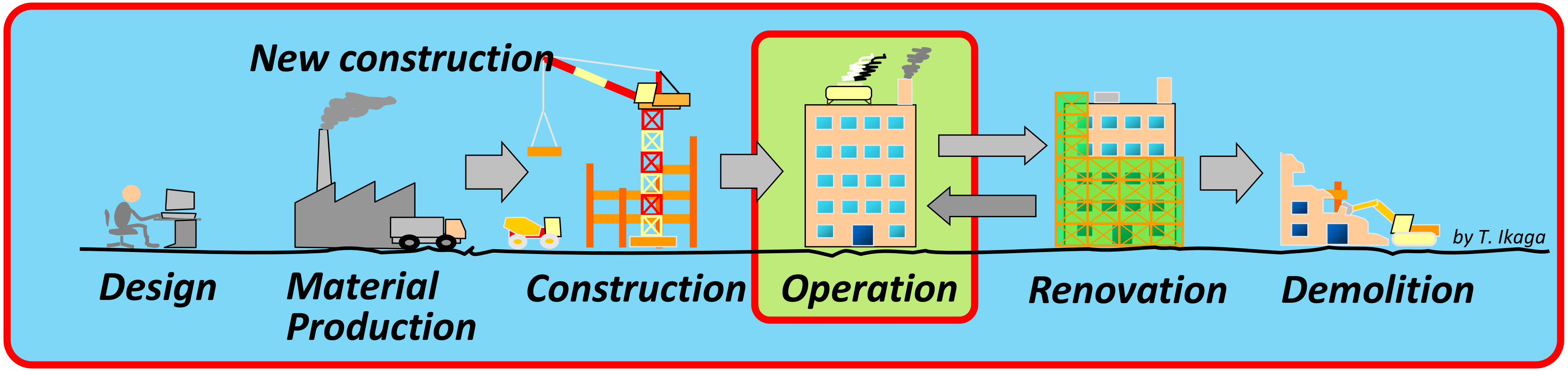
Development of WLC Tool and Database by Zero Carbon Buildings Promotion Council, Japan

Katsumi Niwa,
Secretary of Committee on Zero Carbon Buildings Promotion

General Manager, Management Section,
Engineering Department, Nikken Sekkei

G7 Reduction of whole life carbon in building



*The promotion of **whole life carbon reduction** in building sector has been included in the*
G7 Climate, Energy and Environment Ministers' Communiqué
in April 2023 and
***G7 Urban Development Ministers' Communiqué** in July 2023.*

G7 2023 HIROSHIMA SUMMIT Sapporo
G7 Ministers' Meeting on Climate, Energy and Environment

G7 2023 HIROSHIMA SUMMIT
KAGAWA TAKAMATSU
Sustainable Urban Development Ministers' Meeting

Related ministerial meeting on hay fever

2023年5月30日

花粉症対策の全体像

Documents released by the Japanese government　令和５年５月３０日　花粉症に関する関係閣僚会議決定

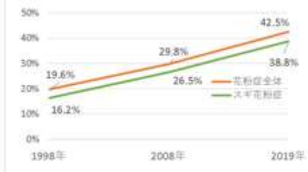
Ⅰ　はじめに

- 花粉症は未だ多くの国民を悩ませ続けている社会問題
- 省庁の縦割りを排し、様々な対策を効果的に組み合わせて実行していくことが重要。また、息の長い取組が必要。

➡ 今後10年を視野に入れた施策も含めて、花粉症という社会問題を解決するための道筋を示す

Ⅱ　花粉症の実態と人工林の将来

➢ 有病率：約10年ごとに10ポイント程度ずつ増加



出典）日本耳鼻咽喉科免疫アレルギー感染症学会のデータより作成

➢ 医療費（花粉症を含むアレルギー性鼻炎）
→保険診療：約3,600億円、市販薬：約400億円

➢ 花粉発生源となるスギ人工林（20年生超）は**431万ha**

➡ 「発生源対策」の取組を集中的に進めて
花粉量の削減を加速化

Ⅲ　花粉症対策の３本柱

１．発生源対策

10年後には花粉発生源の**スギ人工林を約２割減少**させることを目指す。スギ人工林由来の花粉が約２割減少すれば、花粉量の多かった今シーズンであっても平年並みの水準まで花粉量を減少させる効果が期待できる。また、**将来的（約30年後）**には**花粉発生量の半減**を目指す。

● **スギ人工林の伐採・植替え等の加速化**
スギ人工林の伐採を約５万ha/年→（10年後）**約７万ha/年**まで増加させるとともに、花粉の少ない苗木や他樹種による植替え等を推進
⇒ 花粉発生源となる**スギ人工林の減少スピードを約２倍**に
（「花粉発生源スギ人工林減少推進計画（略称：スギ伐採加速化計画）」）

・**スギ材需要の拡大**【林野庁・国土交通省】
住宅分野でのスギ材製品への転換促進、木材活用大型建築の新築着工面積の倍増等
－ スギ製材・合板・集成材等のJAS材の増産に向けた**加工流通施設の国内整備**の支援、国産材の利用割合の低い横架材等について**輸入材を代替可能な製品を製造する技術**の普及等、安定供給体制の構築
－ **JAS規格・建築基準**の合理化
－ **国産材を活用した住宅に係る表示**の仕組みの構築（花粉症対策への貢献度を明示）
－ 建築物に係る**ライフサイクルカーボンの評価方法**の構築（3年を目途）
－ **住宅生産者による花粉症対策の取組の見える化**　等
⇒ 需要を1,240万㎥→（10年後）**1,710万㎥（470万㎥増）**に拡大

・**花粉の少ない苗木の生産拡大**【林野庁】
－ 国・自治体等における苗木生産体制の短期的かつ集中的な整備
⇒ 10年後には花粉の少ないスギ苗木の生産割合を**スギ苗木全体の９割以上**に引上げ

・**林業の生産性向上及び労働力の確保**【林野庁】
労働力の大幅な減少が見込まれる中、
－ 高性能林業機械の導入支援等により**生産性を向上**
－ 外国人材の受入れ拡大、新規就業者の確保・育成、処遇の改善、農業など他産業との連携、地域おこし協力隊との連携等により、労働力の減少に歯止めをかけ、**10年後も現在と同程度の林業人材を確保**

➡ **年内に「林業活性化・木材利用推進パッケージ」（仮称）を策定**【林野庁・国土交通省】

２．飛散対策

● **スギ花粉飛散量の予測**
➢ 精緻化されたデータを民間事業者に提供すること等により、**民間事業者が実施する予測の精度向上を支援**
・スギ雄花**花芽調査の強化**（34都府県→**全国に拡大、調査地点数の倍増**）等【環境省・林野庁】
・航空レーザー計測による**スギ人工林の分布、森林地形等の情報の高度化**、それらのデータの公開の推進【林野庁】
・スーパーコンピューターやAIを活用した、花粉飛散予測に特化した**詳細な三次元の気象情報の提供**【気象庁】
・花粉飛散量の**実測データ**の提供、画

３．発症・曝露対策

● **花粉症の治療**
・ 診療ガイドライン改訂や**対症療法等の医療・相談体制**の整備を推進【厚生労働省】
・ **アレルゲン免疫療法（舌下免疫療法等）**の開始時期等について、医療機関等における適切な**情報提供や集中的な広報**を実施【厚生労働省】
－学会等を通じた医療機関等への協力要請
－実施医療機関のリスト化・周知
－オンライン診療可能な医療機関の周知
・ **森林組合等への協力要請**や**企業への要請**等に着手
⇒**舌下免疫療法の治療薬**を25万人分/年→（５年以内）**100万人分/年に増産**【厚生労働省】
・ 治療法・治療薬の開発に資する大学や国立研究機関等での**研究開発**等を支援【文部科学省・厚生労働省】

● **花粉症対策製品**など

> ***Assessment Tool on Whole life carbon of building shall be developed up to 2025***
> *Decided by related ministerial meeting on hay fever on 30 May 2023*

Zero Carbon Buildings Promotion Council, Japan

Industry, Academy & Government (MLIT, METI, MOE & Local Authorities) since 2022

Chair: Dr. Shuzo MURAKAMI, President, Institute for Built Environment and Carbon Neutral for SDGs(IBECs)
Vice chair: Dr. Toshiharu IKAGA, Professor, Keio University

In response, the ***Zero Carbon Building Promotion Council*** *was established supported by the* ***Japanese Ministry of Land, Infrastructure, Transport and Tourism****, and is currently developing a* ***whole-life carbon calculation tool until March 2024****.*
However, the issue in Japan is that manufacturing companies are lagging behind ***EU*** *and* ***US*** *in* ***carbon labeling of building materials and equipment****.*

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Committee on Zero Carbon Buildings Promotion

Chair: Dr. Shuzo MURAKAMI, President, Institute for Built Environment and Carbon Neutral for SDGs(IBECs)
Vice chair: Dr. Toshiharu IKAGA, Professor, Keio University
Secretary: Mr. Katsumi NIWA, Nikken Sekkei Ltd.

WG on Basic Issue Study of Whole Life Carbon

Chair: Dr. Toshiharu IKAGA, Professor, Keio University
Vice chair: Dr. Tsuyoshi SEIKE, Professor, University of Tokyo
Secretary: Mr. Katsumi NIWA, Nikken Sekkei Ltd.

Sub WG on Development of Whole Life Carbon Tool

Chair: Dr. Toshiharu IKAGA, Professor, Keio University
Consultant: Mr. Masatoshi KUBOKI, Nikken Sekkei Ltd.

Sub WG on Database Issue

Chair: Dr. Tsuyoshi SEIKE, Professor, University of Tokyo
Consultant: Ms. Yoshiko OGAMI, Nikken Sekkei Ltd.

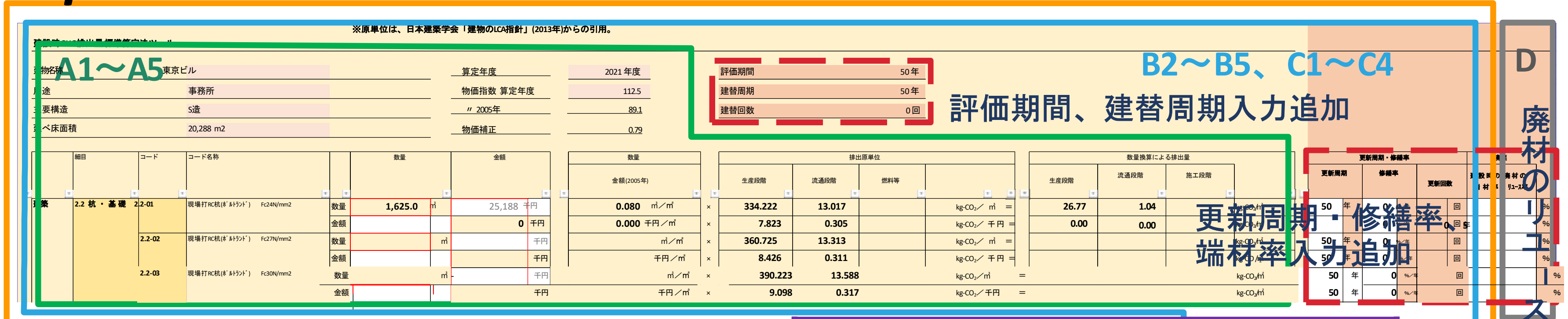
Sub WG on Overseas Policies and Practice

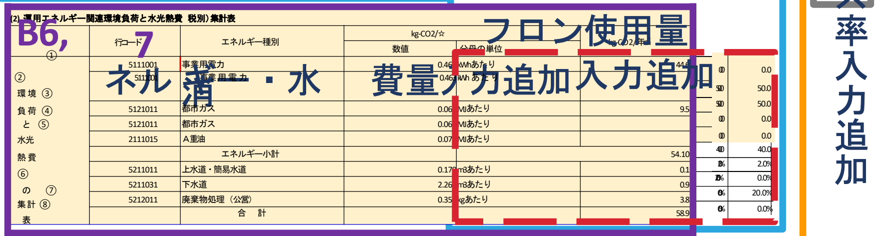
Chair: Mr. Ryuichi HORIE, CEO, CSR Design Green Investment Advisory, Co., Ltd.
Consultant: Ms. Yoshiko OGAMI, Nikken Sekkei Ltd

Assessment Tool on Whole life carbon of building

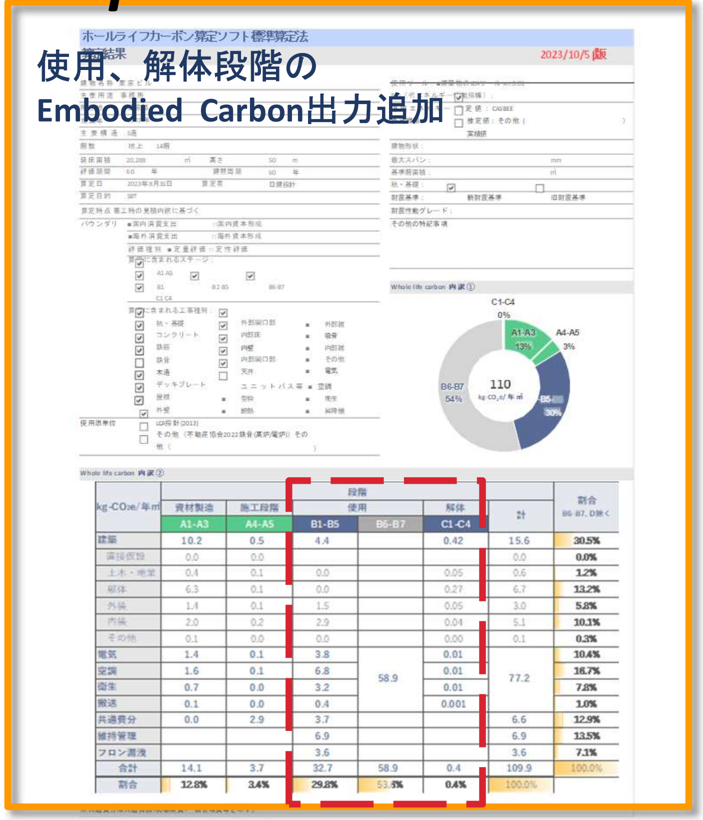
Deliverable sample from Committee on Zero Carbon Buildings Promotion

Input Sheet

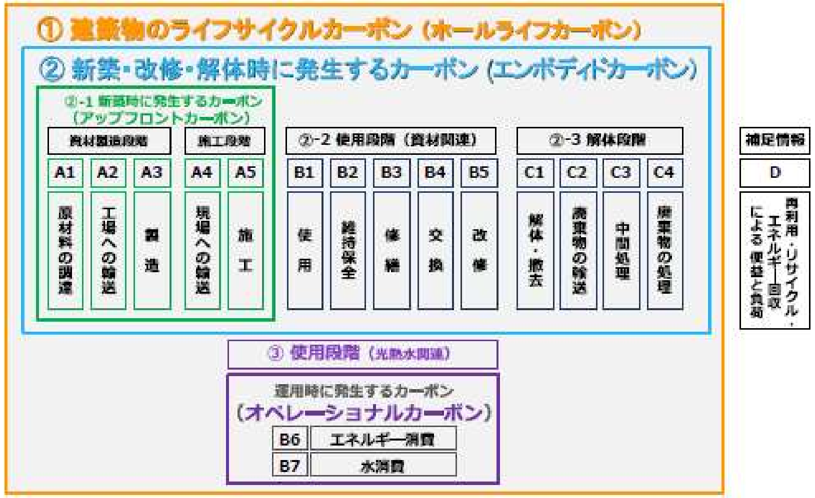




Output Sheet

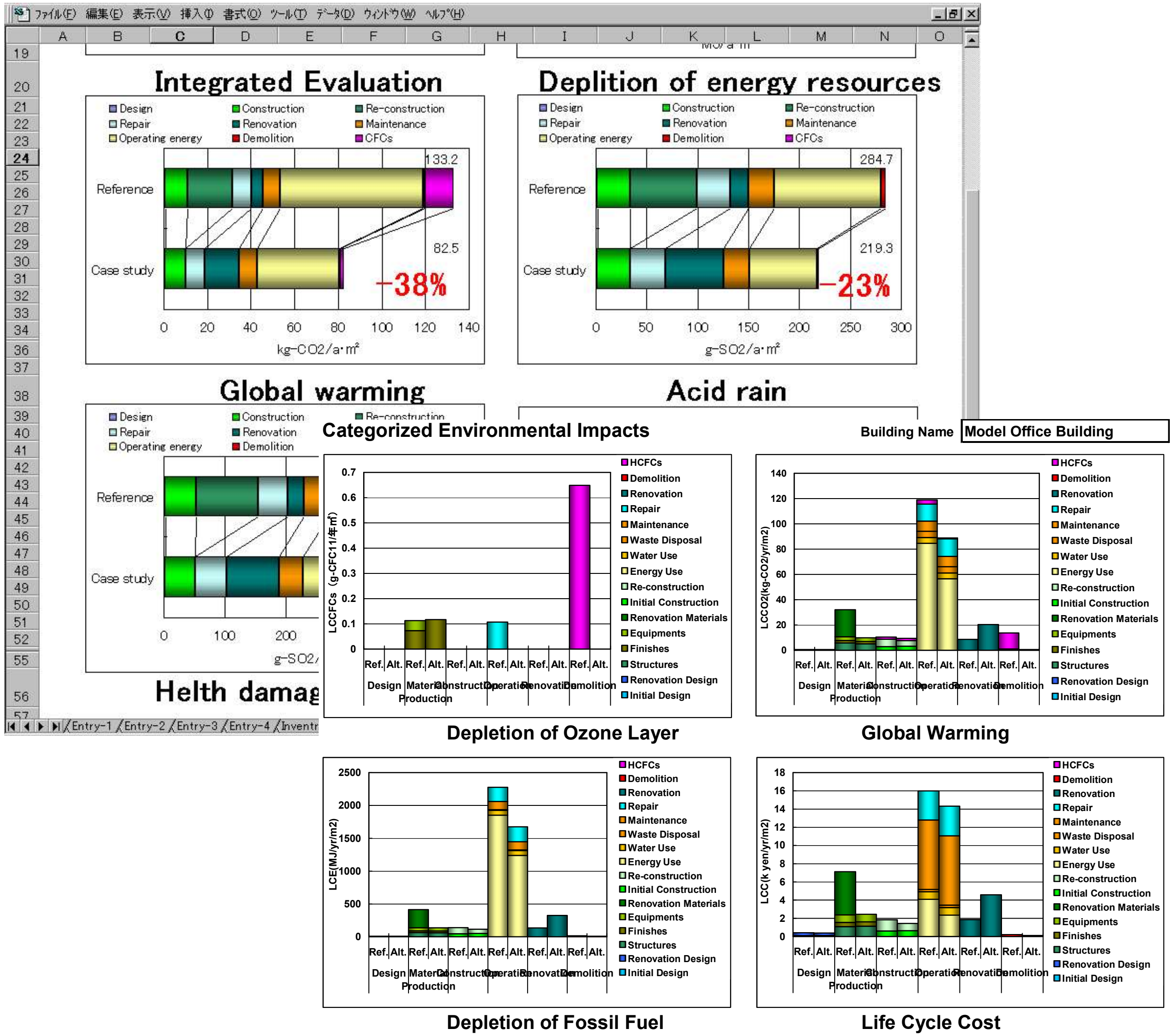


青字：「Scope3算定を行う建築工事発注事業者のための建設時ＧＨＧ排出量算定マニュアル　2022年度版」（不動産協会）からの追加項目



Assessment Framework on Whole life carbon of building (WBCSD,2021)

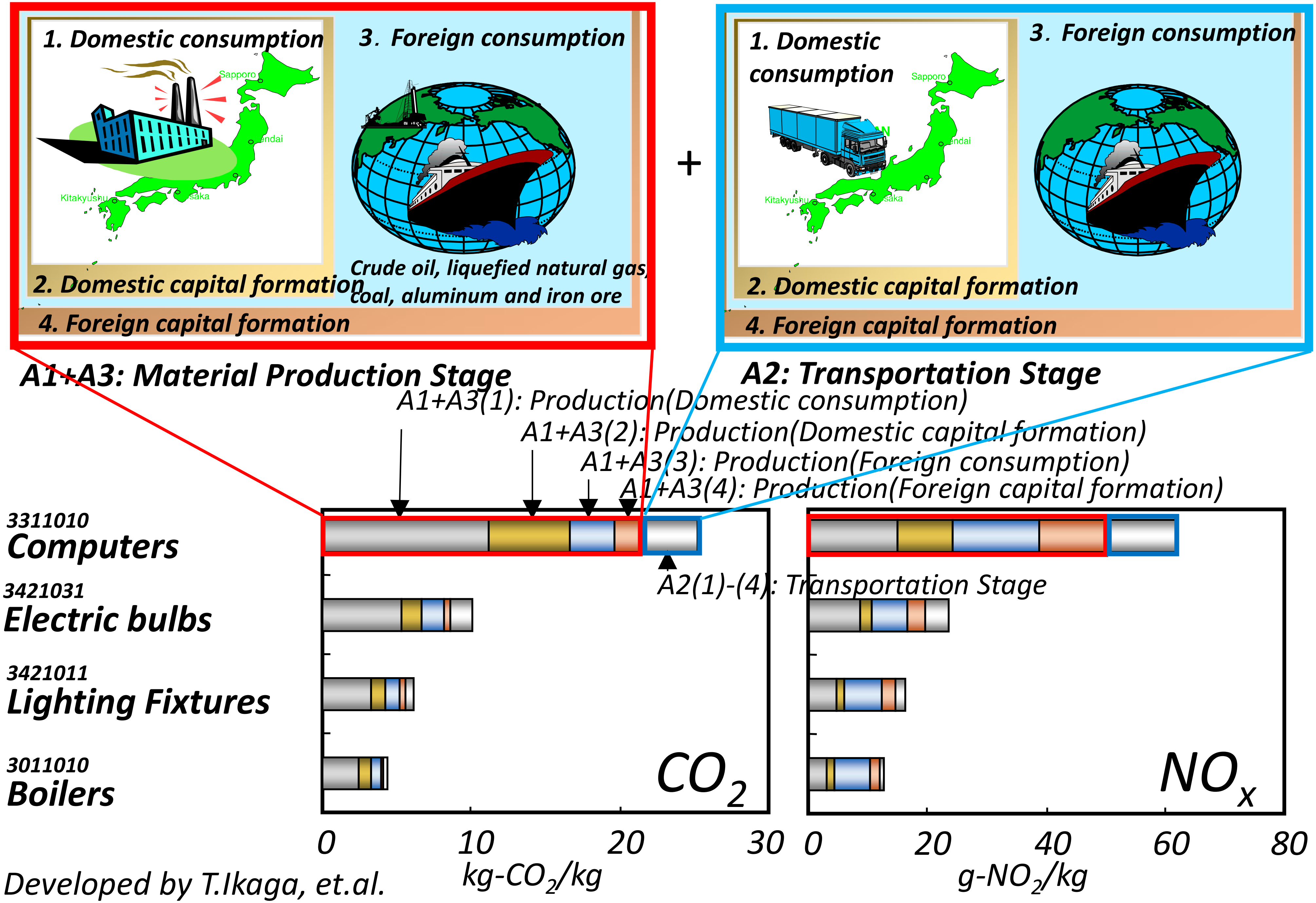
AIJ's LCA Tool and Database for buildings
Architectural Institute of Japan (AIJ)



First published in 1999 Revised in 2003, 2006 and 2013 *Tool and Database were developed by T.Ikaga, etc.*

Two years later of BRI's Life cycle Energy Tool developed by Dr. Y. Kadoma, T. Sawachi and S. Nakajima in 1997

Hybrid Database combined with Process and I/O Analysis



Developed by T.Ikaga, et.al.

Hybrid Database combined with Process and I/O Analysis

CO_2 database based on world statistics and field surveys done by Ikaga lab. since 2009

Supported by MLIT

Ministry of Land, Infrastructure, Transport and Tourism

Forest and sawmill survey

Austria

Finland

Canada

USA

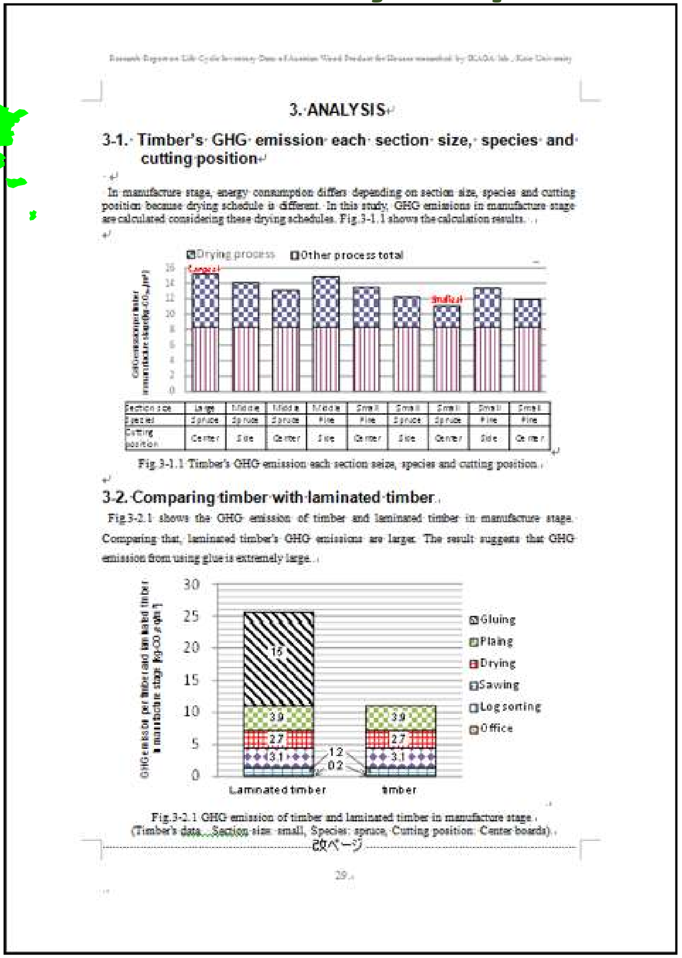
Tokyo

Kochi

Saga

Ibaraki

Field survey Report



3. ANALYSIS

3-1. Timber's GHG emission each section size, species and cutting position

In manufacture stage, energy consumption differs depending on section size, species and cutting position because drying schedule is different. In this study, GHG emissions in manufacture stage are calculated considering these drying schedules. Fig.3-1.1 shows the calculation results.

Section size	Large	Middle	Middle	Middle	Small	Small	Small	Small	Small
Species	Spruce	Spruce	Spruce	Pine	Pine	Spruce	Spruce	Pine	Pine
Cutting position	Center	Side	Center	Side	Center	Side	Center	Side	Center

Fig.3-1.1 Timber's GHG emission each section seize, species and cutting position.

3-2. Comparing timber with laminated timber

Fig.3-2.1 shows the GHG emission of timber and laminated timber in manufacture stage. Comparing that, laminated timber's GHG emissions are larger. The result suggests that GHG emission from using glue is extremely large.

Fig.3-2.1 GHG emission of timber and laminated timber in manufacture stage.
(Timber's data...Section size: small, Species: spruce, Cutting position: Center boards).

改ページ

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Energy consumption
Drying schedule
Material flow etc.

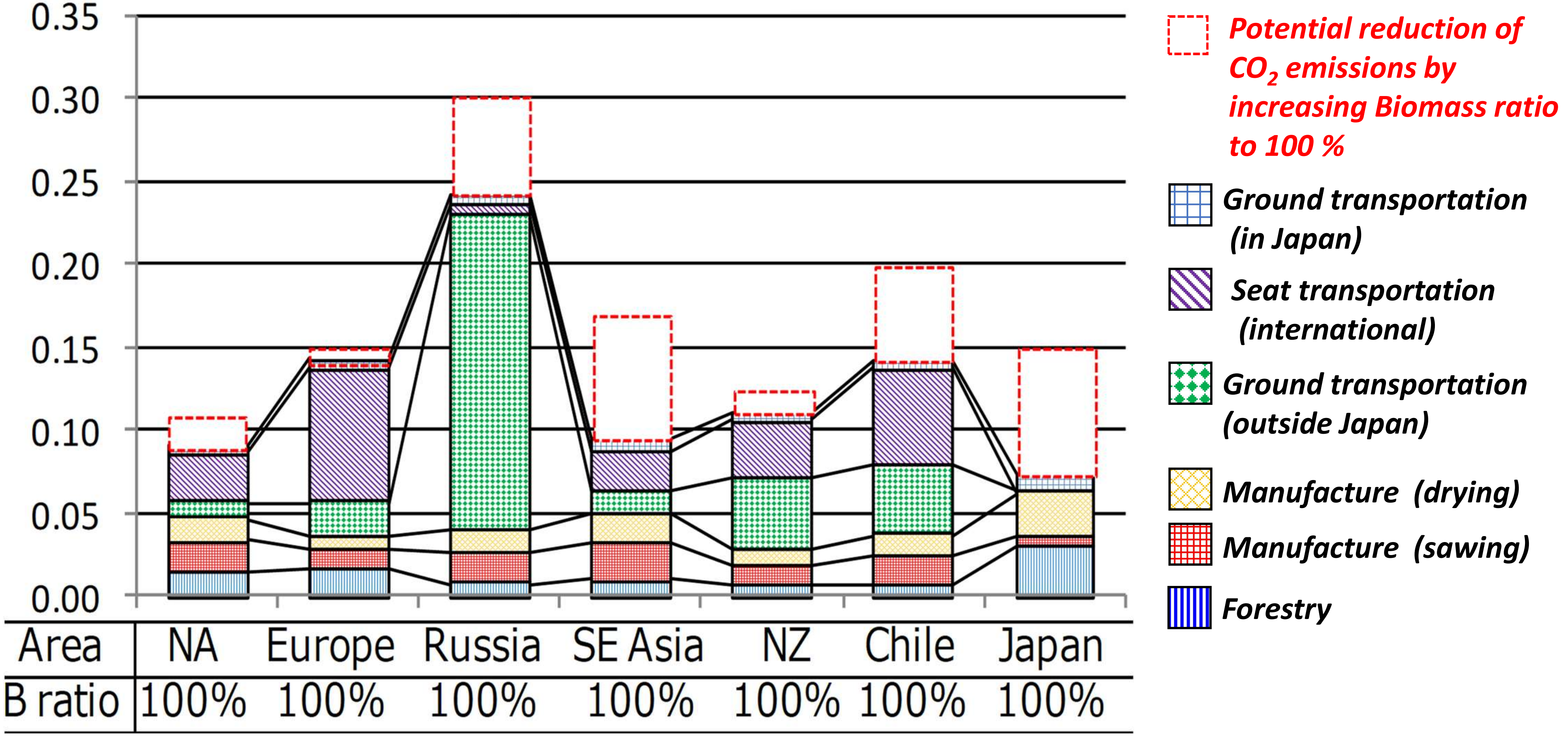
Hybrid Database combined Process and I/O Analysis

Calculation conditions: 100% use of biomass ratio for frying wood

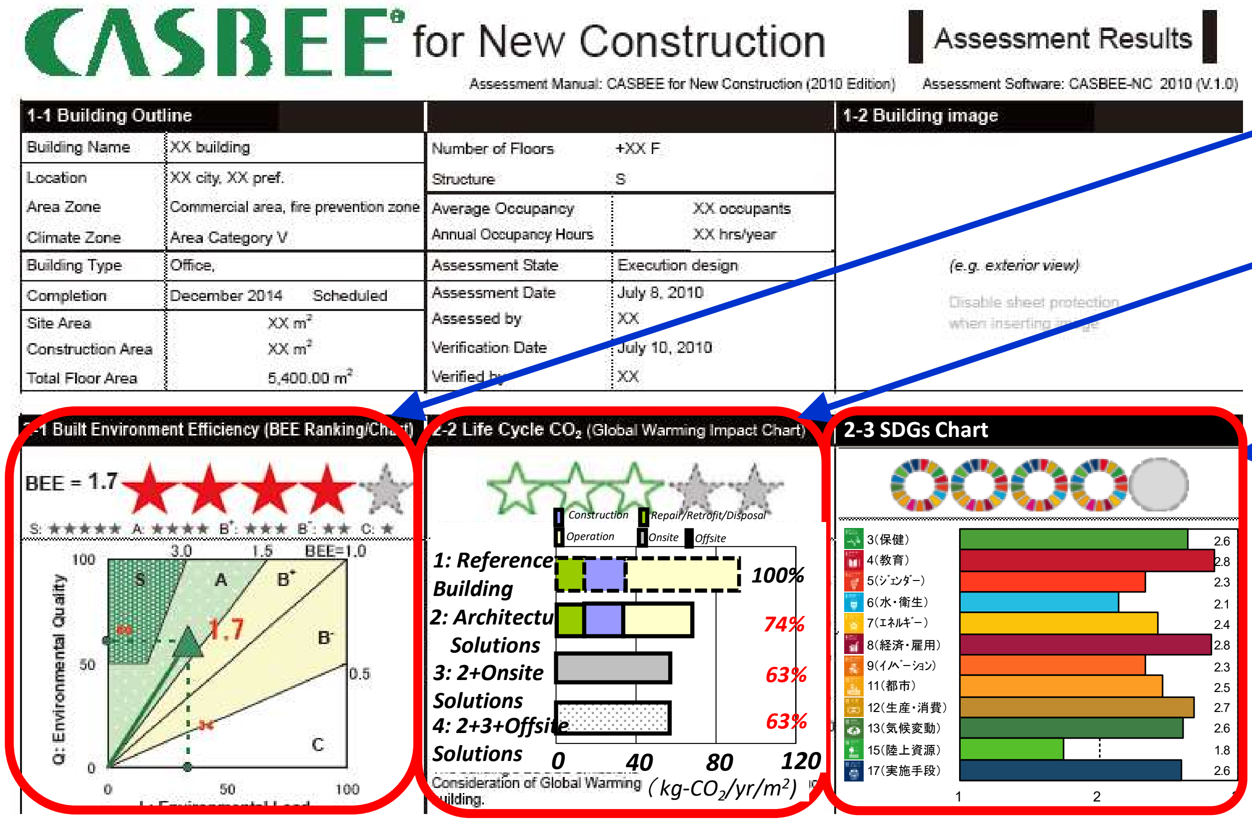
Product: Timber
Biomass ratio :100%

Section size: Middle
Final destination :Tokyo

CO_2 emissions [t-CO_2/m³]

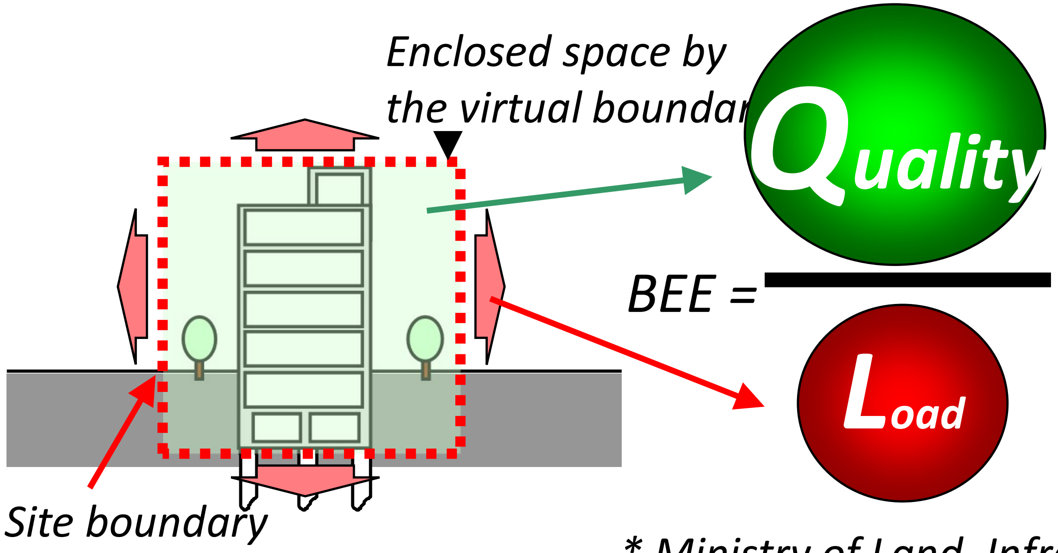


Streamlined LCA tool for buildings into CASBEE



BEE Graphic Chart
: Built-Environmental Efficiency
LCCO2 Bar Chart added in 2008
: Whole Life Carbon

SDGs Chart added in 2021



CASBEE

Comprehensive **A**ssessment **S**ystem

for **B**uilt **E**nvironment **E**fficiency

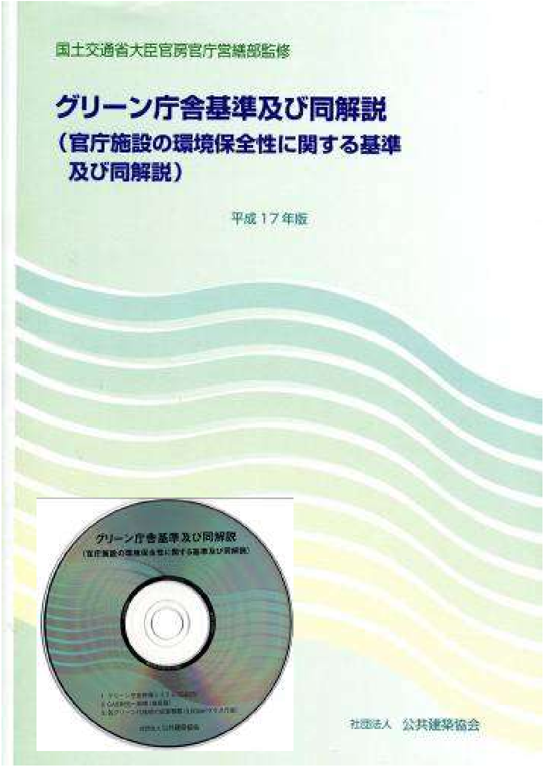
supported by MLIT* since 2001

Former chair: Dr S. MURAKAMI, IBECs
Chair: Prof. T. IKAGA, Keio Univ.

* Ministry of Land, Infrastructure, Transport and Tourism, Japan

LCA, LCC & CASBEE Tool

for new construction and renovation of government buildings



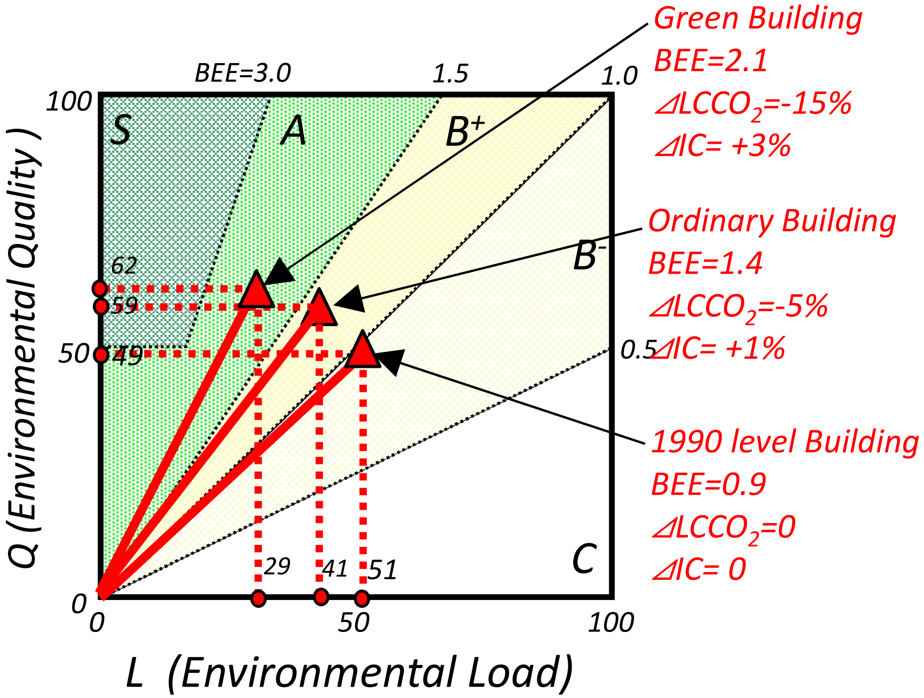
LCA & LCC Tool

Published in Apr. 1999
Revised in Jan. 2006

LCA & LCC Tool

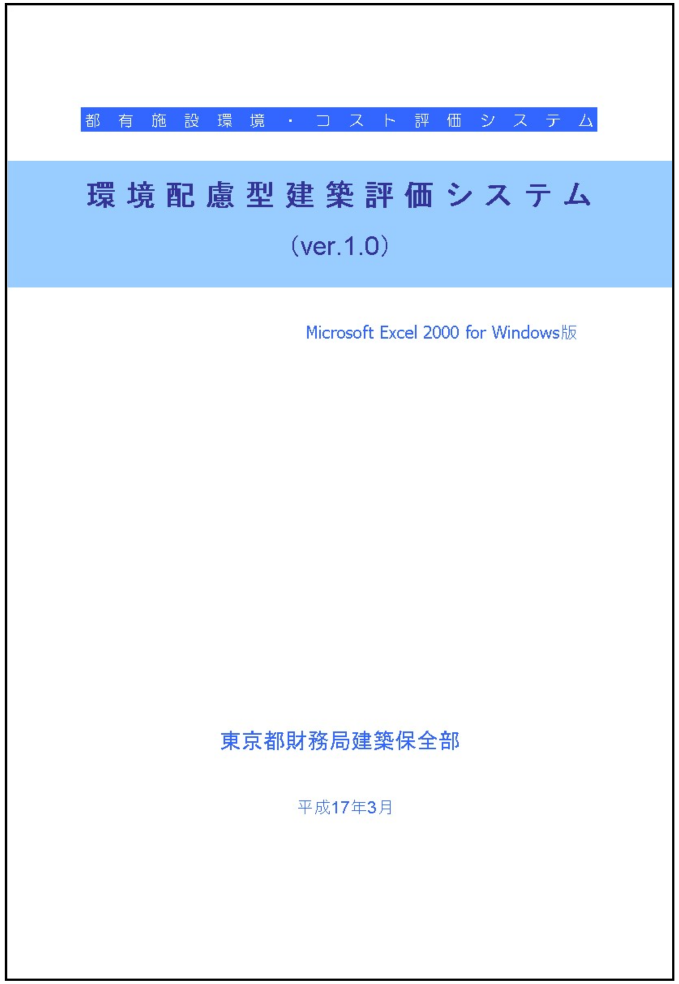
Published in Mar. 2001
Revised in Mar. 2006

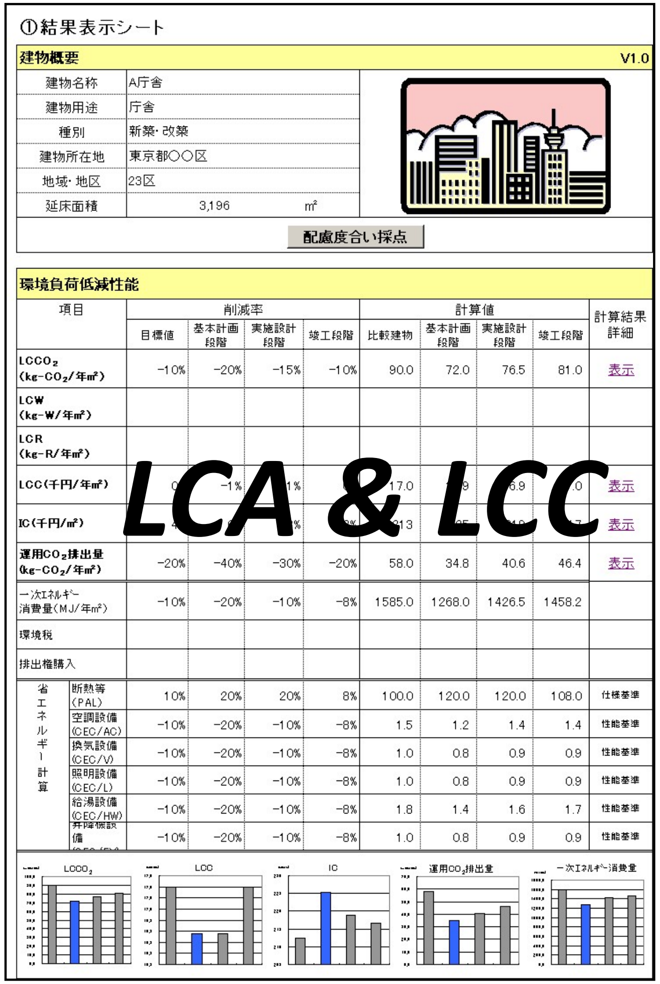
CASBEE-NC **CASBEE-EB** **CASBEE-RN**



Government Buildings Department,
Ministry of Land, Infrastructure and Transport

LCA, LCC & CASBEE Tool
for New Construction & renovation of public buildings: Offices, Schools and Hospitals



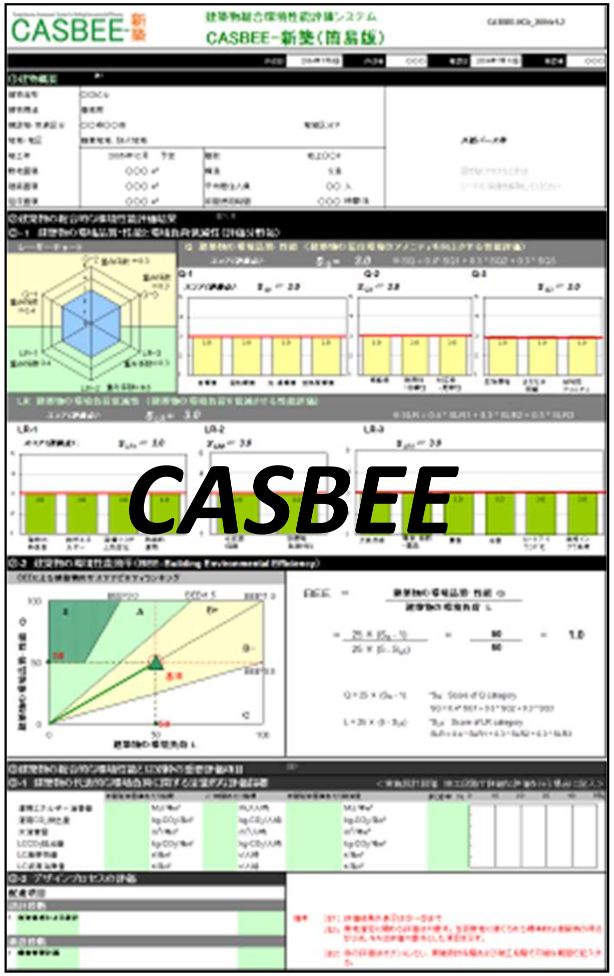

①結果表示シート

建物概要	V1.0
建物名称	A庁舎
建物用途	庁舎
種別	新築･改築
建物所在地	東京都○○区
地域･地区	23区
延床面積	3,196 ㎡

配慮度合い採点

環境負荷低減性能

項目		削減率 目標値	削減率 基本計画段階	削減率 実施設計段階	削減率 竣工段階	計算値 比較建物	計算値 基本計画段階	計算値 実施設計段階	計算値 竣工段階	計算結果詳細
$LCCO_2$ ($kg-CO_2$/年㎡)		-10%	-20%	-15%	-10%	90.0	72.0	76.5	81.0	表示
LCW (kg-W/年㎡)										
LCR (kg-R/年㎡)										
LCC(千円/年㎡)		[illegible]	-1%	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	表示
IC(千円/㎡)		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	表示
運用CO_2排出量 ($kg-CO_2$/年㎡)		-20%	-40%	-30%	-20%	58.0	34.8	40.6	46.4	表示
一次ｴﾈﾙｷﾞｰ消費量(MJ/年㎡)		-10%	-20%	-10%	-8%	1585.0	1268.0	1426.5	1458.2	
環境税										
排出権購入										
省エネルギー計算	断熱等 (PAL)	10%	20%	20%	8%	100.0	120.0	120.0	108.0	仕様基準
	空調設備 (CEC/AC)	-10%	-20%	-10%	-8%	1.5	1.2	1.4	1.4	性能基準
	換気設備 (CEC/V)	-10%	-20%	-10%	-8%	1.0	0.8	0.9	0.9	性能基準
	照明設備 (CEC/L)	-10%	-20%	-10%	-8%	1.0	0.8	0.9	0.9	性能基準
	給湯設備 (CEC/HW)	-10%	-20%	-10%	-8%	1.8	1.4	1.6	1.7	性能基準
	昇降機設備	-10%	-20%	-10%	-8%	1.0	0.8	0.9	0.9	性能基準



Tokyo Metropolitan City Government, published in Mar 2005

EEDF

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Thank you for your attention !

Acknowledgements：
This PTT was provided by Professor Ikaga,
Vice chair of the Zero Carbon Buildings Promotion Council.