

JRE CO₂ Reduction and ZEB Conversion Study Report (Summary Edition)

March 2021

Mitsubishi Jisho Sekkei Inc.



1. Background and Purpose



Background and purpose

In 2019, Mitsubishi Jisho Sekkei Inc.※(hereinafter “MJS”) collaborated with its client, Japan Real Estate Asset Management (hereinafter “JRE-AM”), to verify the possibility of reducing CO₂ emissions in the entire portfolio of 71 buildings owned by Japan Real Estate Investment Corporation (hereinafter “JRE”). The collaboration results confirmed that by retrofitting existing installations, coupled with the Net Zero Energy Building (hereinafter “ZEB”) measures, 25% or more of the CO₂ reduction rate can be achieved. The collaboration also revealed multiple properties that can be potentially converted to ZEB.

Study in 2020

Following up from the 2019 study, the following were conducted:

- ① Applied for ZEB certification for the Higashi-Gotanda 1Chome Building, which had been a candidate building for ZEB conversion in the 2019 study.
- ② Selected candidate buildings for potential ZEB conversion and conducted actual inspections and energy saving calculations. Confirmed a candidate building for ZEB certification in 2021.

※Mitsubishi Jisho Sekkei Inc. is one of the oldest architectural firm, having originated from The Marunouchi Architectural Office in Mitsubishi Company to improve Marunouchi, Tokyo as a center of Business.

We are, currently, participating in the Marunouchi rebuilding and redevelopment business, and are also actively developing overseas businesses. As more existing buildings re-assess their energy efficiency, it is inevitable that the building renovation business shall also expand. Moving forward, we will continue to make further progress by proactively working on long-term consulting operations (CM operations), safety measures such as earthquake resistance and vibration isolation, and environment-related measures such as SDGs and ESG investment from new construction to rebuilding.

2. ZEB Certification for Higashi-Gotanda 1Chome Building (BELS Certification)



What is BELS

What is BELS

"Building-Housing Energy-efficiency Labeling System"

- A certification system in which a third-party organization evaluates the energy-saving performance of buildings and displays the certification labels. From April 2014, buildings for non-residential use are required to display these labels.
- Based on the "Guidelines for Labeling Energy Consumption Performance of Buildings" established by the Ministry of Land, Infrastructure, Transport and Tourism
- The purpose is to create an environment of excellence for the energy-saving performance of buildings through proper and independent evaluation where buildings with excellent energy-saving performance are identified and recognized.
- The BELS certification agency objectively evaluates energy-saving performance based on the primary energy consumption for both new construction and existing buildings, and ranks the energy-saving performance with a five-level star mark (evaluated by BEI) ※

※BEI (Building Energy-efficiency Index)

Index for evaluating energy-saving performance of non-residential buildings

The definition of ZEB by reduction rate for standard primary energy consumption of offices, etc. is as follows.

- ZEB : Over 100% (Including energy creation)
- Nearly ZEB : Over 75% (Including energy creation)
- ZEB Ready : Over 50% (Energy saving only)
- ZEB Oriented : Over 40% (Energy saving + Introduce unevaluated technology) ※

※Those over 10,000 m²

What is BELS

What is BELS

▶ Display energy saving performance in comprehensible manner

●★★ is the energy saving standard conformity level

Number of ★	Non residential use 1 (Office, School, Factory, etc.)	Non residential use 2 (Hotel, Hospital, Restaurant, etc.)	Residential use
★★★★★	0.6	0.7	0.8
★★★★	0.7	0.75	0.85
★★★ (Guidance standard conformity level)	0.8	0.8	0.9
★★ (Energy saving standard conformity level)	1.0	1.0	1.0
★	1.1	1.1	1.1

【Compliance with energy saving standards】

Indication of conformity with primary energy and thermal insulation performance standards

【Display of UA value】

Primary energy consumption standard	Adaptation
Outer wall thermal insulation performance standard	Adaptation Ua = 0.65

【Display of “zero energy equivalent”】

Primary energy consumption standard	Adaptation (zero energy equivalent)
Outer wall thermal insulation performance standard	Adaptation Ua = 0.59



Name of Building-Housing Energy-efficiency Labeling System

▶ Reduction rate of design primary energy consumption from standard primary energy consumption.
▶ When the evaluation is performed by the dwelling building of the apartment house or the dwelling unit, it is displayed as "of this dwelling building", "of this dwelling unit", etc.

When a partial evaluation is performed using a dwelling unit, etc., information that can identify the location is displayed.
Ex) ○Mansion Room ●, etc.

In case of ZEB acquisition, the logo mark will be marked here.

The performance evaluated and displayed by BELS is the primary energy consumption performance and the heat insulation performance of the outer wall. (Source: Housing Performance Evaluation and Display Committee)

Building overview and proposed ZEB retrofits

Building overview

Floor Area : 6,460m²

Use : Office、Goods store

Number of floors : 1 floor below ground,
8 floors above ground

Year of completion : 2004 (Age of building : 17years)

Air-conditioning system : Multiple packaged
air conditioning unit system

Ventilation system : Total heat exchanger on each floor

Proposed retrofits for ZEB conversion

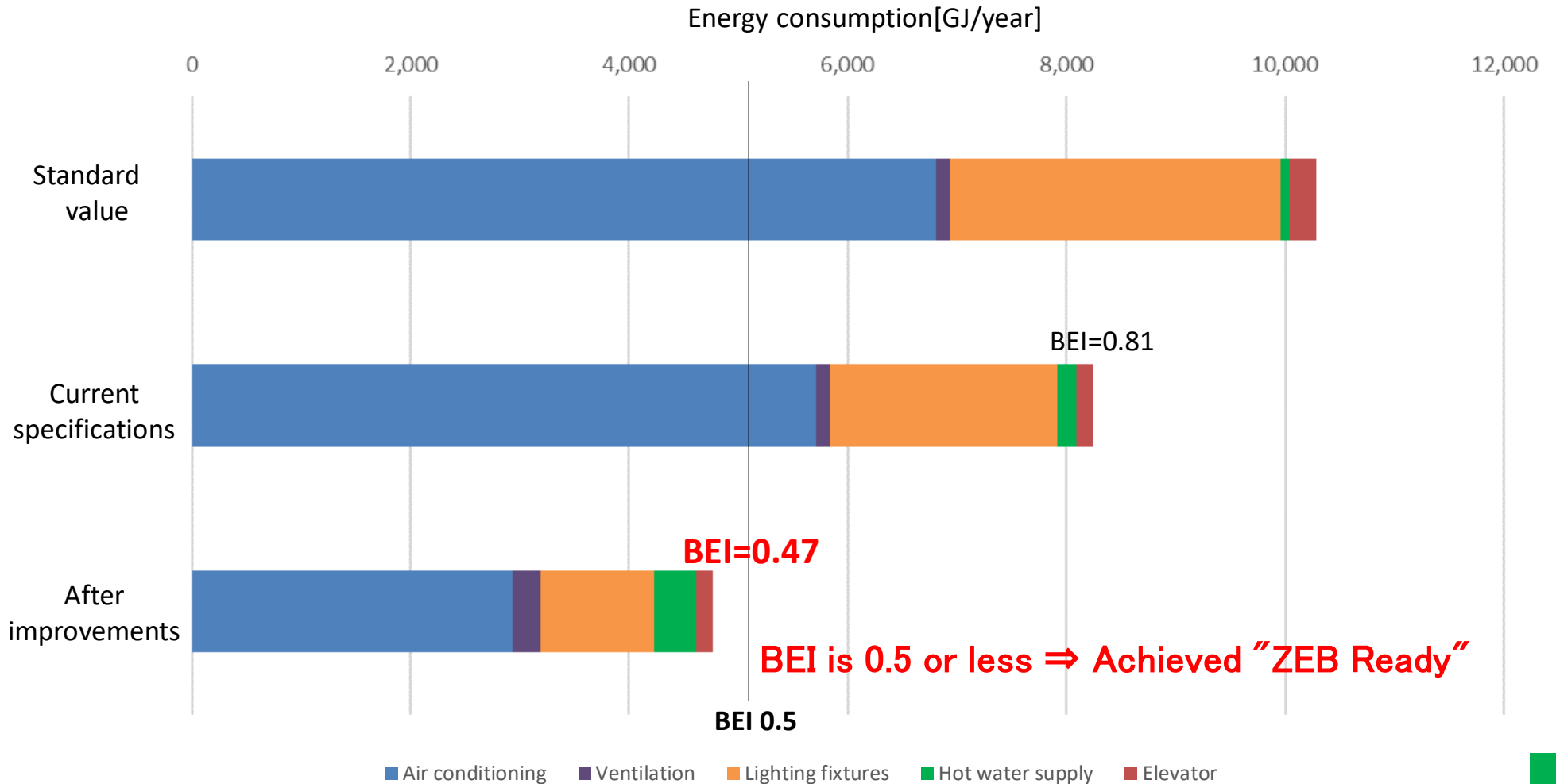
- ① Upgrade the air-conditioning units to latest model
- ② Upgrade all lighting to LED lighting and introduce lighting control
- ③ Optimize the air-conditioning system capacity
- ④ Revise the ventilation volume per person to an optimum amount
- ⑤ Assuming that goods store on the 1st floor will also be upgraded, propose to optimize the capacity



Energy saving calculation result



Energy saving calculation result (at the time of application)



ZEB certification acquisition

Documents issued by BELS certification

BELS evaluation report

BELS 評価書

申請者の連絡先

東京都千代田区大手町一丁目1番1号 大手町パークビルディング

申請者の氏名又は名称 ※複数申請者の場合は、別項に記載されます。

ジャパンリアルエステイト投資法人 執行役員 柳澤 裕

下記の建築物に関して、BELS 評価業務方法書に従って評価を行った結果について証します。
 なお、評価結果については、提出を受けた図書にて評価したものであり、それ以降の計画の変更や時間経過などによる変化がないことを保証するものではありません。

建築物の所在地 地域区分 6

東京都品川区東五反田一丁目24番2号

名称

東五反田1丁目ビル

建築物に関する基本的事項

階数 地上8階 構造 鉄骨造

延べ面積 6,462.30㎡

新築竣工時期 (計画中の場合は予定時期) 2004年7月下旬

申請対象部分に関する基本的事項

用途 事務所、店舗

改修の竣工時期 (※1)

(※1) 申請対象部分を改修する場合のみ記載されます。



評価結果

■一次エネルギー消費量基準

評価手法 (※2)	非住宅部分	通常の計算法 (平成28年基準)	住戸部分 (共用除く)	対象外
BEI の値 (削減率) (※3)	新築 (改修後等)	0.47 (53%削減)	改修前	
単位面積当たりの一次エネルギー消費量 (MJ/㎡・年)	設計値 (その他除く)	704	設計値 (その他含む)	1,136
	基準値 (その他除く)	1,528	基準値 (その他含む)	1,960

■外皮性能基準

外皮性能	非住宅部分	適合	住戸部分	-

(※2) 平成28年基準とは、建築物エネルギー消費性能基準等を定める省令 (平成28年経済産業省令・国土交通省令第1号) に基づく基準をいいます。
 (※3) 削減率は、設計一次エネルギー消費量 (その他一次エネルギー消費量を除く) の基準一次エネルギー消費量 (その他一次エネルギー消費量を除く) からの削減率をいいます。

特記事項

■「ZEB マーク」又は「ZEH マーク」、「ゼロエネ相当」、「ZEH-M マーク」に関する事項 ZEB Ready

再生可能エネルギーを除いた設計一次エネルギー消費量の基準一次エネルギー消費量からの削減率 (※4) 53%削減

再生可能エネルギーを加えた設計一次エネルギー消費量の基準一次エネルギー消費量からの削減率 (※4)

(※4) 設計・基準一次エネルギー消費量は、「その他一次エネルギー消費量」を除きます。また、再生可能エネルギー量の対象は敷地内 (オンサイト) に限定し、自家消費分に加え、売電分も対象に含まれます。住宅の場合、再生可能エネルギーは再生可能エネルギー等とし、太陽光発電システム、コージェネレーションシステムの連動によるエネルギーをいいます。

評価書交付年月日 2021年3月5日

評価書交付番号 002-01-2021-00004

評価機関名 一般財団法人日本建築センター

評価員氏名 高橋 徹

002-01-2021-00004

評価結果 (詳細)

■設備毎の単位面積当たりの一次エネルギー消費量について (MJ/㎡・年)

非住宅部分 (※5)	設備項目	空調設備	機械換気設備	照明設備	給湯設備	昇降機	エネルギー利用効率化設備
		設計値	432.08	37.87	154.23	55.88	23.61
	基準値	982.82	52.73	442.34	21.62	27.86	
住戸部分	設備項目	冷房設備	暖房設備	換気設備	照明設備	給湯設備	エネルギー利用効率化設備
		設計値					
	基準値						
共同住宅等の共用部分 (※6)	設備項目	空調設備	機械換気設備	照明設備	給湯設備	昇降機	エネルギー利用効率化設備
		設計値					
	基準値						

(※5) 非住宅の評価手法がモデル建物法の場合は、「設計値」に BEI 値が表示されます。また、「設備項目」に「エネルギー利用効率化設備」とあるのは「太陽光発電設備」となります。
 (※6) 「エネルギー利用効率化設備」の「太陽光発電設備」は自己消費量を対象としています。

参考情報

■二次エネルギー消費量に関する項目 (※7)

・設計二次エネルギー消費量

太陽光発電による削減量 (※8) : コージェネレーションによる削減量 (※9) :

電力 (買電量) (※10) : ガス : 灯油 :

・基準二次エネルギー消費量 (※11)

電力 : ガス : 灯油 :

(※7) 申請対象部分に住宅部分 (共用部分を除く) が含まれ、かつ WEB プログラム Ver.2.4.2 以降の計算結果が提出された場合に表示されます。

WEB プログラムとは、国土技術政策総合研究所及び国立研究開発法人建築研究所が公開している「エネルギー消費性能計算プログラム (住宅版)」をいいます。

(※8) 太陽光発電による発電量のうち、売電を除く自己消費量をいいます。

(※9) コージェネレーションによる発電量をいいます。

(※10) 総電力から、(※8) 及び (※9) を差し引いた電力をいいます。

(※11) 基準二次エネルギー消費量は、1) クレジット制度方法論 番号 EN-5-019 Ver.2.0「省エネルギー住宅の創案又は省エネルギー住宅への改修」に基づき算出しています。

■特記事項補足

- ・該当項目なし

■その他の項目 (申請者からの情報提供に基づいて記載した事項であり、評価に基づくものではありません。)

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Ver.20.10.26

ZEB certification acquisition

Documents issued by BELS certification



3. Study on ZEB Conversion



About ZEB conversion of existing buildings

About ZEB conversion of existing buildings

In order to achieve the SDGs target, JRE has committed to own 5 to 10 ZEBs as environment-related KPIs toward 2030. Continuing from the 2019 study, MJS and JRE-AM conducted the following specific studies to shortlist properties in the portfolio that can be retrofitted and converted to ZEB and to target these for certification.

Contents of Study for ZEB conversion of existing buildings

- Understand the current status of JRE-owned properties
- Identify the criteria for properties to be considered for ZEB
- Perform rough calculation for proposed ZEB conversion
- Select candidate properties for ZEB
- Apply for ZEB certification (Scheduled for 2021)

Verification result of Building A (simple evaluation)

Building overview

Location : Tokyo Floor area : more than 5,000m² Age of the building : more than 10 years
Air-conditioning system : multiple packaged air-conditioning unit + outdoor air processing unit (Heat source equipment)

Proposed Improvements

- ① Upgrade to the highest efficiency air-conditioning unit ② Review of air-conditioning capacity
- ③ Change ventilation system ④ Change all lightings to LED

Simple evaluation result

	BPI (Thermal insulation performance)
Current specifications	0.96

※ Before retrofit

	BEI/AC (Air conditioning only)	BEI/L (Lightings only)	BEI
Current specifications	0.74	1.00	0.81

	BEI/AC (Air conditioning only)	BEI/L (Lightings only)	BEI
After improvements	0.54	0.41	0.52

Verification result of Building B (simple evaluation)

Building overview

Location : Kansai area Floor area : more than 5,000m² Age of the building : more than 10 years
Air-conditioning system : multiple packaged air-conditioning unit system , total heat exchanger on each floor

Proposed Improvements

- ① Upgrade to the highest efficiency air-conditioning unit ② Review of air-conditioning capacity
- ③ Change all lightings to LED

Simple evaluation result

	BPI(Thermal insulation performance)
Current specifications	0.76

※ Before retrofit

	BEI/AC (Air conditioning only)	BEI/L (Lightings only)	BEI
Current specifications	0.68	0.81	0.73

	BEI/AC (Air conditioning only)	BEI/L (Lightings only)	BEI
After improvements	0.54	0.41	0.52

Verification result of Building C(detailed evaluation)

Building overview

Location : Hokuriku area Floor area : more than 5,000m² Age of the building : more than 10 years
Air-conditioning system : multiple packaged air-conditioning unit + outdoor air processing unit on each floor (Heat source equipment)

Proposed Improvements

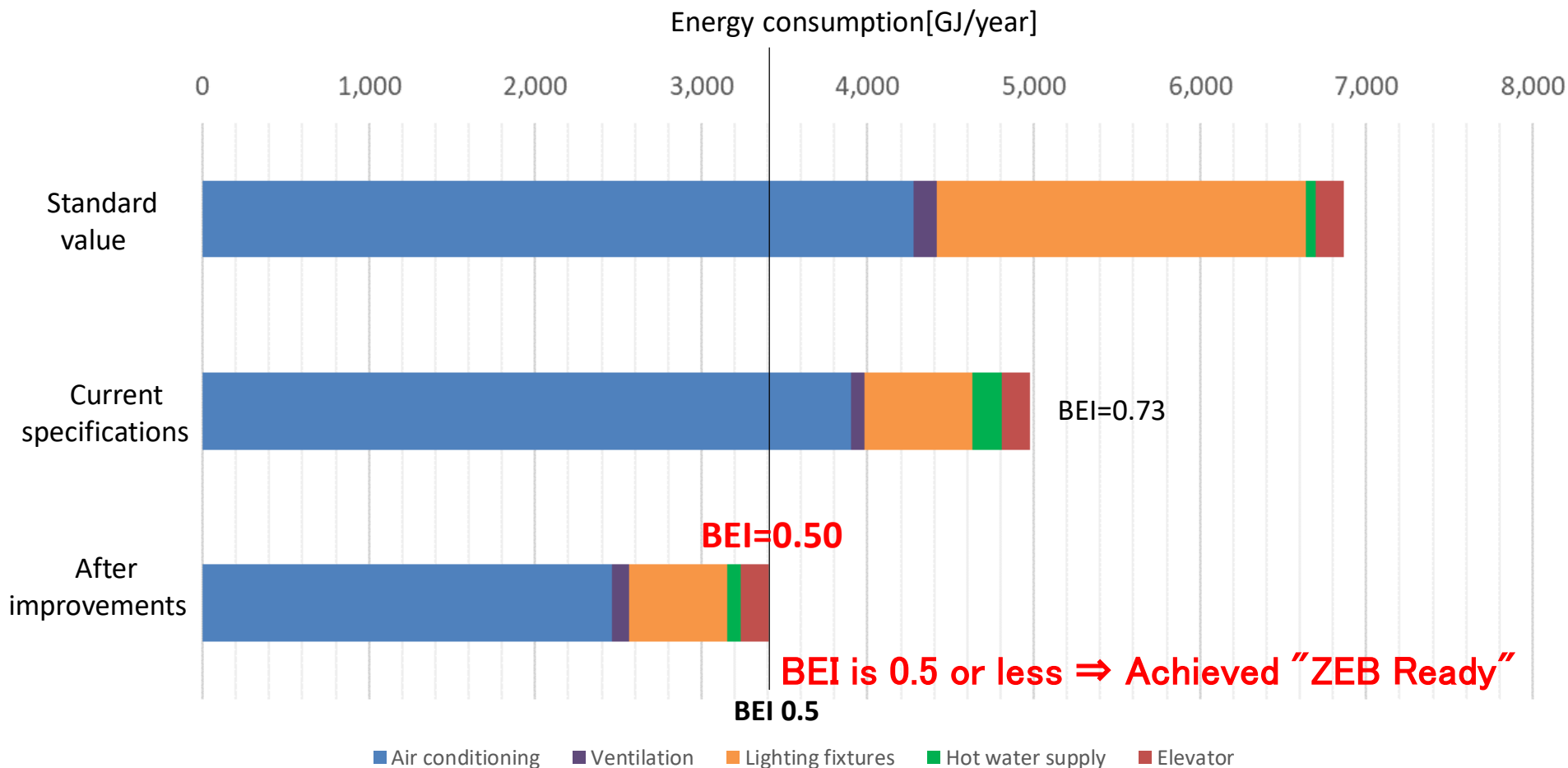
- ① Upgrade to the highest efficiency air-conditioning unit ② Review of air-conditioning capacity
- ③ Change ventilation system ④ Review of ventilation capacity ⑤ Introduce lighting control

Detailed evaluation result

- The simple calculation for BPI and BEI suggested the possibility of attaining ZEB Ready.
- When compared against Building A and Building B, it was judged that Building C offered a better operable and workable solution. Hence, Building C was selected as the building candidate for certification in 2021.
- BPI = 0.79 (Before retrofit) BEI = See next page

Verification result of Building C (detailed evaluation)

Energy saving calculation result (Conventional Input Method)



Toward the future ZEB certification in the JRE portfolio

About the study of ZEB conversion in this report:

- Continuing from the 2019 study (2 properties), a simple evaluation was conducted on 3 properties for the ZEB conversion study in 2020. The outcome of the simple evaluation suggested the possibility of attaining ZEB by applying specific measures for that purpose.
- Detailed energy-saving calculations were carried out, specifically for building C; confirming the BEI to be 0.5 or less. With such results, the application for ZEB certification shall proceed in 2021.

Going forward, JRE and MJS will continue to evaluate the actual condition of properties in the portfolio and to study potential ZEB conversions in order to achieve the aim of owning 5 to 10 ZEBs as committed in the KPI.

The results of this verification illustrate the potential for Mitsubishi Jisho Sekkei Inc. Renovation Design Department. We aim to further evolve by proactively promoting environment-related initiatives such as SDG's and ESG investment.