental load (L) in terms of GHG emissions, industrial cities are likely to receive a low score. It is certainly important that these industrial cities accept this fact and work on further reducing such emissions. On the other hand, the output of industrial cities is indispensable, as it contributes to the benefit of not only the cities themselves, but also the whole country. Consequently, CASBEE-City concurrently uses two assessment methods; the “Emitter-pays principle” in which GHG emissions are calculated in the city – the source of emissions – and the “Beneficiary-pays principle,” in which the calculation is based on the final point of demand.

3.4.4 BAU of L (Tendency value)

The BAU of L is estimated basically in accordance with the new action planning manual. The manual explains BAU as cases in which no additional measures are expected to be taken, assuming that the efficiency of energy consuming devices is equivalent to the current situation. The current situation in this case includes the base year, the current year and the short-term target year.

3.4.5 Degree of operability regarding future assessment of L

Measures, policies, and efforts toward achieving goals are classified roughly into two categories; commitments of the government and those of nongovernmental organizations. Table I.3.2 shows a list of actions to be implemented in order to create a low-carbon society. The operability (Xi) of assessment item (i) is determined in a range of 0 to 1 based on this list depending on the number of actions implemented or planned. Table I.3.3 shows Xi values corresponding to the number of actions implemented.

Each action that has been implemented is counted as 1, and those that have been planned but have yet to be implemented are each given 0.5. Those that fall under neither of the two are placed in a separate free description space in which the city’s unique efforts can be described.

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Table I.3.2 List of measures, policies and efforts to be implemented for achieving goals

Item	Policy
Commitment of the government	
1) Completing the new action plan	- The new action plan should include the year in which the plan is formulated in its planned period.
2) Formulating a master plan and a mid- and long-term vision for achieving mid- and long-term goals stipulating a budget, timing and organization in charge	- The new action plan should include the year in which the plan is formulated in its planned period.
3) Setting controllable numerical targets, conducting ongoing monitoring and publishing it once or more a year	- The system, staff and budget required for implementing the target management, monitoring and publication should be secured. - Items subject to the monitoring should account for a certain proportion of the total emissions or the total reduction (i.e. 50% or more).
4) Establishing a promotion committee or town meeting consisting of public administration, citizens, companies and universities, and holding them twice or more a year	- The group should be well balanced, the members of which include people from different major backgrounds including the government, citizens, companies, universities and NPOs.
5) Holding an environmental seminar for citizens and businesses twice or more a year	- Environmental seminars and workshops should be held.
6) Lessons or programs regarding environmental education are included in curriculum for elementary schools, junior high schools and high schools.	- Environmental education programs in which students learn about environmental issues and efforts of companies should be conducted. - Environmental education lessons with people from outside the school such as companies or local communities as lecturers should be organized.
7) Setting a public comment period before major decisions regarding budget or timing	- A period for public comments on environment-related policies should have been set in the past year, or should be planned for the current year.
8) Other (Special efforts utilizing characteristics of the local area)	- Special notes
Commitment of nongovernmental organizations	
9) Having an accurate monitoring system including direct data collection from each household and the promotion of BEMS and HEMS	- Items subject to monitoring should account for a certain proportion of the GHG emissions set in the reduction measure (i.e. 30% or more).
10) Personal goals and action plans for private companies, NPOs and individuals in the city are included	- Targets set in the new action plan should reflect the personal targets or action plans of residents and businesses.
11) Intellectual contributions from research institutes and universities in the city are included	- A framework for cooperation with research institutes or universities should be established, project verifications should be conducted and a follow-up mechanism should be established.
12) Having commitments of nonlocal organizations including energy-saving activities and the promotion of carbon sinks by companies and NPOs operating in a wide area	- A framework for cooperation with organizations having a base outside the city should be established, such as companies and NPOs conducting activities in a wide area, the activities of which include energy-saving campaigns and the promotion of carbon sinks.
13) Other (Special efforts utilizing characteristics of the local area)	- Special notes

Table Ⅰ.3.3 Correspondence table of the number of measures, policies, efforts and the degree of operability (Xi)

Number of actions implemented (0.5 is given to the actions planned but not yet implemented.)	Xi
Implementing 9 or more actions in the relevant section	1.0
Implementing 7 actions in the relevant section	0.7
Implementing 5 actions in the relevant section	0.5
Implementing 3 actions in the relevant section	0.3
Number of actions implemented is less than 3	0

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3.5 Assessment items for Q

3.5.1 Basic idea regarding Q

Q (quality) is, in principle, the sum of unique added values of the city created by the operation and maintenance of the urban area. In order to express the Q value by a simple and precise index, a single economic index may be adopted, which includes the city's gross regional product (GRP) or the land price of a representative location.

However, economic indices sometimes depend greatly on elements with a tenuous connection with global environmental issues. Moreover, the assessment in terms of the quality of life (QOL) of the people cannot be fully expressed by the economic index only.

Accordingly, based on a triple bottom line of the environment, society and the economy, which is one of the major ideas when understanding the sustainability of a region, assessment items are selected in order to represent a group of explanatory variables of the city's added values.

3.5.2 Structure of assessment items

The overall structure consists of the main category with the classifications of Q1 Environmental aspect, Q2 Social aspect and Q3 Economic aspect, and middle category and minor category under the main category. The actual assessment is conducted at the minor category level, the results of which are totaled in terms of the middle category items, the major category items, and all items, respectively, in order to derive assessment values. Some of the minor category items are regarded as "Not Applicable" (N/A) under certain conditions. A list of assessment items is shown in Table I.3.4.

Table Ⅰ.3.4 List of assessment items

Main category	Middle category	Minor category
Q1 Environmental aspects	Q1.1 Nature conservation	Q1.1.1 Ratio of green and water spaces
	Q1.2 Local environmental quality	Q1.2.1 Air
		Q1.2.2 Water
		Q1.2.3 Noise
		Q1.2.4 Chemicals substance
	Q1.3 Resources recycling	Q1.3.1 Recycling rate of general waste
	Q1.4 Environmental measures	Q1.4.1 Efforts and policies to improve the environment and biodiversity
Q2 Social aspects	Q2.1 Living environment	Q2.1.1 Adequate quality of housing
		Q2.1.2 Adequate provision of parks and open spaces
		Q2.1.3 Adequate sewage systems
		Q2.1.4 Traffic safety
		Q2.1.5 Crime prevention
		Q2.1.6 Disaster preparedness
	Q2.2 Social services	Q2.2.1 Adequacy of education services
		Q2.2.2 Adequacy of cultural services
		Q2.2.3 Adequacy of medical services
		Q2.2.4 Adequacy of childcare services
		Q2.2.5 Adequacy of services for the disabled
		Q2.2.6 Adequacy of services for the elderly
	Q2.3 Social vitality	Q2.3.1 Rate of population change due to births and deaths
		Q2.3.2 Rate of population change due to migration
		Q2.3.3 Progress towards an information society
		Q2.3.4 Efforts and policies for vitalizing society
Q3 Economic aspects	Q3.1 Industrial vitality	Q3.1.1 Amount equivalent to gross regional product
		Q3.1.2 Ratio of change in the number of employees
	Q3.2 Economic exchanges	Q3.2.1 Index equivalent to number of people visiting city
		Q3.2.2 Efficiency of public transportation
	Q3.3 Financial viability	Q3.3.1 Tax revenues
		Q3.3.2 Outstanding local bonds

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3.5.3 Weighting coefficient

Weighting coefficients between different assessment categories are set as shown in Table I.3.5 in accordance with the conventional method used in the CASBEE Family, by conducting a questionnaire targeting public administrators, businesses and residents (Number of valid responses: Public administrators 46, Businesses 332, Residents 2328), and by utilizing the Analytic Hierarchy Process (AHP) method. In cases when multiple middle items and minor items or just multiple minor items are set, the weighting coefficients of individual items are equally set. When some of the minor items have “N/A” (Not Applicable), the weight is divided evenly between other minor items under the same middle item.

Table Ⅰ.3.5 Weighting coefficients of main items

Main item	Weighting coefficient
Environmental aspects	0.45
Social aspects	0.30
Economic aspects	0.25

3.5.4 Rating standards and three city type classifications

The rating of minor items is on a five-point scale ranging from level 1 to 5, according to the value of the assessment index defined for individual items based on various data including statistics. The standards for classification by level are designed so that the assessment results of all the municipalities are evenly distributed in each level at approximately 20% each.

Some minor items have a wide range of values in the assessment index depending on the characteristics (size) of the city. Therefore, in terms of items that are regarded as possible and reasonable in view of data acquisition, cities are classified into three groups according to the size of the municipality’s permanent population; (1) Government-ordinance-designated cities or equivalents with populations of approximately 500,000 or more, or Tokyo's 23 wards, (2) Major local cities with populations of 50,000 or more and less than 500,000 and (3) Small-scale cities, towns and villages with populations of less than 50,000. Standards for classification by level are set for each group. Due to population shifts, some cities may fall under a different classification group in the future, but in principle, the future assessment is based on the current classification.

Hereinafter, the aforementioned classifications are referred to as (1) = Ordinance-designated cities, (2) = General cities and (3) = Towns and villages, both in this manual and the accompanying assessment software.

3.5.5 BAU of Q (Tendency value)

As many assessment items of Q are expressed by indices on a per-capita basis including the adjusted population and the population by age bracket, the calculation is based on the idea that Q_{BAU} is equal to $Q_{Current}$ value. This means that the basic unit stays constant in the future unless special measures are taken.

However, as for assessment items of Q2 expressed in an index on a per-capita basis, representing data related to the size of the facility, in the medium term, Q_{BAU} is calculated based on the idea that the size of the facility stays the same unless special measures are taken, which is realistic. In this case, the result of Q_{BAU} differs from the $Q_{Current}$ situation as the future population fluctuates depending on the forecast.

Some of the economic indices of Q3 calculate Q_{BAU}, reflecting the nationwide decreasing tendency of

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the working-age population, because the total amount is expected to decrease nationwide as the working-age population decreases toward the future.
Regarding the actual calculation methods for individual assessment items, please refer to “2. Calculation of BAU for individual Q items” of Part Ⅳ. Preliminary studies and related data about Q in Commentaries and Data.

3.5.6 Degree of operability regarding future assessment of Q

In order to determine the degree of operability in terms of the future target value in individual assessment items, the degree of conformance of a municipality is assessed in terms of the three check items shown in Table I.3.6.

Table I.3.6 Degree of operability of the future target value

Check item	Number of items checked	Degree of operability
(1)Specific policies are established for achieving goals. (2)Simple and comprehensible explanatory materials regarding the credibility of the target values from the perspective of a third party are prepared. (3)Target values have been or will be made public.	0	0.5
	1	1.0
	2	
	3	

3.6 Scores for L and Q, and BEE calculation

Environmental load L is expressed as per-capita annual GHG emissions of the adjusted population (t-CO_2/Person/Year). The calculation and estimation of emissions are carried out individually for the aforementioned sectors and fields, but the total score summing all the sectors and fields represents the final assessment of L. This representative value may possibly be in a wide range of values including negative values, depending on the characteristics of the city. Therefore, a conversion formula is adopted, in which the scale of L is expressed within the range of 0 to 100, regardless of the values of the total emissions in individual cities. In this formula, coefficients are set in order to make the national average (10 t-CO_2/Person/Year) the median (50). At the same time, the level of this median is set as 3.0, giving the total score of L, rounded to one decimal place, which corresponds the range of Level 1 to 5. As when L is shown in parallel with Q, it is easy to understand if the higher score (level) of L means that the performance of the city is better, so the formula is set to indicate a high score when the amount of emissions is lower (when the scale is close to 0). (Details of the conversion formula are explained in PART II.)
Quality Q is rated in accordance with rating standards within the range of Level 1 to 5 set for individual minor items. Level 1 is counted as 1 point, whereas Level 5 means 5 points, and the score for each item is determined. After weighting adjustments in consideration of weights between assessment items, scores ranging from 1 to 5 are given for middle items, major item, and the sum total of Q. The total score of Q is expressed as SQ and is defined as Q = 25 x (SQ－1) in order to convert the score into a value on a scale of 0 to 100.
Although it has been described that BEE, the environment efficiency of the city, is calculated as Q/L, in order to express the numerator and denominator in the same dimension, both Q and L are calculated on the aforementioned scale of 0 to 100.

$$BEE = \frac{Q}{L} = \frac{25 \times (SQ-1)}{L}$$

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4. Assessment procedure

4.1 Structure of assessment sheets

CASBEE-City adopts universal spreadsheet software so that a wide range of data can be easily entered and the assessment results are automatically calculated. This spreadsheet software consists of multiple sheets, the major assessment sheets of which include a “Main sheet” and a “Rating sheet” used for data input, as well as a “Score sheet” and a “Assessment results sheet” for data output. The basic data necessary for conducting the assessment are entered in the Main sheet. The Rating sheet indicates the rating standards for each assessment item, which are referred to when entering the rating result for each item.

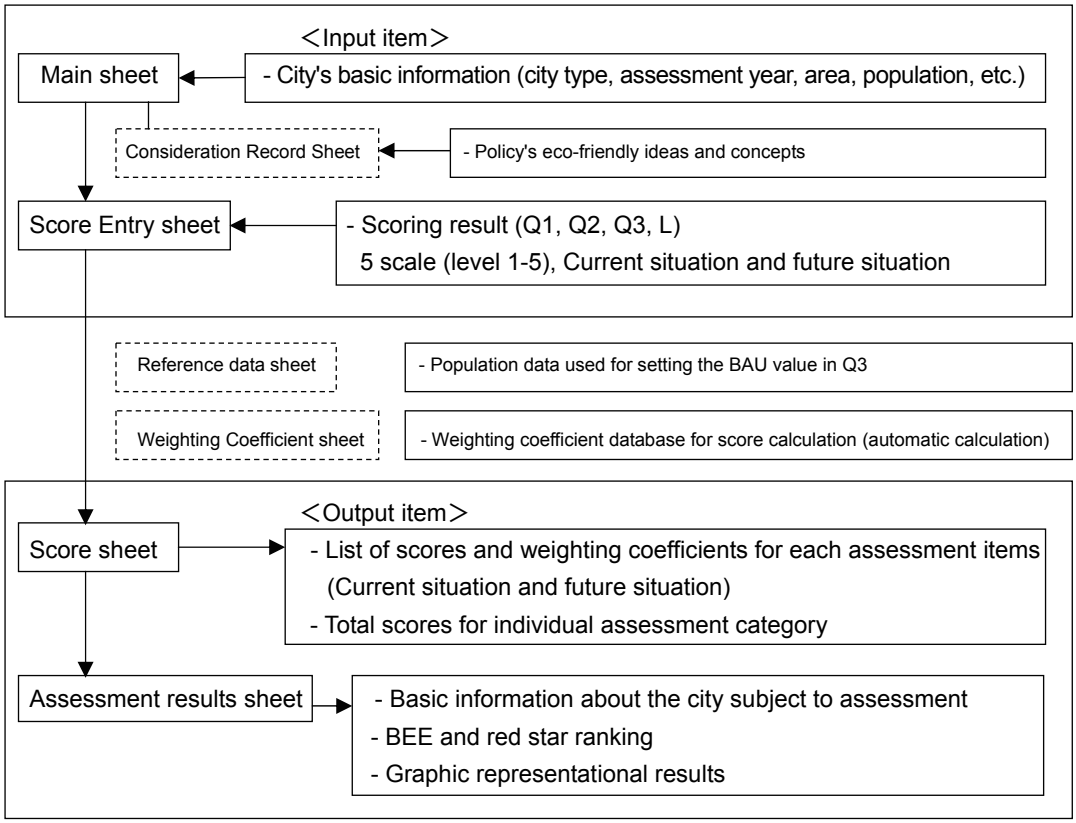

Figure Ⅰ.4.1 Overall structure of assessment sheets

4.2 Main sheet

The Main sheet is the sheet on which the user first inputs information required for the assessment including the city overview. Figure I.4.2 shows the Main sheet screen.

The “City type” in “1) City outline (1) Basic information about the city” refers to the three classifications according to the size of the population described in “3.5.4 Rating standards and three city type classifications.” When one of the classifications is selected from the pull-down menu options, the corresponding rating criteria are automatically applied throughout the calculation software.

Data obtained from the latest National Census as of the base year is used for the current (the base year) values of the daytime population, nighttime population, infant population (0 to 4 years old) and elderly population (65 years old and over). In terms of the future (the year for comparison), if a local

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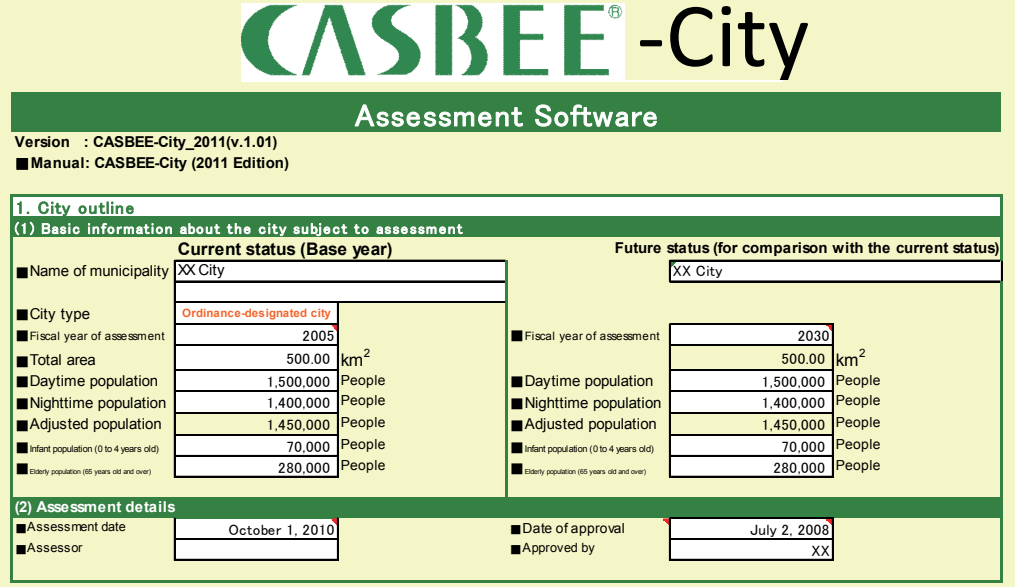
community conducts a population forecast, the data obtained from the forecast can be used. If not, the estimated future population (the average variant) by municipality of the year provided by the Japanese National Institute of Population and Social Security Research is entered. The daytime population is obtained by multiplying the future estimate of the nighttime population by the current day and nighttime population ratio. These population data are commonly used in the assessment calculations of L and Q.


CASBEE® -City

Assessment Software

Version : CASBEE-City_2011(v.1.01)

■Manual: CASBEE-City (2011 Edition)

1. City outline

(1) Basic information about the city subject to assessment

	Current status (Base year)		Future status (for comparison with the current status)	
■Name of municipality	XX City		XX City	
■City type	Ordinance-designated city			
■Fiscal year of assessment	2005		2030	
■Total area	500.00	km^2	500.00	km^2
■Daytime population	1,500,000	People	1,500,000	People
■Nighttime population	1,400,000	People	1,400,000	People
■Adjusted population	1,450,000	People	1,450,000	People
■Infant population (0 to 4 years old)	70,000	People	70,000	People
■Elderly population (65 years old and over)	280,000	People	280,000	People

(2) Assessment details

■Assessment date	October 1, 2010	■Date of approval	July 2, 2008
■Assessor		■Approved by	XX

Figure Ⅰ.4.2 Main sheet screen

The Main sheet has a supplementary “Eco-friendliness points” sheet, in which special features of the city’s environment-related policies and efforts, including those in the planning stage and those in practice, are described from the two perspectives of Q and L.

The information entered in the Main sheet and the Eco-friendliness points sheet is automatically displayed in the required fields in individual sheets and the assessment results sheet.

4.3 Score entry sheet

The Rating sheet is a sheet on which the user actually inputs scoring results and consists of four sheets; Q1 to Q3, and L, each representing a different assessment category. The rating is made according to criteria for each assessment item indicated on individual sheets on a five-point scale of Level 1 to 5.

Cells to be entered are shown in light blue on the sheet, and the input data are automatically calculated as they are entered according to the instructions on the screen. The operation procedures are therefore quite straightforward. The L sheet has a special setting for certain cells in which the data may be overwritten if necessary after reviewing the results of the automatic calculation.

4.3.1 L Score entry sheet

The L sheet consists of three tables arranged in tandem as shown in Figure I.4.3. Cells to be entered are highlighted in light blue and appear in the middle and lower tables. The upper table provides explanations regarding criteria and shows assessment results obtained from calculations based on

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data entered in the middle and lower tables. The left half of the upper table covers the Emitter-pays principle, whereas the right half corresponds to the Beneficiary-pays principle.

Amounts of emissions in L1.1.1 to L3.1 are entered in the middle table. This table consists of three columns of major items, middle items, and minor items starting from the left, as well as three more of (1) $L_{Current}$, (2) L_{BAU}, and (3) L_{Future}. Each of the columns of (1) to (3) is further divided into two classifications of the Emitter-pays principle and the Beneficiary-pays principle. When certain data are entered in the Emitter-pays principle column, the corresponding amount in the Beneficiary-pays principle column will be automatically calculated. In terms of (3), ΔL (An increase or reduction target set by individual municipalities) is entered instead of an actual Future L value.

The lower table calculates the operability X regarding the future values. When one of the items is selected from the pull-down menu options (by entering ○), the value of X will be calculated automatically. By multiplying the above ΔL by X, the value for (3) will be obtained.

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■自治体名称 XX市　　政令市

L 環境負荷

発生地型						再配分型					
現状	将来	Lのスケール(0～100)		X: 当該都市の年間1人あたりCO2 排出量 ［t-CO2/人・年］		現状	将来	Lのスケール(0～100)		X: 当該都市の年間1人あたりCO2 排出量 ［t-CO2/人・年］	
レベル 4.1	レベル 4.1	現状 L= 22.0	将来 L= 22.1	現状 X= 4.8	将来 X= 4.8	レベル 4.1	レベル 4.1	現状 L= 22.1	将来 L= 22.1	現状 X= 4.8	将来 X= 4.8
レベル 1	レベル 1	98.75 超		28 超		レベル 1	レベル 1	98.75 超		28 超	
レベル 2	レベル 2	75		14.5		レベル 2	レベル 2	75		14.5	
レベル 3	レベル 3	50		10		レベル 3	レベル 3	50		10	
レベル 4	レベル 4	25		5.5		レベル 4	レベル 4	25		5.5	
レベル 5	レベル 5	1.25 以下		-8.0以下		レベル 5	レベル 5	1.25 以下		-8.0以下	

色欄について、プルダウンメニューから選択、または数値・コメントを記入のこと　　自動計算されます：原則として、修正不可

大項目	中項目	小項目	現状				将来											（参考）2005年度産業関連部門温室効果ガス排出量*1
			評価年度	2005年度	補正人口	1450000人	評価年度	2030年度	補正人口	1450000人								
			$L_{現状}$の計算				L_{BAU}（現状趨勢ケース）の計算				$L_{将来}$の計算							
			発生地型		再配分型		発生地型		再配分型		発生地型					再配分型		
			CO2排出量（吸収量は、マイナス値で入力）	一人当たりCO2排出量	CO2排出量（吸収量は、マイナス値で入力）	一人当たりCO2排出量※2	CO2排出量（吸収量は、マイナス値で入力）	一人当たりCO2排出量	CO2排出量（吸収量は、マイナス値で入力）	一人当たりCO2排出量	ΔLi	Xi	ΔLi×Xi	L将来（CO2排出量等）	一人当たりCO2排出量	CO2排出量（吸収量は、マイナス値で入力）	一人当たりCO2排出量	
			t-CO2	t-CO2/人	t-CO2	t-CO2/人	t-CO2	t-CO2/人	t-CO2	t-CO2/人	t-CO2	-	t-CO2	t-CO2	t-CO2/人	t-CO2	t-CO2/人	億t-CO2
L1 年間温室効果ガス排出量	L1.1 エネルギー起源CO2	L1.1.1 産業部門	5,160,000	3.56	5,165,625	3.56	5,160,000	3.56	5,165,625	3.56	5,000	1.00	5,000	5,165,000	3.56	5,165,625	3.56	4.56
		L1.1.2 民生家庭部門		0.00	0	0.00		0.00	0	0.00		1.00	0	0	0.00	0	0.00	
		L1.1.3 民生業務部門		0.00	0	0.00		0.00	0	0.00		1.00	0	0	0.00	0	0.00	
		L1.1.4 運輸部門		0.00	0	0.00		0.00	0	0.00		1.00	0	0	0.00	0	0.00	
		L1.1.5 エネルギー転換部門	890,000	0.61	889,258	0.61	890,000	0.61	889,258	0.61	5,000	1.00	5,000	895,000	0.62	889,258	0.61	0.785
		（小計）	6,050,000	4.17	6,054,883	4.18	6,050,000	4.17	6,054,883	4.18	—	—	—	6,060,000	4.18	6,054,883	4.18	
	L1.2 工業プロセス分野		610,000	0.42	610,586	0.42	610,000	0.42	610,586	0.42	5,000	1.00	5,000	615,000	0.42	610,586	0.42	0.539
	L1.3 廃棄物分野			0.00	0	0.00		0.00	0	0.00		1.00	0	0	0.00	0	0.00	
	L1.4 農業分野		310,000	0.21	310,391	0.21	310,000	0.21	310,391	0.21	1,000	1.00	1,000	311,000	0.21	310,391	0.21	0.274
	L1.5 代替フロン等3ガス			0.00	0	0.00		0.00	0	0.00		1.00	0	0	0.00	0	0.00	
	（合計）		6,970,000	4.81	6,975,859	4.81	6,970,000	4.81	6,975,859	4.81	—	—	—	6,986,000	4.82	6,975,859	4.81	
L2 環境負荷低減・吸収量	L2.1 低炭素エネルギー源			0.00	0	0.00		0.00	0	0.00		1.00	0	0	0.00	0	0.00	
	L2.2 CO2吸収源			0.00	0	0.00		0.00	0	0.00		1.00	0	0	0.00	0	0.00	
	（合計）		0	0.00	0	0.00	0	0.00	0	0.00	—	—	—	0	0.00	0	0.00	
L3 他地域でのCO2排出の抑制支援量	L3.1 国内取引等			0.00	0	0.00		0.00	0	0.00		1.00	0	0	0.00	0	0.00	
（合計）			6,970,000	**4.81**	6,975,859	**4.81**	6,970,000	4.81	6,975,859	4.81	—	—	—	6,986,000	**4.82**	6,975,859	**4.81**	

*1：環境省：2005年度の温室効果ガス排出量（確定値）について
*2：全国の総排出量を配分する際の人口は、2005年国勢調査値（1.28億人）を用いている。

対策、施策、取組の項目数とXi

項目	採否	考え方
＜行政のコミットメント＞		
新実行計画を策定	1	・当該年度が計画期間に含まれる新実行計画が策定されていること
中長期目標実現に向けたマスタープラン、中長期ビジョンを策定（予算、時期、担当等が明記さ	1	・当該年度が計画期間に含まれる新実行計画が策定されていること
管理可能な数値目標を設け、継続的なモニタリングを行い、年1回以上の頻度で公開	1	・目標管理・モニタリング・公開を実施するための体制、人員、予算等が確保されていること ・モニタリングの対象が総排出量あるいは総削減量の一定割合（例．1/2以上等）を占めていること
行政、市民、企業、大学等で構成する推進協議会やタウンミーティングを設置し、年2回以上の	0.5	・行政、市民、企業、大学、NPOの各主体が構成員に含まれている等、バランスのとれたメンバー構成になっていること
市民・事業者向けの環境セミナーを年2回以上の頻度で開催	1	・環境セミナーや講習会を開催していること
小中高での環境教育に関する何らかの授業・プログラムが組み込まれている	1	・環境問題や企業の取組を学ぶ環境教育プログラム等を実施していること ・環境に関する企業や自治体の出前教室等が開催されていること
予算や時期等の重要な決定ではパブリックコメントを実施	0.5	・過去1年以内に、温暖化関連施策に関してパブコメの実績があること、または、当該年度に温暖化関連施策に関してパブコメの予定があること
その他（地域特性を生かした特筆すべき取組）		・あれば特記すること
＜行政以外の主体のコミットメント＞		
高精度でモニタリングする仕組みがある（各世帯からの直接データ収集、BEMS、HEMSが普及	0.5	・モニタリング範囲が温室効果ガス排出量の削減対策の一定割合（例．30%以上等）をカバーしていること
当該都市の民間企業やNPO、個人の自主目標・行動計画が含まれる	1	・新実行計画の目標想定に、住民・事業者による自主目標や行動計画が反映されている
当該都市の研究機関、大学等による知的貢献が含まれる	1	・研究機関、大学等との連携体制が構築され、事業の検証やフォローアップが実施されること
地元以外の主体のコミットメントがある（広域企業、広域NPO等による省エネ、吸収源普及活動	0.5	・地元以外の主体（広域企業、広域NPO等による省エネ、吸収源普及活動等）との連携体制が構築されていること
その他（地域特性を生かした特筆すべき取組）	0	・あれば特記すること
合計	9.0	Xi= 1

Figure Ⅰ.4.3 L Score entry sheet screen (Japanese version)

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4.3.2 Q Score entry sheet

Sheets for Q1, Q2, and Q3 respectively include three tables in terms of individual minor items (detailed items for Q2.2); List of assessment criteria, Data entry table and Description space for actions, measures and efforts, as shown in Figure I.4.4. All the minor (detailed) items are arranged in numerical order. When certain data are entered into the middle one of the three tables on a screen in the following steps, assessment results (the current and future levels) of the corresponding item are automatically calculated and shown immediately in two columns from the left in the List of assessment criteria of the upper table.

☐Current situation: Data value Q of the latest available year for individual items

A data value of the latest available year as of the current assessment year (base year) set on the Main sheet and its year are entered in individual data items.

☐Tendency value Q_{BAU}: Calculated automatically. No data entry required.

☐Estimated future value:

The target value of the future assessment year (year for comparison) set on the Main sheet is entered in individual data items. No entry is required unless a future target value is set.

☐Future target value checking:

In order to determine the operability of the future target value entered, either of Yes (Applicable) or No (Not applicable) is selected from the pull-down menu options in terms of three checking items, based on the results of which the operability X will be automatically calculated.

☐Future value Q_{Future}:

Q_{Future} used for the future assessment is calculated automatically in accordance with the following formula.

$$Q_{Future} = Q_{BAU} + (\text{Future target value} - Q_{BAU}) \times \text{Operability X}$$

Q_{BAU} replaces Q_{Future} when no future target values are entered.

The bottom one of the three tables has only one row in which details of actions or efforts taken may be freely described, including an explanation of assessment points and notes. (Not mandatory)

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Q1 環境

色欄について、プルダウンメニューから選択、または数値・コメントを記入のこと

1 自然保全

1.1 自然的土地比率

		現状 重み係数(既定)＝	1.00	将来 重み係数(既定)＝	1.00
現状	将来	政令市	一般の市	町村	
レベル 3.0	レベル 3.0	(林野面積＋経営耕地面積＋湖沼面積＋干潟面積)／自治体面積［㎡］			
レベル 1	レベル 1	0.1 未満	20.0 未満	52.5 未満	
レベル 2	レベル 2	0.1 以上 2.5 未満	20.0 以上 40.0 未満	52.5 以上 67.5 未満	
■レベル 3	■レベル 3	2.5 以上 15.0 未満	40.0 以上 55.0 未満	67.5 以上 80.0 未満	
レベル 4	レベル 4	15.0 以上 45.0 未満	55.0 以上 70.0 未満	80.0 以上 87.5 未満	
レベル 5	レベル 5	45.0 以上	70.0 以上	87.5 以上	

	現状			将来						
				Q_{BAU}	将来目標値	将来目標値チェック			実現可能度X	$Q_{将来}$
データ項目	単位	各項目最新年	データ値Q	2030年		目標達成に向けて具体的な施策が定められている	目標値の信頼性に関して、他者に十分理解されるような説明資料がある	目標値を公表している、または今後公表を予定している	2030年	
林野面積	㎡	2005年	20,000,000	20,000,000	20,000,000	○	×	×	1	20,000,000
耕地面積	㎡	2005年	5,000,000	5,000,000	5,000,000	○	○	×	1	5,000,000
湖沼面積	㎡	2008年	1,000,000	1,000,000	1,000,000	×	×	×	0.5	1,000,000
干潟面積	㎡			0					0.5	0
自治体面積	㎡	2005年	500,000,000	500,000,000	500,000,000					500,000,000
指標値	%		5.20	5.20	5.20					5.20

将来に向けた環境品質、活動度向上の取組みについて簡潔に記載して下さい。 (255文字以内。なお、先頭の30文字までがスコアシートに表示されます。)	

Figure Ⅰ.4.4 Q Score entry sheet screen (Japanese version)

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4.4 Score sheet

Figure I.4.5- shows the Score sheet screen. The Score sheet has a list of rating results entered in the Score Entry sheet. Scores for individual items are multiplied by the respective weighting coefficient, the results of which are sequentially and automatically totaled to display total scores for individual assessment fields of Q1-3 and L, as well as those for assessment category Q and L.

CASBEE-City (2011 edition)
xx city

■Manual: CASBEE-City (2011 edition)
■software: CASBEE-City_2011(v.1.0)

Score sheet

Concerned items	Summary of environmental policies	Present		Future		Total	
		Score	Weighting coefficients	Score	Weighting coefficients	Present	Future
Q; Quality of cities						3.3	3.5
Q1 Environmental aspect		_	0.45	_	0.45	4.0	4.6
1 Nature conservation		5.0	0.25	5.0	0.25	5.0	5.0
1.1 Ratio of green and water spaces	–	5.0	1.00	5.0	1.00		
2 Local environmental quality		4.0	0.25	4.5	0.25	4.0	4.5
2.1 Air	–	5.0	0.25	5.0	0.25		
2.2 Water	–	5.0	0.25	5.0	0.25		
2.3 Noise	–	1.0	0.25	5.0	0.25		
2.4 Chemical substance	–	5.0	0.25	3.0	0.25		
3 Resource recycling		3.0	0.25	4.0	0.25	3.0	4.0
3.1 Recycling rate of general waste	–	3.0	1.00	4.0	1.00		
4 Environmental policy		4.0	0.25	5.0	0.25	4.0	5.0
4.1 Projects and policies for improvement of the environment and biodiversity	–	4.0	1.00	5.0	1.00		
Q2 Social aspect		_	0.30	_	0.30	2.9	2.8
1 Living environment		2.6	0.33	2.6	0.33	2.6	2.6
1.1 Adequate quality of housing standard	–	4.0	0.17	1.0	0.17		
1.2 Adequate provision of parks and open spaces	–	1.0	0.17	4.0	0.17		
1.3 Adequate sewage systems	–	3.0	0.17	3.0	0.17		
1.4 Traffic safety	–	2.0	0.17	2.0	0.17		
1.5 Crime prevention	–	1.0	0.17	1.0	0.17		
1.6 Disaster preparedness	–	5.0	0.17	5.0	0.17		
2 Social services		3.3	0.33	3.0	0.33	3.3	3.0
2.1 Adequacy of education services		3.0	0.17	1.0	0.17		
1 Adequacy of education services (1)	–	5.0	0.50	1.0	0.50		
2 Adequacy of education services (2)	–	1.0	0.50	1.0	0.50		
2.2 Adequacy of cultural services		1.0	0.17	1.0	0.17		
1 Adequacy of cultural services (1)	–	1.0	0.50	1.0	0.50		
2 Adequacy of cultural services (2)	–	1.0	0.50	1.0	0.50		
2.3 Adequacy of medical services	–	5.0	0.17	5.0	0.17		
2.4 Adequacy of childcare services		3.0	0.17	3.0	0.17		
1 Adequacy of childcare services (1)	–	1.0	0.50	1.0	0.50		
2 Adequacy of childcare services (2)	–	5.0	0.50	5.0	0.50		
2.5 Adequacy of services for the disabled		3.0	0.17	3.0	0.17		
1 Adequacy of services for the disabled (1)	–	5.0	0.50	5.0	0.50		
2 Adequacy of services for the disabled (2)	–	1.0	0.50	1.0	0.50		
2.6 Adequacy of services for the elderly		5.0	0.17	5.0	0.17		
1 Adequacy of services for the elderly (1)	–	5.0	0.50	5.0	0.50		
2 Adequacy of services for the elderly (2)	–	5.0	0.50	5.0	0.50		
3 Social vitality		2.7	0.33	3.0	0.33	2.7	3.0
3.1 Rate of population change due to births and deaths	–	1.0	0.25	1.0	0.25		
3.2 Rate of population change due to migration	–	1.0	0.25	1.0	0.25		
3.3 Progress towards an information society	–	5.0	0.25	5.0	0.25		
3.4 Efforts and policies for vitalizing society	–	4.0	0.25	5.0	0.25		
Q3 Economic aspect		_	0.25	_	0.25	2.5	2.5
1 Industrial vitality		2.5	0.33	2.5	0.33	2.5	2.5
1.1 Amount equivalent to gross regional product	–	3.0	0.50	3.0	0.50		
1.2 Ratio of change in the number of employees	–	2.0	0.50	2.0	0.50		
2 Economic exchanges		3.0	0.33	3.0	0.33	3.0	3.0
2.1 Index equivalent to number of people visiting city	–	4.0	0.50	4.0	0.50		
2.2 Efficiency of public transportation	–	2.0	0.50	2.0	0.50		
3 Financial viability		2.0	0.33	2.0	0.33	2.0	2.0
3.1 Tax revenues	–	3.0	0.50	3.0	0.50		
3.2 Outstanding local bonds	–	1.0	0.50	1.0	0.50		
L; Environmental load of cities						-	-
L Environmental load (Beneficiary-pays principle)		3	-	4	-	3.4	3.7
L Environmental load (Emitter-pays principle)		4	-	4	-	4.2	4.4

Figure Ⅰ.4.5 Score Sheet

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4.5 Assessment results sheet

The Assessment results sheet shows figures and graphs representing the assessment results of Q (the quality inside the city), L (the environmental load of the city) and BEE (the Built Environment Efficiency of the city). The assessment results of CASBEE-City can be easily recognized at a glance, as all the related information about the city subject to assessment is condensed into one sheet. However, the assessment results of L require one sheet for each of the two different assessment methods; the “Emitter-pays principle” and the “Beneficiary-pays principle.” An overview of the Assessment results sheet is shown in Figure I.4.6.

The name of the tool, the type of the assessment method for L and the version of the software used for the assessment are clearly indicated at the top of the sheet. Under the top section, the outline of the city subject to assessment and its assessment results are shown, which is divided into the following four blocks of (1) to (4):
Figure I.4.6 shows the Beneficiary-pays principle as an example, but the same structure applies to the Emitter-pays principle.

(1) “1 Basic information about the city”
The brief overview of the city subject to assessment entered in the “1) City outline” section in the Main sheet is automatically shown, such as the name of the municipality, the city type, population and area.

(2) “2-1 Environmental efficiency of the city” and “2-2 Assessment results of the main item (BEE chart and radar chart)”
The current value and the future estimated value of BEE (the Built Environment Efficiency) derived from the assessment results of Q (the quality inside the city) and L (the environmental load of the city) are shown in section 2-1. The graph represents the BEE value by plotting Q on the y axis and L on the x axis, the value of which is expressed by the gradient of the straight line connecting the origin (Q＝0, L＝0) and the coordinate point of the Q value and L value. The higher the Q value and the lower the L value are, the steeper the gradient becomes, which indicates that the city has a high propensity for sustainability.
CASBEE labels the comprehensive assessment results of the city’s environmental efficiency by area divided into five ranks according to the gradient; C (Poor), B-, B+, A and S (Excellent). Each of the five ranks has the corresponding number of ★ symbols, and the current value written in black on a dark blue background and the future value written in red on a light blue background are arranged one above another so that the information on the screen can be easily recognized at a glance.
A radar chart collectively representing the scores of Q1 to 3 and L is placed in section 2-2, in which features of the city’s environment-related efforts can be recognized immediately. The color scheme for the current and future values is same as that of section 2-1.

(3) “2-3 Breakdown of Q” and “2-4 Breakdown of L”
The environmental assessment results of the city are expressed by individual assessment items in sections 2-3 and 2-4. These sections show bar charts representing the results of individual rating items counted on the Score sheet. Both the current and future values are shown using the same color scheme as section 2-1.
The assessment results of Q (the quality inside the city) are expressed as bar charts on the upper half of the section, each representing one of the three assessment items; “Q1 Environmental aspect,”

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"Q2 Social aspect" and "Q3 Economic aspect." In the lower half, the assessment results for L (the environmental load of the city) are shown in the same manner, the assessment items of which include "L1 GHG emissions," "L2 Environmental load reduction and CO_2 absorption" and "L3 Domestic trade, etc.."

(4) "3 Environmental considerations in policymaking"

Section 3 automatically displays special features of the city's administrative efforts written in the Eco-friendliness Points Sheet, in terms of the improvement of Q (the quality inside the city) and the reduction of L (the environmental load of the city). The right half of the section is for arbitrary use, including drawings or pictures demonstrating the gist of such efforts.

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CASBEE®-City (Beneficiary-pays principle)

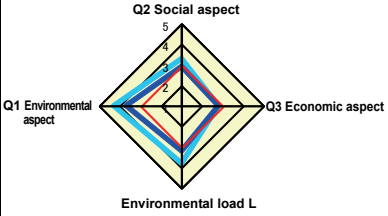
■Manual: CASBEE-City (2011 Edition) ■Software: CASBEE-City_2011 (v.1.0)

1 City outline

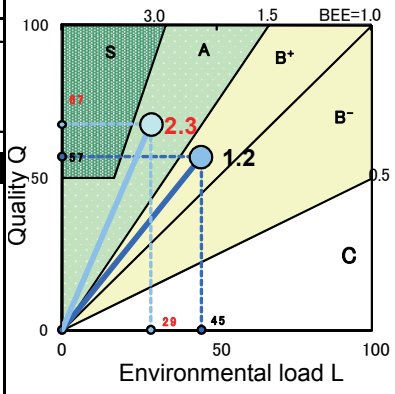
XX City City type: Ordinance-designated city

	Current status	Future status	
Assessment year	2005	2030	Fiscal year
Daytime population	1,500,000	1,600,000	People
Nighttime population	1,400,000	1,500,000	People
Adjusted population	1,450,000	1,550,000	People
Total area	1000		km2

2-2 Assessment results of major items (Radar chart)



2-1 City's environmental efficiency (BEE chart)



Now

BEE = 56.8 / 45.1 = 1.2 (Current value)

Future

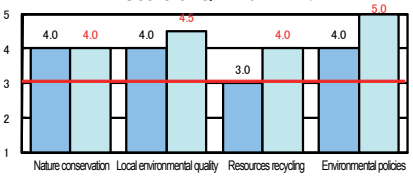
BEE = 67.3 / 28.8 = 2.3 (Future value)

Legend: S: ★★★★★ A: ★★★★ B+: ★★★ B−: ★★ C: ★

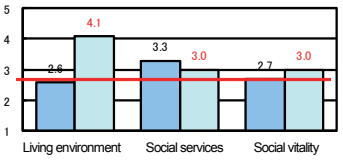
2-3 Assessment of mid-items of Q (Present→Future)

Score of Q= 3.2→ 3.6

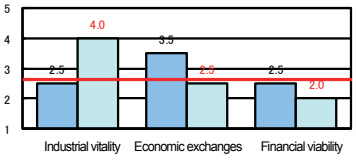
Q1 Environmental aspect Score of Q1= 3.7→ 4.3



Q2 Social aspect Score of Q2= 2.9→ 3.3



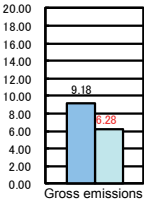
Q3 Economic aspect Score of Q3= 2.8→ 2.8



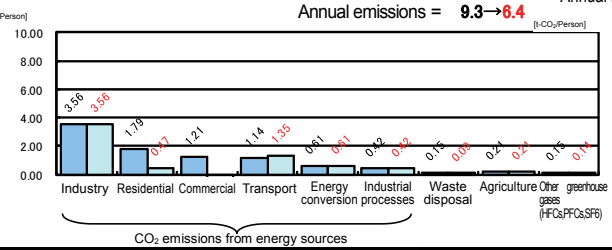
2-4 Assessment of mid-items of L (Present→Future)

Score of L= 3.2→ 3.8

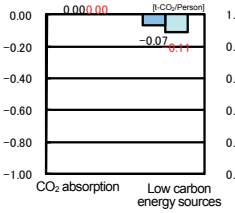
Total emissions Annual emissions = 9.2→ 6.3 [t-CO2/Person]



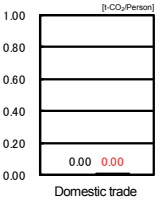
L1 GHG emissions Annual emissions = 9.3→6.4 [t-CO2/Person]



L2 Environmental load reduction and CO_2 absorption Annual reduction and absorption = −0.1→−0.1 [t-CO2/Person]



L3 Domestic trade, etc.. Annual controlled discharge = 0.1→0.1 [t-CO2/Person]



3 Environmental considerations in policymaking

Efforts toward the improvement of quality Q

- Regarding Q1.1 Nature conservation, the ratio of green and water spaces is high, with forests covering 90% of the local area.
- A wide range of unique efforts including subsidy programs are made in terms of Q1.3 Resources recycling and Q1.4 Environmental measures.
- Regarding Q2.1 Living environment, consideration for the environment as well as the preservation of scenery is given by laying power lines underground and managing electricity for street lights with small hydroelectric generation, which is quite effective in terms of safety and security, as it reduces blind spots.
- Regarding Q3, policies that focus on the development of ecotourism and associate the city's tourism industry with its designation as an Eco model city have been implemented, such as inns at which farming can be experienced.

Efforts toward the reduction of environmental load L

- CO_2 emissions-free houses built with the support of the Ministry of Land, Infrastructure, Transport and Tourism, and newly-constructed government complexes built due to the deterioration of old buildings, contribute to the control of CO_2 emissions from energy sources, by adopting various environmentally-friendly technologies other than solar power generation, including highly-efficient solar thermal air sampling instruments, super-insulating and airtight materials meeting standards for next-generation energy-saving, ice thermal storage devices and automatic energy measuring devices.
- Designing a system for the continuous utilization of abundant forest resources by establishing a framework in which profits from selling the electric power of a wind power station on a mountaintop covers part of the costs for forest improvement
- A mid- and long-term action plan created after application for designation as an eco model city ensures and aims to achieve the target of 70% energy emissions reduction from energy sources, provided that the maximum effort is made and by estimating GHG emissions over the next 40 years till 2050.

(Drawings or pictures)

Attach drawings or pictures to further explain about the comments in the column on the left
(Cancel the sheet protection when attaching)

Figure Ⅰ.4.5 Assessment results sheet

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PART Ⅱ Assessment method and criteria

1. L; Environmental load of cities

1.1 Basic principle of L assessment

1.1.1 L assessment guideline

The following methodologies from the “New action planning manual” are utilized as common practical and reasonable assessment methods at the city level:

(1) Method of estimating current GHG emissions
(2) Target setting in an action plan
(3) Method of estimating future GHG emissions
(4) Countermeasure options required for formulating discharge control measures and policies

The new action planning manual suggests different methods, in terms of the types of greenhouse gases subject to assessment when estimating the current GHG emissions, the estimation accuracy and the need for estimating the future GHG emissions, depending on the type of city such as government-ordinance-designated cities, core cities and special-ordinance cities, and other municipalities. However, CASBEE-City conducts calculation and estimation as accurately as possible depending on the rater’s situation on a practical level, and does not adopt methods in which types of GHG emissions subject to assessment or conditions may change according to the size or type of city.

1.1.2 Reduction measures, policies and efforts led by organizations other than the city’s public administration

Reduction measures, policies and efforts led by organizations other than the city’s (municipality’s) public administration, such as state regulations and voluntary efforts by private businesses, will be handled as appropriate.

(1) In view of reducing GHG emissions, reduction targets are set for individual fields including industry, business and households, and even for individual industrial sectors and products. Sectoral approaches – efforts toward achieving the targets – are also being studied and promoted in various areas. These efforts are dealt with in the L assessment, when they are regarded as the city’s efforts.

(2) The reduction of GHG emissions through measures led by organizations other than the city’s public administration, such as the direct effect of state regulations, improvement in the efficiency of equipment and the reduction of the system power consumption rate are excluded from the L assessment.

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1.2 Individual assessment items

The structure of assessment items for L is basically in accordance with the new action planning manual, as shown in Table II.1.1. The gross annual emissions of the city ((t-CO_2/Year) for each item is first calculated, followed by the calculation of per-capita CO_2 emissions of the adjusted population (t-CO_2/People/Year).

Table Ⅱ.1.1 L assessment items (idmtical to Table Ⅰ.3.1)

Main category	Middle category	Minor category	Beneficiary-pays principle items
L1 GHG emissions	L1.1 CO_2 from energy sources	L1.1.1 Industrial sector	○
		L1.1.2 Residential sector	
		L1.1.3 Commercial sector	
		L1.1.4 Transportation sector	
		L1.1.5 Energy conversion sector	○
	L1.2 Industrial processes	—	○
	L1.3 Waste disposal sector	—	
	L1.4 Agricultural sector	—	○
	L1.5 Other greenhouse gases (HFCs, PFCs, SF6)	—	
L2 Environmental load reduction and CO_2 absorption	L2.1 Low-carbon energy sources	—	
	L2.2 CO_2 absorption	—	
L3 Support to other regions for reducing CO_2 emissions	L3.1 Domestic trade, etc.	—	

The main category items are mainly classified into three items; L1 GHG emissions, L2 Environmental load reduction and CO_2 absorption and L3 Domestic trade, etc.. Outlines of individual items are described in the following paragraphs:

1.2.1 L1: GHG emissions

In accordance with the section structure of the new action planning manual, the L assessment consists of assessment items for CO_2 from energy sources (L1.1) and those for GHG emissions other than for energy purposes (L1.2 to L1.5).

CO_2 emissions from energy sources (L1.1) consists of multiple sectors including Industrial sector (L1.1.1), Residential sector (L1.1.2), Commercial sector (L1.1.3), Transportation sector (L1.1.4) and Energy conversion sector (L1.1.5).

Among these sectors, the Industrial sector (L1.1.1), Energy conversion sector (L1.1.5), Industrial processes (L1.2) and Agricultural sector (L1.4) use the assessment method in which GHG emissions are calculated within the municipality in combination with that in which GHG emissions are redistributed to other municipalities, the details of which are described in section 1.2.4.

L1.1 CO_2 emissions from energy sources

CO_2 emissions attributed to energy consumption account for the majority of human-induced

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greenhouse gases, which are further classified as follows:

L1.1.1 Industrial sector

The industrial sector addresses CO_2 emissions attributed to energy consumption through production activities in various industries, such as manufacturing, agriculture, forestry and fisheries, mining and construction.

L1.1.2 Residential sector

This sector addresses CO_2 emissions for home energy use other than for transportation purposes such as private cars.

L1.1.3 Commercial sector

This sector addresses CO_2 emissions attributed to energy consumption in office buildings and other business premises in which corporate administration departments are located, and that of the tertiary industries including hotels, department stores and other service businesses.

L1.1.4 Transportation sector

This sector is classified into two major groups; passenger transport including cars and buses, and cargo transport including land, maritime and air transportation, and addresses CO_2 emissions attributed to energy consumption in these groups. In accordance with the new action planning manual, the place where emissions are recorded is, in principle, determined depending on the transportation channel as follows and emissions redistribution between cities is not conducted:

-Cars: Emissions are recorded at the place where the car is registered.

-Railways: Emissions are recorded at the place where the train passes through.

-Ships: Emissions are recorded where the ship arrives.

-Airplanes: Emissions are recorded where the plane lands.

L1.1.5 Energy conversion sector

This sector addresses CO_2 emissions attributed to energy consumption in the process of converting imported or produced energy sources into a more usable form, the classifications of which include power generation, oil refinement, coke production and the captive consumption of town gas.

L1.2 Industrial processes

This sector addresses the following GHG emissions in industrial processes other than those for energy consumption purposes:

- CO_2 emissions attributed to the manufacturing of cement, quicklime and soda lime
- CH_4 emissions attributed to the production of chemicals including carbon black
- N_2O generated in the production processes of adipic acid and nitric acid
- CH_4 and N_2O generated during fuel combustion
- NH_4 and N_2O generated from running vehicles

L1.3 Waste disposal sector

GHG emissions in the waste disposal sector fall roughly into four categories; waste incineration, waste landfill, effluent treatment and the utilization of waste as an alternative fuel, the details of which are described as follows:

- CO_2, CH_4, and N_2O emissions attributed to the incineration disposal of general waste including waste plastic and waste synthetic fabric, and industrial waste including waste oil, various types of waste plastic and specially controlled industrial waste

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- CH_4 generated at waste landfill sites
- CH_4, N_2O generated during the effluent treatment process
- CO_2, CH_4, and N_2O generated through the utilization of waste as an alternative fuel.

L1.4 Agricultural sector

This sector addresses the following GHG emissions in Agricultural processes.

- CH_4 emitted from rice paddies
- CH_4 generated through domestic animal rearing
- CH_4 and N_2O emissions attributed to the treatment of domestic animal waste
- CH_4 and N_2O emissions attributed to the incineration of agricultural waste
- N_2O emissions attributed to the use of fertilizers on farmland.

L1.5 Other greenhouse gases (HFCs, PFCs, SF6)

Other greenhouse gases include HFCs, PFCs and SF6, which are used as refrigerants and are emitted into the air.

1.2.2 L2: Environmental load reduction and CO2 absorption (Reduction of GHG emissions and CO_2 absorption)

This section includes CO_2 reduction by utilizing low-carbon energy sources such as renewable energy sources (L2.1) and CO_2 absorption by forests (L2.2).

L2.1 Low-carbon energy sources

a. Assessing the annual reduction of GHG emissions by utilizing renewable or unused energy sources, conducted by individual municipalities as an effort toward the reduction of environmental load.

b. As the utilization of renewable or unused energy sources by suppliers affect the GHG emissions coefficient, the following should be taken into account in order to avoid double counting GHG emissions between L2.1 and those of the annual emissions (L1):

- Regarding the current assessment (i.e. the current estimate of GHG emissions), efforts of consumers to improve energy independence contributing to the reduction of CO_2 emissions from energy sources, including the utilization of solar power, solar heat, sewage channel heat, atmospheric heat and exhaust heat from factories, shall be deemed to have already been reflected in the annual emissions (L1). Therefore, they are not counted in L2.1.
- The reduction of environmental load by means other than those mentioned above, such as the utilization of excess renewable or unused energy sources, should be regarded as an effort of the municipality and will be assessed in this section (L2.1), on the premise of avoiding double counting, if their impacts are quantifiable.
- Energies supplied to other municipalities are counted at the supplying municipality only, not in the consuming municipality, according to the new action planning manual.

L2.2 CO_2 absorption

a. Calculation of carbon absorption is based on the new action planning manual.

b. The calculation method of absorption by forests is in accordance with the “Ordinance for Enforcement of the Offsetting Credit (J-VER) Scheme” and in the “Monitoring Guidelines for the Offsetting Credit (J-VER) Scheme (Ver.1.1) for Emissions Reduction Projects” introduced by the Ministry of the Environment on October 13, 2009, and on September 9, 2009, respectively.

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1.2.3 L3: Support to other regions for reducing CO_2 emissions

This section includes the municipality's efforts for CO_2 emissions control in other municipalities, such as purchasing the domestic CDM credit. According to the Kyoto Protocol in which the CDM (*) is regarded as a supplementary mean of achieving target figures in individual countries, CASBEE-City also places the CDM as a supplementary mean of reducing actual GHG emissions and environmental load through the trading of low-carbon energy sources (L2.1) between municipalities. When this tool is revised in the future, further subdivisions of this section will be discussed as various certification schemes are established.

*CDM: Clean Development Mechanism

(1) In view of the current situation in which the overseas trade at the local municipality level is unlikely to be carried out, and domestic schemes including the CDM trading are being developed, the following items focusing on the domestic trade are addressed in the assessment:
   a. Domestic CDM credit (certified)
   b. Offsetting credit (certified)
   c. Green electricity bond (certified)
   d. Emissions trading
   e. Development of low-carbon products and goods
   f. Efforts of NPOs

(2) The aforementioned credits are usually obtained at the company level, and are difficult to distribute among municipalities. Though some of them have a public list, most of them are unlikely to be made public even in the future. Currently, the trading volume is not prescribed in the Global Warming Solutions Act, however, the following should be noted in the calculation in order to avoid double counting or even triple counting between those who acquire the emissions credits (the seller) and those who buy the credits from the seller to reduce emissions:

   - Municipalities purchasing credits
     Credits purchased are collectively counted in L3. (The emissions reduction is not counted in L1 the GHG emissions.)
   - Municipalities selling credits
     Credits sold are counted in L3.

(3) Industrial cities may set a goal of promoting the production of low-carbon goods in factories located in the area, which can be regarded as the city's own effort, and can be assessed in this section (L3), if the impact and effects of the effort are quantifiable, and the same principle applies to goods received from other cities, on the premise of avoiding double counting.

(4) Efforts made by organizations based on the city, conducting business activities in a wide area can be assessed as the city's efforts in this section (L3) on the premise of avoiding double counting, if their impacts are quantifiable.

(5) In view of the above, the overall assessment is conducted, summarizing the following points in accordance with the declaration by the municipality:

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a. Credits are certified by the emissions trading system or the J-VER
b. A trading between two cities is counted at the both cities for 1/2 each.
c. The buyer of credits is an organization or a company conducting business within the city only, excluding the following:
   - Local governments or semi-governmental organizations
   - Companies and NPOs with a business establishment within the city only
   - Local communities such as neighborhood associations

1.2.4 Emissions of industry-related sectors

Cities with a number of industry-related companies, organizations and facilities etc. are likely to have more GHG emissions than other cities. In this case, the fact that these cities greatly contribute to the convenience or improvement of other cities through the product supply has to be considered.

The industry-related sectors include the following four sectors:

L1.1.1 Industrial sector	
L1.1.5 Energy conversion sector	Captive consumption of electric power plants and town gas stations
L1.2 Industrial process sector	Cement manufacturing and quicklime production
L1.4 Agricultural sector	CH_4 emissions from rice paddies and cattle rearing

CASBEE-City is designed to assess environmental load (L) in consideration of the above factors by indicating two values in accordance with the following ideas. In the both ideas, the supply of electricity, town gas, and district heat is counted at the place of consumption, in accordance with the general calculation method adopted in the new action planning manual.

- Emitter-pays principle: Based on the calculation method in which CO_2 emissions from industry-related sectors are counted at the place of emission (i.e. the principle source of emissions), the emissions are included in the city's inventory where the industry is located, the value of which is the same as that calculated in accordance with the new action planning manual.
- Beneficiary-pays principle: Based on the calculation method in which CO_2 emissions from industry-related sectors are counted at the place of final consumption (i.e. the place of consumption principle), industry-related emissions in individual cities are deducted from their inventories, and instead, the national average of industry-related sectors is added in the assessment.

The reason for adding the industry-related emissions as the national average in the Beneficiary-pays principle is because, unlike the supply of electricity, gas, and district heat, products of the industry-related sectors including agricultural products do not have a measurement value of consumption for each consuming area, and therefore, from a practical point of view, the calculation is based on the idea in which all the people should bear an equal share of the total emissions of the industry-related sectors.

There was an idea in which the redistribution applies to certain industries with particularly high CO_2 emissions, and a preliminary study thereon as a replacement was conducted. However, as the results of the study show that it is necessary to understand emissions of the industry in every

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city nationwide, data of which are difficult to obtain, and that it is also hard to select certain industries to which the redistribution applies. Consequently, the idea was not adopted as a replacement. (For details of the preliminary study, please refer to the Commentaries and data 1.)

＜Calculation procedure for L (Beneficiary-pays principle)＞

[L (Beneficiary-pays principle) (t-CO_2/person/year)]

= [L (Emitter-pays principle) (t-CO_2/person/year)]

－ [Emissions of industry-related sectors in the city (t-CO_2/year)] / [Adjusted population of the city (person)][*1]

＋ [Total national emissions of industry-related sectors(t-CO_2/year)][*2]/ [Total population (person)]

*1 Adjusted population (person) ={(Daytime population)+(Nighttime population)} / 2

*2 Possible figures include the definite value of GHG emissions released by the Ministry of the Environment and data regarding indirect emissions after electricity distribution and heat partition announced by the Greenhouse Gas Inventory Office (GIO).

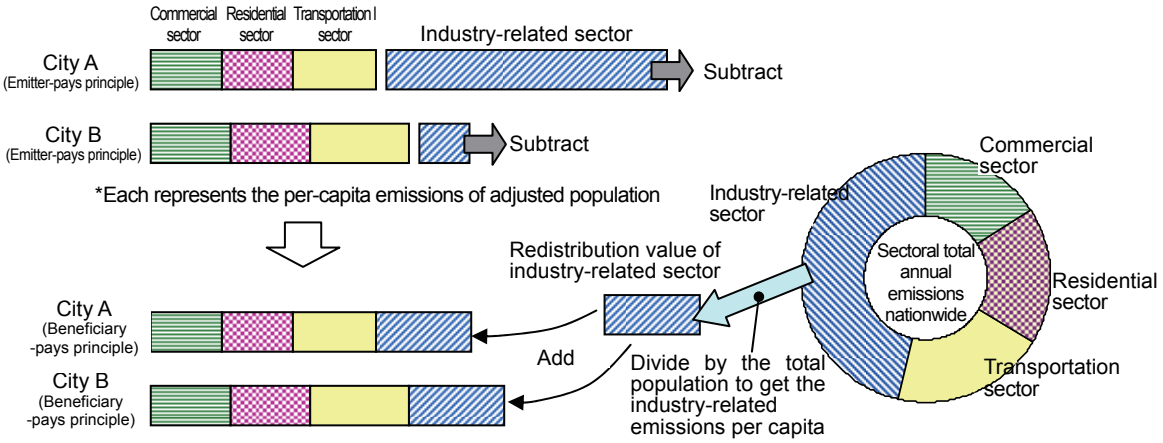

Figure Ⅱ.1.1 Calculation procedure of L (Beneficiary-pays principle)

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1.3 L assessment criteria

1.3.1 Single-axis assessment combining L1, L2 and L3

After careful consideration, a single-axis assessment using a value totaling L1, L2 and L3 is adopted for the L assessment for the following reasons:

(A) Currently, efforts regarding L2 and L3 are made in very few cities and obtaining data for individual cities nationwide is quite difficult. Therefore, setting proper and respective levels for L1, L2 and L3 is also difficult. As for future assessment, the standards for level setting required to conduct a fair assessment have not been completely established for the same reason.

(B) The results of the single-axis assessment combining L1, L2, and L3 are expressed as a bar chart prepared for each of the three items, apart from a radar chart, in order to identify the features of the city.

1.3.2 L assessment criteria

When calculating BEE (Q/L), if the actual value of CO_2 emissions per capita of the city (t-CO_2/Person/Year) is used as L, there is a possibility that the L value is 0 or a negative number (e.g., in a city which is heavily forested and the amount of CO_2 absorption is the same as or more than the amount of emissions of the city after implementing carbon absorption measures), which is inappropriate for calculating BEE based on the "Efficiency" concept. Accordingly, in the L assessment scale, the following logistic function is applied, in which the L value is converted from the actual value of CO_2 emissions having a wide range of possible values including negative numbers to values between 0 to 100, and is used for the BEE calculation. In this case, the L value, which has been scaled, will be rounded up to the closest whole number. (Therefore, in theory, the minimum L value on the scale in this tool is 1, and the maximum is 100.)

$$L = 100 * \frac{1}{1 + \exp(-a * (X - m))}$$

X: Annual CO_2 emissions per capita in the city (t-CO_2/Person/Year)
m: National average of the annual CO_2 emissions per capita (t-CO_2/Person/Year) ・・・ 10 t-CO_2/Person/Year
a: Gain (A coefficient that increases the sensitivity of near-average values) ・・・ 0.2432 (= 1/8*ln(7))

The Gain is designed to set a reference point at L=12.5 when a city achieves the long-term reduction goal for developed countries of 80% from the national average in 2005, in other words, when X = 2 (t-CO_2/person/year). (See Figure II.1.2)

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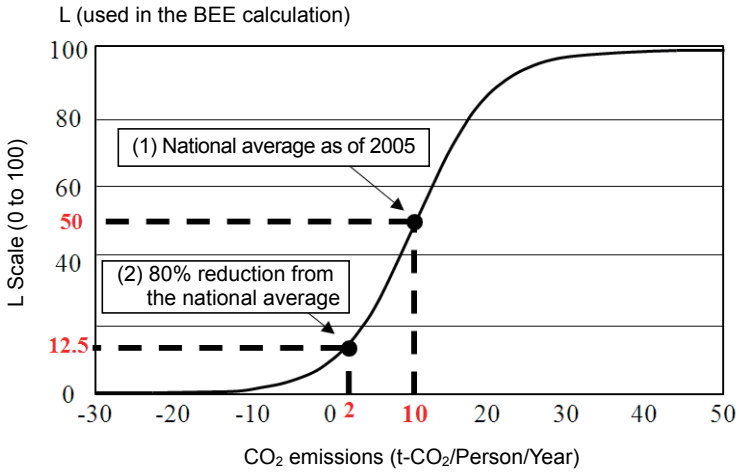

Figure Ⅱ.1.2: Assessment and conversion of L

☐Formula for conversion to L score

The L score used on the Score sheet or radar charts is a value obtained from the L scale (1 to 100) based on the conversion described above, which is further converted using the following formula and rounded off to one decimal place.

L score = 5－L/25

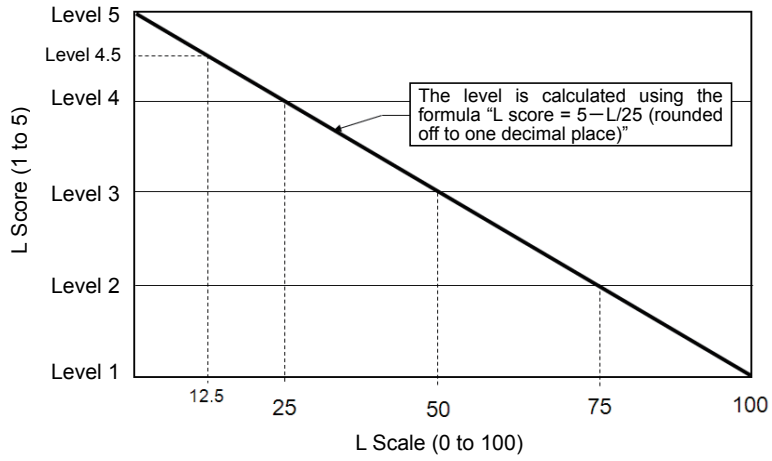

Figure Ⅱ.1.3: Relation between L score and scale

The reference point (Scale = 12.5 when X = 2 t-CO_2/person/year) for setting Gain on the logistic curve corresponds to 4.5 in the L score as shown in Figure Ⅱ.1.3. In other words, when reducing CO_2 emissions at the 80% level from the national average, the L value of the city is assessed as Level 5, equivalent to the highest level, supposing that it is rounded off to the closest whole number.

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2. Q; Quality of cities

Q1 Environmental aspect

●1.1 Nature conservation

●1.1.1 Ratio of green and water spaces

The assessment focuses on the degree of natural conservation by utilizing the ratio of green and water spaces in the area of the municipality.

☐Assessment index

(Forest area + Farmer-owned cultivated area + Lake area + Mudflat area) / Area of the municipality

☐Criteria

	Ordinance-designated cities	General cities	Towns and villages
Unit	%		
Level 1	Less than 0.1	Less than 20.0	Less than 52.5
Level 2	0.1 or more to less than 2.5	20.0 or more to less than 40.0	52.5 or more to less than 67.5
Level 3	2.5 or more to less than 15.0	40.0 or more to less than 55.0	67.5 or more to 80.0
Level 4	15.0 or more to less than 45.0	55.0 or more to less than 70.0	80.0 or more to less than 87.5
Level 5	45.0 or more	70.0 or more	87.5 or more

☐Reference data

(1) Forest area: “Census of Agriculture and Forestry,” the Ministry of Agriculture, Forestry and Fisheries

(2) Farmer-owned cultivated area: “Census of Agriculture and Forestry,” the Ministry of Agriculture, Forestry and Fisheries

(3) Lake area: Independent surveys conducted by individual municipalities

(4) Mudflat area: Independent surveys conducted by individual municipalities

(5) Area of the municipality: Total land area from the “Census of Agriculture and Forestry,” the Ministry of Agriculture, Forestry and Fisheries (Source: “Land Survey of Prefectures, Shi, Ku, Machi and Mura,” the Geographical Survey Institute)

☐Explanation of index

-Green and water spaces are regarded as an index representing the degree of the nature conservation directly related to the natural water circulation, environmental purification and the green network.

-Natural land consists of forest area (the total area of current forest areas and native grassland other than forests), farmer-owned cultivated area and aquatic environment including lake areas and mudflats serving as habitats for a variety of life forms.

☐Notes

-Regarding Q1.1 Natural conservation in the middle items, opinions were expressed that the assessment should include not only quantity, but also quality. Development of an objective and accurate index regarding quality is recognized as one of the items for continued discussion in the future.

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●1.2 Local environmental quality

The assessment is based on the following 4 indices representing the level of basic environmental elements.

●1.2.1 Air

The assessment focuses on the degree of attainment of the environmental standard in terms of the 4 major substances representing air quality.

☐Assessment index

The degree of attainment of the environmental standard in terms of the density of nitrogen dioxide (NO_2), sulfur dioxide (SO_2), suspended particulate matter (SPM) and photochemical oxidant (Ox), measured at the general air pollution monitoring stations.

☐Criteria

	Ordinance-designated cities	General cities	Towns and villages
Unit	Ratio of the number of substances, among 4 items (NO_2, SO_2, SPM, Ox), achieving the environmental standard at every monitoring point (%)		
Level 1	Less than 20		
Level 2	20 or more to less than 40		
Level 3	40 or more to less than 60		
Level 4	60 or more to less than 80		
Level 5	80 or more		

☐Environmental standard

Source: “Environmental Quality Standards Regarding Air Pollution” based on the regulations of the Basic Act for Environmental Pollution Control and the Environmental Basic Act

(1) NO_2 : The daily average value of the hourly value is less than 0.06 ppm.

(2) SO_2 : The daily average value of the hourly value is 0.04 ppm or less and the hourly value is 0.1 ppm or less.

(3) SPM: The daily average value of the hourly value is 0.10 mg/m^3 or less and the hourly value is 0.20 mg/m^3 or less.

(4) Ox : The hourly value is 0.06 ppm or less.

☐Reference data

“Environmental Numerical Databases,” National Institute for Environmental Studies

☐Explanation of index

Regarding air quality control, a number of municipalities have established constant monitoring stations in order to conduct monitoring of the object substances. Among the five major substances representing air quality, excluding carbon monoxide (CO), for which the environmental standard has been achieved in most parts of Japan, the assessment is conducted based on whether the environmental standard is achieved at every monitoring point in terms of nitrogen dioxide (NO_2),

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sulfur dioxide (SO_2), suspended particulate matter (SPM) and photochemical oxidant (Ox).

☐Exemption from the assessment

-Municipalities in which no monitoring points for any of the 4 substances have been established are exempt from assessment using this index.

-When monitoring points for only some of the 4 substances have been established within the municipality, the assessment will exclude those without monitoring points and calculate the percentage.

●1.2.2 Water

The assessment focuses on the degree of attainment of the environmental standard in terms of public water areas including rivers and groundwater.

☐Assessment index

Degree of attainment of the environmental standard in terms of the water quality of rivers (in terms of health or living environment) and groundwater (health).

☐Criteria

	Ordinance-designated cities	General cities	Towns and villages
Unit	Number of items, among the three items (River/Health, River/Living environment, Groundwater/Health), that exceed the environmental standard at every monitoring point along the river, and those which exceed the environmental standard at 95% or more of the monitoring points for groundwater.		
Level 1	0 There is at least one monitoring point where the River/ Health item is not above the standard.		
Level 2	−		
Level 3	1 The River/Health item is above the standard at all monitoring points.		
Level 4	2 The River/Health item and River/ Living Environment item exceed the standard at all monitoring points.		
Level 5	3 Both of the River/Health item and River/Living Environment item exceed the standard at all monitoring points, and the Groundwater/Health item is also above the standard at 95% or more of the monitoring points.		

☐Environmental standard

Source: “Environmental Quality Standards Regarding Water Pollution” based on the regulations of the Basic Act for Environmental Pollution Control and the Environmental Basic Act

☐Reference data

(1) Monitoring points where the environmental standard is achieved in terms of the River/Health and River/Living environment item: “Environmental Numerical Databases,” National Institute for Environmental Studies

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(2) Monitoring points where the environmental standard is achieved in terms of the Groundwater/Health item: Activity reports of the environmental bureau in individual municipalities

☐Explanation of index

-Regarding the water quality, individual municipalities conduct annual water quality measurement in terms of public water areas including rivers. Many municipalities also conduct the same for groundwater.

-The assessment is conducted in view of the degree of attainment in terms of 26 health items relating to health protection, which are the standards of water quality in public water areas, the environmental standard relating to the conservation of the living environment prescribed in the Environmental Basic Act (the BOD value) and as for level 5, the degree of attainment of the environmental standard regarding the overall survey for understanding the state of the groundwater quality of the entire municipality.

☐Exemption from the assessment

-Municipalities in which no monitoring points for the River/Health item have been established are exempt from assessment using this index.

-When no monitoring points for the River/Living Environment and the Groundwater items have been established, the municipality will be assessed as not meeting the standards in terms of the 2 items.

●1.2.3 Noise

The assessment focuses on the degree of attainment of the environmental standard for road traffic noise.

☐Assessment index

Number of houses which are below the environmental standard regardless of day or night in terms of motor vehicle traffic noise / Number of houses subject to the assessment

☐Criteria

	Ordinance-designated cities	General cities	Towns and villages
Unit	%		
Level 1	Less than 88.0		
Level 2	88.0 or more to less than 92.0		
Level 3	92.0 or more to less than 94.0		
Level 4	94.0 or more to less than 97.0		
Level 5	97.0 or more		

☐Environmental standard

Source: “Environmental Quality Standards Regarding Noise” based on the regulations of the Environmental Basic Act

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☐Reference data

(1) Number of houses subject to the assessment: Results of the Motor Vehicle Traffic Noise Survey, National Institute for Environmental Studies
(Assessment results of the degree of attainment of the environmental standard)

(2) Number of houses which are below the standard regardless of day or night: Results of the Motor Vehicle Traffic Noise Survey, National Institute for Environmental Studies
(Assessment results of the degree of attainment of the environmental standard)

☐Explanation of index

-Regarding noise issues, sources of noise include fixed sources such as factories, offices and construction sites, as well as mobile sources such as cars, trains and airplanes. As factories and offices belong to the specific facilities category and are correlated with land use, data relating to road traffic noise are selected as an assessment item in this section.

-The assessment is based on the degree of attainment of the environmental standard in terms of two time periods during day and night at the monitoring points.

☐Exemption from the assessment

-Municipalities in which the number of houses subject to assessment is 0 are exempt from assessment using this index.

●1.2.4 Chemical substance

The assessment focuses on the degree of attainment of the environmental standard for air and water quality relating to the utilization of dioxins.

☐Assessment index

Degree of attainment of the environmental standard for air and water quality relating to the utilization of dioxins.

☐Criteria

	Ordinance-designated cities	General cities	Towns and villages
Unit	Ratio of the number of items, among 2 items (air and water/sediment of public water areas), achieving the environmental standard at every monitoring point (including those of individual municipalities) (%)		
Level 1	0		
Level 2	―		
Level 3	50		
Level 4	―		
Level 5	100		

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☐Environmental standard

Source: “Environmental Quality Standards Regarding Air Pollution, Water Pollution and Soil Pollution (including the pollution of bottom sediments) by Dioxins” based on the regulations of the Act on Special Measures concerning Countermeasures against Dioxins

☐Reference data

Surveys conducted by the National Institute for Environmental Studies and activity reports of the environmental bureau in individual municipalities

☐Explanation of index

The environmental standard is set for each of the three major chemical substances such as the Pollutant Release and Transfer Register (PRTR), dioxins and environmental endocrine disrupters. The assessment focuses on the degree of attainment of the environmental standard for air and water quality in terms of the utilization of dioxins and is based on a variety of results of past studies conducted by individual municipalities.

☐Exemption from the assessment

-Municipalities in which no monitoring points for both items have been established are exempt from assessment using this index.

-When monitoring points for only one of the two items have been established within the municipality, the assessment will exclude the item without monitoring points and calculate the percentage.

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●1. 3 Resource recycling

●1.3.1 Recycling rate of general waste

The assessment focuses on the recycling rate of general waste representing the most basic resource recycling.

☐Assessment index

(Direct recycling + Recycling after intermediate treatment* + Group collection) /
(Solid waste disposal + Group collection)

*The following are facilities for recycling after intermediate treatment:

- Waste combustor
- Bulk waste disposal facility
- Waste composting facility
- Waste processing facility for use as animal feed
- Methanation facility
- Waste-derived fuel fabrication facility
- Facilities conducting other recycling
- Other facilities

☐Criteria

	Ordinance-designated cities	General cities	Towns and villages
Unit	%		
Level 1	Less than 11.5	Less than 15.0	Less than 12.5
Level 2	11.5 or more to less than 14.5	15.0 or more to less than 17.5	12.5 or more to less than 17.5
Level 3	14.5 or more to less than 17.5	17.5 or more to less than 22.5	17.5 or more to less than 22.5
Level 4	17.5 or more to less than 23.5	22.5 or more to less than 30.0	22.5 or more to less than 30.0
Level 5	23.5 or more	30.0 or more	30.0 or more

☐Reference data

"MOE Information on waste management technology," Office of Waste Disposal Management, Waste Management and Recycling Department, Ministry of the Environment

☐Explanation of index

-The assessment is based on the recycling rate of general waste representing the most basic resource recycling.

-The numerator expressing net recycling consists of Group collection + Direct recycling + Recycling after intermediate treatment. Recycling after intermediate treatment includes waste processed at waste combustors, bulk waste disposal facilities, waste composting facilities, waste processing facilities for use as animal feed, methanation facilities and waste-derived fuel fabrication facilities.

☐Notes

-"Reuse" and "Reduce," elements of "3R" together with "Recycle," are related to resource recycling. However, as an assessment index regarding "Reuse" has not been determined so far and "Reduce" is easier to understand when assessed in the L (Environmental load) section, the assessment in this section adopts the recycling rate as the only index at the moment.

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●1. 4 Environmental policy

●1.4.1 Projects and policies for improvement of the environment and biodiversity

The assessment focuses on anthropogenic factors for the conservation and sustainable development of local environmental quality and biodiversity.

☐Assessment index

Projects and policies for the conservation and sustainable development of local environmental quality and biodiversity are assessed in accordance with a point rating system.

☐Criteria

	Ordinance-designated cities	General cities	Towns and villages
Unit	Number of projects and policies (in the following 10 items)		
Level 1	Less than 3		
Level 2	3 or more to less than 5		
Level 3	5 or more to less than 7		
Level 4	7 or more or less than 9		
Level 5	9 or more		

☐Projects and policies subject to counting

(1) The Basic Environment Regulation and the Basic Environment Plan (Local Agenda) are formulated.
(2) A framework for setting a numerical index and publicizing the progress and results of environmental efforts (i.e. Environmental Reports and Environmental White Papers) has been established.
(3) A series of ISO-14000 certifications has been obtained, or individual environment management systems have been introduced.
(4) Specific guidelines for development projects planning in view of the environmental consideration have been established.
(5) Support is provided for the environmental efforts of small-and-medium-sized businesses and individual households through financial frameworks including environmental funds and tax systems.
(6) Support is provided to NPOs which promote environmental education and activities in order to enhance the environmental activities of citizens.
(7) A framework for reflecting the opinions of citizens through providing information and promoting exchanges in order to enhance daily cooperation among citizens, businesses and the government has been established.
(8) A red data book containing special instructions according to the degree of danger of extinction has been prepared.
(9) Policies for the proper management and exclusion of nonnative species have been

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implemented.
(10) Monitoring of biodiversity is constantly conducted.

☐Reference data
Basic Environment Plan for individual municipalities

☐Explanation of index
-The efforts of individual municipalities for the improvement of the environment and biodiversity are comprehensively assessed.
-The assessment includes the publication of the progress on the formulation of the Basic Environment Plan and the result thereof, the introduction of environmental management, the formulation of environmental indices for development projects, support systems for citizen participation and NPOs activities, and the progress on the policy implementation for ensuring biodiversity.

☐Notes
-Items in this section focus on assessment in terms of the very efforts and policies of individual municipalities. Therefore, they have a different character from other assessment items regarding the quality improvement of the municipality based on a numerical index as a result of its efforts and policies. Instead, they adopt the so-called qualitative assessment. If it is possible to set assessment items that are expressed using a numerical index in the future, items in this section will be reviewed for reorganization when this tool is updated.
-As biodiversity is expected to attract increasing social attention in the future, whether it is regarded as an independent minor item will be discussed when this tool is updated.

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Q2 Social aspect

●2.1 Living environment

The assessment is based on the following 5 indices representing the degree of safety and security of the municipality and the basic living amenity.

●2.1.1 Adequate quality of housing standard

The assessment focuses on the level of the housing standard according to the size of the existing housing stock.

☐Assessment index

Per capita dwelling floor space

☐Criteria

	Ordinance-designated cities	General cities	Towns and villages
Unit	m^2 / Person		
Level 1	Less than 28.0	Less than 32.0	Less than 38.0
Level 2	28.0 or more to less than 30.5	32.0 or more to less than 35.5	138.0 or more to less than 40.5
Level 3	30.5 or more to less than 31.5	35.5 or more to less than 37.5	40.5 or more to less than 43.0
Level 4	31.5 or more to less than 33.5	37.5 or more to less than 40.5	43.0 or more to less than 47.0
Level 5	33.5 or more	40.5 or more	47.0 or more

☐Reference data

Per-capita dwelling floor space: “National Census,” Statistics Bureau, Ministry of Internal Affairs and Communications

☐Explanation of index

-“Per capita dwelling floor space” shown in the “Census returns” prepared by the Statistics Bureau of the Ministry of Internal Affairs and Communications is used as an index.

-The national census is statistics based on the number of people, not the number of houses, which does not include empty houses. Therefore, houses built in excess of need are not included in the assessment.

-The higher the value of this index, the higher the housing standard becomes, and therefore, the degree of living amenity is considered to be high.

☐Notes

-The census returns disclose both the floor space per household and the floor space per capita as statistical information, but this assessment adopts the latter as the standard for the dwelling floor space required for an affluent and comfortable life set by the government is proportional to the number of people per household.

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●2.1.2 Adequate provision of parks and open spaces

The assessment focuses on the degree of development of parks related to the degree of living amenity based on the area of city parks and similar facilities.

☐Assessment index

(Area of city parks + Area of other facilities similar to city parks) / Adjusted population

☐Criteria

	Ordinance-designated cities	General cities	Towns and villages
Unit	m^2 / Person		
Level 1	Less than 7.50		
Level 2	7.50 or more to less than 9.50		
Level 3	9.50 or more to less than 10.5		
Level 4	10.5 or more to less than 13.0		
Level 5	13.0 or more		

☐Reference data

(1) Area of city parks: “City Park Database,” City and Regional Development Bureau, Ministry of Land, Infrastructure, Transport and Tourism

(2) Area of facilities similar to city parks: Independent surveys conducted by individual municipalities

(3) Adjusted population (= (Daytime population + Nighttime population) /2): “Census returns,” Statistics Bureau, Ministry of Internal Affairs and Communications

☐Explanation of index

-The value used as the index is obtained by dividing the area of city parks approved by the Parks, Green Spaces and Landscape Division, the City and Regional Development Bureau, the Ministry of Land, Infrastructure, Transport and Tourism and similar facilities approved by municipalities, by the adjusted population.

-City parks refer to parks established by the national government or local government bodies under the City Park Law within urban planning districts, and are classified into the following types:

Basic Parks for Community Use: City Block parks, Neighborhood parks, Community parks
Basic Parks for City Wide Use: Comprehensive parks, Sport parks
Large Scaled Parks: Regional Parks, Recreation Cities
National Government Parks
Buffer Green Belts: Specific Parks, Buffer Green Belts, Ornamental Green Spaces, Greenways

-Facilities similar to city parks refer to spaces with the openness, security and functionality of public spaces such as green spaces, and may depend on the situations of individual municipalities.

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☐Notes

-Facilities similar to city parks are included in the area subject to assessment, in order to compensate for cases in which there are very few parks falling under the above category of “City parks” indicated in the Explanation of index in some towns and villages.

●2.1.3 Adequate sewage systems

The assessment focuses on the development of sewage systems related to the degree of living amenity.

☐Assessment index

Sanitation coverage (Population served by a sewage system / Total population) + Rural sanitation coverage (Rural population served by a sewage system / Total population)

☐Criteria

	Ordinance-designated cities	General cities	Towns and villages
Unit	%		
Level 1	Less than 90.0	Less than 40.0	15.0 or more
Level 2	90.0 or more to less than 99.0	40.0 or more to less than 60.0	15.0 or more to less than 45.0
Level 3	99.0 or more to less than 99.8	60.0 or more to less than 80.0	45.0 or more to less than 60.0
Level 4	99.8 or more to less than 99.9	80.0 or more to less than 95.0	60.0 or more to less than 75.0
Level 5	99.9 or more	95.0 or more	75.0 or more

☐Reference data

(1) Sanitation coverage: “Sanitation coverage,” Japan Sewage Works Association

(2) Rural sanitation coverage: Independent surveys conducted by individual municipalities

☐Explanation of index

-The sanitation coverage (the percentage of sewage treatment population in the total population) according to the Japan Sewage Works Association is used as an index.

-Regarding areas served by a rural community sewage system, the index includes its user population in the entire population served by a sewage system.

-The higher the value of the index is, the higher the level of development in sewage treatment is considered to be, and therefore, the degree of living amenity is considered to be high.

☐Notes

-Sewage treatment facilities include septic tanks for combined treatment as well as sewage systems and rural community sewage systems. However, the assessment will be carried out in terms of the latter two, considering the functionality thereof.

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●2.1.4 Traffic safety

The assessment focuses on the frequency of traffic accidents related to regional safety and security.

☐Assessment index

Number of traffic accidents / Adjusted population

☐Criteria

	Ordinance-designated cities	General cities	Towns and villages
Unit	Number of accidents / 1,000 people		
Level 1	7.25 or more	8.0 or more	7.0 or more
Level 2	5.25 or more to less than 7.25	6.5 or more to less than 8.0	5.0 or more to less than 7.0
Level 3	4.75 or more to less than 5.25	5.5 or more to less than 6.5	3.5 or more to less than 5.0
Level 4	4.0 or more to less than 4.75	4.5 or more to less than 5.5	2.0 or more to less than 3.5
Level 5	Less than 4.0	Less than 4.5	Less than 2.0

☐Reference data

(1) Number of traffic accidents: “Traffic Statistics,” National Police Agency

(2) Adjusted population (= (Total population + Daytime population) / 2): “Census returns,” Statistics Bureau, Ministry of Internal Affairs and Communications

☐Explanation of index

-The value used as the index is obtained by dividing the number of traffic accidents shown in the “Traffic Statistics” prepared by the National Police Agency, by the adjusted population.

-The lower the value of the index is, the higher the level of traffic safety becomes, and therefore, the level of regional safety and security is considered to be high.

-Traffic accidents in the Traffic Statistics refer to accidents on roads specified in the Road Traffic Act, caused by the traffic of vehicles (including lightweight vehicles such as bicycles), streetcars and trains, involving deaths or injuries. Therefore, accidents involving property damage only are excluded.

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●2.1.5 Crime prevention

The assessment focuses on the crime rate related to regional safety and security.

☐Assessment index

Number of crimes recorded / Adjusted population

☐Criteria

	Ordinance-designated cities	General cities	Towns and villages
Unit	Number of accidents / 1,000 people		
Level 1	20.0 or more	19.0 or more	12.0 or more
Level 2	17.0 or more to less than 20.0	15.5 or more to less than 19.0	8.5 or more to less than 12.0
Level 3	14.5 or more to less than 17.0	12.0 or more to less than 15.5	6.0 or more to less than 8.5
Level 4	12.0 or more to less than 14.5	9.5 or more to less than 12.0	4.0 or more to less than 6.0
Level 5	Less than 12.0	Less than 9.5	Less than 4.0

☐Reference data

(1) Number of crimes recorded: “Criminal statistics,” National Police Agency

(2) Adjusted population (= (Daytime population + Nighttime population) / 2): “Census returns,” Statistics Bureau, Ministry of Internal Affairs and Communications

☐Explanation of index

-The value used as the index is obtained by dividing the number of crimes recorded in the “Criminal statistics” prepared by the National Police Agency, by the adjusted population.

-The lower the value of the index is, the higher the level of regional security becomes, and therefore, the level of regional safety and security is considered to be high.

-Crimes in the Criminal statistics refer to crimes specified under 13 laws and regulations including the Criminal Code (excluding those regarding road traffic accidents prescribed in Article 211 of the Criminal Code) and the Explosives Control Act. The number of crimes recorded is the number of committed crimes recognized by the police through offense reports, indictments, accusations and other related means.

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●2.1.6 Disaster preparedness

The assessment focuses on the progress on the seismic adequacy of public facilities related to regional safety and security.

☐Assessment index

Rate of the seismic adequacy of public facilities owned or controlled by the local government, serving as disaster-prevention centers (Proportion of earthquake-resistant buildings to all the buildings).

☐Criteria

	Ordinance-designated cities	General cities	Towns and villages
Unit	%		
Level 1	Less than 55.0		
Level 2	55.0 or more to less than 60.0		
Level 3	60.0 or more to less than 62.5		
Level 4	62.5 or more to less than 67.5		
Level 5	67.5 or more		

☐Reference data

"Survey on the progress of the seismic adequacy of public facilities serving as disaster-prevention centers," Fire and Disaster Management Agency

☐Explanation of index

-The rate of the seismic adequacy of public facilities owned or controlled by the local government, serving as disaster-prevention centers, is used as the index.

-The higher the value of the index is, the higher the level of disaster management is considered to be, and therefore, the level of regional safety and security is considered to be high.

-Public facilities serving as disaster-prevention centers refer to public buildings owned or controlled by the local government such as prefectures and municipalities (Buildings for public or official use: Buildings made of other than wood with a height of two or more stories or a total floor space of 200 m^2 or more), that serve as disaster prevention centers when emergency response measures are taken, including those owned or controlled by prefectures that are located within the municipality, examples of which are the following:

(1) Social welfare facilities: All

(2) Educational facilities (School buildings and school gyms):
Those designated as shelters

(3) Government office buildings: Those serving as disaster-prevention centers

(4) Public halls and community centers: Those designated as shelters

(5) Gymnasiums: Those designated as shelters

(6) Medical facilities: Those designated as medical aid centers
in the regional disaster prevention plan

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(7) Police headquarters and police stations: All
(8) Fire headquarters and fire stations: All
(9) Others: Those designated as shelters

-The following are the criteria for determining seismic adequacy:
(1) Buildings constructed with a building certification issued after June 1, 1981
(2) Buildings constructed with a building certification issued before May 31, 1981 that were determined as seismically adequate in the seismic diagnosis
(3) Buildings renovated in order to enhance seismic adequacy

☐Notes
-The index was adopted as the major index representing the level of disaster management, because countermeasures against earthquake damage are regarded as most important when considering various kinds of disaster management, and the index can be improved through the efforts of individual municipalities.

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●2.2 Social services

The assessment is based on the following 6 minor items introduced in 2.2.1 to 2.2.6, indicating the levels of education, culture, medical care and welfare, all of which make up the social services. However, as the individual minor items include various social issues, and the assessment is carried out preferably from various perspectives such as the size of the facility, the status of utilization and adequacy in terms of the software, the assessment will further add multiple detailed indices to the current minor items when appropriate indices are newly found.

●2.2.1 Adequacy of education services (1)

The assessment focuses on the enrichment of the compulsory education system based on the number of students per teacher at elementary and junior high schools.

☐Assessment index

Number of students at elementary and junior high schools / Number of teachers at elementary and junior high schools

☐Criteria

	Ordinance-designated cities	General cities	Towns and villages
Unit	Number of students / Teacher		
Level 1	19.0 or more	19.0 or more	16.0 or more
Level 2	18.5 or more to less than 19.0	17.5 or more to less than 19.0	13.0 or more to less than 16.0
Level 3	17.5 or more to less than 18.5	16.0 or more to less than 17.5	10.0 or more to less than 13.0
Level 4	17.0 or more to less than 17.5	14.0 or more to less than 16.0	7.0 or more to less than 10.0
Level 5	Less than 17.0	Less than 14.0	Less than 7.0

☐Reference data

Number of students and teachers at elementary and junior high schools: Report on the “School Basic Survey,” Ministry of Education, Culture, Sports, Science and Technology

☐Explanation of index

-The value used as the index is obtained by dividing the total number of students at elementary and junior high schools shown in the report on the “School Basic Survey” prepared by the Ministry of Education, Culture, Sports, Science and Technology, by the number of teachers at elementary and junior high schools.

-The lower the value of the index is, the higher the level of educational services is considered to be in terms of compulsory education.

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●2.2.1 Adequacy of education services (2)

The assessment focuses on the enhancement of lifelong learning based on the frequency of lectures and courses held at social education facilities.

☐Assessment index

Number of lectures and courses held at social education facilities / Total population

For the definition, please refer to the explanation of the index below.

☐Criteria

	Ordinance-designated cities	General cities	Towns and villages
Unit	Number of lectures / 1,000 people		
Level 1	Less than 2.0		
Level 2	2.0 or more to less than 3.5		
Level 3	3.5 or more to less than 5.0		
Level 4	5.0 or more to less than 8.0		
Level 5	8.0 or more		

☐Reference data

(1) Number of lectures and courses at social education facilities: “Social Education Survey,” Ministry of Education, Culture, Sports, Science and Technology

(2) Total population: “Census returns,” Statistics Bureau, Ministry of Internal Affairs and Communications

☐Explanation of index

-The value used as the index is obtained by dividing the number of lectures and courses held at social education facilities by the total population.

-Social education facilities in the above survey refer to the following facilities:

- Community centers
- Community center-equivalent facilities
- Lifelong learning centers

-The higher the value of the index is, the higher the level of educational services is considered to be in terms of lifelong learning.

-Unlike other indices, the index used in this section uses the total population (the nighttime population) for the denominator instead of the adjusted population, as it is regarded as an index for assessing the frequency of opportunities for lifelong learning provided mainly to the residents of the municipality.

☐Notes

-The adequacy of education services is assessed in terms of 2 indices; (1) the enrichment of the compulsory education system and (2) the enhancement of lifelong learning.

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●2.2.2 Adequacy of cultural services (1)

The assessment focuses on the enrichment of cultural services based on the development of cultural facilities.

☐Assessment index

Floor space of public cultural facilities / Adjusted population

For the definition, please refer to the explanation of the index below.

☐Criteria

	Ordinance-designated cities	General cities	Towns and villages
Unit	m^2 / 100 people		
Level 1	Less than 20.0		
Level 2	20.0 or more to less than 25.0		
Level 3	25.0 or more to less than 32.5		
Level 4	32.5 or more to less than 40.0		
Level 5	40.0 or more		

☐Reference data

(1) Floor space of public cultural facilities: “Public Facility Survey,” Ministry of Internal Affairs and Communications and independent surveys conducted by individual municipalities

(2) Adjusted population (= (Total population + Daytime population) / 2): “Census returns,” Statistics Bureau, Ministry of Internal Affairs and Communications

☐Explanation of index

-The value used as the index is obtained by dividing the total floor space of public cultural facilities by the adjusted population.

-Public cultural facilities refer to the following facilities in the Public Facility Survey of the Ministry of Internal Affairs and Communications:

  -Libraries

  -Museums (General museums, science museums, history museums, art museums, other museums (outdoor museums, zoos, botanical gardens, zoo and botanical gardens and aquariums))

  -Public halls, civic auditoriums and community centers

-The floor space is defined as follows according to the definition in the Public Facility Survey:

  “Other museums” of “Museums”: Floor space

  Facilities other than “Other museums”: Total site area

-Facilities owned or controlled by prefectures that are located within the municipality are included in the assessment.

-The higher the value of the index is, the higher the level of facility development in the cultural services field is considered to be, and therefore, the level of cultural services is considered to be high.

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☐Notes

-Initially, the number of facilities was considered as a possible index instead of the floor space of facilities, but opinions were expressed that the number of facilities alone was insufficient for determining the level of services, and the floor space data was confirmed available. Consequently, the assessment adopted the floor space as the index.

●2.2.2 Adequacy of cultural services (2)

The assessment focuses on the enrichment of cultural services based on the status of utilization of cultural facilities.

☐Assessment index

(Number of participants in events hosted or co-hosted by cultural halls + Number of visitors to museums) / Adjusted population

☐Criteria

	Ordinance-designated cities	General cities	Towns and villages
Unit	Number of participants and visitors / Adjusted population		
Level 1	Less than 0.75		
Level 2	0.75 or more to less than 0.95		
Level 3	0.95 or more to less than 1.25		
Level 4	1.25 or more to less than 1.65		
Level 5	1.65 or more		

☐Reference data

(1) Number of participants in events hosted or co-hosted by cultural halls: “Social Education Survey,” Ministry of Education, Culture, Sports, Science and Technology

(2) Number of visitors to museums: “Social Education Survey,” Ministry of Education, Culture, Sports, Science and Technology

(3) Adjusted population (= (Total population + Daytime population) / 2): “Census returns,” Statistics Bureau, Ministry of Internal Affairs and Communications

☐Explanation of index

-Cultural halls and museums are selected as cultural facilities subject to the assessment. The value used as the index is obtained by dividing the total number of participants in events hosted or co-hosted by cultural halls and visitors to museums by the adjusted population.

-The higher the value of the index is, the more frequently the facilities are used for cultural service purposes, and therefore, the level of cultural services is considered to be high.

☐Notes

-The adequacy of cultural services is assessed in terms of 2 indices; (1) the development of cultural facilities and (2) the status of utilization of cultural facilities.

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●2.2.3 Adequacy of medical services

The assessment focuses on the development of medical services based on the number of beds at medical facilities.

☐Assessment index

Number of beds at medical facilities / Adjusted population

☐Criteria

	Ordinance-designated cities	General cities	Towns and villages
Unit	Number of beds / 1,000 people		
Level 1	Less than 7	Less than 9	Less than 1
Level 2	7 or more to less than 9	9 or more to less than 12	1 or more to less than 6
Level 3	9 or more to less than 12	12 or more to less than 15	6 or more to less than 12
Level 4	12 or more to less than 18	15 or more to less than 20	12 or more to less than 22
Level 5	18 or more	20 or more	22 or more

☐Reference data

(1) Number of beds at medical facilities: “Survey of Medical Institutions,” Ministry of Health, Labour and Welfare

(2) Adjusted population (= (Total population + Daytime population) / 2): “Census returns,” Statistics Bureau, Ministry of Internal Affairs and Communications

☐Explanation of index

-The value used as the index is obtained by dividing the number of beds at medical facilities (i.e. hospitals and clinics) shown in the “Survey of Medical Institutions” prepared by the Ministry of Health, Labour and Welfare, by the adjusted population.

-The higher the value of the index is, the higher the level of development of medical institutions is considered to be, and therefore, the level of medical services is considered to be high.

☐Notes

-The adequacy of medical services is assessed preferably in terms of not only the adequacy of the number of beds, but also the development of preventive healthcare. However, as an appropriate assessment index for preventive healthcare has not been determined so far, it will be a task to be considered toward updating this tool in the future.

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●2.2.4 Adequacy of childcare services (1)

The assessment focuses on the development of childcare services based on the proportion of children on waiting lists to the capacity of nursery schools.

☐Assessment index

Number of children waiting to get in nursery schools / Capacity of nursery schools

☐Criteria

	Ordinance-designated cities	General cities	Towns and villages
Unit	Number of children on waiting lists / 1,000 children		
Level 1	14.0 or more		
Level 2	7.0 or more less than 14.0		
Level 3	3.0 or more to less than 7.0		
Level 4	1.0 or more to less than 3.0		
Level 5	Less than 1.0		

☐Reference data

(1) Number of children waiting to get in nursery schools: “Survey on the Number of Children on Waiting Lists for Nursery Schools,” Ministry of Health, Labour and Welfare

(2) Capacity of nursery schools: “Survey of Social Welfare Institutions,” Ministry of Health, Labour and Welfare

☐Explanation of index

-The value used as the index is obtained by dividing the number of children on waiting lists for nursery schools shown in the “Survey on the Number of Children on Waiting Lists for Nursery Schools” conducted by the Ministry of Health, Labour and Welfare (MHLW) by the capacity of nursery schools shown in the “Survey of Social Welfare Institutions” conducted by the MHLW.

-The lower the value of the index is, the higher the level of facility improvement for nursery schools is considered to be, and therefore, the level of childcare services is considered to be high.

☐Notes

-Initially, the value obtained by dividing the capacity of nursery schools by the total population was considered as a possible effective index, but during the process of deliberation, there was a debate over whether using the number of children waiting to get in nursery schools may be appropriate rather than the capacity of nursery schools. After taking into consideration the opinions of municipalities, the value obtained by dividing the number of children waiting to get in nursery schools by the capacity of nursery schools was ultimately adopted as a suitable index for expressing the degree of surplus or shortfall of childcare facilities.

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●2.2.4 Adequacy of childcare services (2)

The assessment focuses on the development of childcare services based on the improvement of regional child-support centers.

☐Assessment index

Number of child-support centers / Population of infants from 0 to 4 years old

☐Criteria

	Ordinance-designated cities	General cities	Towns and villages
Unit	Number of centers / 10,000 infants		
Level 1	Less than 7		
Level 2	7 or more to less than 9		
Level 3	9 or more to less than 11		
Level 4	11 or more to less than 14		
Level 5	14 or more		

☐Reference data

(1) Number of regional child-rearing support centers: “Project on Regional Child-Rearing Support Centers,” Ministry of Health, Labour and Welfare

(2) Population of infants from 0 to 4 years old: “Census returns,” Statistics Bureau, Ministry of Internal Affairs and Communications

☐Explanation of index

-The value used as the index is obtained by dividing the number of regional child-rearing support centers based on the “Project on Regional Child-Rearing Support Centers” conducted by the Ministry of Health, Labour and Welfare, by the population of infants from 0 to 4 years old in the national census.

-The higher the value of the index is, the higher the level of improvement of regional child-rearing support centers is considered to be, and therefore, the level of childcare services is considered to be high.

-The number of regional child-rearing support centers is equal to the sum of facilities falling under one of the following: Plaza-type, Center-type, Children’s house-type.

☐Notes

-The adequacy of childcare services is assessed in terms of 2 indices; (1) the lack of nursery schools and (2) the development of child-rearing support as a countermeasure to the falling birthrate.

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●2.2.5 Adequacy of services for the disabled (1)

The assessment focuses on the development of services for people with disabilities based on the development of facilities for disabled.

☐Assessment index

Capacity of facilities for the disabled / Total population

For the definition, please refer to the explanation of the index below.

☐Criteria

	Ordinance-designated cities	General cities	Towns and villages
Unit	Number of slots at facilities / 1,000 people		
Level 1	Less than 0.4	Less than 0.5	0
Level 2	0.4 or more to less than 0.8	0.5 or more to less than 1.25	—
Level 3	0.8 or more to less than 1.1	1.25 or more to less than 2	More than 0 to less than 2
Level 4	1.1 or more to less than 1.4	2 or more to less than 3	2 or more to less than 5
Level 5	1.4 or more	3 or more	5 or more

☐Reference data

(1) Capacity of facilities for people with disabilities: “Survey of Social Welfare Institutions,” Ministry of Health, Labour and Welfare

(2) Total population: “Census returns,” Statistics Bureau, Ministry of Internal Affairs and Communications

☐Explanation of index

-The value used as the index is obtained by dividing the capacity of facilities for the disabled shown in the “Survey of Social Welfare Institutions” conducted by the Ministry of Health, Labour and Welfare, by the total population shown in the national census.

-Facilities for people with disabilities refer to the following facilities specified in the “Survey of Social Welfare Institutions:”

Rehabilitation support facilities for people with physical disabilities
Rehabilitation facilities for people with intellectual disabilities
Social rehabilitation facilities for people with mental disabilities

-The higher the value of the index is, the higher the level of development of facilities for people with disabilities is considered to be, and therefore, the level of services for people with disabilities is considered to be high.

-Unlike other indices, this index uses the total population (the nighttime population) for the denominator instead of the adjusted population, as it is regarded as an index for assessing the level of services for the disabled, focusing mainly on residents of the municipality.

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●2.2.5 Adequacy of services for the disabled (2)

The assessment focuses on the adequacy of services for the disabled, in terms of the development of barrier-free access to railway stations and buses, from the viewpoint of promoting barrier-free facilities, in order to provide independence for the disabled, help them lead a communal life, and establish a safe society.

☐Assessment indices

(1) Ratio of barrier-free railway stations

(2) Ratio of bus companies introducing low-floor buses

The decision over which index to adopt is left up to the discretion of individual municipalities.

☐Criteria

(1) Ratio of barrier-free railway stations

	Ordinance-designated cities	General cities	Towns and villages
Unit	%		
Level 1	0		
Level 2	—		
Level 3	More than 0 to less than 12.5		
Level 4	12.5 or more to less than 25.0		
Level 5	25.0 or more		

(2) Ratio of bus companies introducing low-floor buses

	Ordinance-designated cities	General cities	Towns and villages
Unit	%		
Level 1	Less than 4.0		
Level 2	4.0 or more to less than 9.0		
Level 3	9.0 or more to less than 15.0		
Level 4	15.0 or more to less than 25.0		
Level 5	25.0 or more		

☐Reference data

1) Ratio of barrier-free railway stations: “Information on Barrier-Free Access by Prefectures: Development of Barrier-Free Facilities for Passenger Transport,” Ministry of Land, Infrastructure, Transport and Tourism

(2) Ratio of bus companies introducing low-floor buses: “Information on Barrier-Free Access by Prefectures: Introduction of Low-Floor Buses by Bus Companies,” Ministry of Land,

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Infrastructure, Transport and Tourism

☐Explanation of index

-Development of barrier-free access to public transportation shown in the “Information on Barrier-Free Access by Prefectures” prepared by the Ministry of Land, Infrastructure, Transport and Tourism is used as an index.

(1) Regarding the ratio of barrier-free railway stations, stations in conformity to Articles 4 to 28 of the “Standard for passenger facilities, the structure and equipment of vehicles required for the smooth transportation,” the Barrier-Free Transportation Act, Ministry of Land, Infrastructure, Transport and Tourism, are regarded as “barrier-free.” The proportion of barrier-free stations to stations with more than 5,000 users per day that have been undergoing construction work in accordance with the Barrier-Free Transportation Act is obtained.

(2) Regarding the ratio of bus companies introducing low-floor buses, buses with a floor level of approximately less than 30 cm-high above the ground that are in conformity to Article 34 to 39 of the “Standard for passenger facilities, the structure and equipment of vehicles required for the smooth transportation,” the Barrier-Free Transportation Act, Ministry of Land, Infrastructure, Transport and Tourism, are regarded as “Non-step buses.” The proportion of non-step buses to all the buses is obtained.

-The higher the value of the index is, the higher the level of barrier-free access to public transportation is considered to be, and therefore, the level of services for people with disabilities is considered to be high.

-As every municipality has a different degree of dependence on each type of public transportation, two kinds of indices, one for railways and the other for buses, have been prepared so that individual municipalities can choose one as appropriate.

☐Municipalities exempt from the assessment

-Municipalities, in which no stations with more than 5,000 users per day are located and non-step buses cannot be adopted for special reasons including regional weather characteristics, are exempt from the assessment of this section.

☐Notes

-The adequacy of services for the disabled is assessed in terms of 2 indices; (1) the development of facilities for the disabled and (2) the enhancement of barrier-free access to railway stations and buses.

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●2.2.6 Adequacy of services for the elderly (1)

The assessment focuses on the development of services for the elderly based on the improvement of long-term care insurance facilities.

☐Assessment index

Capacity of long-term care insurance facilities / Elderly population (65 years old and older)
For the definition, please refer to the explanation of the index below.

☐Criteria

	Ordinance-designated cities	General cities	Towns and villages
Unit	Number of slots at facilities / 100 people		
Level 1	Less than 1.5	Less than 2.5	Less than 2.25
Level 2	1.5 or more to less than 2.0	2.5 or more to less than 3	2.25 or more to less than 3.25
Level 3	2.0 or more to less than 2.75	3 or more to less than 3.5	3.25 or more to less than 4.25
Level 4	2.75 or more to less than 3.25	3.5 or more to less than 4.25	4.25 or more to less than 6
Level 5	3.25 or more	4.25 or more	6 or more

☐Reference data

(1) Capacity of long-term care insurance facilities: “Survey of Institutions and Establishments for Long-term Care,” Ministry of Health, Labour and Welfare
(2) Elderly population (65 years old and older): “National Census,” Statistics Bureau, Ministry of Internal Affairs and Communications

☐Explanation of index

-The value used as the index is obtained by dividing the capacity of long-term care insurance facilities shown in the “Survey of Institutions and Establishments for Long-term Care” conducted by the Ministry of Health, Labour and Welfare, by the elderly population (65 years old and older) in the national census.
-Long-term care insurance facilities refer to the following establishments in the above Survey:
  -Facilities Covered by Public Aid Providing Long-Term Care to the Elderly
  -Long-Term Care Health Facilities
  -Medical Long-Term Care Sanatoriums
-The higher the value of the index is, the higher the level of improvement of long-term care facilities for the elderly is considered to be, and therefore, the level of services for the elderly is considered to be high.
-Unlike other indices, the index in this section uses the elderly population (65 years old and older) for the denominator instead of the adjusted population, in order to assess the development of services focusing mainly on the elderly residents of the municipality.

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●2.2.6 Adequacy of services for the elderly (2)

The assessment focuses on the development of services for the elderly based on the improvement of facilities for in-home services.

☐Assessment index

Number of facilities for in-home services / Elderly population (65 years old and older)
For the definition, please refer to the explanation of the index below.

☐Criteria

	Ordinance-designated cities	General cities	Towns and villages
Unit	Number of facilities / 1,000 people		
Level 1	Less than 2.75		
Level 2	2.75 or more to less than 3.1		
Level 3	3.1 or more to less than 3.5		
Level 4	3.5 or more to less than 3.8		
Level 5	3.8 or more		

☐Reference data

(1) Number of facilities for in-home services: “Survey of Institutions and Establishments for Long-term Care,” Ministry of Health, Labour and Welfare
(2) Elderly population (65 years old and older): “National Census,” Statistics Bureau, Ministry of Internal Affairs and Communications

☐Explanation of index

-The value used as the index is obtained by dividing the number of facilities for in-home services shown in the “Survey of Institutions and Establishments for Long-term Care” conducted by the Ministry of Health, Labour and Welfare, by the elderly population (65 years old and older) in the national census.
-Facilities for in-home services refer to the following establishments in the above Survey:
  -Facilities for home-visit long-term care
  -Facilities for home-visit bathing long-term care
  -Home-visit nursing stations
  -Facilities for outpatient long-term care
  -Facilities for outpatient rehabilitation
  -Facilities for short-term admission for daily life long-term care
  -Facilities for short-term admission for recuperation
  -Facilities for daily life long-term care admitted to a specified facility
  -Facilities for rental service of equipment for long-term care covered by public aid
  -Facilities for the sale of specified equipment covered by public aid
-The higher the value of the index is, the higher the level of services for housebound seniors is considered to be, and therefore, the level of services for the elderly is considered to be high.

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-Unlike other indices, the index in this section uses the elderly population (65 years old and older) for the denominator instead of the adjusted population, in order to assess the development of services focusing mainly on the elderly residents of the municipality.

☐Notes

-The adequacy of services for the elderly is assessed in terms of 2 indices; (1) the development of long-term care insurance facilities and (2) the development of facilities for in-home services.

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●2.3 Social vitality

The assessment is based on the following 4 indices representing the demographic trend, which is the source of social vitality, progress towards an information society and governmental efforts toward social vitalization.

●2.3.1 Rate of population change due to births and deaths

The assessment focuses on the proportion of the natural increase-decrease of population, the difference in the number of births and deaths, to the total population comparing with the national avarage, as part of the demographic trend.

☐Assessment index

Rate of population change due to births and deaths in the municipality – Rate of population change due to births and deaths of the national population

*Rate of population change due to births and deaths = Number of the natural increase-decrease of population (Number of births – Number of deaths) / Total population

☐Criteria

	Ordinance-designated cities	General cities	Towns and villages
Unit	Percentage points (PP)		
Level 1	Less than 0.32	Less than 0.1	Less than -0.6
Level 2	0.32 or more to less than 0.38	0.1 or more to less than 0.3	-0.6 or more to less than -0.3
Level 3	0.38 or more to less than 0.46	0.3 or more to less than 0.45	-0.3 or more to less than -0.05
Level 4	0.46 or more to less than 0.6	0.45 or more to less than 0.6	-0.05 or more to less than 0.25
Level 5	0.6 or more	0.6 or more	0.25 or more

☐Reference data

(1) Number of the natural increase-decrease of population: “Vital Statistics,” Statistics and Information Department, Ministry of Health, Labour and Welfare

(2) Total population: “National Census,” Ministry of Internal Affairs and Communications

※The rate of population change due to births and deaths of the national population is automatically calculated on the data entry sheet.

☐Explanation of index

-The value of the index is the difference between the proportion of the natural increase-decrease of population (the difference in the number of births and deaths) shown in the “Vital Statistics” prepared by the Statistics and Information Department, the Ministry of Health, Labour and Welfare, to the total population shown in the “Census returns” prepared by the Statistics bureau of the Ministry of Internal Affairs and Communications, and the national average.

-The higher the value of the index is, the higher the rate of population change due to births and deaths becomes, which would lead to the improvement of social vitality.

☐Notes

-“Vital Statistics” deals only with figures regarding births and deaths of Japanese people within the

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country, excluding those occurring outside the country and those of foreign nationals within the country. Therefore, separate consideration is required when those excluded have a significant impact on the municipality.

●2.3.2 Rate of population change due to migration

The assessment focuses on the proportion of the social increase-decrease of population, the difference in the number of move-ins and move-outs, to the total population, as part of the demographic trend.

☐Assessment index

Rate of population change due to migration in the municipality.

*Rate of population change due to migration = Number of social increase-decrease of population (Number of move-ins – Number of move-outs) / Total population

☐Criteria

	Ordinance-designated cities	General cities	Towns and villages
Unit	%		
Level 1	Less than -0.35	Less than -0.85	Less than -1.3
Level 2	-0.35 or more to less than 0	-0.85 or more to less than -0.6	-1.3 or more to less than -0.95
Level 3	0 or more to less than 0.4	-0.6 or more to less than -0.35	-0.95 or more to less than -0.65
Level 4	0.4 or more to less than 0.9	-0.35 or more to less than 0	-0.65 or more to less than -0.2
Level 5	0.9 or more	0 or more	-0.2 or more

☐Reference data

(1) Number of move-ins and move-outs: “Annual Report on the Internal Migration in Japan Derived from the Basic Resident Registers,” Statistics Bureau, Ministry of Internal Affairs and Communications

(2) Total population: “Census returns,” Statistics Bureau, Ministry of Internal Affairs and Communications

☐Explanation of index

-The value used as the index is the proportion of the social increase-decrease of population (the difference in the number of move-ins and move-outs) according to the “Annual Report on the Internal Migration in Japan Derived from the Basic Resident Registers” prepared by the Statistics Bureau of the Ministry of Internal Affairs and Communications, to the total population shown in the “Census returns” prepared by the Statistics Bureau of the Ministry of Internal Affairs and Communications.

-The higher the value of the index is, the higher the rate of population change due to migration becomes, which would lead to the improvement of social vitality.

☐Notes

-The number of move-ins and move-outs does not include people who lived abroad before moving-in and those moving out to other countries. Those who changed addresses within the

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same municipality and those who do not possess Japanese citizenship are also excluded. Therefore, separate consideration is required when those excluded have a significant impact on the municipality.

●2.3.3 Progress towards an information society

The assessment focuses on the implementation of measures for the cultivation of human resources suitable for an information society based on the supply of computers for educational use.

☐Assessment index

Number of computers for educational use in elementary and junior high schools / Number of students in elementary and junior high schools

☐Criteria

	Ordinance-designated cities	General cities	Towns and villages
Unit	Number of computers / 100 people		
Level 1	Less than 7.5	Less than 7	Less than 11
Level 2	7.5 or more to less than 9	7 or more to less than 9	11 or more to less than 15
Level 3	9 or more to less than 10	9 or more to less than 11	15 or more to less than 20
Level 4	10 or more to less than 12	11 or more to less than 14	20 or more to less than 30
Level 5	12 or more	14 or more	30 or more

☐Reference data

(1) Number of computers for educational use in elementary and junior high schools: “Survey of the Actual State of Informatization in Schools,” Ministry of Education, Culture, Sports, Science and Technology

(2) Number of students in elementary and junior high schools: “Survey of the Actual State of Informatization in Schools,” Ministry of Education, Culture, Sports, Science and Technology

☐Explanation of index

-The value used as the index is obtained by dividing the number of computers for educational use at elementary and junior high schools shown in the “Survey of the Actual State of Informatization in Schools” conducted by the Ministry of Education, Culture, Sports, Science and Technology, by the number of students in elementary and junior high schools.

-The higher the value of the index is, the higher the level of measures for an information society is considered to be in terms of compulsory education.

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●2.3.4 Efforts and policies for vitalizing society

The assessment focuses on measures and policies for social revitalization.

☐Assessment index

Rating measures and policies for social revitalization, including frameworks in which local residents can actively participate in public administration or communities.

☐Criteria

	Ordinance-designated cities	General cities	Towns and villages
Unit	Number of measures and policies (in the following 7 items)		
Level 1	Less than 3		
Level 2	3 or more to less than 4		
Level 3	4 or more to less than 6		
Level 4	6 or more to less than 7		
Level 5	7		

☐Assessment items for measures and policies to be counted

(1) Establishing regulations in which a public comment period is guaranteed at the planning stage of important policies
(2) Accepting candidates of committee members for policy making from among local residents
(3) Providing a free space including an electronic forum on a website on which local residents can exchange messages and opinions freely
(4) Establishing and promoting an information disclosure system as regulations including extra-governmental organizations
(5) Either establishing regulations for supporting NPOs or implementing 5 or more actual measures for supporting them
(6) Promoting the community business operated mainly by local residents by taking specific support measures
(7) Establishing and promoting regulations regarding gender equality

☐Reference data

Independent surveys of individual municipalities

☐Explanation of index

-The efforts of municipalities for social revitalization are comprehensively assessed. The implementation statuses of various measures are subject to the assessment, which include setting a public comment period, the acceptance of candidates of committee members for policy making from among citizens, inviting public opinions on a website, information disclosure systems and support for NPOs.

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☐Notes

-Items in this section focus on assessment in terms of the very efforts and policies of individual municipalities. Therefore, they have a different character from other assessment items regarding the quality improvement of the municipality based on a numerical index as a result of its efforts and policies. Instead, they adopt the so-called qualitative assessment. If it is possible to set assessment items that are expressed using a numerical index in the future, items in this section will be reviewed for reorganization when this tool is updated.

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Q3 Economic aspect

●3.1 Industrial vitality

The assessment focuses on industrial input and output, the major components of industrial vitality.

●3.1.1 Amount equivalent to gross regional product

The assessment focuses on the sum of the annual output of agriculture, manufacturing and commerce, selected from among the production output by industrial classification, as an alternative index to the GRP (output of all industries) of the municipality.

☐Assessment index

(Agricultural output + Value of manufactured goods shipments + Annual sales of commercial goods) / Adjusted population

☐Criteria

	Ordinance-designated cities	General cities	Towns and villages
Unit	One million yen/Person		
Level 1	Less than 3.5	Less than 3.0	Less than 1.3
Level 2	3.5 or more to less than 4.5	3.0 or more to less than 4.0	1.3 or more to less than 2.0
Level 3	4.5 or more to less than 6.5	4.0 or more to less than 5.5	2.0 or more to less than 3.0
Level 4	6.5 or more to less than 13	5.5 or more to less than 8.5	3.0 or more to less than 5.0
Level 5	13 or more	8.5 or more	5.0 or more

☐Reference data

(1) Agricultural output: “Statistics of Agricultural Income Produced,” Statistics Department, Ministry of Agriculture, Forestry and Fisheries

(2) Value of manufactured goods shipments: “Census of Manufactures,” Economic and Industrial Policy Bureau, Ministry of Economy, Trade and Industry

(3) Annual sales of commercial goods: “Census of commerce,” Economic and Industrial Policy Bureau, Ministry of Economy, Trade and Industry

(4) Adjusted population (= (Total population + Daytime population) / 2): “Census returns,” Statistics Bureau, Ministry of Internal Affairs and Communications

☐Explanation of index

-The assessment uses the sum of the annual output of agriculture, industry and commerce, selected from among the production output by industrial classification, the data of which are available at the municipal level, as a GRP (Gross Regional Product) alternative, which is divided by the adjusted population in order to obtain the value added per capita.

-The adjusted population is used for the denominator instead of total population in view of the fact that the daytime population is associated with creating added value.

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●3.1.2 Ratio of change in the number of employees

The assessment focuses on the ratio of change in the number of employees, which is regarded as one form of industrial input.

☐Assessment index

(Number of employees – Number of employees 5 years ago) / Number of employees / 5

☐Criteria

	Ordinance-designated cities	General cities	Towns and villages
Unit	%		
Level 1	Less than -0.9	Less than -1.4	Less than -2.6
Level 2	-0.9 or more to less than -0.5	-1.4 or more to less than -0.8	-2.6 or more to less than -1.8
Level 3	-0.5 or more to less than -0.3	-0.8 or more to less than -0.2	-1.8 or more to less than -1.0
Level 4	-0.3 or more to less than 0.0	-0.2 or more to less than 0.6	-1.0 or more to less than 0.0
Level 5	0.0 or more	0.6 or more	0.0 or more

☐Reference data

Number of employees: “Establishment and Enterprise Census,” Statistics Bureau, Ministry of Internal Affairs and Communications

☐Explanation of index

-The ratio of change in the number of employees in the last 5 years shown in the “Establishment and Enterprise Census” prepared by the Statistics Bureau of the Ministry of Internal Affairs and Communications is used as an index (It represents the annual average rate by dividing the number of employees by 5.)

-The higher the value of the index is, the more industrial vitality is considered to be enhanced.

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●3.2 Economic exchanges

The assessment of regional economic exchanges is based on two indices of the index equivalent to number of people visiting city and the efficiency of public transportation.

●3.2.1 Index equivalent to number of people visiting city

The assessment focuses on the number of employees in retail trades, restaurants and hotels in the total population, as an alternative index to the exchange population representing the number of visitors to the region.

☐Assessment index

Number of employees in retail trades, restaurants and hotels / Total population

☐Criteria

	Ordinance-designated cities	General cities	Towns and villages
Unit	%		
Level 1	Less than 8.75	Less than 8.25	Less than 5.75
Level 2	8.75 or more to less than 9.75	8.25 or more to less than 9.5	5.75 or more to less than 7.25
Level 3	9.75 or more to less than 11.25	9.5 or more to less than 10.5	7.25 or more to less than 8.75
Level 4	11.25 or more to less than 14.0	10.5 or more to less than 12.0	8.75 or more to less than 11.0
Level 5	14.0 or more	12.0 or more	11.0 or more

☐Reference data

(1) Number of employees in retail trades, restaurants and hotels: “Establishment and Enterprise Census,” Statistics Bureau, Ministry of Internal Affairs and Communications

(2) Total population: “Census returns,” Statistics Bureau, Ministry of Internal Affairs and Communications

☐Explanation of index

-The assessment is based on the exchange population, which is a major element of the economic vitality of the municipality. The exchange population represents the number of visitors to the municipality. However, it is difficult to obtain data which directly express the exchange population. Accordingly, the value obtained by dividing the sum of employees in retail trades, restaurants and hotels, by the total population, is used as a surrogate variable, the classifications of which are based on the “Establishment and Enterprise Census” prepared by the Statistics Bureau, Ministry of Internal Affairs and Communications.

-When the value of this variable is relatively high, the number of people who come from outside the municipality to buy products or services of the municipality is considered to be high.

-The industrial classification “Retail Trade” in the “Establishment and Enterprise Census” represents the sum of the middle classifications from “55 Retail trade, general merchandise” to “60 Miscellaneous retail trade” in the major classification “J. Wholesale and Retail Trade,” whereas, “Restaurants and Hotels” represents the major classification “M. Eating and Drinking Places, Accommodations” in the Census.

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●3.2.2 Efficiency of public transportation

The assessment focuses on the development of public transportation according to the percentage of the commuting population using public transportation.

☐Assessment index

Number of people aged 15 and older who use railways, electric trains or buses for commuting to and from school or work outside the house / Number of people aged 15 or older who commute to and from school or work outside the house

*Buses include shared-ride buses, company-owned buses and school buses.

☐Criteria

	Ordinance-designated cities	General cities	Towns and villages
Unit	%		
Level 1	Less than 20.0	Less than 4.5	Less than 4.0
Level 2	20.0 or more to less than 32.5	4.5 or more to less than 8.5	4.0 or more to less than 6.0
Level 3	32.5 or more to less than 42.5	8.5 or more to less than 15.0	6.0 or more to less than 8.0
Level 4	42.5 or more to less than 50.0	15.0 or more to less than 27.5	8.0 or more to less than 12.5
Level 5	50.0 or more	27.5 or more	12.5 or more

☐Reference data

(1) Number of people aged 15 and older who use railways, electric trains or buses for commuting to and from school or work outside the house: “Census returns” (in years ending with zero in which a large-scale census was conducted), Statistics Bureau, Ministry of Internal Affairs and Communications

(2) Number of people aged 15 or older who commute to and from school or work outside the house: “Census returns” (in years ending with zero in which a large-scale census was conducted), Statistics Bureau, Ministry of Internal Affairs and Communications

☐Explanation of index

-The value used as the index is the percentage of people in individual municipalities aged 15 or older who use public transportation including railways and trains, share-ride buses, company-owned buses and school buses for commuting to and from school or work outside the house, shown in the “National Census” conducted by the Ministry of Internal Affairs and Communications.

-The higher the value of the index is, the higher the level of public transportation in the municipality is considered to be.

☐Notes

-In reality, public transportation in neighboring municipalities is included as some people commute outside the municipality. The newest data available as of 2011 regarding the assessment item in this section is from the 2000 survey, as this item is included only in large-scale censuses conducted in years ending with zero.

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●3.3 Financial viability

The assessment of the financial viability of the municipality is based on the following 2 indices representing the financial situation.

●3.3.1 Tax revenues

The assessment focuses on the scale of the annual revenue of the municipality according to per-capita tax revenues for local governments in the adjusted population.

☐Assessment index

Tax revenues for local governments / Adjusted population

☐Criteria

	Ordinance-designated cities	General cities	Towns and villages
Unit	10,000 yen / Person		
Level 1	Less than 9.0	Less than 12.0	Less than 8.0
Level 2	9.0 or more to less than 13.0	12.0 or more to less than 14.0	8.0 or more to less than 10.0
Level 3	13.0 or more to less than 17.0	14.0 or more to less than 16.0	10.0 or more to less than 12.0
Level 4	17.0 or more to less than 19.5	16.0 or more to less than 18.0	12.0 or more to less than 15.0
Level 5	19.5 or more	18.0 or more	15.0 or more

☐Reference data

(1) Tax revenues for local governments: “State of Account Settlement by Municipalities,” Local Public Financial Bureau, Ministry of Internal Affairs and Communications

(2) Adjusted population (= (Total population + Daytime population) / 2): “Census returns,” Statistics Bureau, Ministry of Internal Affairs and Communications

☐Explanation of index

-The value used as the index is obtained by dividing tax revenues for local governments, shown in the “State of Account Settlement by Municipalities” prepared by the Local Public Financial Bureau of the Ministry of Internal Affairs and Communications, by the adjusted population.

-Tax revenues for local governments refer to the taxation paid by residents and companies registered in the municipality, which hold a key position in the annual revenue of the local government, in terms of sharing expenses of the local government. They also account for a major part of the annual revenues and the use is left up to the discretion of the local government. The taxable income includes the income of people working outside the municipality. When the value obtained by dividing tax revenues by the adjusted population is high, the economic infrastructure of the municipality is likely to be developed.

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●3.3.2 Outstanding local bonds

The assessment focuses on the independence of local government finances according to the percentage of outstanding municipal bonds among internal revenue sources.

☐Assessment index

Current outstanding municipal bonds / Balance of internal revenue sources

For the definition, please refer to the explanation of the index below.

☐Criteria

	Ordinance-designated cities	General cities	Towns and villages
Unit	Ratio		
Level 1	2.4 or more	2.8 or more	5.5 or more
Level 2	1.7 or more to less than 2.4	2.0 or more to less than 2.8	4.0 or more to less than 5.5
Level 3	0.9 or more to less than 1.7	1.6 or more to less than 2.0	2.8 or more to less than 4.0
Level 4	0.5 or more to less than 0.9	1.2 or more to less than 1.6	1.8 or more to less than 2.8
Level 5	Less than 0.5	Less than 1.2	Less than 1.8

☐Reference data

(1) Current outstanding municipal bonds: “State of Account Settlement by Municipalities,” Local Public Financial Bureau, Ministry of Internal Affairs and Communications

(2) Internal revenue sources: “State of Account Settlement by Municipalities,” Local Public Financial Bureau, Ministry of Internal Affairs and Communications

☐Explanation of index

-Internal revenue sources refer to financial resources raised by the municipality independently, including local taxes, contributions, fees and charges, property revenues, donations, money transferred, balances brought forward and other income.

-This index represents the proportion of outstanding municipal bonds to internal financial resources procurable by the municipality independently, the amount of which is determined by the municipality. The lower the proportion is, the more independent the municipality becomes, which would be likely to lead to the enhancement of the municipality’s economic foundation.

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[Commentaries and Data]

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PARTⅢ. Preliminary studies and related data about L

1. Results of study regarding method of deducting emissions of specific sectors with high degree of carbon aggregation in industry

CASBEE-City (Low-carbon Edition) redistributes the emissions of all sectors in industry. During the process of preliminary studies, a method of deducting the CO_2 emissions of specific manufacturers with a high degree of carbon aggregation from the total emissions of the municipality was discussed. The outline of the studies are described below.

1) Methods discussed

(Method 1) Deducting CO_2 emissions attributed to specific sectors of the manufacturing industry from the total emissions of the municipality

(Method 2) Classifying sectors of the manufacturing industry nationwide into 2 groups in a unified manner (1: High-aggregation sectors; 2: Low-aggregation sectors), and calculating CO_2 emissions from the difference in the basic unit according to the structure of the manufacturing industry in the municipality

2) Conditions for calculation (Common to 1 and 2)

(1) Assessment year: Fiscal 2003

The top 5 sectors (steel, chemicals, ceramics and soil/stone, petroleum and coal products, pulp and paper) account for 86%.

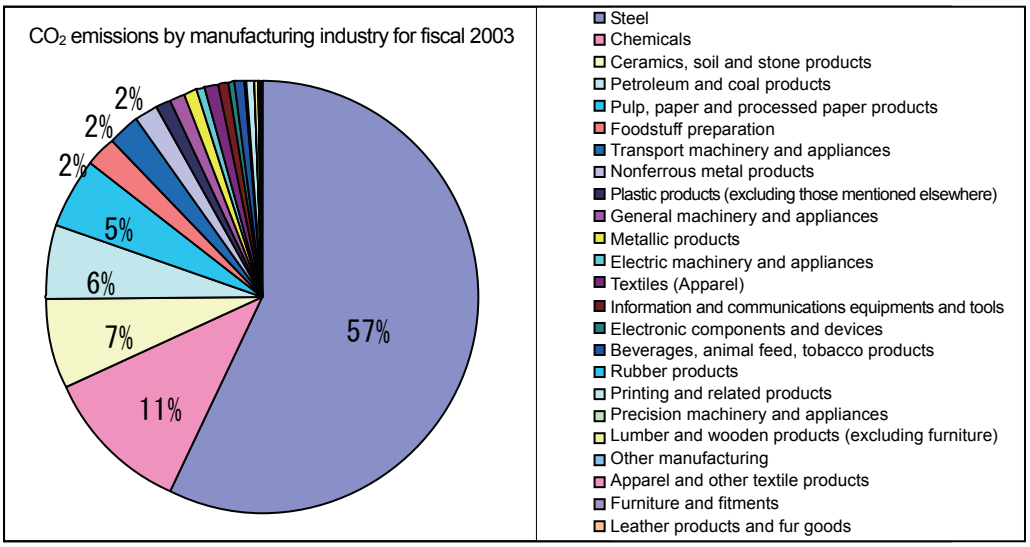

Figure Ⅲ.1: CO_2 emissions of the manufacturing industry nationwide by sector for fiscal 2003

(2) Municipalities subject to the assessment: 19 cities

- 13 Eco model cities (A preliminary calculation has not been conducted in some cities due to the difficulty in obtaining data.)
- 6 cities other than the above, with heavy industries as the major industries

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(3) Both methods are based on the premise that data, obtained in accordance with the “Manual for planning local governement’s action plan to address the issue ofglobal warming (Regional policies), First edition” prepared by the Ministry of Environment, are available, upon the practical application to municipalities. (Provisional data prepared for preliminary studies are used in the preliminary calculations described below.)

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3) Understanding the difference in CO_2 emissions per basic unit by sector of the manufacturing industry

CO_2 emissions per basic unit (CO_2 emissions per unit of raw materials used) by sector of the manufacturing industry were calculated and the results are shown in Figure Ⅲ.2.

(1) Calculating the national average of CO_2 emissions per unit of raw materials used by medium industrial classifications

＜Example: Steel Industry＞

[National average of CO_2 emissions per unit of raw materials used in the steel industry (t-CO_2/Yen)]
= [Total CO_2 emissions in the steel industry nationwide (t-CO_2)] / [Total national amount of raw materials used in the steel industry (Yen/Year)]

Statistics of the consumption structure of oil, etc. (Fiscal 2001)*1	Census of manufactures (Fiscal 2003)
[Petroleum consumption (kl)] × [Basic unit of petroleum (t-CO_2/kl)] + [Town gas consumption (m^3)] × [Basic unit of town gas (t-CO_2/m^3)] + adding fuels used in the steel industry by type*2)	Adding the amount of raw materials used in the steel industry by municipality

∗1 As the “Statistics on the consumption structure of oil, etc.” report has not been prepared since 2001, the data used above are from the 2001 survey.

∗2 The basic units of individual fuels are in accordance with the calculation of GHG emissions and report manuals by the Ministry of Environment.

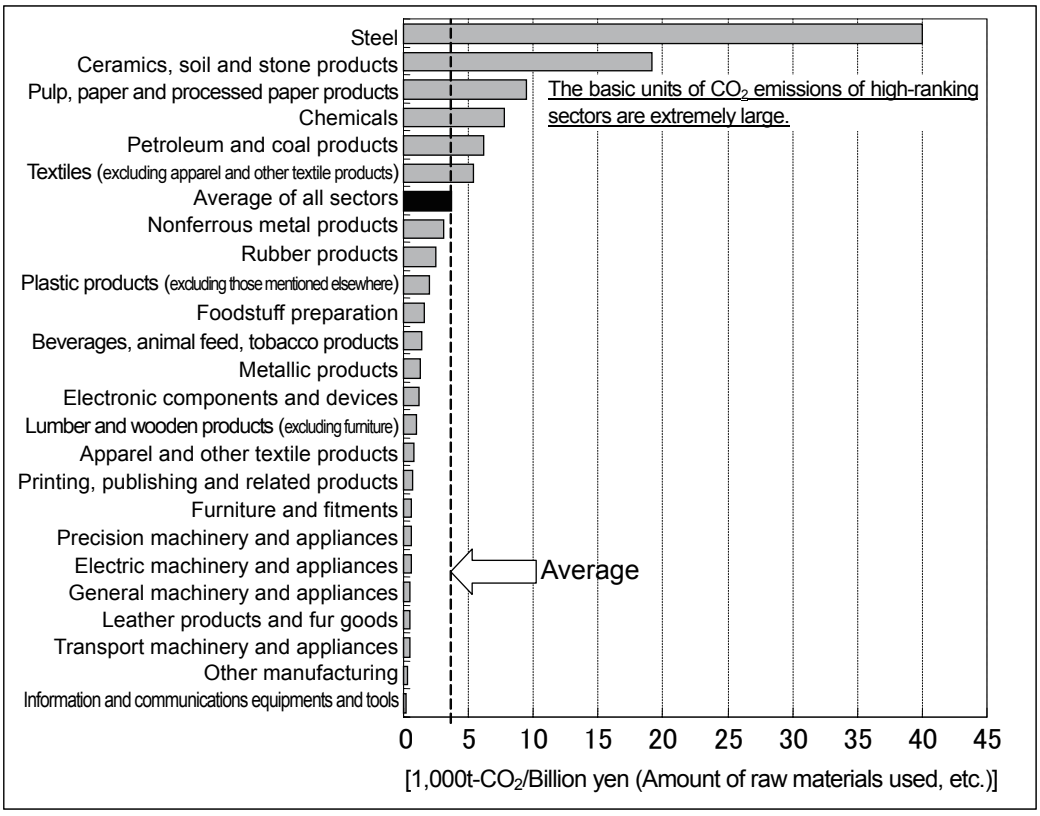

Figure Ⅲ.2: Basic unit of CO_2 emissions by sector of the manufacturing industry

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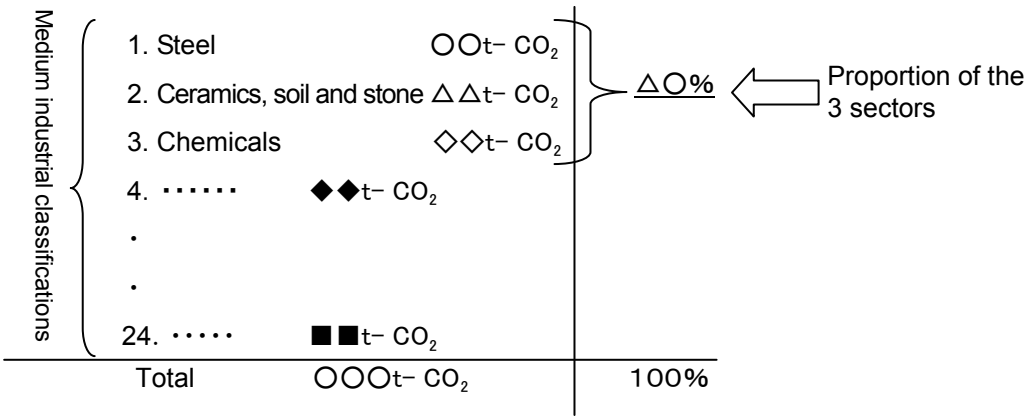
4) Culculation methods and results of preliminary calculation

[Method 1: Deducting CO_2 emissions attributed to specific sectors of the manufacturing industry from the total emissions of the municipality]

The following is the procedure proposed during the study for deducting CO_2 emissions of the top 3 sectors in the emissions ranking such as steel, ceramics and soil/stone and chemicals. (The same applies to cases in which the number of sectors subject to the deduction increases.)

(1) Estimating CO_2 emissions for individual municipalities by the medium industrial classifications
＜Example: Steel Industry＞
[CO_2 emissions attributed to the steel industry in the municipality (t-CO_2/Year)]
= [Amount of raw materials used in the municipality (Yen/Year)] × [National average of CO_2 emissions per unit of raw materials used (t-CO_2/Yen)]
*CO_2 emissions in the steel industry are classified into 2 groups; CO_2 emissions of municipalities with a shaft furnace and those of municipalities without a shaft furnace. The calculation of CO_2 emissions is conducted using the basic unit of CO_2 emissions in terms of the “Steel industry with a shaft furnace” and the “Steel industry without a shaft furnace,” respectively.

(2) Calculating the proportion of CO_2 emissions of the 3 sectors to those of the municipalities (2) calculated by the medium industrial classifications
Example: CO_2 emissions by the medium industrial classifications in a municipality



(3) Multiplying CO_2 emissions of the manufacturing industry listed in the “Environmental White Papers of Local Governments 2007” by the proportion calculated in the previous section(2), then deducting them from the total emissions of the municipality

[CO_2 emissions of the municipality after deducting those of the 3 sectors (t-CO_2/Year)]
= [CO_2 emissions of the manufacturing industry of the municipality listed in the Environmental White Papers of Local Governments (t-CO_2/Year)] × (1-[Proportion calculated in (3)])

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[Result of preliminary calculation based on Method 1]

Table Ⅲ.1: CO_2 emissions, deduction rates and adjustment results of the manufacturing industries according to Method 1

	A	B			C＝－B/A	D	E＝A/D	E＊(1+C)
	Total of the Manufacturing industry	Chemicals	Ceramics, soil and stone	Steel	Deduction rate	Adjusted population in 2005	Per-capita CO_2 emissions of the adjusted population (Before adjustment)	Per-capita CO_2 emissions of the adjusted population (After adjustment)
	(t-CO_2)	(t-CO_2)	(t-CO_2)	(t-CO_2)	%	People	(t-CO_2/People)	(t-CO_2/People)
City A	5,517,296	36,459	64,513	5,326,536	−98.4%	102,459	53.8	0.9
City B	138,620	6,270	34,412	22,710	−45.7%	174,080	0.8	0.4
City C	−	−	−	−	−	4,149	−	−
City D	31,453	3,082	0	0	−9.8%	447,580	0.1	0.1
City E	7,723,293	387,758	839,637	1,352,676	−33.4%	3,392,386	2.3	1.5
City F	17,276,356	3,908,316	419,634	9,400,390	−79.5%	1,240,724	13.9	2.9
City G	1,827,122	508,029	136,409	463,091	−60.6%	433,914	4.2	1.7
City H	189,353	0	36,449	0	−19.2%	110,911	1.7	1.4
City I	6,457,116	7,964	154,446	2,507,579	−41.3%	428,697	15.1	8.8
City J	4,949,900	2,712,502	243,202	104,576	−61.8%	308,626	16.0	6.1
City K	1,689,199	234,997	239,387	104,197	−34.3%	1,528,896	1.1	0.7
City L	10,944,627	572,541	265,662	7,395,907	−75.2%	801,273	13.7	3.4
City M	4,874,884	747,681	79,576	3,458,111	−87.9%	383,172	12.7	1.5
City N	19,684,023	3,117,294	211,951	12,217,879	−79.0%	464,017	42.4	8.9
City O	1,815,312	815,549	345,830	452,522	−88.9%	180,009	10.1	1.1
City P	−	−	−	−	−	4,678	−	−
City Q	11,316,563	641,040	807,745	9,244,171	−94.5%	1,006,986	11.2	0.6
City R	119,655	74,066	2,320	21,707	−82.0%	29,665	4.0	0.7
City S	−	−	−	−	−	53,512	−	−

N/B) "-" indicates "Not applicable"

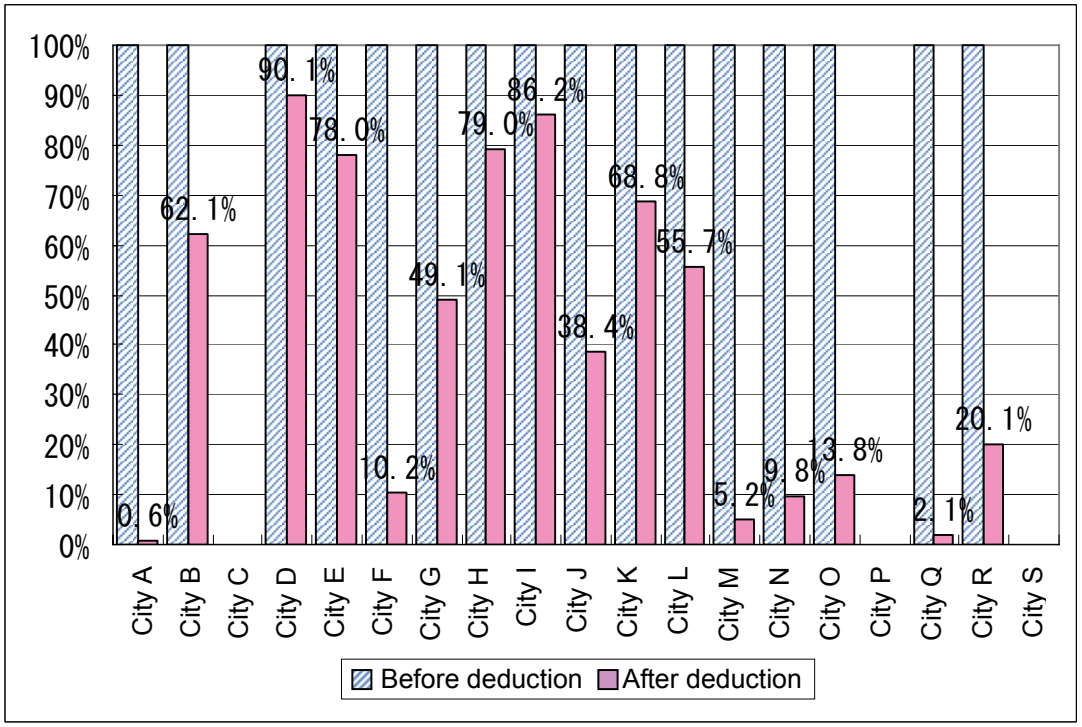

Figure Ⅲ.3: Adjustment rate of L in individual municipalities according to Method 1

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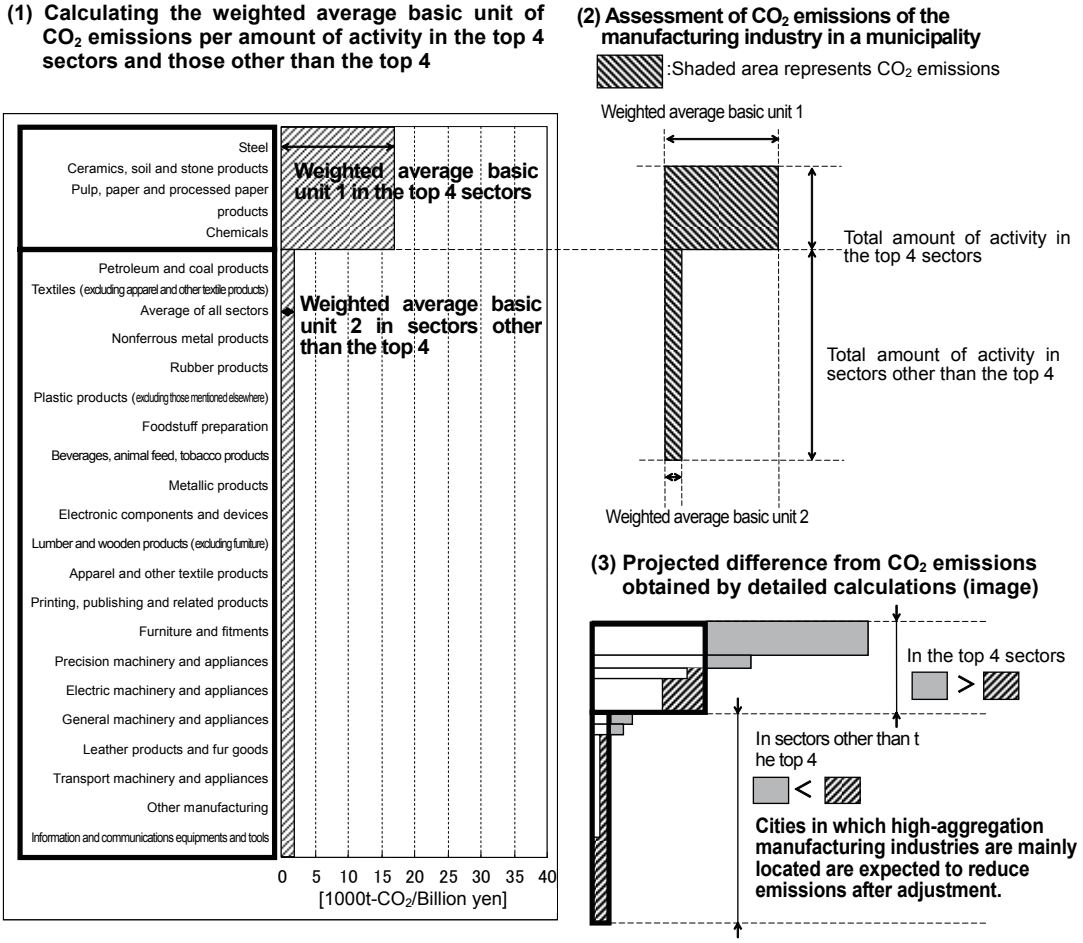
[Method 2: Classifying the manufacturing industry nationwide into 2 groups in a unified manner (1: High-aggregation sectors; 2: Low-aggregation sectors), and calculating CO_2 emissions from the difference in the basic unit according to the structure of the manufacturing industry in the municipality]

The method of calculating CO_2 emissions attributed to the manufacturing industry by municipality is shown in FigureⅢ.4 In this preliminary calculation, the top 4 sectors in the ranking of CO_2 emissions per amount of activity (Steel, ceramics and soil/stone, pulp/paper/paper processing and chemicals) are classified as high-aggregation sectors, and sectors other than the top 4 are low-aggregation sectors. Per-capita CO_2 emissions of the adjusted population from the manufacturing industry in the municipality were calculated using weighted average basic unit 1 according to the amount of activity in the top 4 sectors, and weighted average basic unit 2 according to the amount of activity in sectors other than the top 4.



FigureⅢ.4: Proposed method of calculating per-capita CO_2 emissions of the adjusted population in individual municipalities according to Method 2

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[Result of preliminary calculation based on Method 2]

Table Ⅲ.2: Result of preliminary calculation of CO_2 emissions in individual municipalities according to Method 2

	A	B			(B-A)/A	C	D=A/C	E=B/C
	Total emissions of the manufacturing industry (Before adjustment)	Total emissions of the manufacturing industry (After adjustment)	Top 4 sectors	Sectors other than the top 4	Increase-decrease rate by adjustment	Adjusted population in 2005	Per-capita CO_2 emissions of the adjusted population (Before adjustment)	Per-capita CO_2 emissions of the adjusted population (After adjustment)
	(t-CO_2)	(t-CO_2)	(t-CO_2)	(t-CO_2)	%	People	(t-CO_2/People)	(t-CO_2/People)
City A	5,517,296	2,745,617	2,703,643	41,974	−50.2%	102,459	53.8	26.8
City B	138,620	140,070	83,263	56,807	1.0%	174,080	0.8	0.8
City C	−	−	−	−	−	4,149	−	−
City D	31,453	59,665	24,687	34,978	89.7%	447,580	0.1	0.1
City E	7,723,293	6,067,569	3,571,136	2,496,423	−21.4%	3,392,386	2.3	1.8
City F	17,276,356	16,437,847	14,743,583	1,694,264	−4.9%	1,240,724	13.9	13.2
City G	1,827,122	2,078,965	1,726,065	352,901	13.8%	433,914	4.2	4.8
City H	189,353	268,737	123,552	145,185	41.9%	110,911	1.7	2.4
City I	6,457,116	9,376,029	1,393,817	7,982,212	45.2%	428,697	15.1	21.9
City J	4,949,900	7,910,824	7,092,692	818,132	59.8%	308,626	16.0	25.6
City K	1,689,199	2,193,303	1,178,218	1,015,086	29.8%	1,528,896	1.1	1.4
City L	10,944,627	6,386,107	5,352,736	1,033,371	−41.7%	801,273	13.7	8.0
City M	4,874,884	3,907,770	3,640,147	267,624	−19.8%	383,172	12.7	10.2
City N	19,684,023	15,446,444	13,816,767	1,629,647	−21.5%	464,017	42.4	33.3
City O	1,815,312	2,791,170	2,696,819	94,351	53.8%	180,009	10.1	15.5
City P	−	−	−	−	−	4,678	−	−
City Q	11,316,563	7,471,875	6,940,247	531,628	−34.0%	1,006,986	11.2	7.4
City R	119,655	213,901	195,818	18,083	78.8%	29,665	4.0	7.2
City S	−	−	−	−	−	53,512	−	−

N/B) "-" indicates "Not applicable"

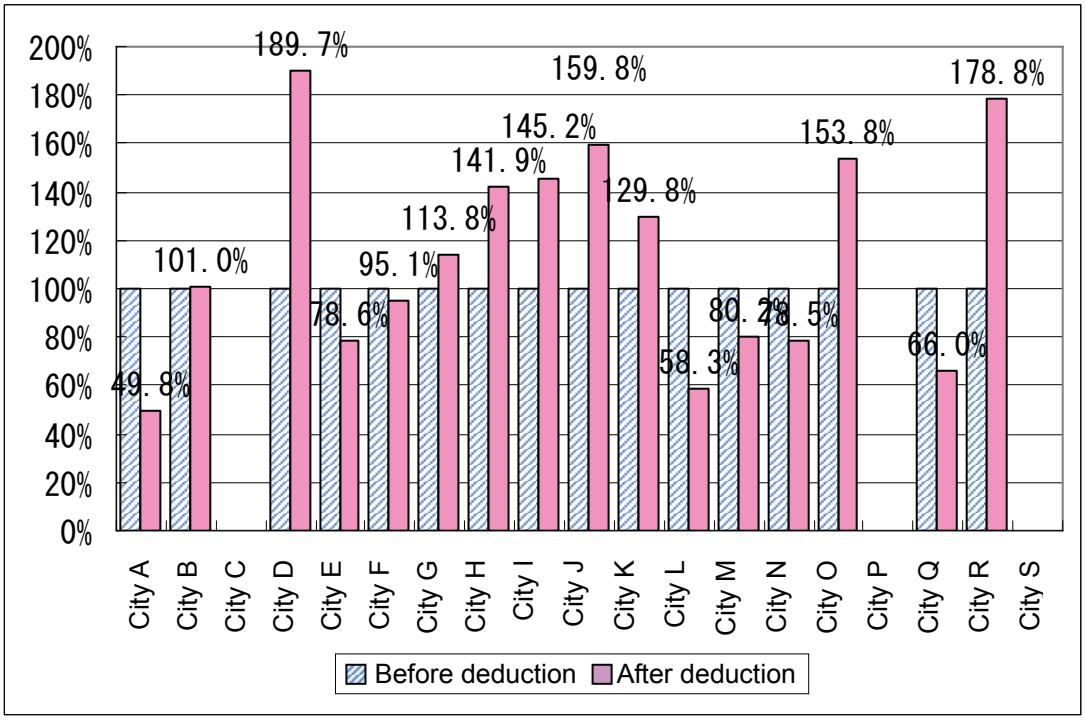

Figure Ⅲ.5: Adjustment rate of L in individual municipalities according to Method 2

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2. Advisability of emissions redistribution in commercial sectors

Activities in commercial sectors, especially those in cities with a concentration of businesses, provide benefits not only to the city subject to assessment, but also to other cities through governmental organizations and business activities in a wide area. Therefore, some people think that CO_2 emissions attributed to the activities in commercial sectors should be redistributed just like those in industrial sectors. However, in view of the effectiveness in the practical utilization of this assessment tool, the redistribution will not apply to commercial sectors in the CASBEE-City (2011 Edition) for the following 3 reasons.

(1) Unlike CO_2 emissions in industrial sectors, which are basically linked to the quantity of the production output, those in commercial sectors are regarded as mainly being linked to the daytime population expressed by the number of people who commute to work or school in the municipality. Therefore, CO_2 emissions in commercial sectors are counted at the place of emission, instead of being redistributed. The calculation of per-capita CO_2 emissions is based on the adjusted population, expressed as [(Nighttime population + Daytime population) / 2], taking into account the daytime population, instead of the permanent population (the nighttime population) of the municipality, in which reasonable corrections are presumably made.

(2) Regardless of the location, the company-wide efforts of individual companies or activities of the industry group for reducing CO_2 emissions make a large contribution in industrial sectors. On the other hand, efforts and policies implemented in all parts of the municipality, including individual areas, city blocks and buildings, have a great impact in commercial sectors. Therefore, rather than counting the reduction effect of these efforts in other municipalities due to the redistribution, counting it in the same municipality, the source of the emissions, is considered appropriate, as it will serve as an incentive for the municipality to further reduce CO_2 emissions.

(3) Based on actual estimated figures of municipalities designated as Eco model cities, per-capita CO_2 emissions in commercial sectors were studied and the results indicated that there would be no major problems in the overall findings without redistribution.

【Analysis based on actual city data】

1) CO_2 emissions of Eco cities by sector

Estimated per-capita figures of CO_2 emissions in individual municipalities from fiscal 2004 to 2007 are shown in the figure below.

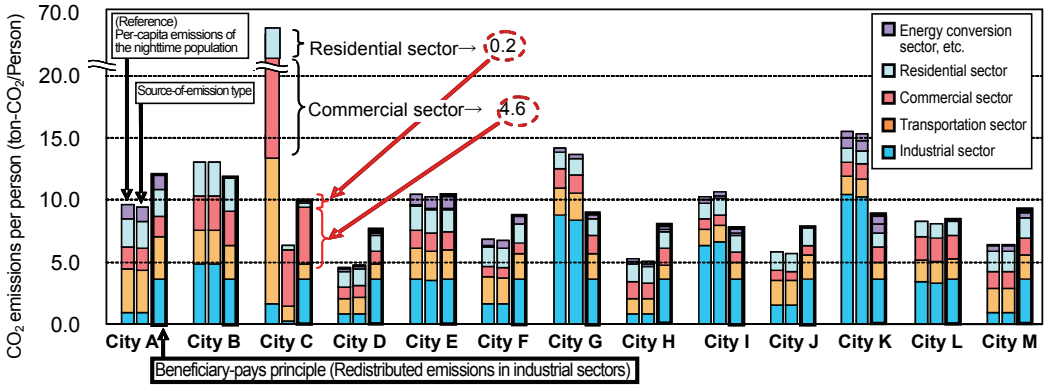

Figure Ⅲ.6: Assessment and CO_2 emissions of Eco model cities by sector (Per-capita emissions of the adjusted population, redistributed emissions in industrial sectors)

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2) Study about cities with a high percentage of daytime population

In Chiyoda ward where CO_2 emissions in commercial sectors account for 74% of all emissions, the daytime population is 20.5 times that of nighttime. Per-capita CO_2 emissions in commercial sectors are greatly reduced by using the adjusted population, like 49.4 (t-CO_2/person of the nighttime population)→4.6 (t-CO_2/person of the adjusted population).

In the same manner, regarding residential sectors in which the connection with the daytime population is relatively tenuous, per-capita CO_2 emissions decrease ("2.6→0.2" in Chiyoda ward), which may be a gross underestimation. However, it is regarded acceptable in terms of the entire residential and commercial sector or all emissions, as CO_2 emissions in commercial sectors account for the majority (74%) of the total emissions.

As shown in TableⅢ.3, cities with a high ratio of daytime population to nighttime population are basically business accumulation areas. As is the case in Chiyoda ward described above, by using the value of per-capita emissions of the adjusted population in the calculation, the overall assessment becomes reasonable.

TableⅢ.3: Cities with a high ratio of daytime population to nighttime population (Top 10 cities)

	Ratio of daytime population to nighttime population (times)
Tokyo Chiyoda	20.5
Osaka Chuo	7.6
Tokyo Chuo	6.6
Nagoya Naka	4.9
Tokyo Minato	4.9
Osaka Kita	4.3
Aichi Tobishima	3.1
Osaka Nishi	2.7
Tokyo Shibuya	2.7
Tokyo Shinjuku	2.5

∗Calculated using the total population and the daytime population shown in the "Census returns" (2005), Statistics Bureau, Ministry of Internal Affairs and Communications

3) National institutions

In cases in which test and research institutions classified into commercial sectors are concentrated, and CO_2 emissions are not reduced despite the use of the adjusted population, emissions will not be redistributed.

This is because the test and research institutions located in one area actually form a framework of the municipality, which indicates that the municipality itself cannot function without them. In some cases, the existence of these institutions has a rather good influence on the municipality's environment.

However, when deducting CO_2 emissions attributed to these institutions from the total emissions of the municipality at the discretion of the assessor, regardless of the above principle, corresponding Q should require certain adjustments as appropriate according to the L deduction (i.e. Q3.1.1: Reducing per-capita GRP equivalent, Q3.2.1: Reducing exchange population equivalent index).

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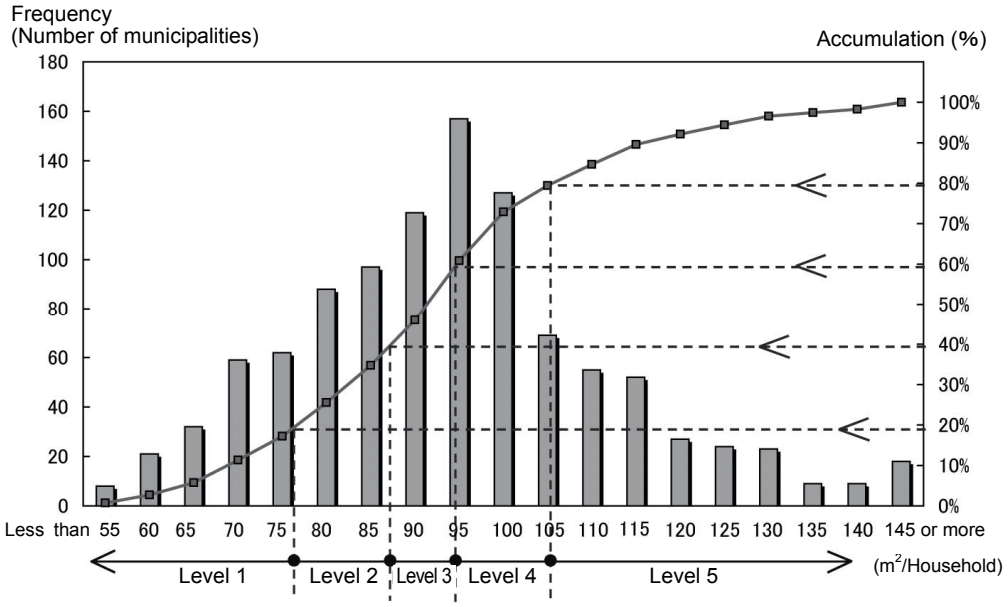
PART Ⅳ. Preliminary studies and related data about Q

1. Assessment standard and setting of individual assessment items

The data of individual indices entered are rated on a 5-point scale in accordance with the assessment standard set for individual items. Indices are essentially based on statistical data available for all the municipalities, and are classified into three groups depending on the size of the population of the municipality as mentioned in 3.5.4 of Part I; Ordinance-designated cities (Population of 500,000 or more), General cities (Population of 50,000 or more to less than 500,000) and Towns and villages (Population of less than 50,000). The distribution of index values for each item is identified (Figure Ⅳ.1), in which the assessment is conducted on a 5-point scale, such that approximately the top 20% is classified as level 5, the next 20% is level 4, the next 20% is level 3, the next is level 2 and the bottom 20% is level 1.



FigureⅣ.1: Example of setting an assessment standard

In some indices, in which only statistical data at the prefecture level are available to the public, the assessment standards are based on data from 47 prefectural governments, which will require further reviews when data based on the size of municipalities are adequately accumulated in the future.
The statistical data used as the basis of the assessment standards for individual assessment items are shown as follows.

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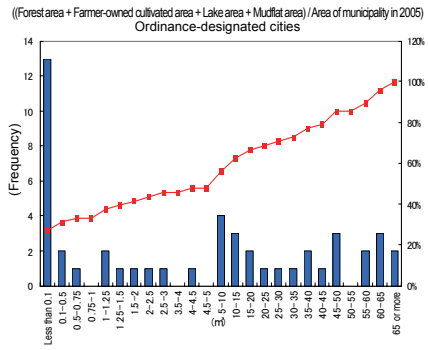
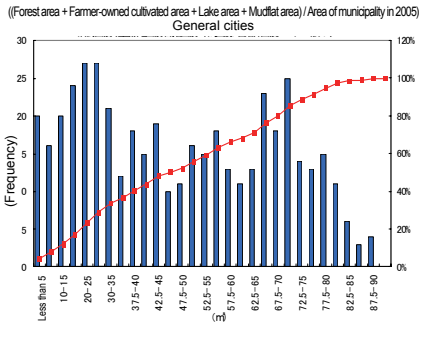
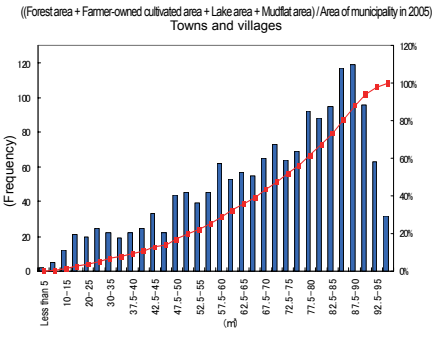
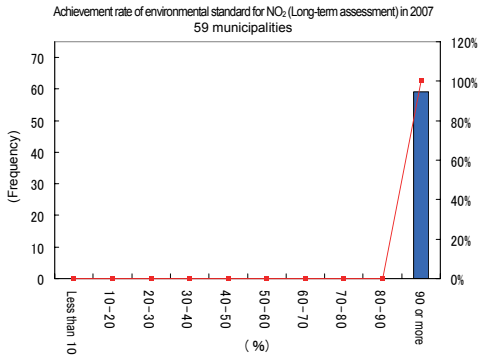
Q1.1 Ratio of green and water spaces

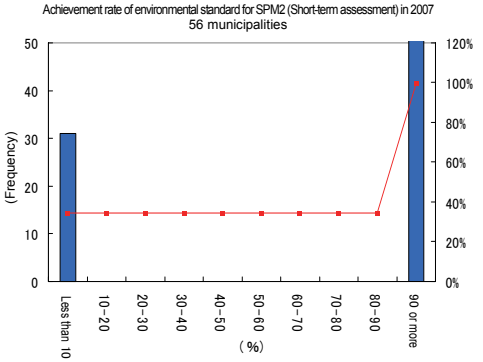


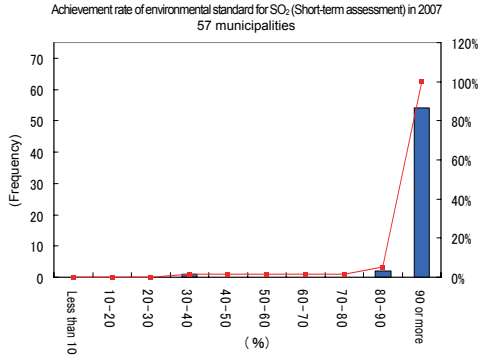


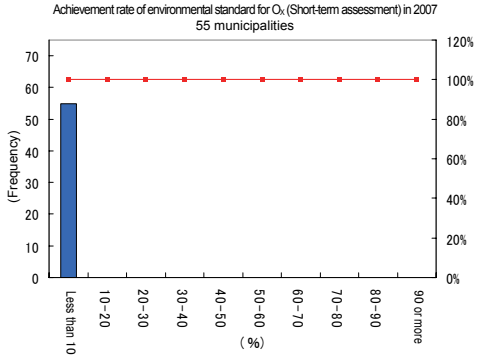


Q1.2.1 Air









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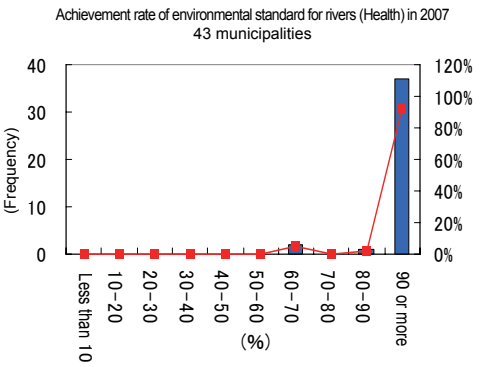

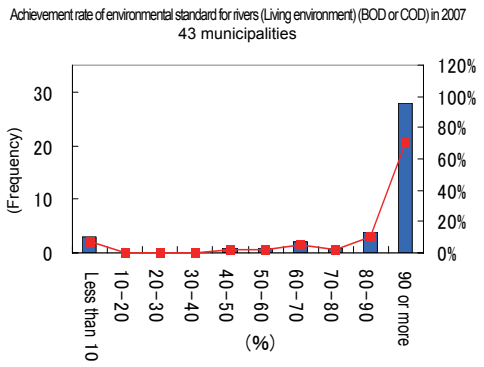

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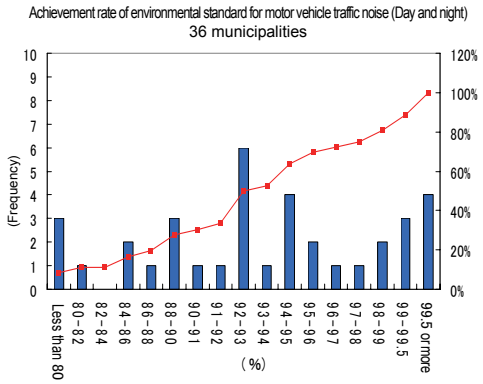
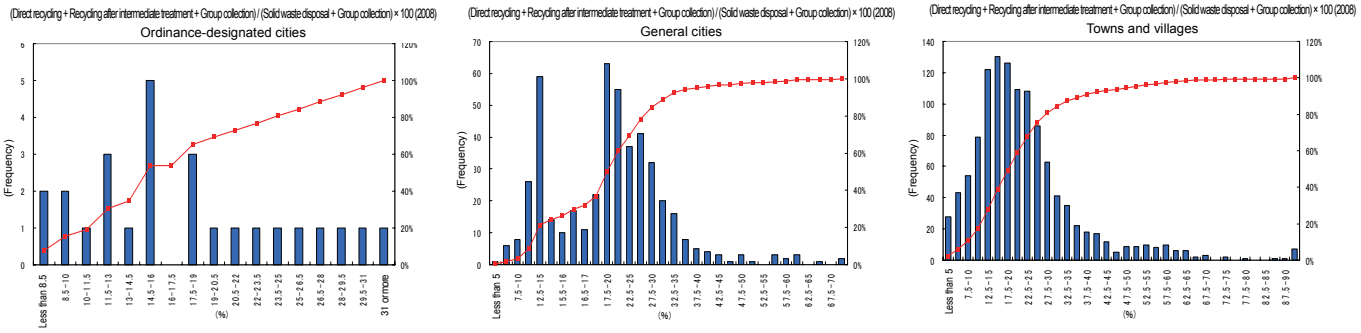
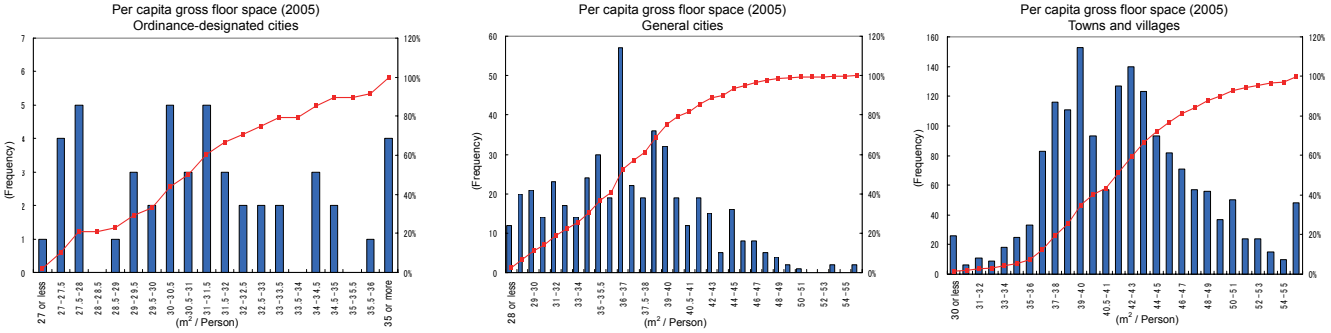
Q1.2.3 Noise



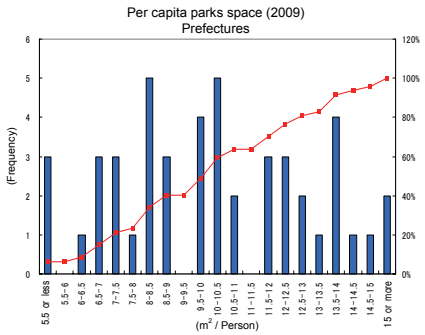
Q1.3.1 Recycling rate of general waste



Q2.1.1 Adequate quality of housing standard



Q2.1.2 Adequate provision of parks and open spaces



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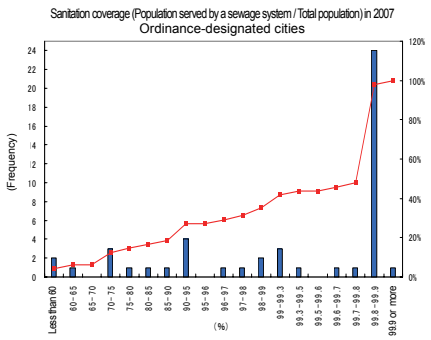
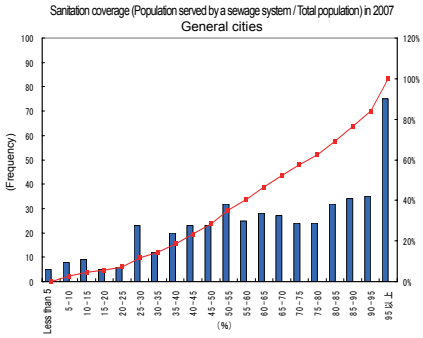
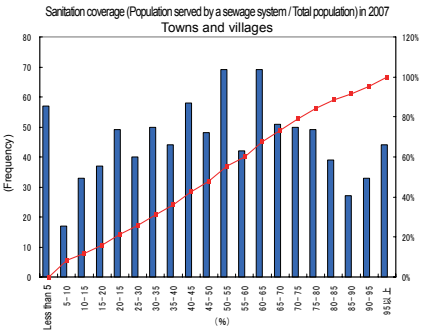
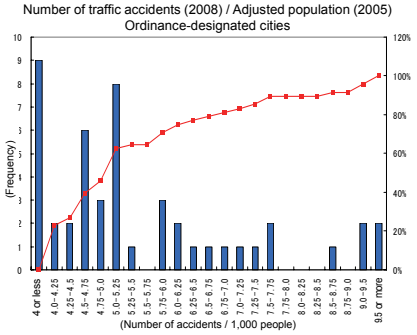
Q2.1.3 Adequate sewage systems

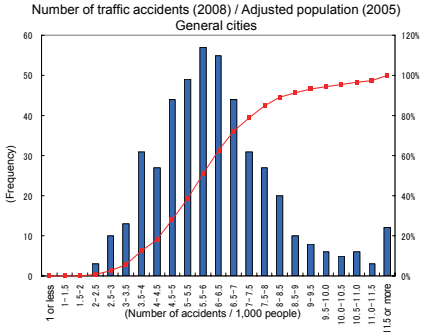


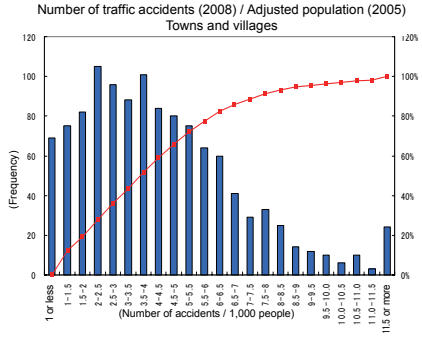




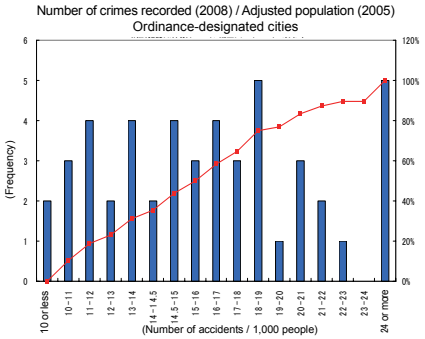
Q2.1.4 Traffic safety

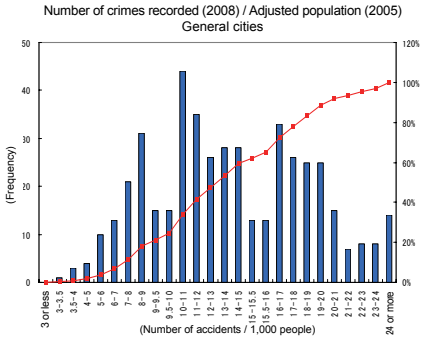


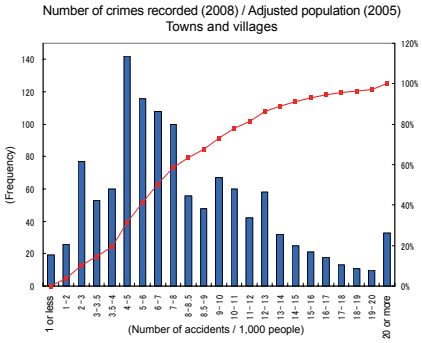




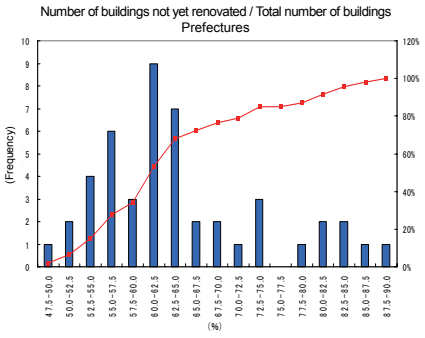
Q2.1.5 Crime prevention







Q2.1.6 Disaster preparedness



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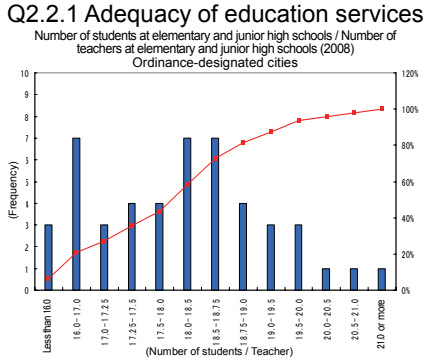
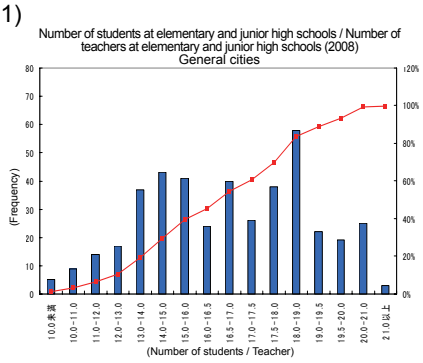
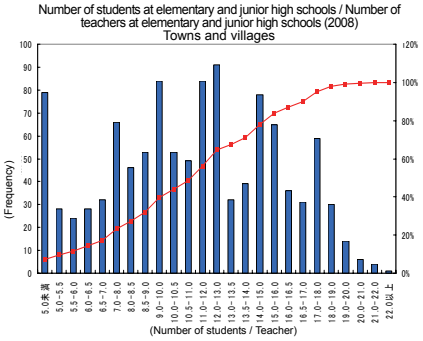
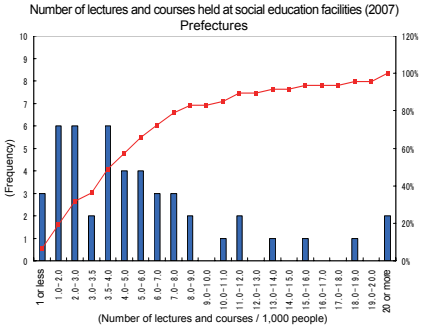
Q2.2.1 Adequacy of education services (1)



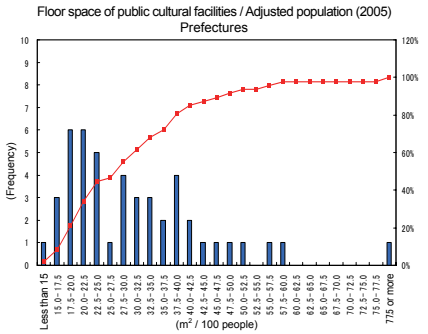




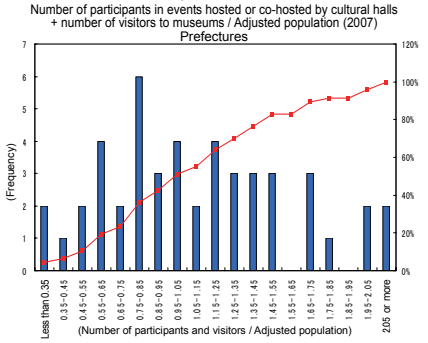
Q2.2.1 Adequacy of education services (2)



Q2.2.2 Adequacy of cultural services (1)



Q2.2.2 Adequacy of cultural services (2)



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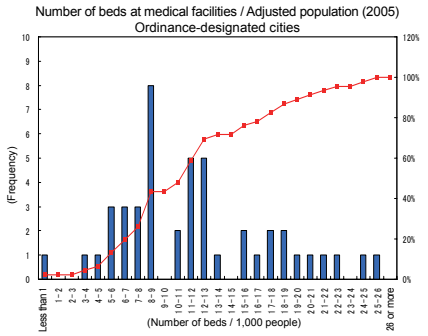
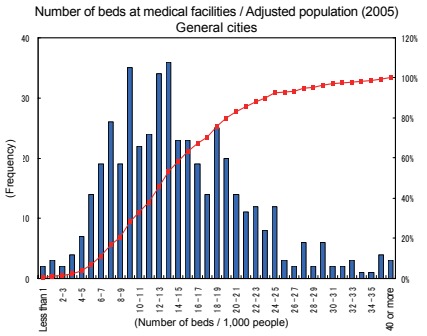
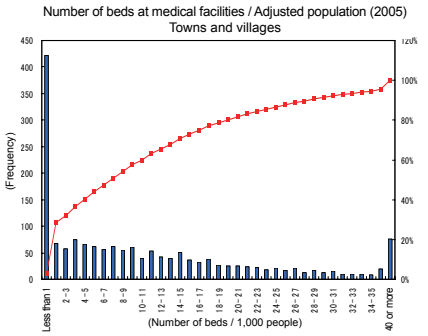
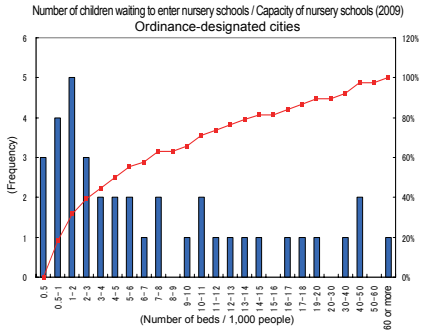
Q2.2.3 Adequacy of medical services







Q2.2.4 Adequacy of childcare services (1)



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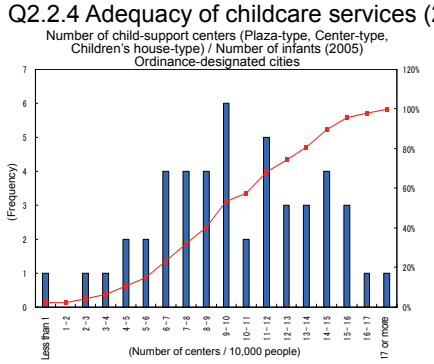
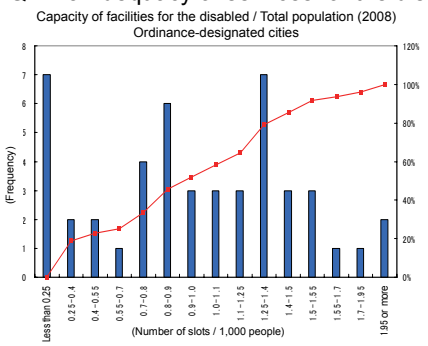
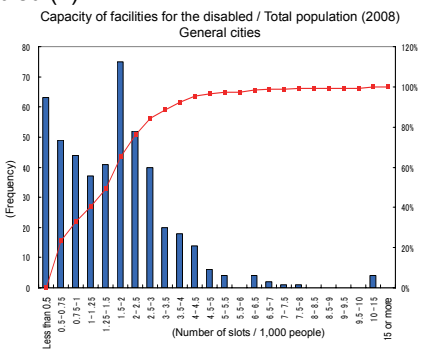
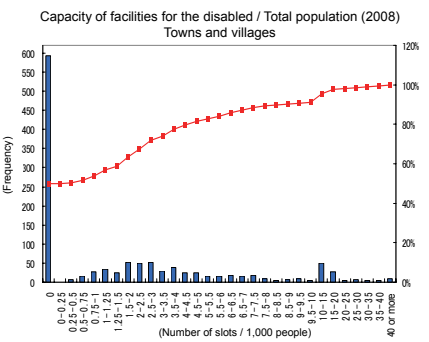


Q2.2.5 Adequacy of services for the disabled (1)







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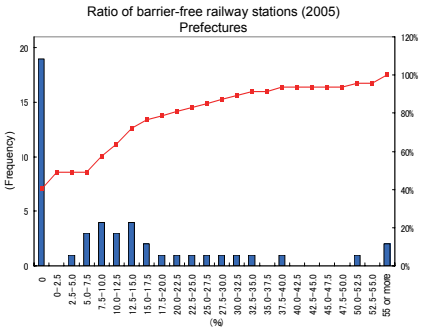
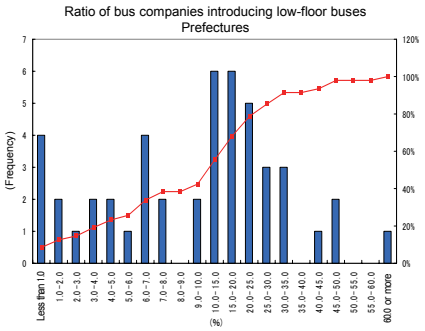
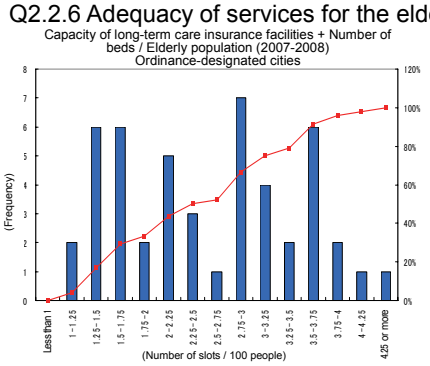
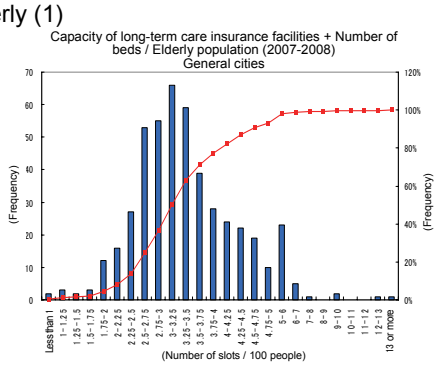
Q2.2.5 Adequacy of services for the disabled (2)

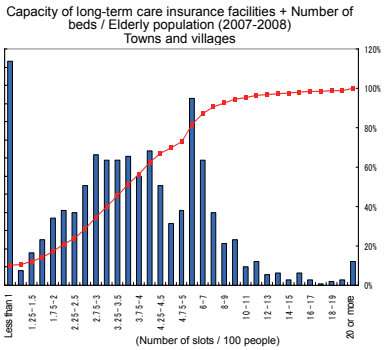




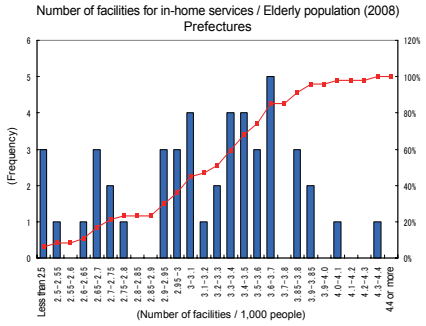
Q2.2.6 Adequacy of services for the elderly (1)



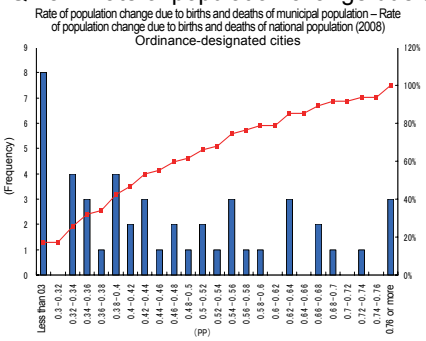


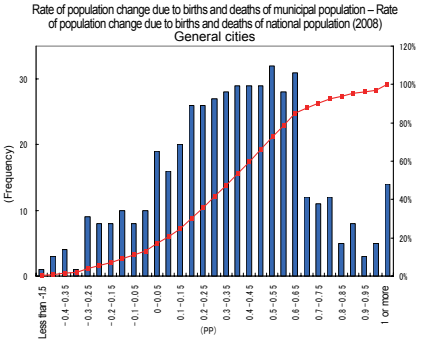


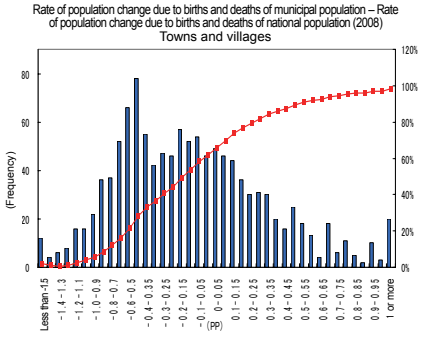
Q2.2.6 Adequacy of services for the elderly (2)



Q2.3.1 Rate of population change due to births and deaths







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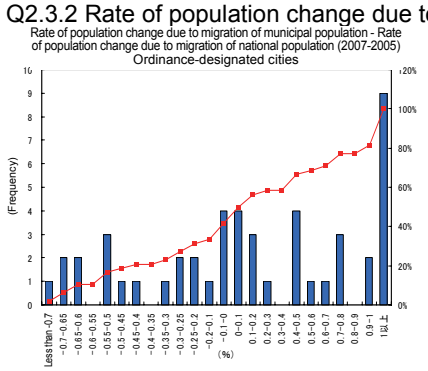
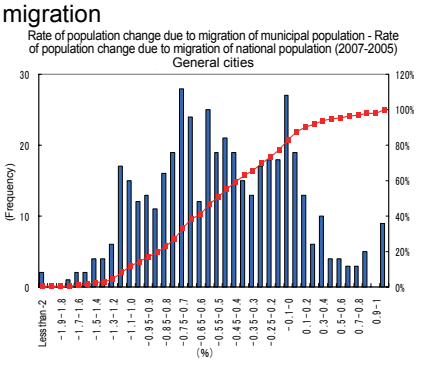
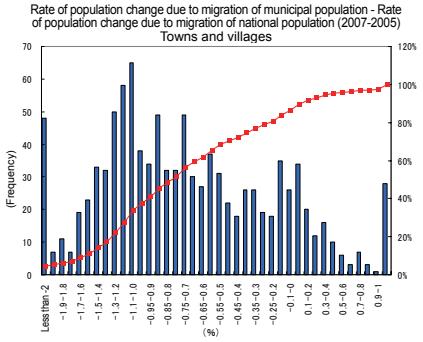
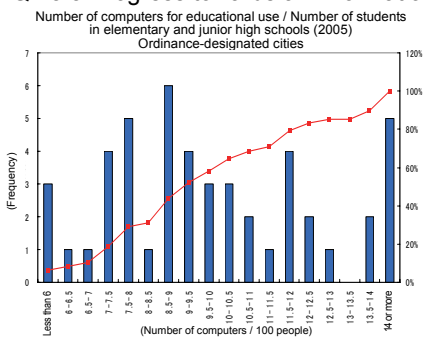
Q2.3.2 Rate of population change due to migration

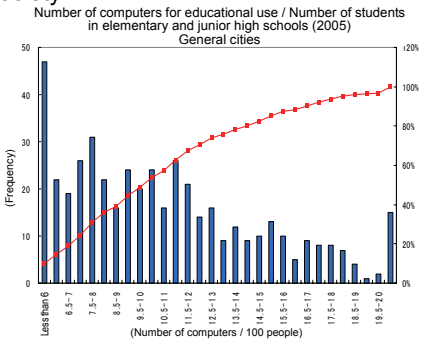


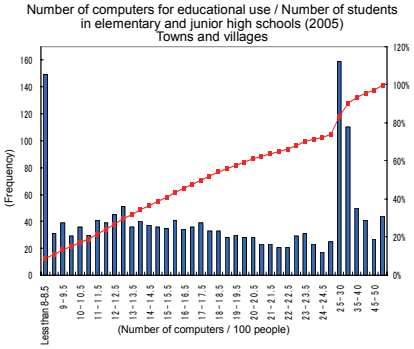




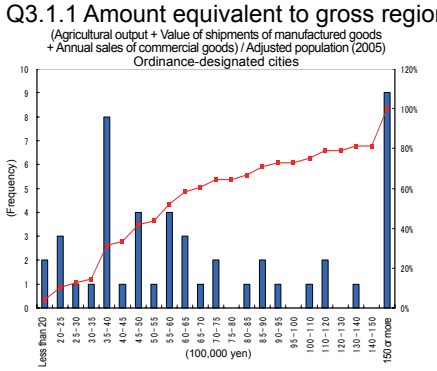
Q2.3.3 Progress towards an information society

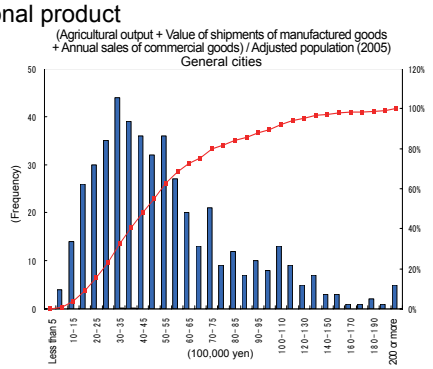


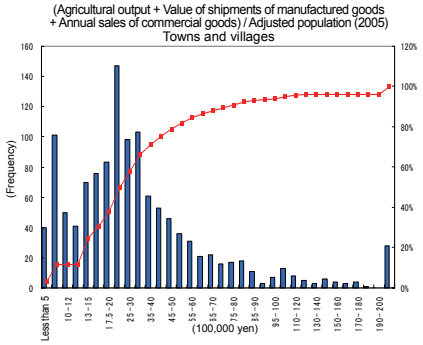




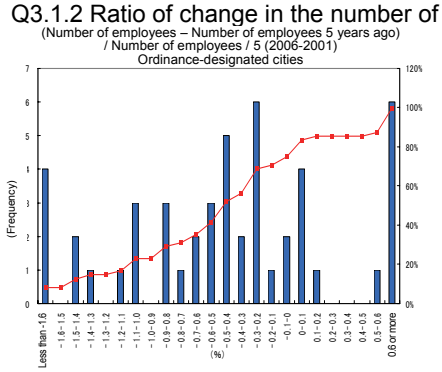
Q3.1.1 Amount equivalent to gross regional product

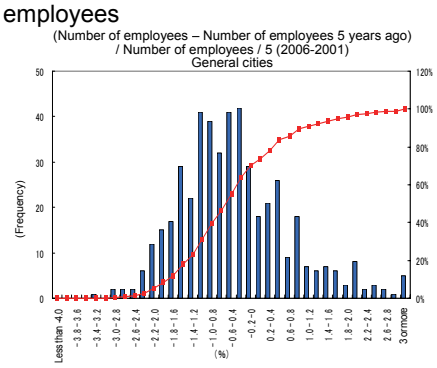


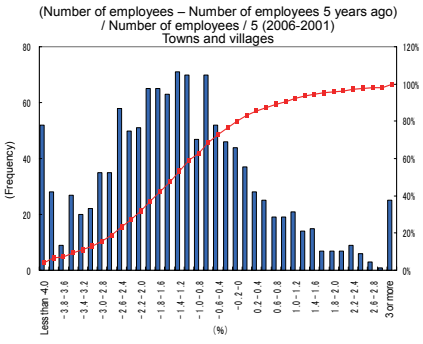




Q3.1.2 Ratio of change in the number of employees







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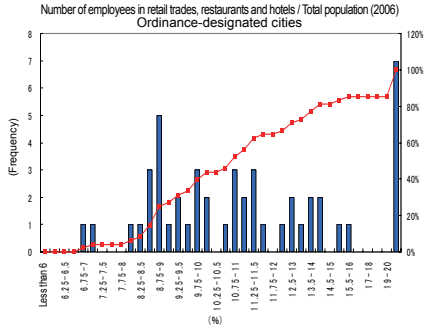
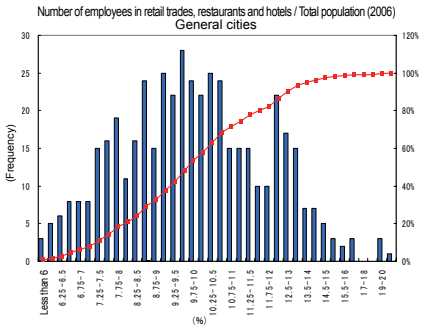
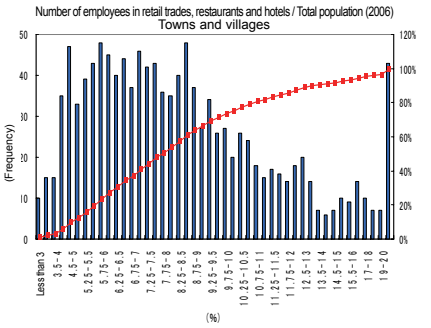
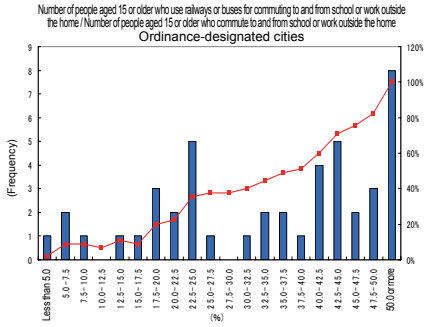
Q3.2.1 Index equivalent to number of people visiting city

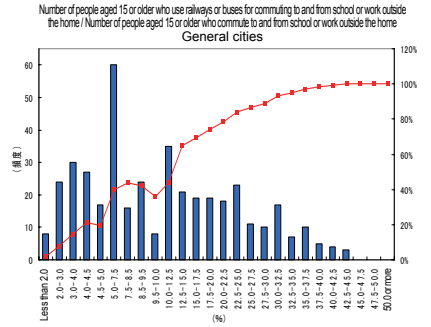


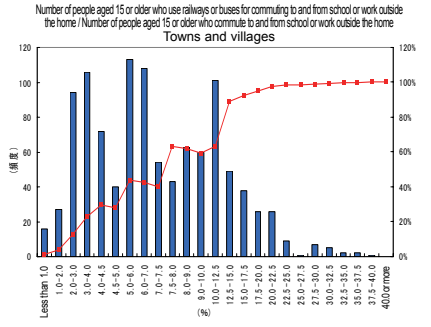




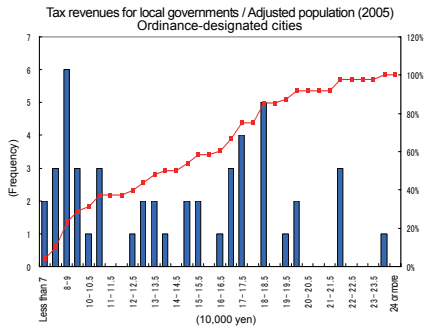
Q3.2.2 Efficiency of public transportation

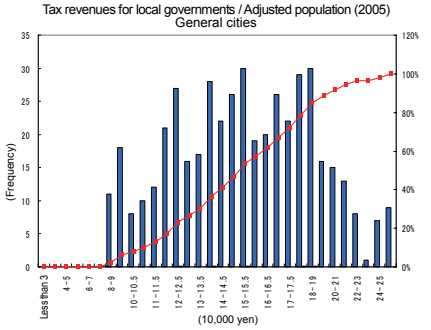


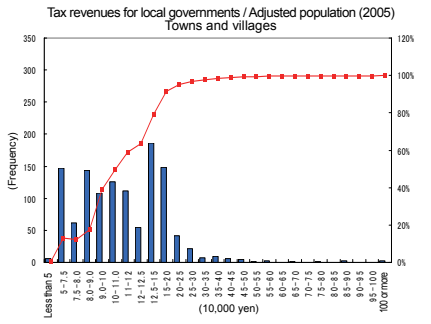




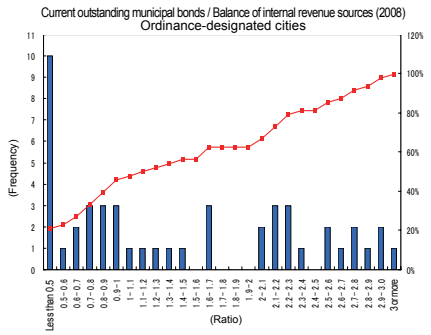
Q3.3.1 Tax revenuesTax revenues for local governments

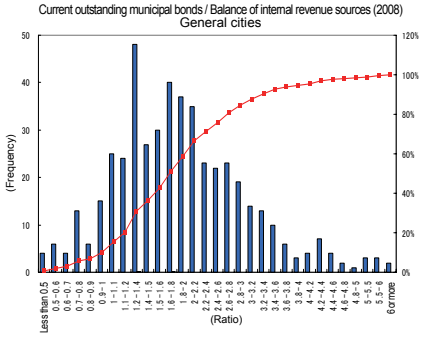


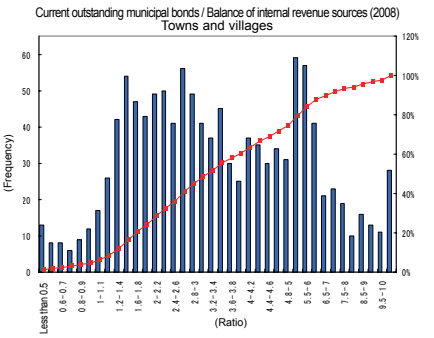




Q3.3.2 Outstanding local bonds







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2. Calculation of BAU for individual Q items

(1) Indices not in the form of "Numerator / Denominator"

⇒The BAU is same as the current value.

№	Major item	Middle item	Minor item	Numerator	Denominator	Corresponding index
1	Q1 Environmental aspect	Q1.3 Resource recycling	Recycling rate of general waste	Recycling rate		(Direct recycling + Recycling after intermediate treatment + Group collection) / (Solid waste disposal + Group collection)
2	Q1 Environmental aspect	Q1.4 Environmental measures	Efforts and policies to improve the environment and biodiversity	Number of measures and policies		Rating of measures and policies
3	Q2 Social aspect	Q2.1 Living environment	Q2.1.1 Adequate quality of housing standard	Per-capita dwelling floor space		Per-capita dwelling floor space
4	Q2 Social aspect	Q2.1 Living environment	Q2.1.3 Adequate sewage systemsSewage	Sanitation coverage + Rural sanitation coverage		Sanitation coverage + Rural sanitation coverage
5	Q2 Social aspect	Q2.2 Social services	Q2.2.5 Adequacy of services for the disabled(2)	Ratio of barrier-free railway stations or ratio of bus companies introducing low-floor buses		Ratio of barrier-free railway stations or ratio of bus companies introducing low-floor buses
6	Q2 Social aspect	Q2.3 Social vitality	Q2.3.4 Efforts and policies for vitalizing society	Number of measures and policies		Rating of measures and policies

(2) Indices for which the denominator is something other than population-related figures

⇒The BAU is same as the current value. (Neither the numerator nor denominator is a variable.)

№	Major item	Middle item	Minor item	Numerator	Denominator	Corresponding index
7	Q1 Environmental aspect	Q1.1 Nature conservation	Ratio of natural land	Forest area + Farmer-owned cultivated acreage + Lake area + Mudflat area	Area of the municipality	(Forest area + Farmer-owned cultivated acreage + Lake area + Mudflat area) / Area of the municipality
8	Q1 Environmental aspect	Q1.2 Local environmental quality	Q1.2.1 Air	Number of places achieving the environmental standard	Number of monitoring stations	Degree of attainment of the environmental standard in terms of the density of NO_2, SO_2, suspended particulate matter (SPM) and Ox measured at general air pollution monitoring stations
9	Q1 Environmental aspect	Q1.2 Local environmental quality	Q1.2.2 Water	Number of places achieving the environmental standard	Number of monitoring stations	Degree of attainment of the environmental standard in terms of the water quality of rivers (health and living environment) and groundwater (health)
10	Q1 Environmental aspect	Q1.2 Local environmental quality	Q1.2.3 Noise	Number of houses below the environmental standard	Number of houses subject to the assessment	Proportion of houses below the environmental standard regardless of day or night in terms of the motor vehicle traffic noise to the number of houses subject to the assessment
11	Q1 Environmental aspect	Q1.2 Local environmental quality	Q1.2.4 Chemicals	Number of places achieving the environmental standard	Number of monitoring stations	Degree of attainment of the environmental standard for air and water quality in terms of utilization of dioxins
12	Q2 Social aspect	Q2.1 Living environment	Q2.1.6 Disaster preparedness	Public facilities serving as disaster-prevention centers that are earthquake-resistant	Total number of public facilities serving as disaster-prevention centers	Rate of seismic adequacy of public facilities serving as disaster-prevention centers
13	Q2 Social aspect	Q2.2 Social services	Q2.2.1 Adequacy of education services (1)	Number of students at elementary and junior high schools	Number of teachers at elementary and junior high schools	Number of students at elementary and junior high schools / Number of teachers at elementary and junior high schools
14	Q2 Social aspect	Q2.2 Social services	Q2.2.4 Adequacy of childcare services(1)	Number of children waiting to enter nursery schools	Capacity of nursery schools	Number of children waiting to enter nursery schools / Capacity of nursery schools
15	Q2 Social aspect	Q2.3 Social vitality	Q2.3.3 Progress towards an information society	Number of computers for educational use in elementary and junior high schools	Number of students in elementary and junior high schools	Number of computers for educational use in elementary and junior high schools / Number of students in elementary and junior high schools
16	Q3 Economic aspect	Q3.1 Industrial vitality	Q3.1.2 Ratio of change in the number of employees	Number of employees – Number of employees 5 years ago	Number of employees	(Number of employees – Number of employees 5 years ago) / Number of employees / 5
17	Q3 Economic aspect	Q3.2 Economic exchanges	Q3.2.2 Efficiency of public transportation	Number of people aged 15 or older who use railways or buses for commuting to and from school or work outside the home	Number of people aged 15 or older who commute to and from school or work outside the home	Rate of people aged 15 or older who commute to and from school or work outside the home by train or bus
18	Q3 Economic aspect	Q3.3 Financial viability	Q3.3.2 Outstanding local bonds	Current balance of municipal bonds	Balance of internal revenue sources	Current balance of municipal bonds / Balance of internal revenue sources

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(3) Indices with the total population or the adjusted population as the denominator that do not depend on the size of the facility

⇒The BAU is same as the current value. (The denominator representing the population varies depending on the future estimate, and the numerator also varies in proportion thereto.)

№	Major item	Middle item	Minor item	Numerator	Denominator	Corresponding index
19	Q2 Social aspect	Q2.1 Living environment	Q2.1.4 Traffic safety	Number of traffic accidents	Adjusted population	Number of traffic accidents / Adjusted population
20	Q2 Social aspect	Q2.1 Living environment	Q2.1.5 Crime prevention	Number of crimes recorded	Adjusted population	Number of crimes recorded / Adjusted population
21	Q2 Social aspect	Q2.2 Social services	Q2.2.1 Adequacy of education services (2)	Number of lectures and courses held at social education facilities	Total population	Number of lectures and courses held at social education facilities / Total population
22	Q2 Social aspect	Q2.2 Social services	Q2.2.2 Adequacy of cultural services (2)	Number of participants in events hosted or co-hosted by cultural halls + number of visitors to museums	Adjusted population	(Number of participants in events hosted or co-hosted by cultural halls + number of visitors to museums) / Adjusted population
23	Q2 Social aspect	Q2.3 Social vitality	Q2.3.1 Rate of population change due to births and deaths	Number of natural increase-decrease of population	Total population	Number of natural increase-decrease (Births – Deaths) / Total population - Natural increase-decrease rate of national population
24	Q2 Social aspect	Q2.3 Social vitality	Q2.3.2 Rate of population change due to migration	Societal population increase-decrease amount	Total population	Amount of societal population increase-decrease (Move-ins – Move-outs) / Total population

BAU differs from the current value in terms of No. 23, as the index value is the difference compared with the Rate of population change due to births and deathse of the national population.

(4) Indices with the total population or the adjusted population or the population by age bracket as the denominator that are related to the size of the facility

⇒The BAU is same as the current value. (The denominator representing the population varies depending on the future estimate, and the numerator also varies in proportion thereto.)

№	Major item	Middle item	Minor item	Numerator	Denominator	Corresponding index
25	Q2 Social aspect	Q2.1 Living environment	Q2.1.2 Adequate provision of parks and open spaces	Area of city parks + Area of other facilities similar to city parks	Adjusted population	(Area of city parks + Area of other facilities similar to city parks) / Adjusted population
26	Q2 Social aspect	Q2.2 Social services	Q2.2.2 Adequacy of cultural services (1)	Floor space of public cultural facilities	Adjusted population	Floor space of public cultural facilities / Adjusted population
27	Q2 Social aspect	Q2.2 Social services	Q2.2.3 Adequacy of medical services	Number of beds at medical facilities	Adjusted population	Number of beds at medical facilities / Adjusted population
28	Q2 Social aspect	Q2.2 Social services	Q2.2.5 Adequacy of services for the disabled (1)	Capacity of facilities for the disabled	Total population	Capacity of facilities for the disabled / Total population
29	Q2 Social aspect	Q2.2 Social services	Q2.2.4 Adequacy of childcare services (2)	Number of child-support centers	Infant population	Number of child-support centers / Infants population
30	Q2 Social aspect	Q2.2 Social services	Q2.2.6 Adequacy of services for the elderly (1)	Capacity of long-term care facilities	Elderly population	Capacity of long-term care facilities / Elderly population
31	Q2 Social aspect	Q2.2 Social services	Q2.2.6 Adequacy of services for the elderly (2)	Number of facilities for in-home services	Elderly population	Number of facilities for in-home services / Elderly population

(5) Economy-related indices

⇒The numerator of the BAU is obtained by multiplying the current value by the coefficient below. The denominator varies depending on the future estimate.

Coefficient (Year X) = (Estimated national working-age population in year X) / (Current national working-age population):

See next page

№	Major item	Middle item	Minor item	Numerator	Denominator	Corresponding index
32	Q3 Economic aspect	Q3.1 Industrial vitality	Q3.1.1 Amount equivalent to gross regional product	Agricultural output + Value of shipments of manufactured goods + Annual sales of commercial goods	Adjusted population	(Agricultural output + Value of shipments of manufactured goods + Annual sales of commercial goods) / Adjusted population
33	Q3 Economic aspect	Q3.2 Economic exchanges	Q3.2.1 Index equivalent to number of people visiting city	Number of employees in retail trades, restaurants and hotels	Total population	Number of employees in retail trades, restaurants and hotels / Total population
34	Q3 Economic aspect	Q3.3 Financial viability	Q3.3.1 Tax revenues	Tax revenues for local governments	Adjusted population	Tax revenues for local governments / Adjusted population

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Reference: Coefficients in proportion to the working-age population (for item (5) on the previous page)

Table: The total population, the population in 3 age brackets (0-14 years old, 15-64 and 65 or older) and age structure coefficient: Birth (Death) medium variant

Year	Population (1,000 people)				Current year＝Coefficient value in 2005
	Total	Young population 0-14 years old	Working-age population 15-64 years old	Elderly population 65 years old or older	Ratio of working-age population (Year X / 2005)
Heisei 17 (2005)	127,768	17,585	84,422	25,761	
18 (2006)	127,762	17,436	83,729	26,597	99.2%
19 (2007)	127,694	17,238	83,010	27,446	98.3%
20 (2008)	127,568	17,023	82,334	28,211	97.5%
21 (2009)	127,395	16,763	81,644	28,987	96.7%
22 (2010)	127,176	16,479	81,285	29,412	96.3%
23 (2011)	126,913	16,193	81,015	29,704	96.0%
24 (2012)	126,605	15,880	79,980	30,745	94.7%
25 (2013)	126,254	15,542	78,859	31,852	93.4%
26 (2014)	125,862	15,201	77,727	32,934	92.1%
27 (2015)	125,430	14,841	76,807	33,781	91.0%
28 (2016)	124,961	14,486	76,025	34,450	90.1%
29 (2017)	124,456	14,133	75,346	34,977	89.2%
30 (2018)	123,915	13,803	74,732	35,380	88.5%
31 (2019)	123,341	13,488	74,199	35,655	87.9%
32 (2020)	122,735	13,201	73,635	35,899	87.2%
33 (2021)	122,097	12,892	73,141	36,064	86.6%
34 (2022)	121,430	12,622	72,678	36,131	86.1%
35 (2023)	120,735	12,381	72,144	36,210	85.5%
36 (2024)	120,015	12,159	71,549	36,307	84.8%
37 (2025)	119,270	11,956	70,960	36,354	84.1%
38 (2026)	118,502	11,769	70,363	36,371	83.3%
39 (2027)	117,713	11,597	69,728	36,388	82.6%
40 (2028)	116,904	11,438	69,028	36,438	81.8%
41 (2029)	116,074	11,290	68,274	36,510	80.9%
42 (2030)	115,224	11,150	67,404	36,670	79.8%
43 (2031)	114,354	11,017	66,835	36,502	79.2%
44 (2032)	113,464	10,888	65,896	36,681	78.1%
45 (2033)	112,555	10,762	64,942	36,851	76.9%
46 (2034)	111,627	10,637	63,949	37,041	75.7%
47 (2035)	110,679	10,512	62,919	37,249	74.5%
48 (2036)	109,714	10,384	61,832	37,498	73.2%
49 (2037)	108,732	10,253	60,699	37,779	71.9%
50 (2038)	107,733	10,118	59,528	38,087	70.5%
51 (2039)	106,720	9,978	58,387	38,354	69.2%
52 (2040)	105,695	9,833	57,335	38,527	67.9%
53 (2041)	104,658	9,682	56,358	38,619	66.8%
54 (2042)	103,613	9,526	55,455	38,632	65.7%
55 (2043)	102,560	9,366	54,589	38,605	64.7%
56 (2044)	101,503	9,202	53,779	38,522	63.7%
57 (2045)	100,443	9,036	53,000	38,407	62.8%
58 (2046)	99,382	8,868	52,268	38,245	61.9%
59 (2047)	98,321	8,701	51,541	38,079	61.1%
60 (2048)	97,261	8,535	50,792	37,934	60.2%
61 (2049)	96,205	8,373	50,038	37,794	59.3%
62 (2050)	95,152	8,214	49,297	37,641	58.4%
63 (2051)	94,102	8,061	48,588	37,453	57.6%
64 (2052)	93,056	7,914	47,894	37,248	56.7%
65 (2053)	92,013	7,774	47,224	37,014	55.9%
66 (2054)	90,971	7,641	46,577	36,753	55.2%
67 (2055)	89,930	7,516	45,951	36,463	54.4%

Population as of October 1 of each year (Regarding 2005, the population shown in the "Census returns" prepared by the Statistics Bureau of the Ministry of Internal Affairs and Communications was used, in which adjustments for prorating the population of uncertain age was made.)
Source of the table on the left: National Institute of Population and Social Security Research

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Afterword

This publication was developed by the Committee for the Development of Environmental Performance Assessment Tools for Cities (chaired by Shuzo Murakami, Chief Executive of the Building Research Institute) established in the Japan Sustainable Building Consortium with the support of the Housing Bureau of the Ministry of Land, Infrastructure, Transport and Tourism. We hope this achievement will be used in various fields and make an important contribution in building a sustainable society.

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