

# Handbook on Self-Assessment Indicator (CO<sub>2</sub> Emission Benchmark) (Brief Version)



# 1. Introduction of Self-Assessment Indicator (CO<sub>2</sub> Emission Benchmark)

Tokyo Metropolitan Government (TMG) is aiming to turn Tokyo into a low-emission yet comfortable “Smart Energy City” with a high level of disaster prevention capability, utilizing experience and skills earned through development of climate change countermeasures and the advanced energy-saving technologies of Japan.

In order to achieve this objective, it is important to promote measures to improve energy efficiency and reduce emissions in the building sector, which accounts for a large part of energy usage and carbon emissions in the city.

Against this background, TMG has established the Self-Assessment Indicator (CO<sub>2</sub> Emission Benchmark) to show the status of CO<sub>2</sub> emissions in each sector and created the Handbook on Self-Assessment Indicator (CO<sub>2</sub> Emission Benchmark) so that the businesses submitting reports in accordance with the Tokyo Carbon Reduction Reporting Program for Small and Medium-scale Facilities can ascertain the emission level of their facilities. This leaflet is the brief version of the Handbook.

The existing benchmark has been created based on CO<sub>2</sub> emissions for fiscal 2009. TMG has revised the benchmark based on the records of fiscal 2012, when new energy-saving measures and power saving initiatives were introduced subsequent to the Great East Japan Earthquake and nuclear power plant accident. In addition, the range for the benchmark has been reviewed and new categories have been added to facilitate target setting.

TMG hopes that this Handbook is widely utilized by the businesses that submitted reports in accordance with the Tokyo Carbon Reduction Reporting Program for Small and Medium-scale Facilities.

# 2. Utilization of Benchmark and Assessment on CO<sub>2</sub> Emission

Utilizing the Benchmark, businesses can find out the subject facility's variance from average CO<sub>2</sub> emission intensity of the industrial sector. Businesses can steadily step up their climate change countermeasures by aiming to reach the next range.

Compare CO<sub>2</sub> emission intensity of your facility and benchmark

**Report**

レンジ	基準	CO2排出原単位(kg-CO2/m <sup>2</sup> 範囲)	割合
A4	0.55以下	32.9 以下	8%
A3+ ~ A3-	0.55超-0.70以下	32.9 超 41.8 以下	10%
A2+ ~ A2-	0.70超-0.85以下	41.8 超 50.8 以下	17%
A1+ ~ A1-	0.85超-1.00以下	50.8 超 59.7 以下	23%
B2+ ~ B2-	1.00超-1.15以下	59.7 超 68.7 以下	19%
B1	1.15超-1.50以下	68.7 超 89.6 以下	16%
C	1.50超	89.6 超	9%
平均原単位		59.7 kg-CO2/m <sup>2</sup>	100%

Bar chart showing the percentage of facilities in each benchmark range: A4 (6%), A3+~A3- (10%), A2+~A2- (17%), A1+~A1- (23%), B2+~B2- (19%), B1 (16%), C (9%).

Staircase graphic with levels: A4, A3+, A3, A3-, A2+, A2, A2-, A1+, A1, A1-, B2+, B2, B2-, B1, C. A speech bubble says: "Gradually step up by aiming to achieve the next range".

<Reference> How to calculate benchmark

$$\text{CO}_2 \text{ emission intensity (kg-CO}_2 \text{/m}^2\text{)} = \frac{\text{CO}_2 \text{ emission (t) x 1,000}}{\text{Floor area (m}^2\text{)}}$$

||  
Benchmark

Note) “Intensity” generally refers to the amount of input required against per unit output. CO<sub>2</sub> emission intensity here refers to annual CO<sub>2</sub> emission per floor area of 1 m<sup>2</sup>.

### 3. How to Check Benchmark

Procedure 1: Search “Tokyo Carbon Reduction Reporting Program for Small and Medium-scale Facilities” on Internet search engine.

Procedure 2: Click “Reports”.



Procedure 3: The search page will be shown as below.



Procedure 4: Scroll down and enter the name of a building to be searched for in the field of “Owner of User” and click “Search”.

Procedure 5: Calculate CO<sub>2</sub> Emission Intensity using the values in the “CO<sub>2</sub> Emission in Fuel etc.”(t- CO<sub>2</sub>) and Floor Area (m<sup>2</sup>) shown in the next page.

4件中 30 件表示

事業者番号 ID	事業者名 Owner or User	事業所番号 No.	事業所等の概要(最新年度)				年度別 公表項目	年度別実績 Performance of Each Year									
			名称 Facility	所在地 Address	延床面積 (m <sup>2</sup> ) Floor	特記事項 (最新年度) Remarks		21年度 実績 (2009)		22年度 実績 (2010)		23年度 実績 (2011)		24年度 実績 (2012)		25年度 実績 (2013)	
								t	kg/m <sup>2</sup>	t	kg/m <sup>2</sup>	t	kg/m <sup>2</sup>	t	kg/m <sup>2</sup>	t	kg/m <sup>2</sup>
D0004	〇〇〇〇株式会社	0001	〇〇第1ビルディング	東京都新宿区〇〇1-1-1	1234.56	CO <sub>2</sub> 排出状況	燃料等	75		72		69		70	56.7	68	55.0
						目標	達成状況										有
						対策の実施状況											

Calculation of CO<sub>2</sub> Emission Intensity for reference (Note that CO<sub>2</sub> Emission Intensity for fiscal 2012 has been officially announced)  
 (Example) CO<sub>2</sub> Emission Intensity=70(t) x 1,000/1,234.56(m<sup>2</sup>) = 56.7(kg- CO<sub>2</sub>/m<sup>2</sup>)

Procedure 6: Check the building size and confirm the emission range in the benchmark list of the corresponding size.

Example: Benchmark list for small-sized buildings for rent (1,000 m<sup>2</sup> or larger but smaller than 3,000 m<sup>2</sup>)  
 Classification number: Buildings for rent (office, small-sized)

[1] Self evaluation index (benchmark)

Range	Ratio to the average value	Range of CO <sub>2</sub> emission intensity (kg-CO <sub>2</sub> /m <sup>2</sup> )	Number of facilities	Percentage	Average floor area (m <sup>2</sup> )
A4	0.55 or less	34.1 or less	48	9.3%	2029
A3 +	More than 0.55-0.60 or less	More than 34.1	37.2 or less	30	1902
A3	More than 0.60-0.65 or less	More than 37.2	40.3 or less	26	1765
A3 -	More than 0.65-0.70 or less	More than 40.3	43.4 or less	36	1891
A2 +	More than 0.70-0.75 or less	More than 43.4	46.5 or less	33	2040
A2	More than 0.75-0.80 or less	More than 46.5	49.6 or less	27	2001
A2 -	More than 0.80-0.85 or less	More than 49.6	52.7 or less	23	215
A1 +	More than 0.85-0.90 or less	More than 52.7	55.8 or less	33	2097
A1	More than 0.90-0.95 or less	More than 55.8	58.9 or less	23	2070
A1 -	More than 0.95-1.00 or less	More than 58.9	Average value 61.9 or less	30	2117
B2 +	More than 1.00-1.05 or less	Average value/more than 61.9	65.0 or less	25	1933
B2	More than 1.05-1.10 or less	More than 65	68.1 or less	25	1989
B2 -	More than 1.10-1.15 or less	More than 68.1	71.2 or less	17	2214
B1	More than 1.15-1.50 or less	More than 71.2	92.9 or less	88	1977

Calculation result of 56.7(kg- CO<sub>2</sub>/m<sup>2</sup>) falls under range A1.

➔ **A1**

## 4. Benchmark Lists (for reference)

### Small-sized Buildings for Rent (Office, 1,000 m<sup>2</sup> or larger but smaller than 3,000 m<sup>2</sup>)

#### [1] Self evaluation index (benchmark)

Range	Ratio to the average value	Range of CO <sub>2</sub> emission intensity (kg-CO <sub>2</sub> /m <sup>2</sup> )	Number of facilities	Percentage	Average floor area (m <sup>2</sup> )
A4	0.55 or less	34.1 or less	48	9.3%	2029
A3 +	More than 0.55-0.60 or less	More than 34.1	30	17.8%	1902
A3	More than 0.60-0.65 or less	More than 37.2	26		1765
A3 -	More than 0.65-0.70 or less	More than 40.3	36		1891
A2 +	More than 0.70-0.75 or less	More than 43.4	33	16.1%	2040
A2	More than 0.75-0.80 or less	More than 46.5	27		2001
A2 -	More than 0.80-0.85 or less	More than 49.6	23		2157
A1 +	More than 0.85-0.90 or less	More than 52.7	33	16.6%	2097
A1	More than 0.90-0.95 or less	More than 55.8	23		2070
A1 -	More than 0.95-1.00 or less	More than 58.9	30		2117
B2 +	More than 1.00-1.05 or less	Average value/more than 61.9	25	13.0%	1933
B2	More than 1.05-1.10 or less	More than 65	25		1989
B2 -	More than 1.10-1.15 or less	More than 68.1	17		2214
B1	More than 1.15-1.50 or less	More than 71.2	88	17.0%	1977
C	More than 1.50	More than 92.9	53	10.3%	1647
Total			517	Average	1966

#### [2] Percentage

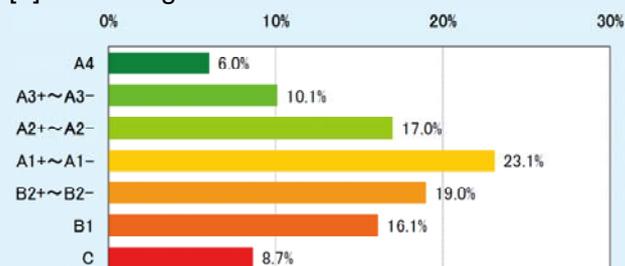


### Medium-sized Buildings for Rent (Office, 3,000 m<sup>2</sup> or larger but smaller than 10,000 m<sup>2</sup>)

#### [1] Self evaluation index (benchmark)

Range	Ratio to the average value	Range of CO <sub>2</sub> emission intensity (kg-CO <sub>2</sub> /m <sup>2</sup> )	Number of facilities	Percentage	Average floor area (m <sup>2</sup> )
A4	0.55 or less	32.9 or less	46	6.0%	5530
A3 +	More than 0.55-0.60 or less	More than 32.9	19	10.1%	4823
A3	More than 0.60-0.65 or less	More than 35.9	28		5718
A3 -	More than 0.65-0.70 or less	More than 38.9	30		5657
A2 +	More than 0.70-0.75 or less	More than 41.8	36	17.0%	5117
A2	More than 0.75-0.80 or less	More than 44.8	50		6048
A2 -	More than 0.80-0.85 or less	More than 47.8	44		5242
A1 +	More than 0.85-0.90 or less	More than 50.8	69	23.1%	5424
A1	More than 0.90-0.95 or less	More than 53.8	62		5855
A1 -	More than 0.95-1.00 or less	Average value 59.7 or less	45		5195
B2 +	More than 1.00-1.05 or less	Average value/more than 59.7	55	19.0%	5864
B2	More than 1.05-1.10 or less	More than 62.7	54		5822
B2 -	More than 1.10-1.15 or less	More than 65.7	36		6088
B1	More than 1.15-1.50 or less	More than 68.7	123	16.1%	5519
C	More than 1.50	More than 89.6	66	8.7%	5853
Total			763	Average	5616

#### [2] Percentage

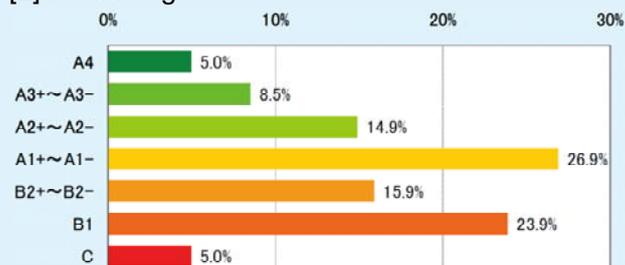


### Semi-large-sized Buildings for Rent (Office, 10,000 m<sup>2</sup> or larger but smaller than 20,000 m<sup>2</sup>)

#### [1] Self evaluation index (benchmark)

Range	Ratio to the average value	Range of CO <sub>2</sub> emission intensity (kg-CO <sub>2</sub> /m <sup>2</sup> )	Number of facilities	Percentage	Average floor area (m <sup>2</sup> )
A4	0.55 or less	32.8 or less	10	5.0%	13061
A3 +	More than 0.55-0.60 or less	More than 32.8	5	8.5%	14108
A3	More than 0.60-0.65 or less	More than 35.8	7		13770
A3 -	More than 0.65-0.70 or less	More than 38.8	5		11952
A2 +	More than 0.70-0.75 or less	More than 41.8	9	14.9%	11890
A2	More than 0.75-0.80 or less	More than 44.7	10		14068
A2 -	More than 0.80-0.85 or less	More than 47.7	11		14794
A1 +	More than 0.85-0.90 or less	More than 50.7	18	26.9%	13933
A1	More than 0.90-0.95 or less	More than 53.7	17		14284
A1 -	More than 0.95-1.00 or less	Average value 59.6 or less	19		14168
B2 +	More than 1.00-1.05 or less	Average value/more than 59.6	15	15.9%	14081
B2	More than 1.05-1.10 or less	More than 62.6	13		14004
B2 -	More than 1.10-1.15 or less	More than 65.6	4		13488
B1	More than 1.15-1.50 or less	More than 68.6	48	23.9%	14434
C	More than 1.50	More than 89.4	10	5.0%	13881
Total			201	Average	13977

#### [2] Percentage

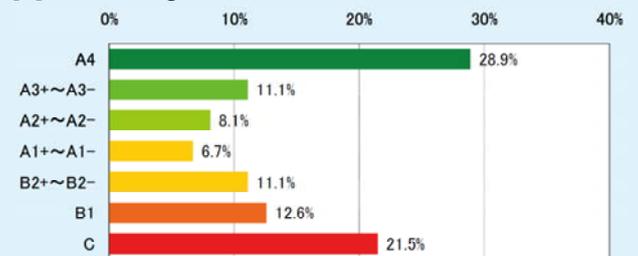


## Small-sized Buildings for Rent (Complex commercial facilities, 1,000 m<sup>2</sup> or larger but smaller than 3,000 m<sup>2</sup>)

### [1] Self evaluation index (benchmark)

Range	Ratio to the average value	Range of CO <sub>2</sub> emission intensity (kg-CO <sub>2</sub> /m <sup>2</sup> )	Number of facilities	Percentage	Average floor area (m <sup>2</sup> )
A4	0.55 or less	91.1 or less	39	28.9%	1649
A3 +	More than 0.55-0.60 or less	More than 91.1	4		1720
A3	More than 0.60-0.65 or less	More than 99.3	6	11.1%	1709
A3 -	More than 0.65-0.70 or less	More than 107.6	5		1721
A2 +	More than 0.70-0.75 or less	More than 115.9	3		1379
A2	More than 0.75-0.80 or less	More than 124.2	4	8.1%	1617
A2 -	More than 0.80-0.85 or less	More than 132.4	4		1796
A1 +	More than 0.85-0.90 or less	More than 140.7	3		2117
A1	More than 0.90-0.95 or less	More than 149.0	2	6.7%	1813
A1 -	More than 0.95-1.00 or less	More than 157.3	4		1917
B2 +	More than 1.00-1.05 or less	Average value/more than 165.5	5		1961
B2	More than 1.05-1.10 or less	More than 173.8	7	11.1%	2034
B2 -	More than 1.10-1.15 or less	More than 182.1	3		2571
B1	More than 1.15-1.50 or less	More than 190.4	17	12.6%	1923
C	More than 1.50	More than 248.3	29	21.5%	1753
Total			135	Average value	1783

### [2] Percentage

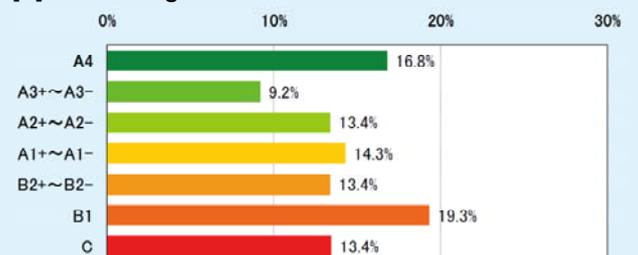


## Medium-sized Buildings for Rent (Complex commercial facilities, 3,000 m<sup>2</sup> or larger but smaller than 10,000 m<sup>2</sup>)

### [1] Self evaluation index (benchmark)

Range	Ratio to the average value	Range of CO <sub>2</sub> emission intensity (kg-CO <sub>2</sub> /m <sup>2</sup> )	Number of facilities	Percentage	Average floor area (m <sup>2</sup> )
A4	0.55 or less	76.4 or less	20	16.8%	5684
A3 +	More than 0.55-0.60 or less	More than 76.4	2		6147
A3	More than 0.60-0.65 or less	More than 83.3	1	9.2%	3965
A3 -	More than 0.65-0.70 or less	More than 90.3	8		6782
A2 +	More than 0.70-0.75 or less	More than 97.2	5		6219
A2	More than 0.75-0.80 or less	More than 104.1	5	13.4%	6388
A2 -	More than 0.80-0.85 or less	More than 111.1	6		6469
A1 +	More than 0.85-0.90 or less	More than 118.0	1		7996
A1	More than 0.90-0.95 or less	More than 125.0	7	14.3%	5218
A1 -	More than 0.95-1.00 or less	More than 131.9	9		6051
B2 +	More than 1.00-1.05 or less	Average value/more than 138.8	5		5994
B2	More than 1.05-1.10 or less	More than 145.8	4	13.4%	4497
B2 -	More than 1.10-1.15 or less	More than 152.7	7		4234
B1	More than 1.15-1.50 or less	More than 159.7	23	19.3%	5771
C	More than 1.50	More than 208.2	16	13.4%	4973
Total			119	Average value	5672

### [2] Percentage



## Semi-large-sized Buildings for Rent (Complex commercial facilities, 10,000 m<sup>2</sup> or larger but smaller than 20,000 m<sup>2</sup>)

### [1] Self evaluation index (benchmark)

Range	Ratio to the average value	Range of CO <sub>2</sub> emission intensity (kg-CO <sub>2</sub> /m <sup>2</sup> )	Number of facilities	Percentage	Average floor area (m <sup>2</sup> )
A4	0.55 or less	54.8 or less	3	7.5%	16663
A3 +	More than 0.55-0.60 or less	More than 54.8	1		10472
A3	More than 0.60-0.65 or less	More than 59.8	3	10.0%	15116
A3 -	More than 0.65-0.70 or less	More than 64.8	0		0
A2 +	More than 0.70-0.75 or less	More than 69.8	1		15390
A2	More than 0.75-0.80 or less	More than 74.7	4	15.0%	12777
A2 -	More than 0.80-0.85 or less	More than 79.7	1		17598
A1 +	More than 0.85-0.90 or less	More than 84.7	2		12428
A1	More than 0.90-0.95 or less	More than 89.7	4	25.0%	14769
A1 -	More than 0.95-1.00 or less	More than 94.7	4		14410
B2 +	More than 1.00-1.05 or less	Average value/more than 99.6	2		15386
B2	More than 1.05-1.10 or less	More than 104.6	3	17.5%	12348
B2 -	More than 1.10-1.15 or less	More than 109.6	2		11641
B1	More than 1.15-1.50 or less	More than 114.6	5	12.5%	12314
C	More than 1.50	More than 149.4	5	12.5%	10928
Total			40	Average value	13470

### [2] Percentage



## 5. Emission Range of the Benchmark

The benchmark consists of 15 ranges in seven grades. The ranges were created by referring to other countries' systems including the Display Energy Certificate (DEC) of the U.K., in consideration of the consistency and comparability with similar systems. Upward from the average CO<sub>2</sub> Emission Intensity line to the top of the list there are A1, A2, A3 and A4 ranges in a descending order; and downward from the average CO<sub>2</sub> Emission Intensity line to the bottom of the list there are B2, B1 and C ranges in an ascending order. A1 through A3 and B2 ranges are further broken down into smaller ranges.

Range		Emission Intensity
A4	A4	55% or less of the average
A3	A3 <sup>+</sup>	More than 55% but 60% or less of the average
	A3	More than 60% but 65% or less of the average
	A3 <sup>-</sup>	More than 65% but 70% or less of the average
A2	A2 <sup>+</sup>	More than 70% but 75% or less of the average
	A2	More than 75% but 80% or less of the average
	A2 <sup>-</sup>	More than 80% but 85% or less of the average
A1	A1 <sup>+</sup>	More than 85% but 90% or less of the average
	A1	More than 90% but 95% or less of the average
	A1 <sup>-</sup>	More than 95% to 100% of the average
Average line		
B2	B2 <sup>+</sup>	More than 100% but 105% or less of the average
	B2	More than 105% but 110% or less of the average
	B2 <sup>-</sup>	More than 110% but 115% or less of the average
B1	B1	More than 115% but 150% or less of the average
C	C	More than 150% of the average

## 6. Points to be Noted When Using the Benchmark

These benchmarks can be utilized irrespective of the size of the facility because the intensity is calculated by dividing CO<sub>2</sub> emission by floor area. However, as CO<sub>2</sub> emission from facilities varies depending on the operation time and the composition of equipment, it is important to grasp actual emission status accurately as necessary.

As for buildings for rent, factors other than energy saving performance must be considered as the total energy consumption by the building is largely affected by the energy consumption of each tenant.

Please refer to the examples of factors that can affect the benchmark when making an assessment.

### [1] Status of operation

Tenants opening around-the-clock tend to emit a large amount of CO<sub>2</sub>.

### [2] CO<sub>2</sub> emission of fitness clubs largely varies depending on the existence of a swimming pool in the club.

### [3] Usage of the room

CO<sub>2</sub> emission of an office building varies depending on the existence of a server room and the floor area of conference rooms and warehouse.

### [4] Buildings for rent

- Vacancy rate (The greater the vacancy rate than average, the less the CO<sub>2</sub> emission becomes)
- Usage (CO<sub>2</sub> emission increases if the building has a server room consuming a large amount of energy.)
- Operation time (whether there are tenants opening around-the-clock)

## 7. Benchmarks of Major Industrial Sectors (Results for Fiscal 2012)

No.	Industrial Sector	Average Intensity (kg- CO <sub>2</sub> /m <sup>2</sup> )	Number of Facilities (valid data)	Average Floor Area
1	Offices (tenant area only)	63.6	727	1,457.6
2	Office (company building)	52.0	573	4,231.9
3	Buildings for Rent (office, small-sized)	61.9	517	1,966.3
	Buildings for Rent (office, medium-sized)	59.7	763	5,616.3
	Buildings for Rent (office, semi-large-sized)	59.6	201	13,977.0
4	Buildings for Rent (complex commercial facilities, small-sized)	165.5	135	1,783.4
	Buildings for Rent (complex commercial facilities, medium-sized)	138.8	119	5,671.7
	Buildings for Rent (complex commercial facilities, semi-large-sized)	99.6	40	13,469.6
5	Convenience Stores	456.6	3,646	141.9
6	Drug Stores	230.1	312	340.8
7	General Supermarkets/Department Stores	204.5	423	3,999.0
8	Fresh Foods Retailers	303.2	694	1,772.4
9	Food Producing Retailers	638.0	355	81.1
10	Retailers of Clothing and Accessories	98.0	168	958.1
11	New Car Dealers	51.6	267	1,668.3
12	Restaurants	496.2	1,569	239.5
13	Bars/Taverns	301.5	1,127	279.9
14	Hamburger Shops	600.5	413	219.5
15	Cafes	324.8	394	139.4
16	Korean Barbecue Restaurants	458.2	119	183.5
17	Chinese Foods and Ramen Noodle Restaurants	876.4	183	106.4
18	Other Restaurants	601.1	439	145.1
19	Inns/Hotels	103.8	158	4,311.1
20	Schools/Educational Facilities	19.9	1,781	7,338.4
21	Hospitals/Clinics	86.2	48	5,213.2
22	Nurseries	49.0	241	959.7
23	Health/Nursing Care Facilities	62.5	423	2,316.8
24	Fitness Clubs	178.9	146	3,247.7
25	Pachinko Parlors	224.9	89	1,068.1
26	Karaoke Boxes	198.5	168	635.4
27	Game Centers	259.9	50	905.2
28	Libraries	52.6	149	1,981.4
29	Museums	56.7	63	2,758.4
30	Ward/City/Town/Village Halls	44.5	62	7,778.2