2nd December
COP21 side event

CASBEE-City

Pilot version for worldwide use (2015)

A Comprehensive city assessment tool
applicable to various types of cities around the world

Members of Committee for the Development of
CASBEE-City (Pilot version for worldwide use)

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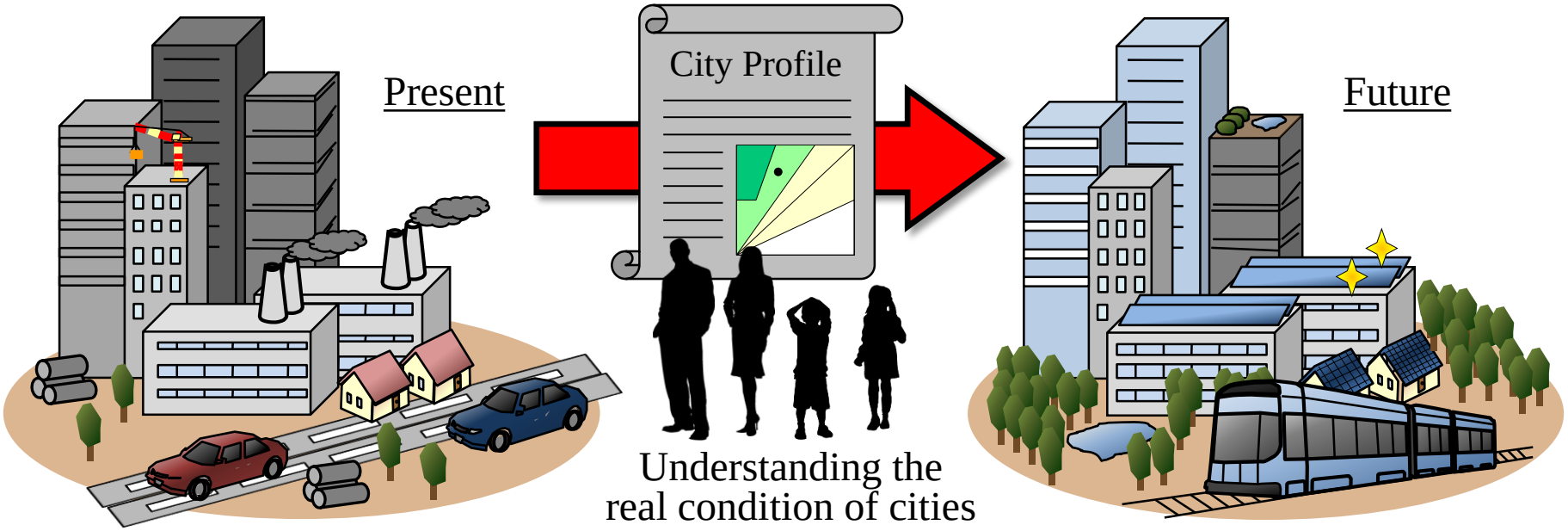
NIES: National Institute for Environmental Studies, IBEC: Institute for Building Environment and Energy Conservation

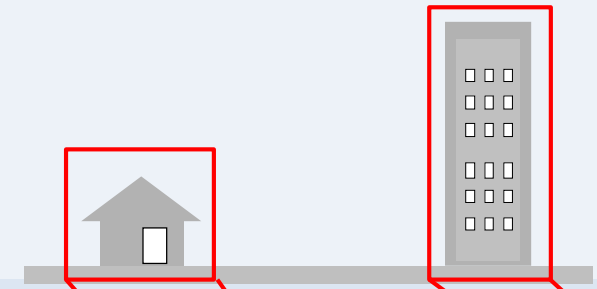
Importance of conducting assessment of cities

Medical check-ups are important for us in detecting diseases at an early stage and living a long healthy life. Assessing a municipality is analogous to having a medical check-up.

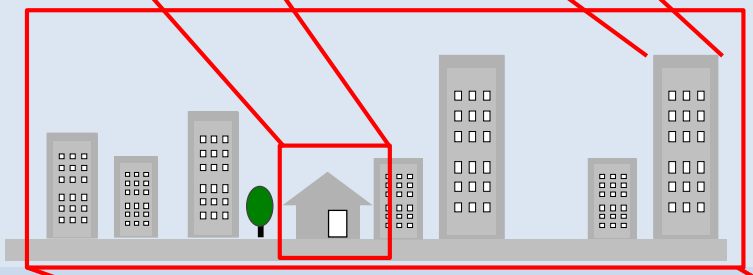


City-scale assessments should be conducted in order to understand the local conditions and to consider effective measures for making cities, towns and villages more sustainable.

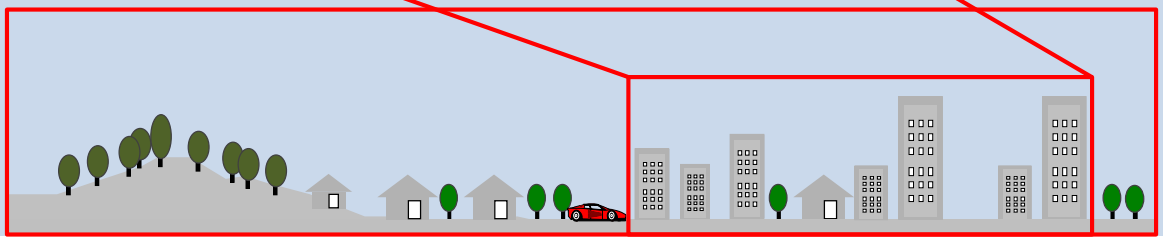
CASBEE and other tools in the world



Housing & Building scale



Urban scale



City scale

BREEAM (U.K.)	LEED (U.S.)	Green Star (Australia)	CASBEE (Japan)
(1990)	(2001)	(2003)	(2001)
(2008)	(2007)	(2012)	(2006)
			(2011)

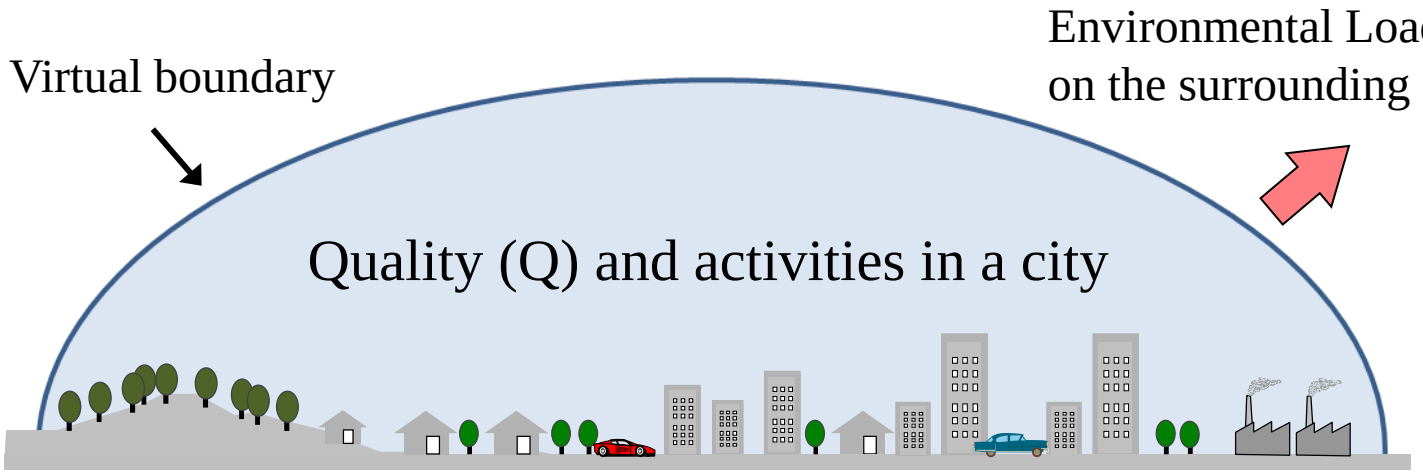
(developed year)

BREEAM: BRE Environmental Assessment Method (U.K.),
CASBEE: Comprehensive Assessment System for Built Environment Efficiency (Japan)
LEED: Leadership in Energy and Environmental Design (U.S.)

Outline of CASBEE-City

CASBEE® - City

Comprehensive Assessment System for Built Environment Efficiency



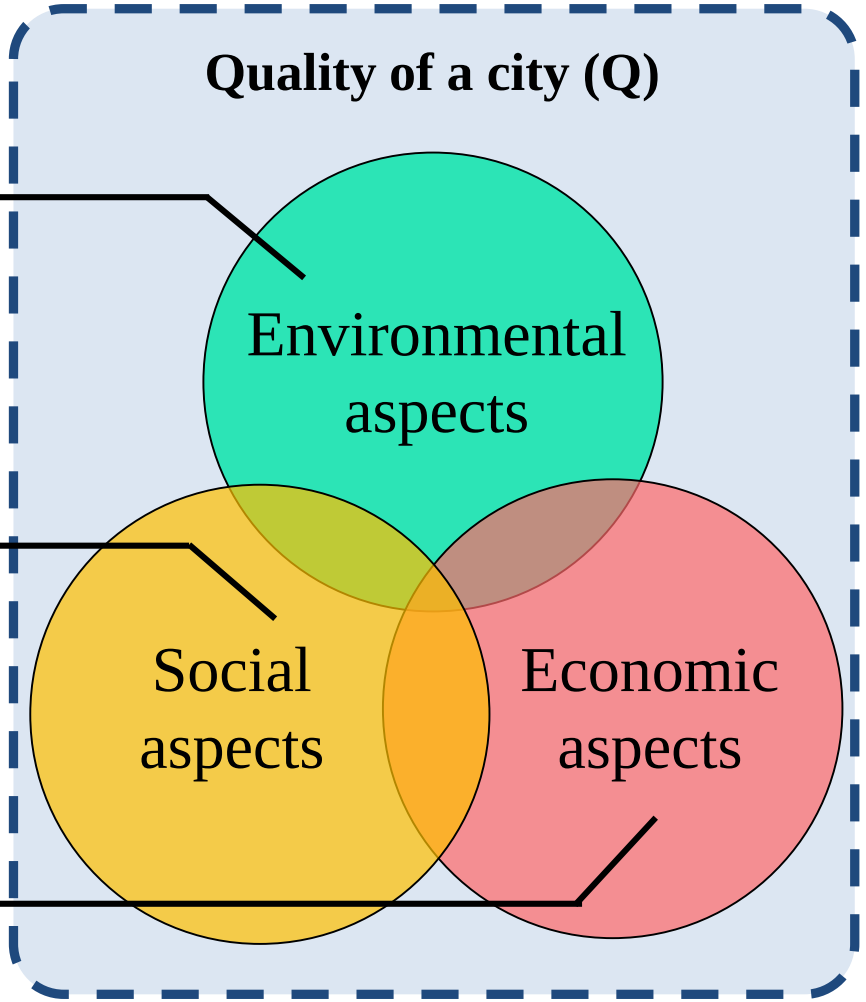
Built Environment Efficiency (BEE)※ = Score for Quality (Q) (Environmental, Social and Economic aspect) / Score for Load (L) (CO_2 emissions per capita per year)

BEE: Built Environment Efficiency

→ Assessment of a target city from both Quality and Load perspective

Assessment items for CASBEE-City (e.g. Japanese standard version)

- Nature conservation
- Local environmental quality
- Resource recycling
- CO_2 sinks
- Living environment
- Social services
- Social vitality
- Industrial vitality
- Financial viability
- Emission trading



Load (L)

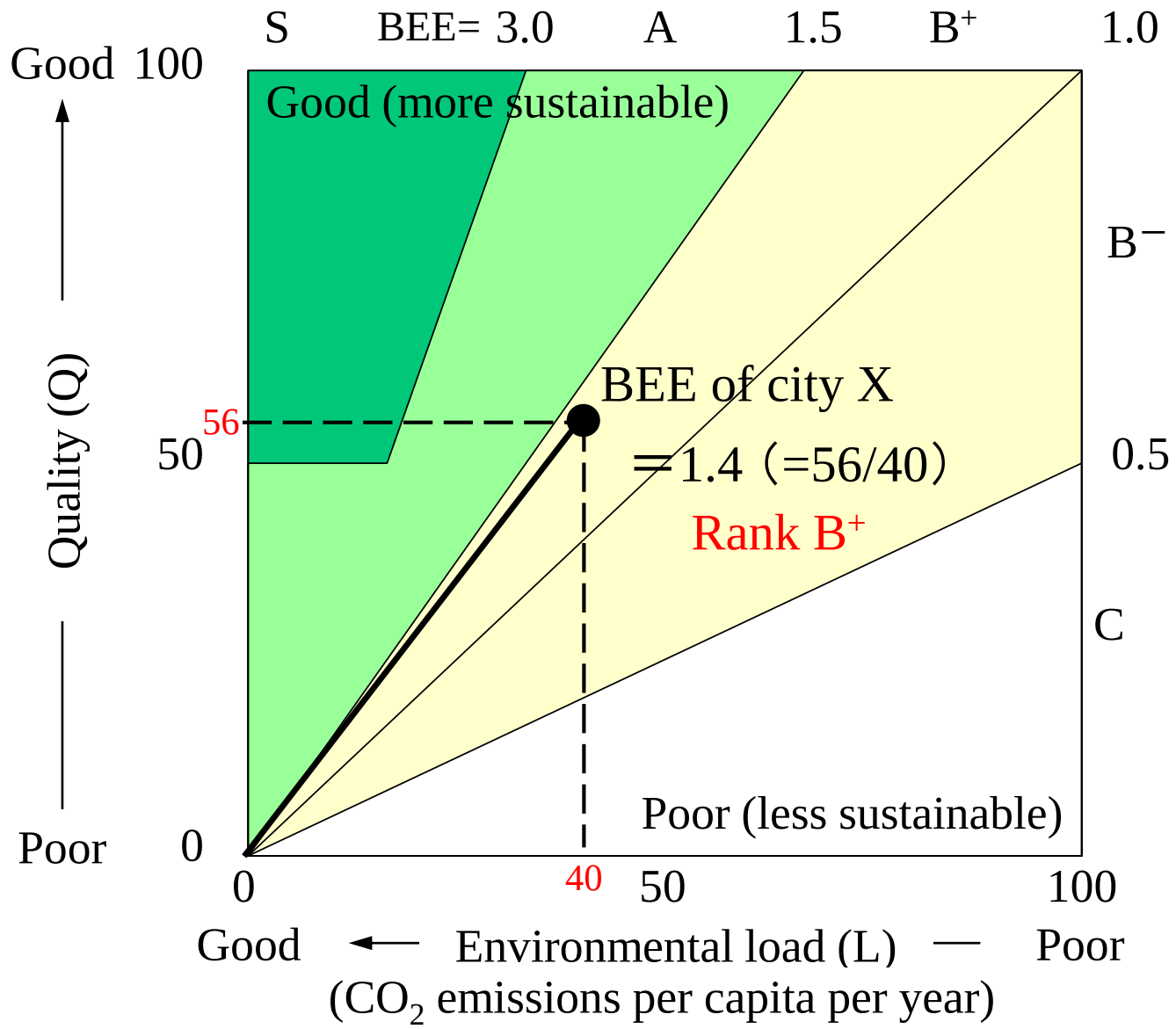
- CO_2 emissions from energy sources
- CO_2 emissions from non energy sources

(per capita per year)

$$\text{BEE} = \frac{\text{Score for Q}}{\text{Score for L}}$$

▶ Comprehensive assessment based on the concept of Triple Bottom Line (TBL) and eco-efficiency

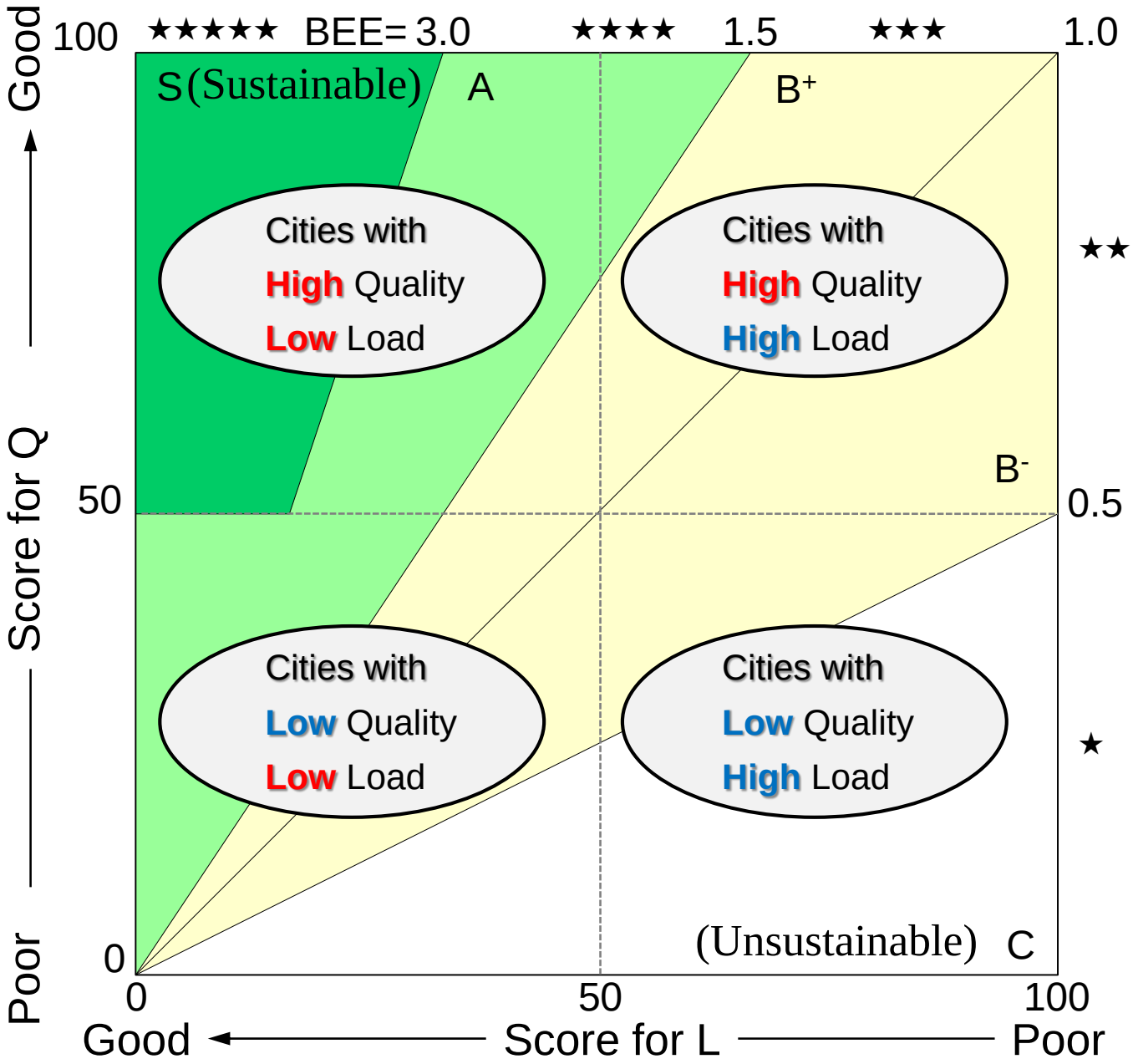
Visualization of city performance based on BEE (BEE chart)



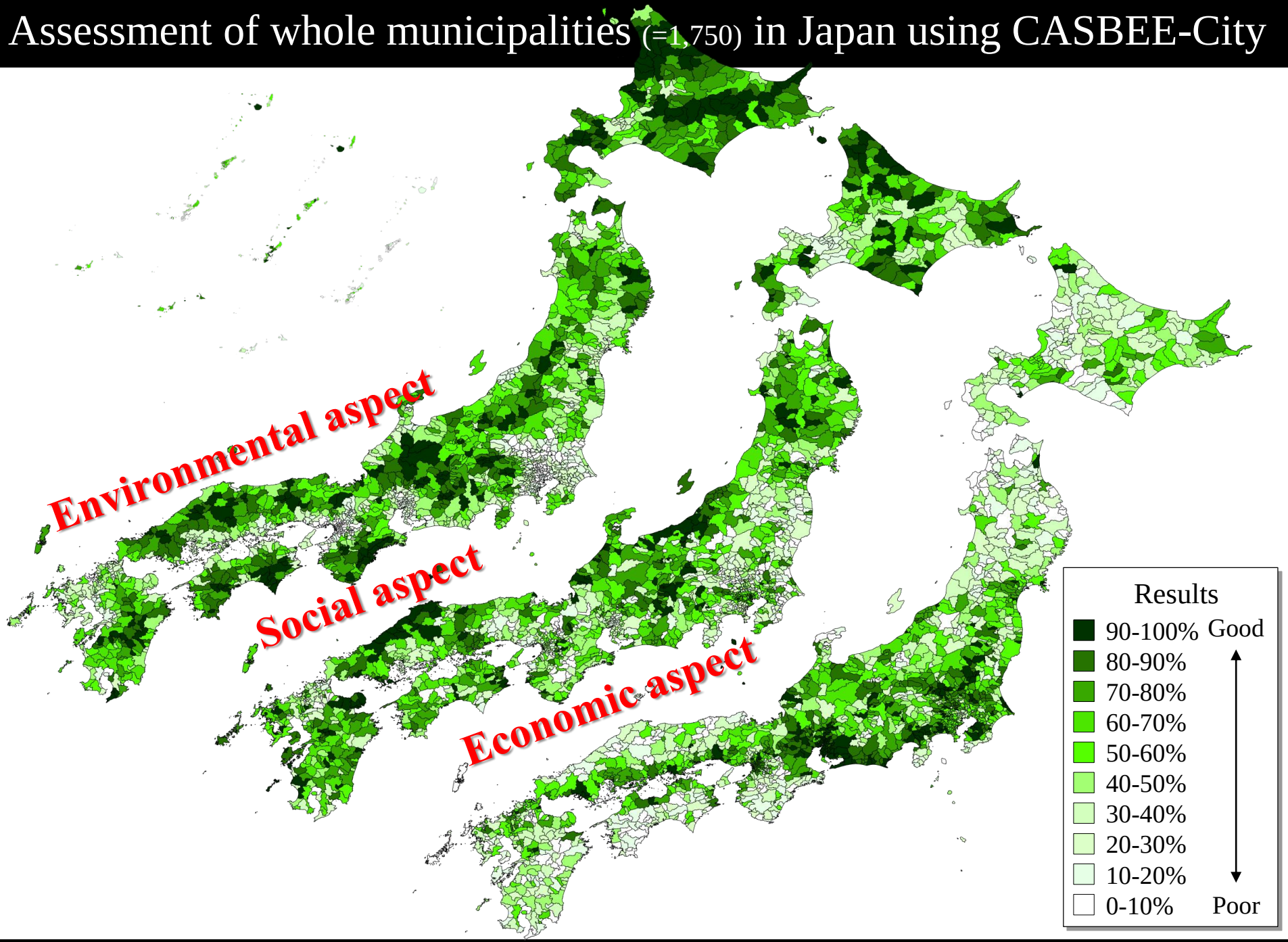
$$\text{BEE of a city} = \frac{\text{Score for Q}}{\text{Score for L}}$$

S	★★★★★
A	★★★★
B^+	★★★
B^-	★★
C	★

Visualization of city performance based on BEE (BEE chart)

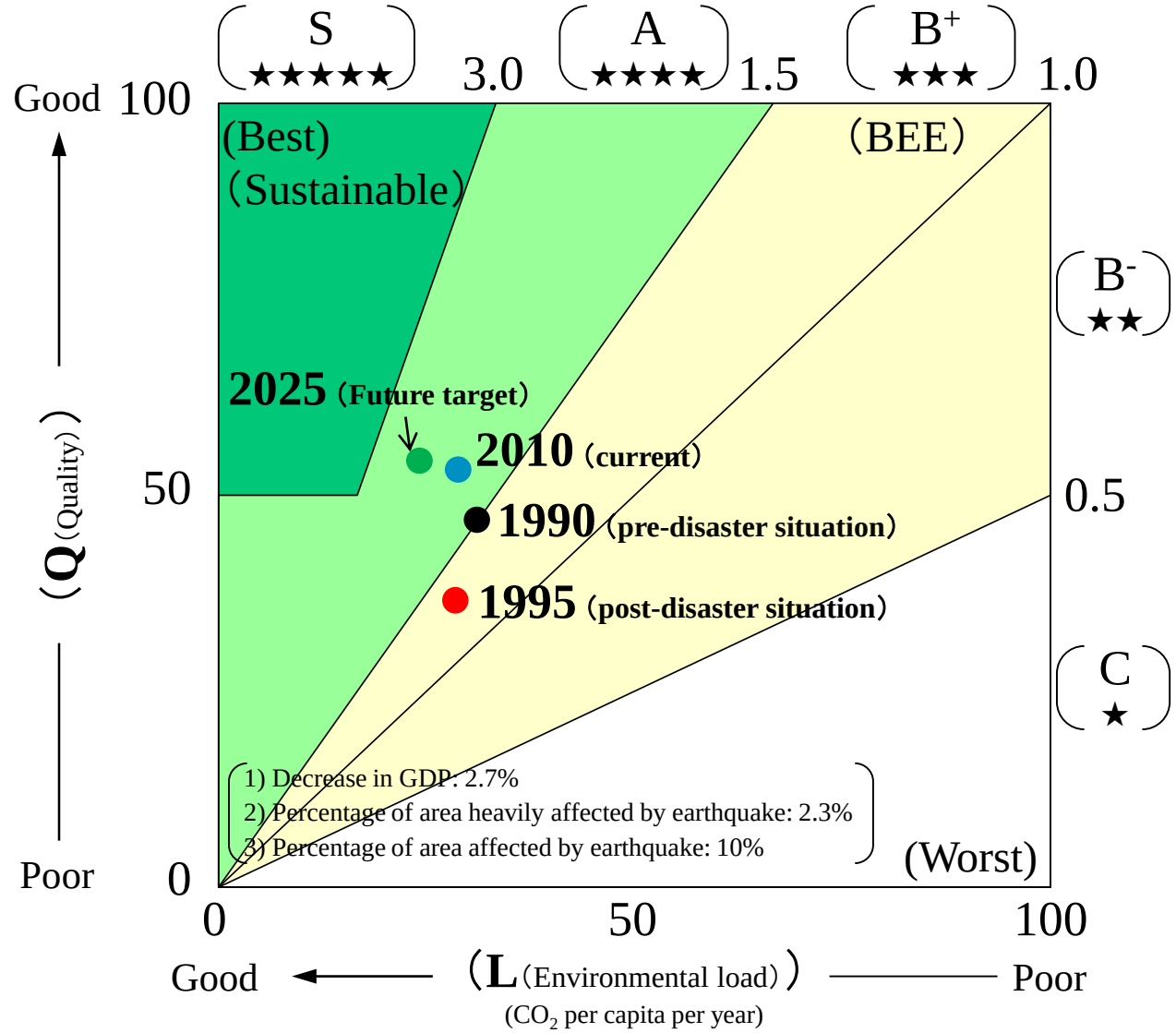


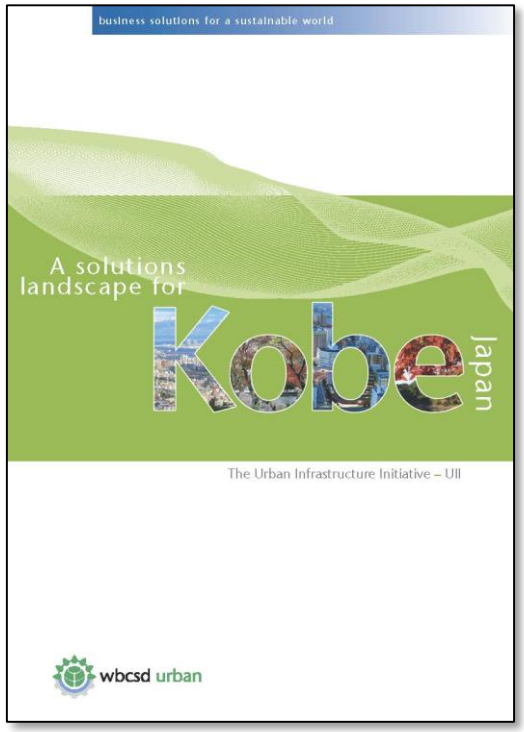
Assessment of whole municipalities (=1,750) in Japan using CASBEE-City



Monitoring the reconstruction process of Kobe after big disaster in 1995

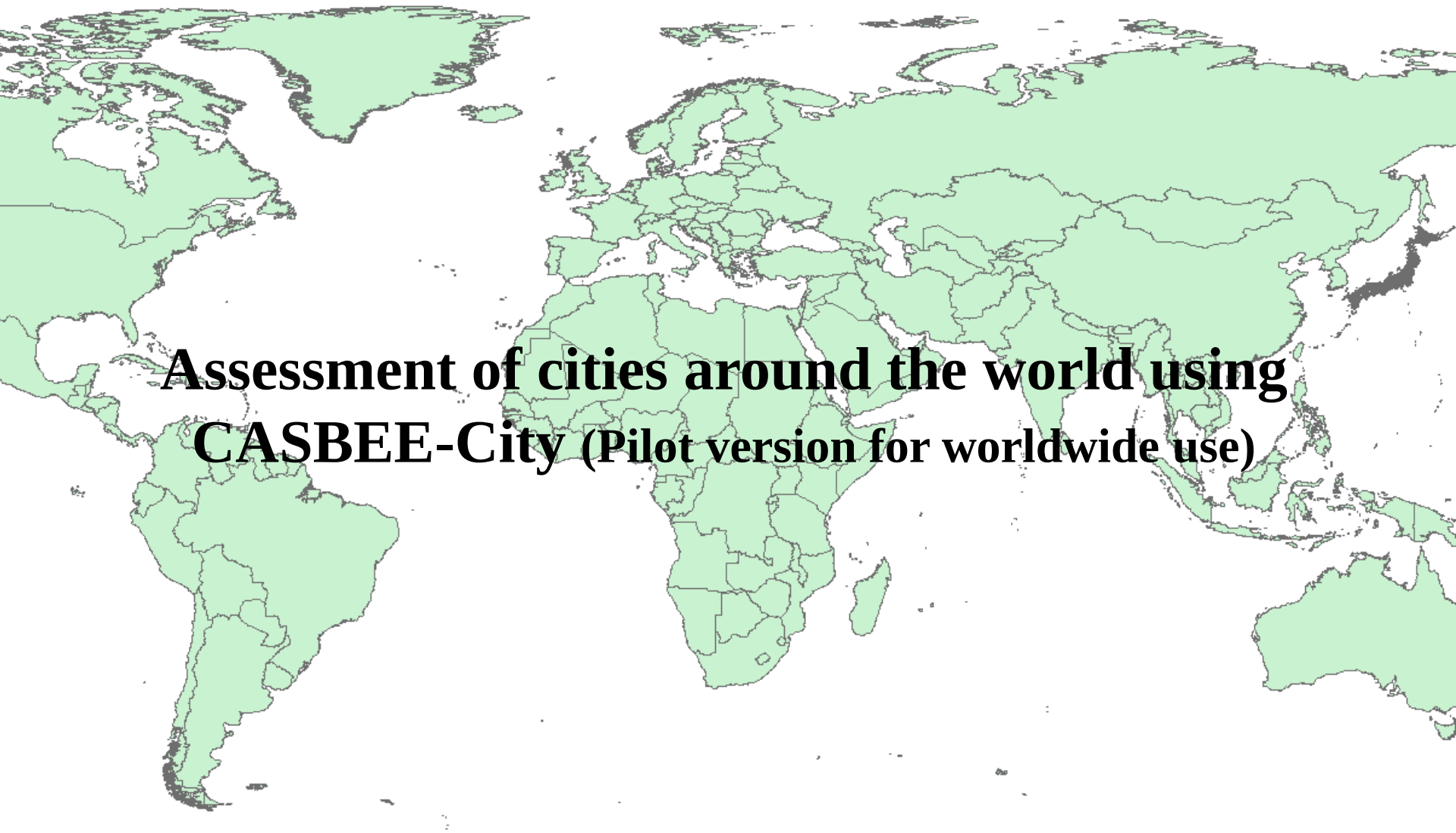
Visualization of reconstruction process using CASBEE-City tool





English report available at:

http://www.wbcsd.org/uiikobereport.aspx

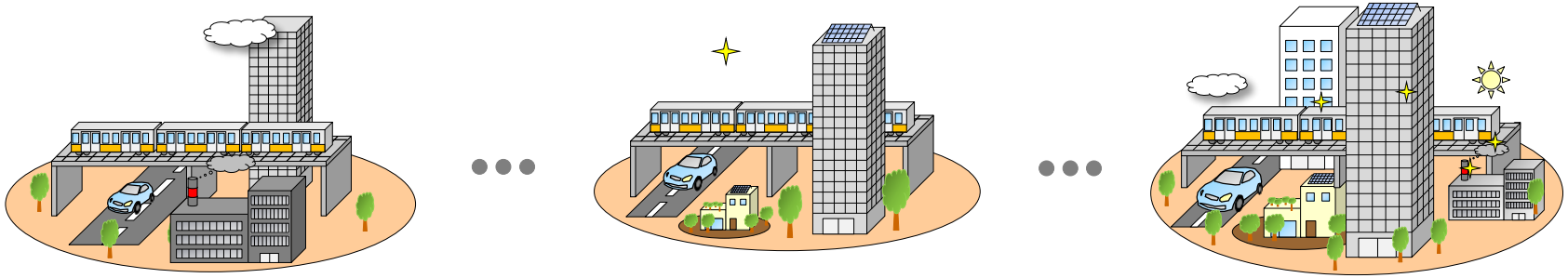


Assessment of cities around the world using CASBEE-City (Pilot version for worldwide use)

Assessment methodology of CASBEE-City (Pilot version for worldwide use)

Expanding Application Boundaries from Japanese Cities to Cities Worldwide

CASBEE-City (Japanese standard version) (A tool developed for assessing Japanese cities)



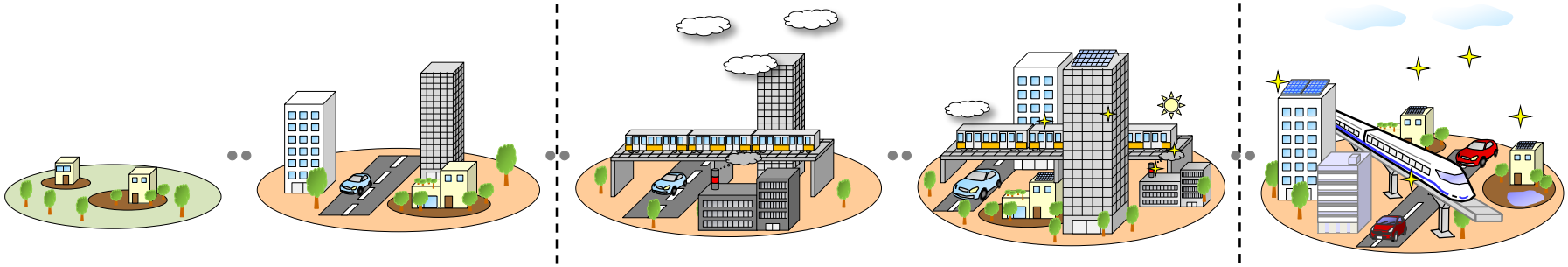
1.00 point
(worst in Japan)

3.00 points
(average level in Japan)

5.00 points
(best in Japan)

CASBEE-City (Pilot version for worldwide use)

CASBEE-City (Jap. standard version)



1.00 point
(worst in the world)

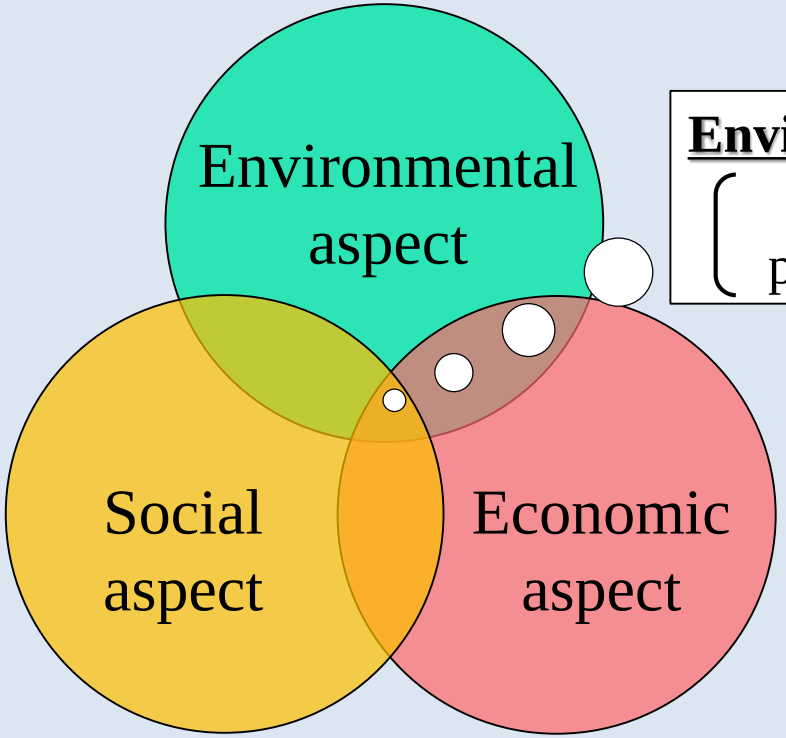
3.00 points
(average level in the world)

5.00 points
(best in the world)

Assessment items for CASBEE-City (Pilot version for worldwide use)

Assessment based on Triple Bottom Line perspectives

Quality (Q) = Assessment from Env., Soc., and Eco. aspects



Environmental Load (L)
(GHG emissions per capita per year)

→ Assessment items and indicators will be carefully developed by referring UN's SDGs (Sustainable Development Goals) and ISO 37120, etc.

Important reference 1: UN's SDGs（Sustainable Development Goals）

SDGs are a proposed set of future development targets beyond 2015
→ 17 goals (to be solved by 2030) are indicated in SDGs

→ More than 300 indicators are proposed to monitor the progress toward the goal

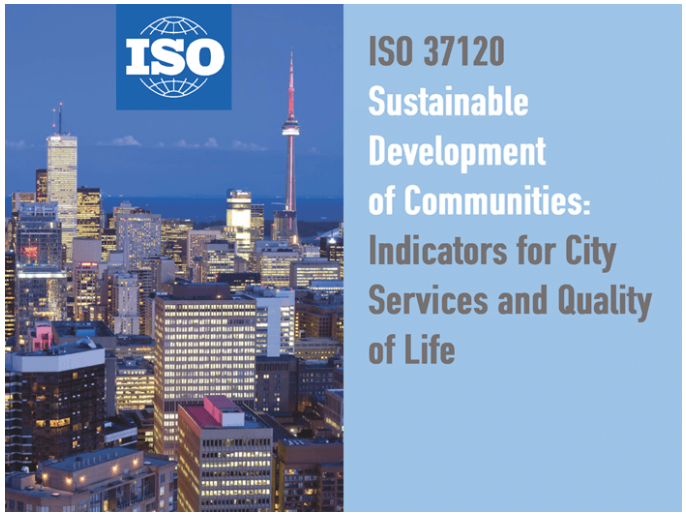
→ Indicators which are applicable to city assessment is referred

Important reference 2: ISO37120

→ Indicators for city services and quality of life (became IS in May 2014)

→ 100 indicators (46 Core Indicators and 54 Supporting Indicators)

- 100 Indicators
  - 1. Economy
    - 1.1 unemployment rate
    - 1.2 property values
    - 1.3 ratio of people in poverty
    - :
    - 1.7 number of new patents
  - 2. Education
  - 3. Energy
  - :
  - 17. Water and sanitation



Characteristics and current situation of ISO37120

1) The first international standardized indicators for city services

2) Under revision process (as of September 2015)

3) Just a set of indicators and is not an assessment tool with value judgment

→ Indicators which are applicable to whole cities in the world is referred

CASBEE indicators (based on SDGs and ISO 37120 indicators)

SDG (candidate) indicators

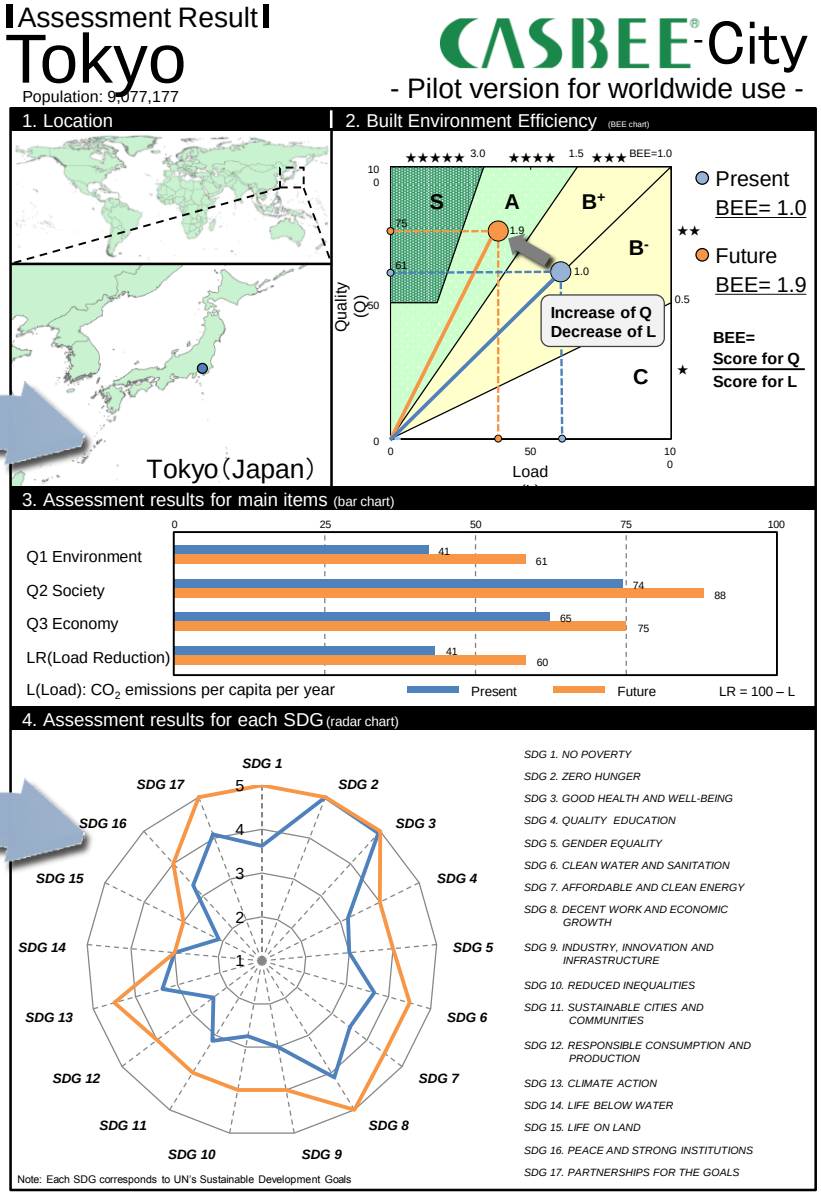
Goal 1. No Poverty	Indicator1-1, Indicator1-2, …
Goal 2. Zero Hunger	Indicator2-1, Indicator2-2, …
Goal 3. Good Health…	Indicator3-1, Indicator3-2, …
⋮	
Goal 17. Partnerships for the Goals	Indicator17-1, Indicator17-2, …

ISO37120 indicators

Sustainable development of communities
– Indicators for city services and quality of life

Core indicators	Supporting indicators
Indicator 1 (Core)	Indicator 1 (Supporting)
Indicator 2 (Core)	Indicator 2 (Supporting)
Indicator 3 (Core)	Indicator 3 (Supporting)
⋮	⋮

Total 100 indicators



Selection criteria (for indicators)

→ Indicators are selected (or newly developed) by taking the following criteria into account and by referring UN's SDGs and ISO's ISO37120, etc.

1) data availability

2) simplicity

3) reliability

4) applicability for urban policy

5) balance among assessment items

Candidate assessment indicators for CASBEE-City (Pilot version for worldwide use)

Q1 Environmental aspect

Q1 Environmental aspect	
Q1.1	Mean urban air pollution of particulate matter (PM10 and PM2.5)
Q1.2	Area of public and green space as a proportion of total city space
Q1.3	Percentage of urban solid waste regularly collected and well managed
Q1.4	Fine particulate matter (PM2.5) concentration
Q1.5	Particulate matter (PM10) concentration
Q1.6	NO2 (nitrogen dioxide) concentration
Q1.7	SO2 (sulphur dioxide) concentration
Q1.8	O3 (Ozone) concentration
Q1.9	Noise pollution
Q1.10	Percentage of city population with regular solid waste collection
Q1.11	Total collected municipal solid waste per capita
Q1.12	Percentage of the city's solid waste that is recycled
Q1.13	Percentage of the city's solid waste that is disposed of in a sanitary landfil
Q1.14	Percentage of the city's solid waste that is disposed of in an incinerator
Q1.15	Percentage of the city's solid waste that is burned openly
Q1.16	Percentage of the city's solid waste that is disposed of in an open dump
Q1.17	Percentage of the city's solid waste that is disposed of by other means Supporting indicator
Q1.18	Hazardous Waste Generation per capita (tonnes)
Q1.19	Percentage of the city's hazardous waste that is recycled
Q1.20	Green are (hectares) per 100,000 population
Q1.21	Annual number of trees planted per 100,000 population
Q1.22	Disclosure of Natural Resource Rights Holdings
Q1.23	Global Food Loss Indicator
Q1.24	Consumption of ozone-depleting substances (MDG Indicator)
Q1.25	Aerosol optical depth (AOD)
Q1.26	Share of companies valued at more than [$1 billion] that publish integrated monitoring]
Q1.27	Number of businesses per 100,000 population
Q1.28	Share of coastal and marine areas that are protected
Q1.29	Percentage of fish tonnage landed within Maximum Sustainable Yield (MSY)

Q2 Social aspect

Q2 Social aspect	
Q2.1	Percentage of urban population living in slums or informal settlements (MDG Indicator)
Q2.2	Percentage of people within 0.5km of public transit running at least every 20 minutes
Q2.3	[Ratio of land consumption rate to population growth rate, at comparable scale]
Q2.4	Losses from natural disasters, by climate and non-climate-related events (in US$ and lives lost)
Q2.5	Number of fire related deaths per 100,000 population
Q2.6	Number of natural disaster related deaths per 100,000 population
Q2.7	Square meters of public indoor recreation space per capita
Q2.8	Square meters of public outdoor recreation space per capita
Q2.9	Number of police officers per 100,000 population
Q2.10	Number of homicides per 100,000 population
Q2.11	Crimes against property per 100,000 population
Q2.12	Response time for police department from initial call
Q2.13	Percentage of city population living in slums
Q2.14	Number of homeless per 100,000 population
Q2.15	Percentage of households that exist without registered legal titles
Q2.16	Areal size of informal settlements as a percentage of city area
Q2.17	Proportion of population below minimum level of dietary energy consumption (MDG Indicator)
Q2.18	Percentage of women of reproductive age (15-49) with anemia
Q2.19	Prevalence of stunting and wasting in children under 5 years of age
Q2.20	Percentage of children less than six months old who are fed breast milk alone (no other liquids or food)
Q2.21	Percentage of women, 15-49 years of age, who consume at least 5 out of 10 defined food groups
Q2.22	Crop yield gap (actual yield as % of attainable yield)
Q2.23	Number of agricultural extension workers per 1000 farmers [or share of farmers covered by agricultural extension programs and services]
Q2.24	Nitrogen use efficiency in food systems
Q2.25	Crop water productivity (tons of harvested product per unit irrigation water)
Q2.26	Maternal mortality ratio (MDG Indicator) and rate
Q2.27	Neonatal, infant, and under-5 mortality rates (modified MDG Indicator)
	Percent of children receiving full immunization (as recommended by national

Q3 Economic aspect

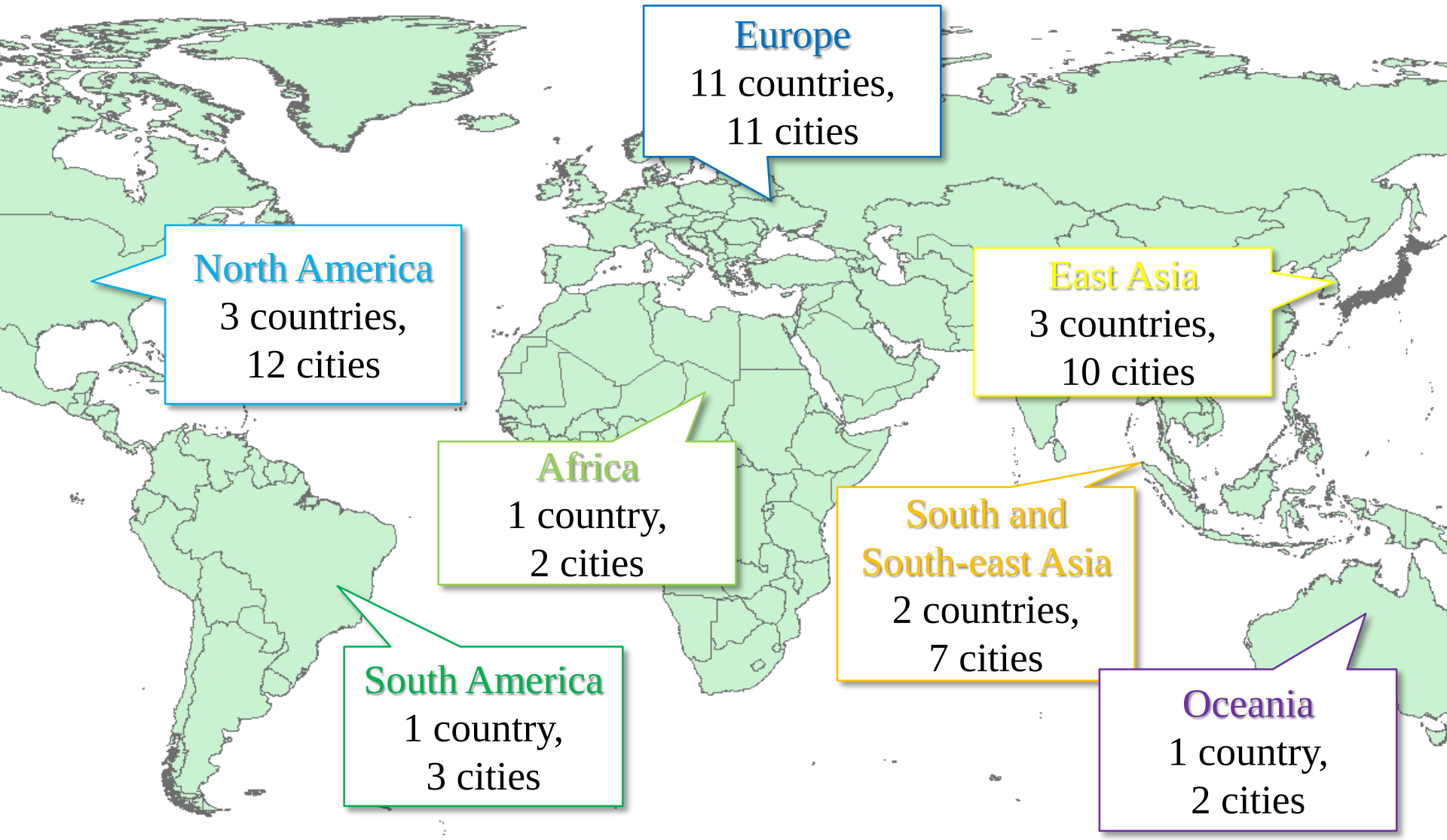
Q3 Economic aspect	
Q3.1	Domestic revenues allocated to sustainable development as percent of GNI - by sector
Q3.2	Assessed value of commercial and industrial properties as a percentage of total assessed value of all properties
Q3.3	Proportion of population below $1.25 (PPP) per day (MDG Indicator)
Q3.4	Proportion of population living below national poverty line, by urban/rural (modified MDG Indicator)
Q3.5	Multidimensional Poverty Index
Q3.6	Percentage of eligible population covered by national social protection programs
Q3.7	Percentage of women, men, indigenous peoples, and local communities with secure rights to land, property, and natural resources, measured by (i) percentage with documented or recognized evidence of tenure, and (ii) percentage who perceive their rights are recognized and protected.
Q3.8	Losses from natural disasters, by climate and non-climate-related events (in US$ and lives lost)
Q3.9	Total fertility rate
Q3.10	Percentage of city population living in poverty
Q3.11	Share of the population using modern cooking solutions, by urban/rural
Q3.12	Share of the population using reliable electricity, by urban/rural
Q3.13	Implicit incentives for low-carbon energy in the electricity sector (measured as US$/MWh or US$ per ton avoided CO2)
Q3.14	Rate of primary energy intensity improvement
Q3.15	Total residential electrical energy use per capita (kWh / year)
Q3.16	Percentage of city population with authorized electrical service
Q3.17	Energy consumption of public buildings per year (kWh / m2)
Q3.18	The percentage of total energy derived from renewable sources, as a share of the city's total energy consumption
Q3.19	Total electrical energy use per capita (kWh / year)
Q3.20	GNI per capita (PPP, current US$ Atlas method)
Q3.21	Country implements and reports on System of Environmental-Economic Accounting (SEEA) accounts
Q3.22	Youth employment rate, by formal and informal sector
	Ratification and implementation of fundamental ILO labor standards and

L Environmental load

L Environmental load	
L1.1	Availability and implementation of a transparent and detailed deep decarbonization strategy, consistent with the 2°C - or below - global carbon budget, and with GHG emission targets for 2020, 2030 and 2050.
L1.2	CO2 intensity of new power generation capacity installed (gCO2 per kWh), and of new cars (gCO2/pkm) and trucks (gCO2/tkm)
L1.3	Net GHG emissions in the Agriculture, Forest and other Land Use (AFOLU) sector (tCO2e)
L1.4	Official climate financing from developed countries that is incremental to ODA (in US$)
L1.5	Greenhouse gas emissions measured in tonnes per capita

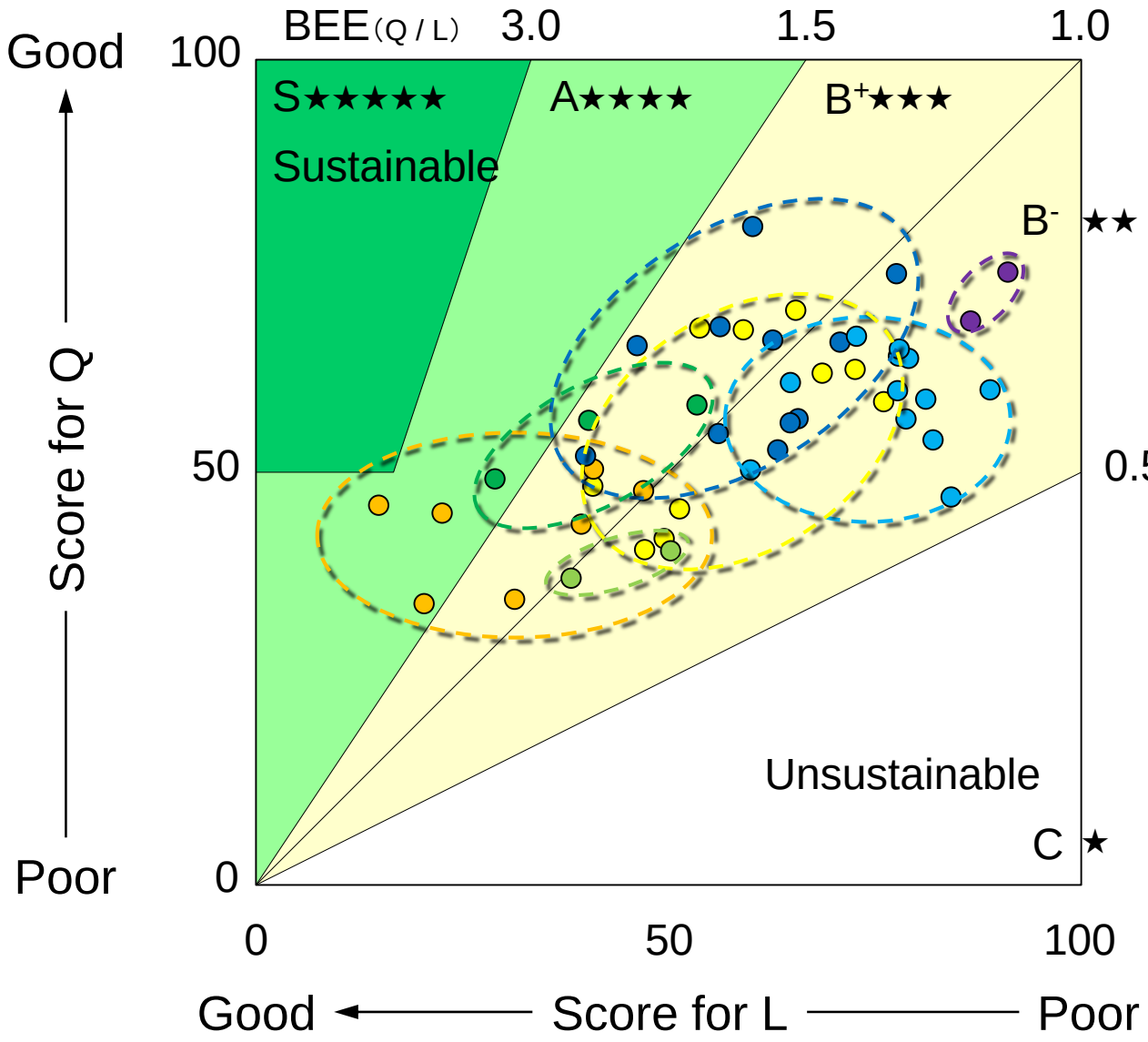
Indicators are carefully selected from more than 300 indicators

Assessment of cities around the world using CASBEE-City (Pilot ver. for worldwide use)



▷ World 47 cities (22 countries) are assessed using CASBEE-City

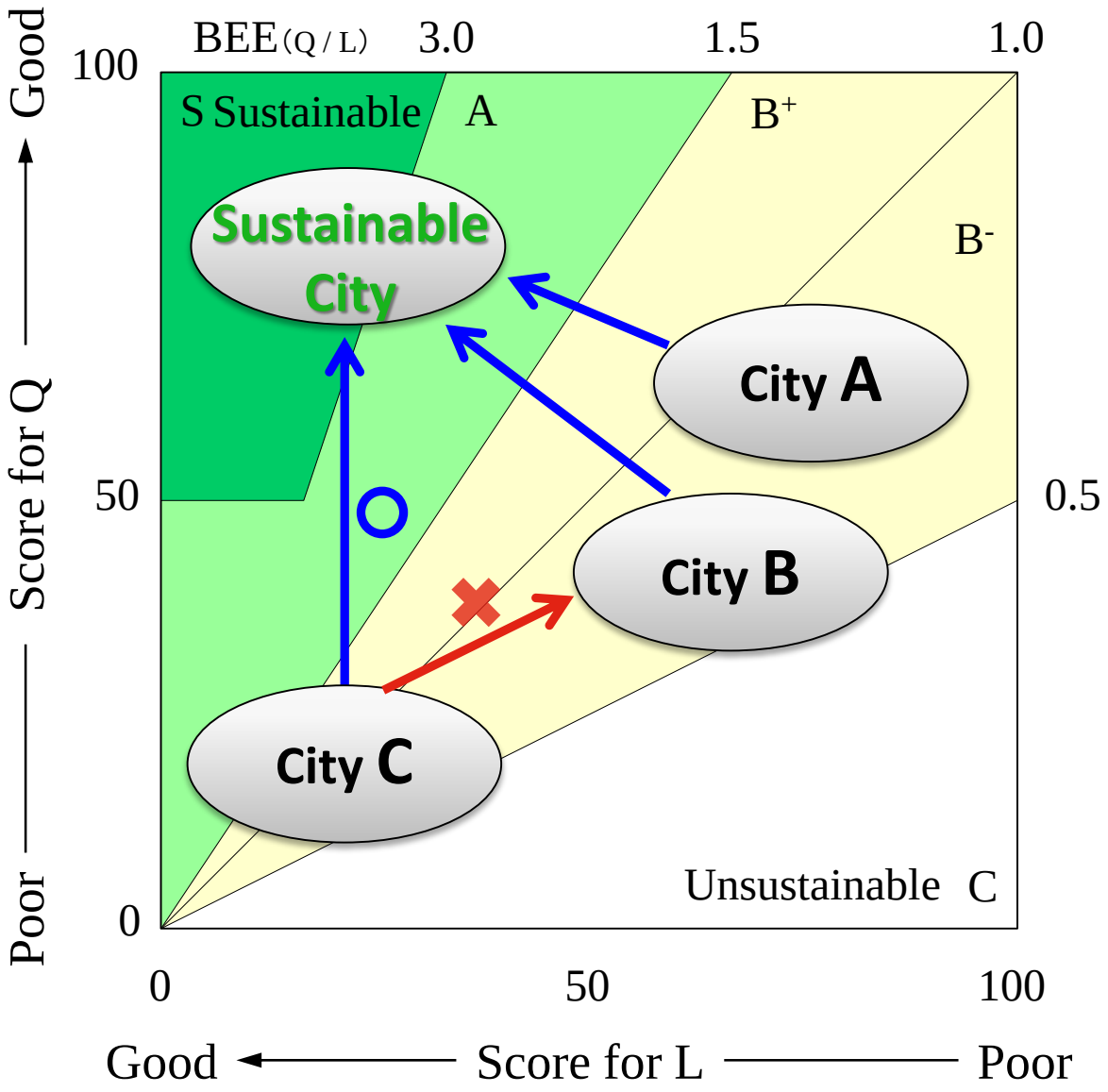
Assessment of major cities around the world using CASBEE-City



- East Asia（n=10）
- South-east Asia（n=7）
- Africa（n=2）
- South America（n=3）
- North America（n=12）
- Europe（n=11）
- Oceania（n=2）

* A single plot represents a city

Achieving real sustainable city using CASBEE-City tool



City A:
Necessary to reduce L

City B:
Necessary to improve Q, with reducing L

City C:
Necessary to improve Q without increasing L

References

[1]Murakami S., Kawakubo S., Asami Y., Ikaga T., Yamaguchi N., Kaburagi S.,
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"CASBEE-for Cities; Pilot version for worldwide use version (2015)", Institute for Building Environment and Energy Conservation (IBEC), ISBN 978-4-9907-4259-1, 2015

Thank you for your kind attention !

We would like to express our sincere gratitude for the great cooperation to the members of committee for the development of CASBEE-City (pilot version for worldwide use); Yasushi Asami, Tomohiro Uchiike, Shinichi Kaburagi, Takahiro Kawayoke, Ryota Kuzuki, Noriaki Takai, Akira Nakamura, Takashi Otsuka, Takashi Hashimoto, Nobuhaya Yamaguchi, Junya Yamasaki, Takeo Fukui, Tadashi Inoue, Koji Yamada, Kiyohisa Oine, Nobufusa Yoshizawa & Shoichiro Fujita.

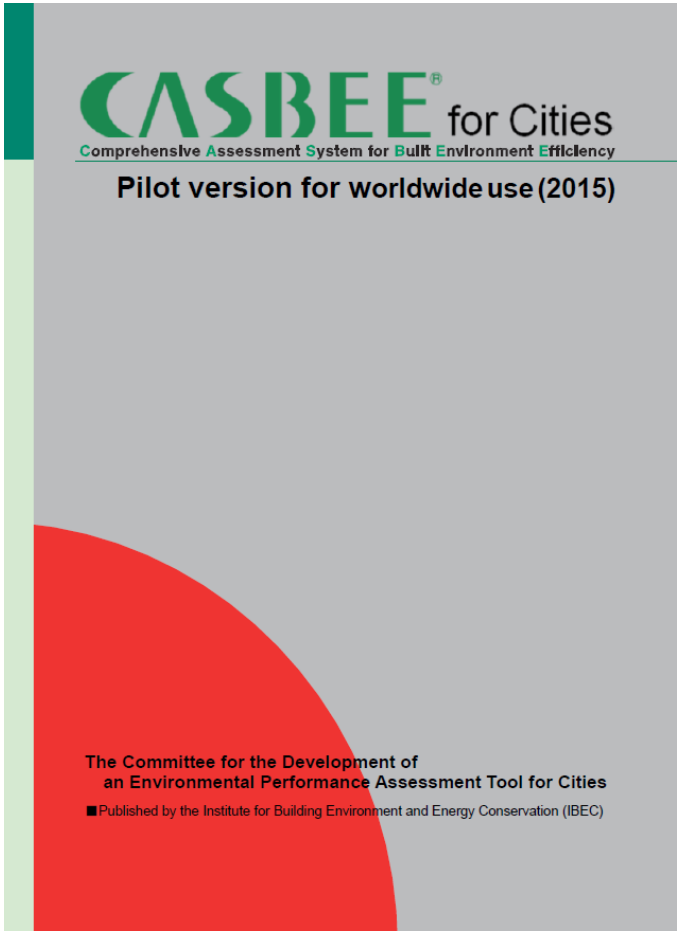

Fig. Brochure of CASBEE for Cities, Pilot version for worldwide use (2015), ISBN 978-4-9907-4259-1