

## V 資料編

別添資料 1： 第 5 回「バンコク都・横浜市都市間連携：企業による脱炭素ビジネスの機会」ワークショップ 発表資料

# Yokohama City's Decarbonization Initiatives: Collaboration with Private Sector in the Central Waterfront Area

Zero Carbon and GREEN×EXPO Promotion Bureau  
City of Yokohama

October 1, 2025

明日をひらく都市  
OPEN×PIONEER

## Profile of Yokohama City

Population : **3,769,150** people

Number of households : **1,827,978** household

Area : **438.01** km<sup>2</sup>

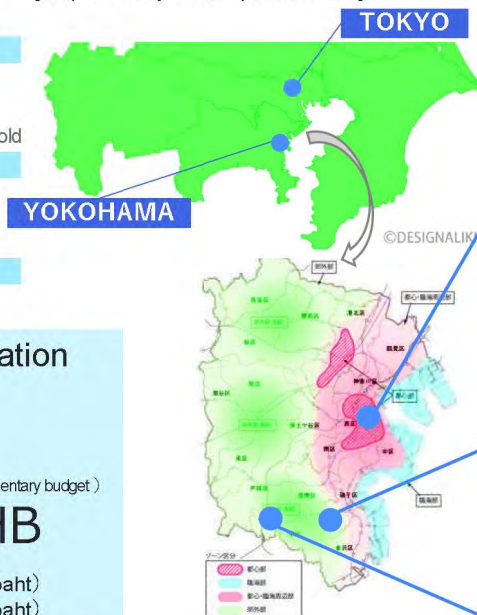
Significantly expand the decarbonization budget year by year

FY2025: **17.71** billion JPY  
(including FY2024 supplementary budget)

Converted to THB... **3.84 billion THB**

FY2024 8.00 billion JPY (Converted to THB: 1.73 billion baht)  
FY2023 4.55 billion JPY (Converted to THB: 0.99 billion baht)

[Map of Tokyo Metropolitan Area]



The Central Waterfront Area (Minatomirai 21)



Suburban Area (Kamigo Neopolis)



Suburban Area (Maioka Furusato Village)

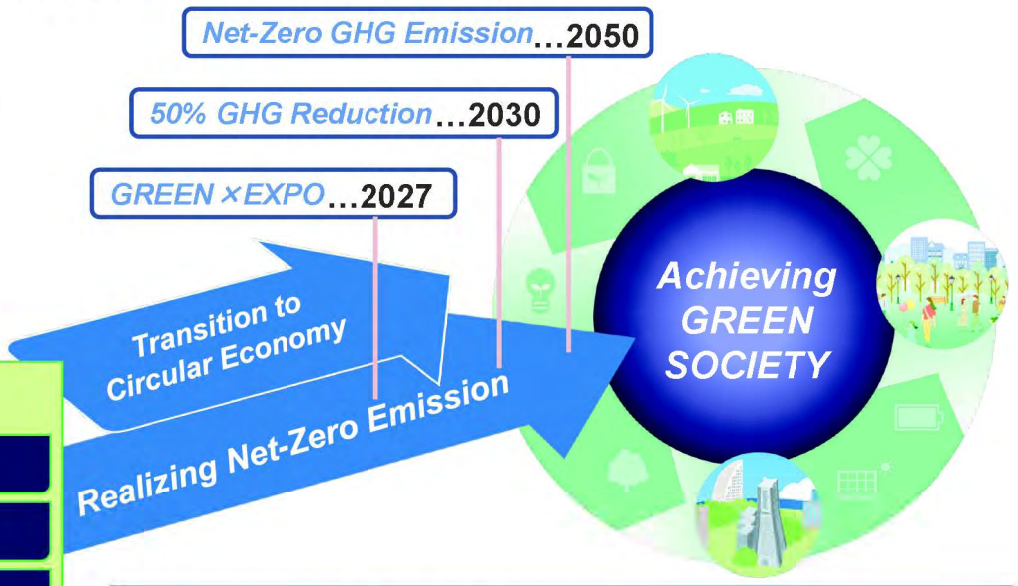
※ Population and Number of Households:  
As of April 1, 2025

Reference: Yokohama City Planning Master Plan  
(General Framework)

# Yokohama's Strategy Toward Green Society

Around **64–90%** of Japan's CO<sub>2</sub> is Emitted From **Cities!**

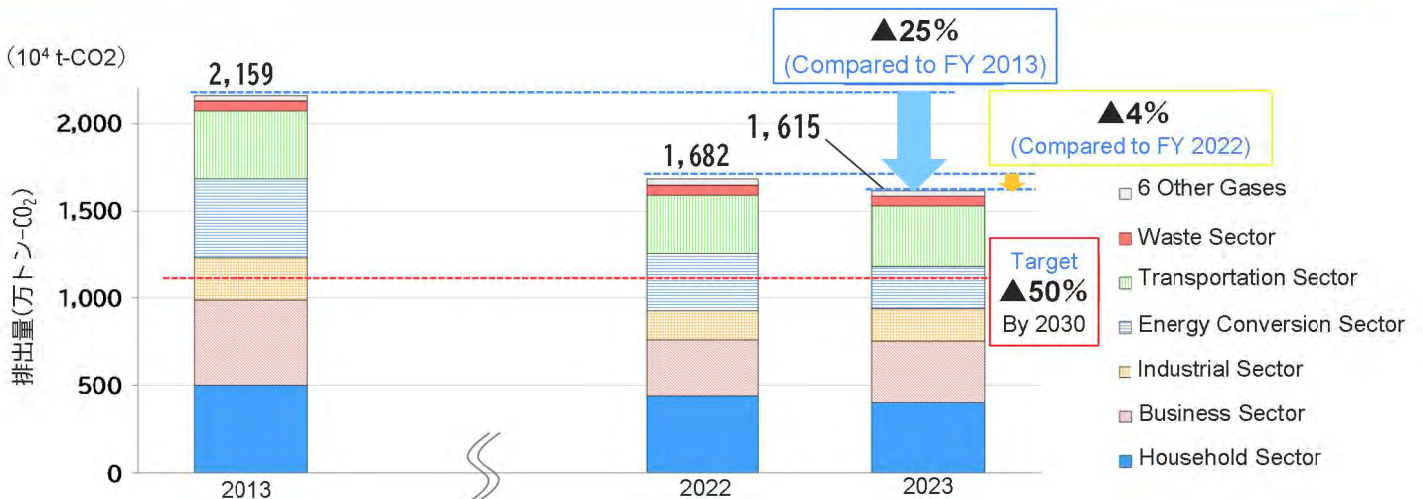
- 4 Pillars of Our Climate**
1. Empowering Citizens
  2. Empowering Businesses
  3. Implementing Innovative Tech
  4. Taking Actions As Local Gov.



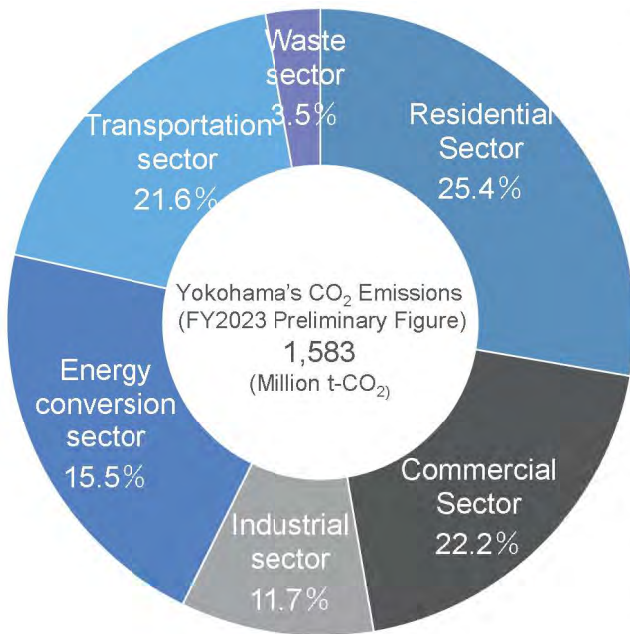
- **Develop KPIs** in each measure
- **Double** the budget on climate actions (yr 2025 vs. 2024)

# City-wide Greenhouse Gas Emissions

- In FY2023, greenhouse gas emissions within the city totaled **16.15 million tons**
- Compared to the base year (FY 2013), there has been a **25% decrease** (the lowest ever). The target is to halve emissions by 2030 and achieve net zero by 2050.



## Co<sub>2</sub> Emissions by Sector



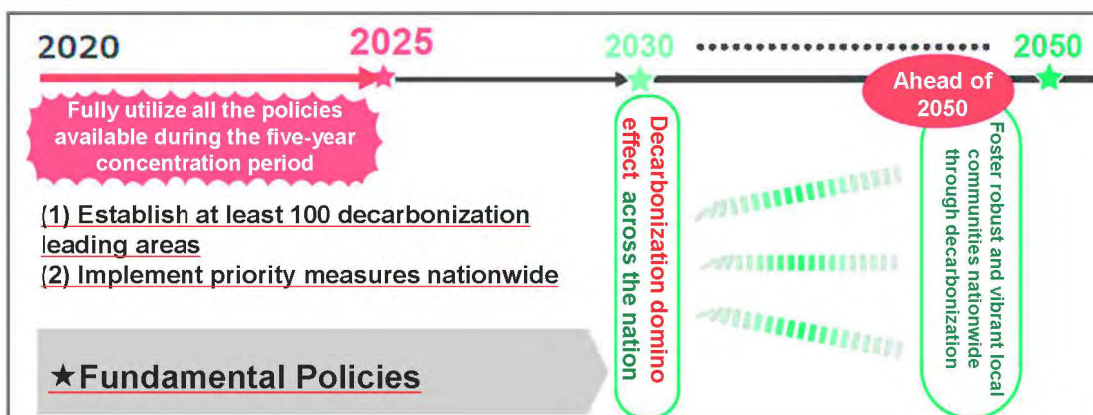
## Comparing Yokohama with National Averages:

- **Industrial Sector:** Lower emissions compared to the national average of 34.3%
- **Residential and Energy Sectors:** Higher emissions than the national averages (National average: Residential: 14.9%, Energy: 8.1%)

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## The Regional Decarbonization Roadmap (Established by the Japanese Government in 2021)

- Fully utilize all the policies available over the next five years to actively support initiatives through the allocation of human resources, technology, information, and financing.
- Establish 100 decarbonization leading areas.
- Initiate decarbonization at the regional level and expand the efforts nationwide to foster a “decarbonizing domino effect.”



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## Selection as a Decarbonization Leading Area

Minatomirai 21 has been selected as a decarbonization leading area (April 2022).

A joint proposal by the City of Yokohama and Yokohama Minato Mirai 21, a general incorporated association



A ceremony for presenting certificates to selected decarbonization leading areas

Achieve decarbonization of Yokohama by 2050 through establishing a decarbonization model for a big city



Minatomirai 21 has been selected as a decarbonization leading area.

## Minatomirai 21 district



Working Population	Approximately 144,000 people	FY2024
Number Of Offices	Approximately 2,010 companies	FY2024
Number Of Visitors	Approximately 82,6 million people	FY2024
Land Use	<b>186 hectares</b> <ul style="list-style-type: none"> <li>• residential land : 87 hectares</li> <li>• Roads and railways : 42 hectares</li> <li>• Park green space : 46 hectares</li> <li>• Pier : 11 hectares</li> </ul>	

- Minatomirai 21 is a hub for offices, commercial facilities, and residences. It also hosts a variety of functions, including business headquarters, research and development facilities, music halls, universities, and MICE facilities (Meetings, Incentive Travels, Conventions, Exhibitions/Events).
- Yokohama Minato Mirai 21 is a general incorporated association that is responsible for the management of the town.
- The area accounts for as much as 10% of the energy consumed by the city's commercial sector.

## Participants in the Decarbonization Leading Area

45 facilities in the MinatoMirai 21 district (as of September 2025)



## Promotion Structure of MinatoMirai 21 District

### Holding of the “Zero Emissions Subcommittee”

#### (1) Purpose of Establishment

- Established as a “**Subcommittee Dedicated to Decarbonization**” within the Minato Mirai 21 district
- The purpose is to lead and drive initiatives toward achieving decarbonization in MinatoMirai 21 district.

#### (2) Structure

Yokohama Minato Mirai 21 Corporation  
 City of Yokohama  
 Facilities Participating in the Decarbonization Leading Area

#### (3) Agenda

- Sharing information on initiatives toward decarbonization in the district, including implementation of renewable energy and resource circulation efforts
- Sharing of best practices and exchange of opinions among participants, etc.



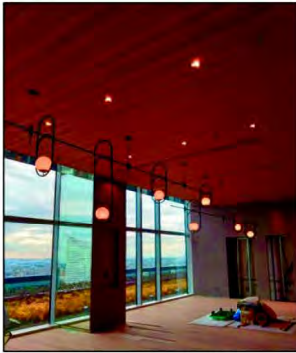
## 1. Maximization of energy saving

### (1) Accelerated conversion to LED

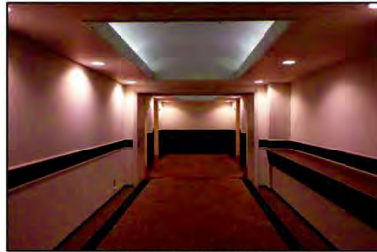
In order to promote thorough energy saving throughout the district, efforts will be made to accelerate LED conversion in facilities that have been using conventional light fixtures.

### (2) Promotion of Net Zero Energy Buildings

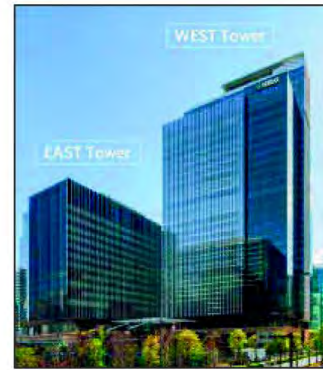
Buildings to be constructed in the future will be required to have maximum energy saving performance.



Yokohama Symphostage



Yokohama Landmark Tower



Yokohama Symphostage

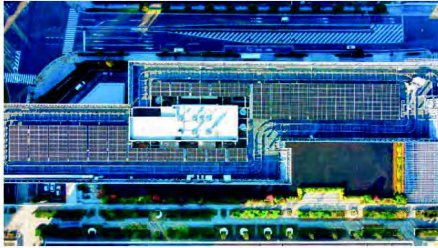
## 2. Conversion of electric power sources to renewable energy

### (1) Installation of photovoltaic power generation facilities on buildings in the decarbonization leading area

New and additional installation of photovoltaic power generation facilities will be planned for buildings inside the decarbonization leading area with a possibility of installation on roofs, etc.



## 2. Conversion of electric power sources to renewable energy



■Yokohama Baycourt Club Hotel & Spa Resort/The Kahala Hotel & Resort Yokohama

Panel generation capacity:  
approximately **170 kW**



■Yokohama World Porters

Panel generation capacity:  
approximately **55 kW**



■Minato Mirai 21 District  
Heating and Cooling Center Plant

Panel generation capacity:  
approximately **3.75 kW**

## Movements Toward The Adoption of Next-Generation Photovoltaic

- At PACIFICO Yokohama, convention complexes, one of the solutions of the next-generation photovoltaics called “BIPV(Building-Integrated Photovoltaics) inner-type”, which AGC Inc. manufactures and installs, was permanently installed for the first time in Japan in June 2025.
- City of Yokohama is conducting a demonstration experiment in collaboration with AGC Inc., utilizing the city hall building, since December 2024 and supports the social implementation of new technologies.

### < BIPV inner-type >

“BIPV inner-type” is a photovoltaic which can be installed on a window frame without construction of existing windows or a building itself. It enables power generation utilizing the window surface, which has been previously difficult to utilize. Furthermore, its simple installation process reduces the difficulty of implementation and offers the advantage of cost reduction of installation.



The Installation at PACIFICO Yokohama



A Demonstration Experiment Conducted at  
Yokohama City Hall

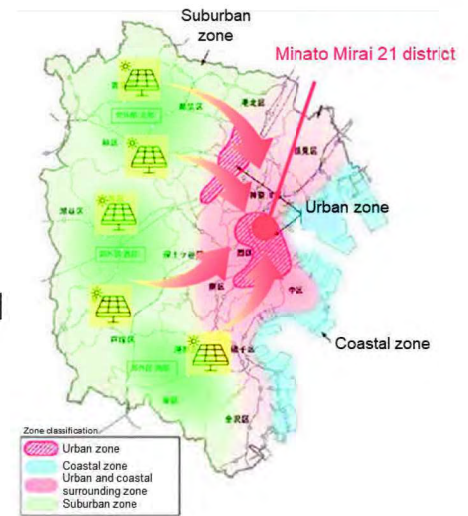
Reference: A press release issued by Pacific Convention Plaza Yokohama (PACIFICO Yokohama), “Solar Power-Generating Glass Permanently Installed in the Exhibition Hall-The Generated electricity is also used for commercial automatic cleaning robots”

## 2. Conversion of electric power sources to renewable energy

### (2) Supply of external electric power generated from renewable energy to the decarbonization leading area

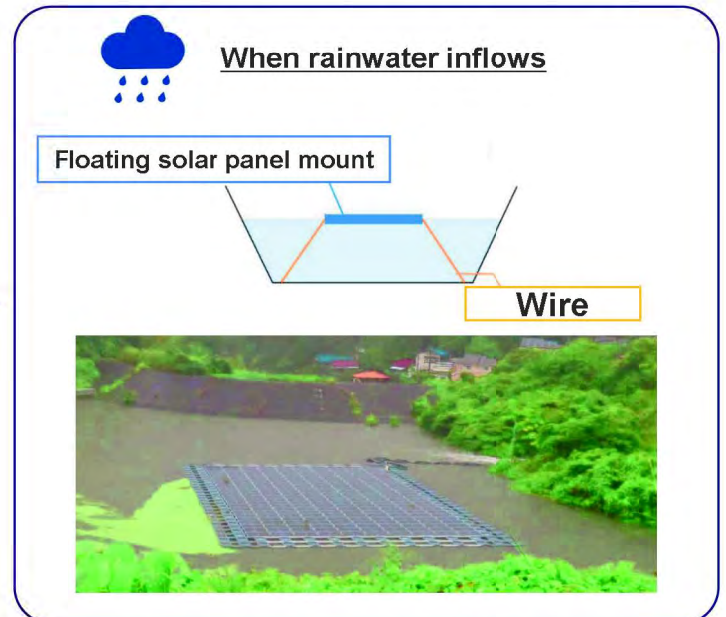
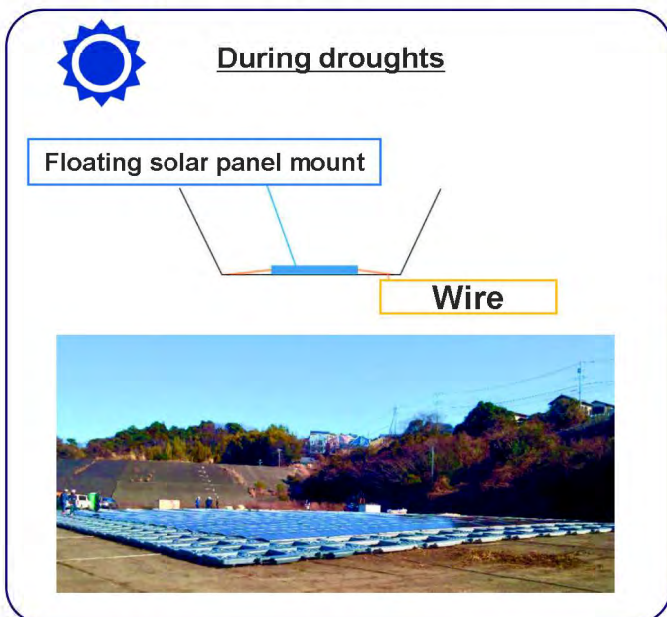
#### (a) Utilization of unused spaces in public facilities

Utilizing unused spaces in public facilities located outside the city's decarbonization leading area, photovoltaic power generation facilities will be installed to provide electric power supply to the decarbonization leading area.



## 2. Conversion of electric power sources to renewable energy

### Utilizing the city's stormwater retention pond (floating solar panel structure)



## 2. Conversion of electric power sources to renewable energy

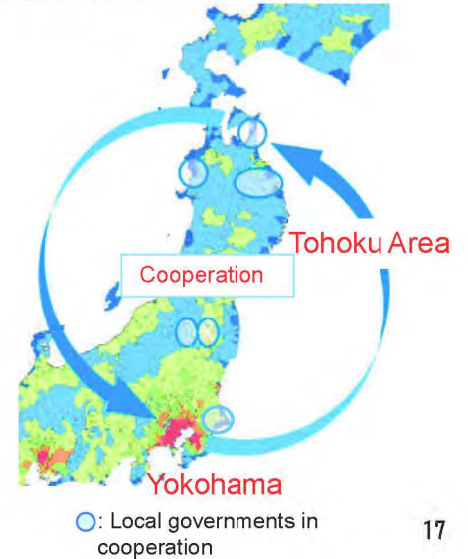
- Cooperation with local governments that have abundant renewable energy resources to secure renewable electricity
- **Supply renewable electricity to some facilities in Minato Mirai 21 through collaboration with private sector**
  - Various exchange projects are conducted with 17 local governments mainly in Tohoku Area



Annual exchange product exhibition at Yokohama City hall



Mutual exchange of high school students between Aizu and Yokohama



## 3. Reducing and Eliminating Carbon Emissions in Regional Cooling and Heating Systems

- MinatoMirai 21 district has adopted one of Japan's largest regional heating and cooling systems, and has achieved energy-efficient heating and cooling.
- The use of regional heating and cooling is incorporated into the master agreement on tower development and is currently utilized in all buildings within MinatoMirai 21 Central District.



### < Regional Heating and Cooling >

This system centrally produces cooling water, steam, and other thermal energy in a state-of-the-art, high-efficiency plant and supplies them to buildings within the district. Compared to installing a heating and cooling system in each building, it offers advantages such as improved energy efficiency.

### < Master Agreement on Town Development >

Approximately 40 years ago, when urban development began in the MinatoMirai 21 district, region-specific regulations were established to promote harmonious town development. These regulations include various provisions, such as restrictions on advertising materials to preserve the urban landscape.

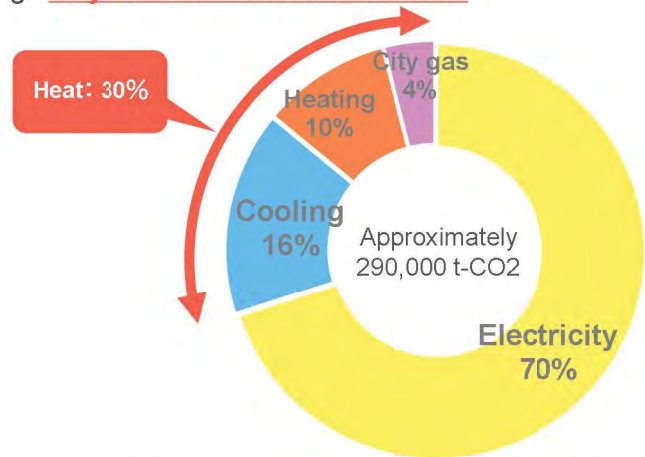


### 3. Reducing and Eliminating Carbon Emissions in Regional Cooling and Heating Systems

- 70% of CO2 emissions in Minato Mirai 21 derives from electricity consumption, 30% from heat utilization
- Our endeavor to **provide CO2-free heat (Equivalent to approximately 30% of emissions from heat use)** at the largest scale in Japan through **City to Business collaboration**



District heat plant supplying to Minato Mirai 21  
One of the world's largest inverter-driven turbo chillers



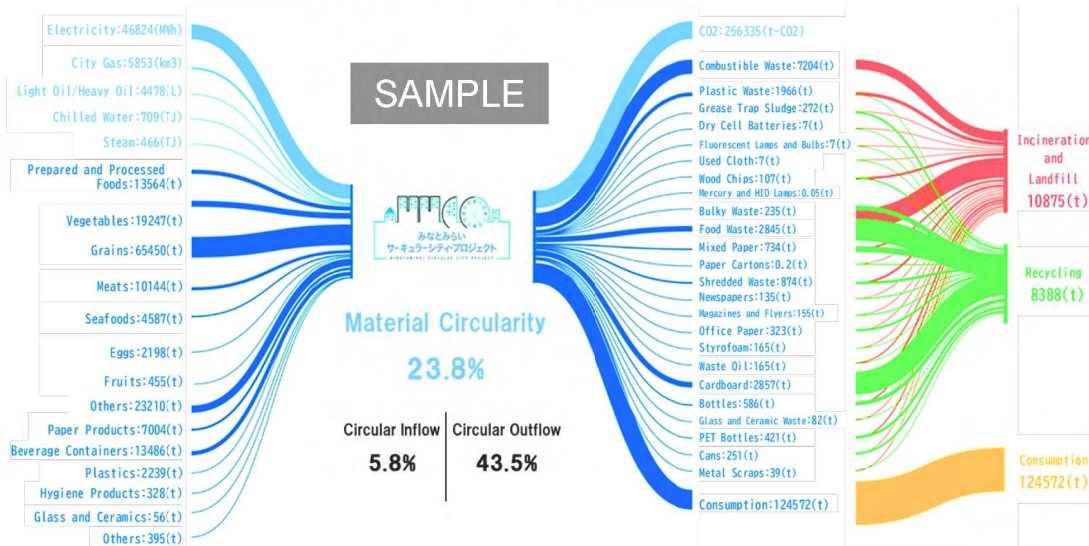
CO2 emissions by demand in Minato Mirai 21 (FY2019)

■ Electricity ■ Cooling ■ Heating ■ City gas

### 4. Quantifying the “Circularity” of Yokohama’s Leading Business District

- Develop Material Flow Diagram
- Evaluate Inflow/Outflow Circularity in the District
- Raise Awareness of Citizens on Resource Circulation

t : weight (ton)  
TJ: energy consumption (tera-joule)



## 5. Holding of events, etc. to urge individual citizens and business operators toward decarbonization behavioral changes

Taking advantage of the Minato Mirai 21 district's ability to attract customers and transmit information, an effort will be made to urge many people, both visitors and employees, in the district to make **behavioral changes toward decarbonization** through PR initiatives and holding events, etc.



### Wrapping Up

- In MinatoMirai 21 district, we are aiming for **“100% net renewable energy in electricity consumption” by fiscal year 2030.**
- We are also aiming to establish a **“decarbonization model for metropolitan areas through public-private collaboration”** while we promote initiatives toward low-carbon and decarbonization of heat and resource circulation!

#### Progress in Decarbonizing Electricity

**40%**

[ Participating Facilities' Net Renewable Energy Rate ]

**24** Facilities / 43 Facilities

[ Number of participating facilities which have converted electric power sources to renewable energy ]

( Performance as of End of March 2025 )

## GREEN × EXPO 2027

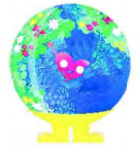
(International Horticultural Expo 2027, Yokohama, Japan)

Scenery of Future Cities Realized by Green Innovation & Nature-based Solutions.



### Event facts

- **Host City**  
Yokohama
- **Period**  
March 19 – Sept. 26, 2027
- **Expected Visitors**  
Over 10 million
- **Official Participants**  
70+ countries and international organizations



## THE 5TH WORKSHOP

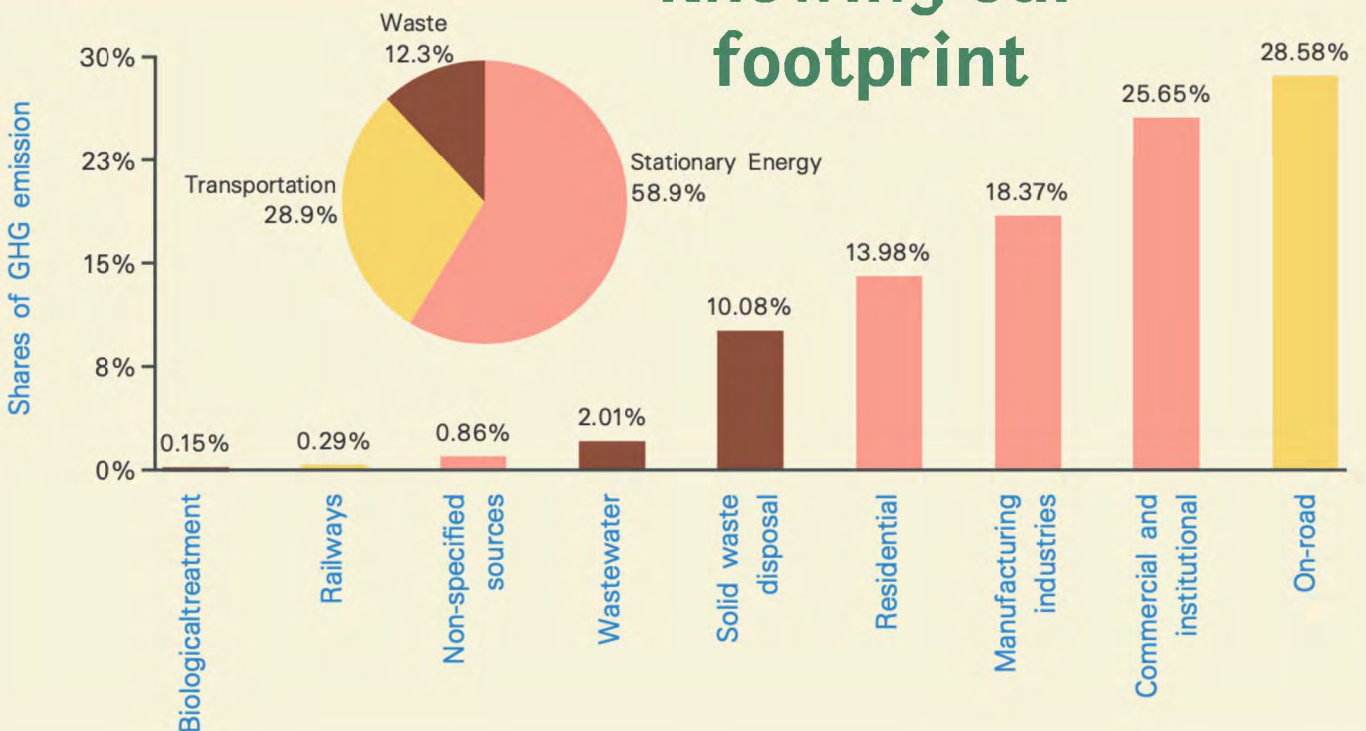
"NET ZERO EMISSIONS BUSINESS OPPORTUNITY UNDER BANGKOK-YOKOHAMA CITY TO CITY COLLABORATION PROGRAM"

# BANGKOK'S CLIMATE ACTION MOMENTUM

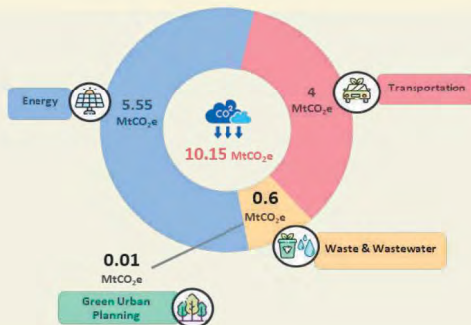
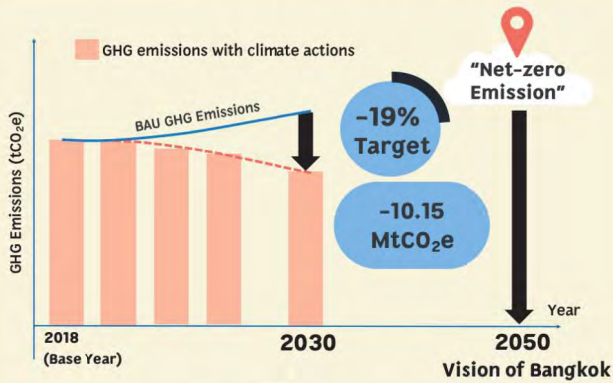


# BANGKOK IS A LIVABLE CITY FOR ALL.

## Knowing our footprint

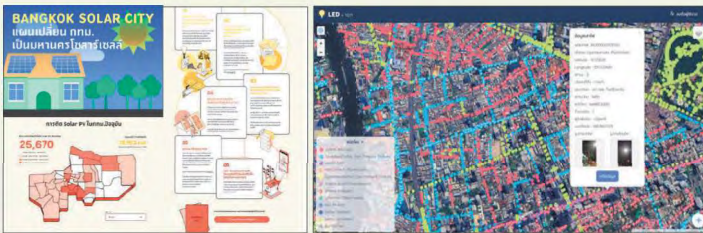


# GHG Reduction Target 2030



Projected GHG emissions under BAU in 2030 = 53.93 MtCO<sub>2</sub>e  
Target GHG emissions in 2030 = 43.78 MtCO<sub>2</sub>e  
GHG emission reduction target in 2030 = 10.15 MtCO<sub>2</sub>e (19%)"

## ENERGY



- BANGKOK SOLAR CITY
- SOLAR GUIDEBOOK
- SOLAR ROOFTOP

LED 98,800 streetlights  
(Reduce GHG = 36,390 tCO<sub>2</sub>e)

## WASTE & WASTEWATER



- Waste Reduction, Segregation at Source
- "No Mixed Waste"
- Expand the service area of wastewater treatment systems

## TRANSPORT

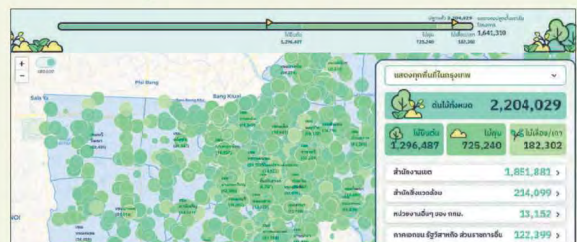


"EV motorcycle taxi"  
Pilot project at Din Daeng and Phaya Thai Districts



BMA Feeder

## GREEN SPACE



One Million Trees Campaign



**Waste-to-Energy**

- Today: 500 tons/day
- 2026: 2,500 tons/day (Total 70 MW) + Potentially another 1,000 ton/day

**Turning away from landfills**

- Today: Landfill 54%, Compost/RDF 40%, W2E 6%
- 2026: Landfill 21%, Compost/RDF 51%, W2E 28%



# Implementation for Households (S)

Voluntary = Separators < Non-Separators

Voluntary measures



Economic measures

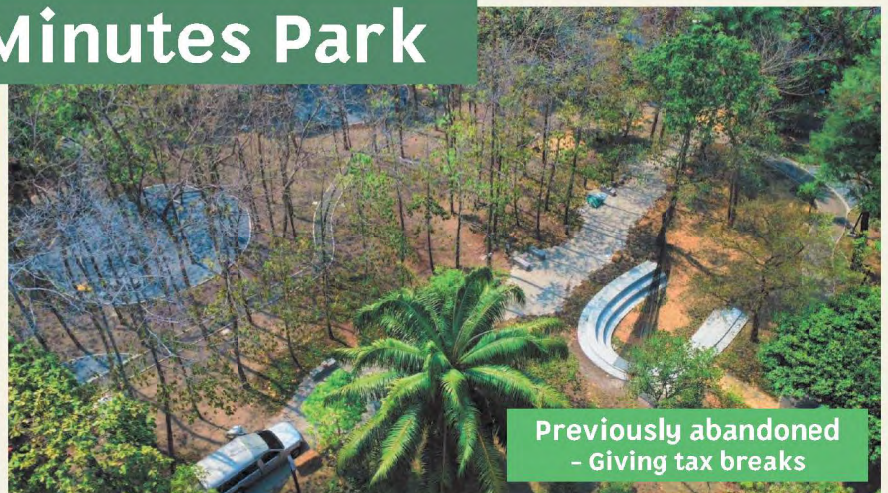
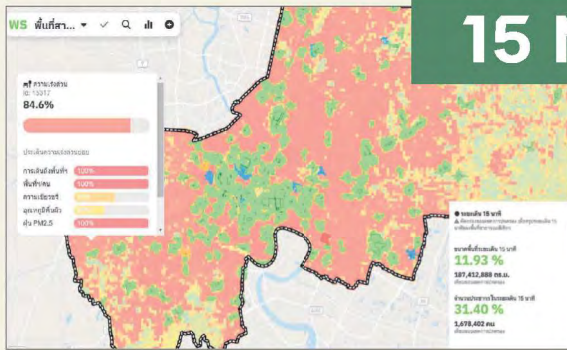


Legal measures



The draft of the waste separation ordinance for Bangkok is currently being prepared.

## 15 Minutes Park



# CHALLENGES AND OPPORTUNITIES



## TECHNOLOGICAL AND INNOVATION

- CARBON CAPTURE
- GREEN HYDROGEN



## FINANCIAL INVESTMENT

- PLANNING AND PREPARATION OF SUFFICIENT BUDGET
- POTENTIAL TO ACCESS GREEN FINANCE



## GLOBAL COLLABORATION

- EXCHANGE OF BEST PRACTICES AND KNOWLEDGE
- FINANCIAL AND TECHNICAL EXPERT SUPPORT



## CARBON CREDIT

- DEVELOP THE PILOT PROJECT FOR CARBON CREDIT



ดาวน์โหลดแอปพลิเคชัน **BKK WASTE PAY**






Download on the App Store

ANDROID APP ON Google play

สอบถามข้อมูล สำนักสิ่งแวดล้อม กรุงเทพมหานคร ☎ 0 2203 2928 หรือฝ่ายรักษาความสะอาดและสวนสาธารณะ ทั้ง 50 เขต (ในเวลาราชการ)

กทม. ชวนร่วมโครงการ

# บ้านดี ไม่แถม

: แยกขยะลดค่าธรรมเนียม

ดาวน์โหลดคู่มือวิธีการลงทะเบียน >



# Bangkok

## Waste and Waste-Water Action Plan 2025-2030

"For the implementation of the Bangkok  
Master Plan on Climate Change  
2021-2030"



Assoc. Prof. Dr. Wilasinee Yoochatchaval

1<sup>st</sup> October 2025

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## Content

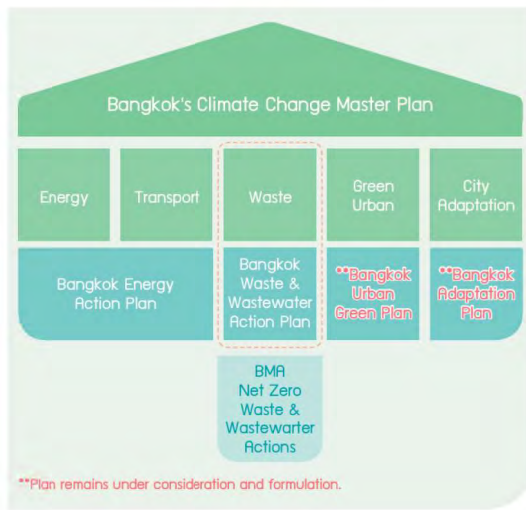
1. Introduction
2. Goals and Objectives of the Bangkok Waste and Waste-Water Action Plan 2025-2030
3. Alignment with the Bangkok Master Plan on Climate Change 2021-2030
4. Current Landscape of Waste and Waste-Water in Bangkok
5. Key Strategies of the Bangkok Waste and Waste-Water Action Plan 2025-2030
6. Key Measures of the Bangkok Waste and Waste-Water Action Plan 2025-2030
7. Monitoring and Evaluation
8. Financial Options
9. Future Considerations



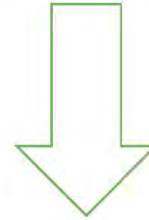
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# 1

## Introduction



### Bangkok Climate Change Master Plan 2021–2030



- JICA&Yokohama City – to – City Collaboration for Zero-Carbon Society
- Climate Change Act
- Onsite treatment
- Waste separation

### Bangkok Waste and Waste-Water Action Plan 2025–2030

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# 2

## Goals and Objectives of the Bangkok Waste and Waste-Water Action Plan 2025–2030

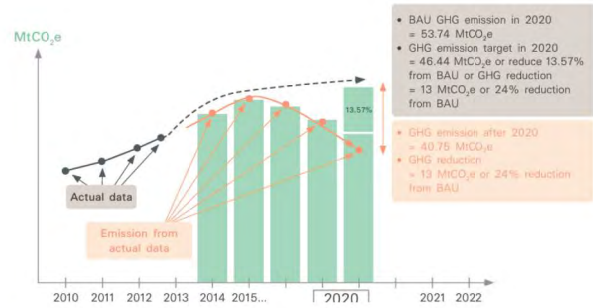
1. Define GHG reduction targets for the Waste and Waste-Water sectors, aligning seamlessly with the measures stipulated in the Bangkok Master Plan on Climate Change 2021-2030
2. Define the concrete action for the measurement and reporting of GHG emission.
3. Establish a comprehensive framework and operational direction at the action plan level, ensuring a tangible reduction of GHG emissions in the waste and wastewater sectors throughout Bangkok.
4. Provide operational guidelines for various agencies under BMA, fostering consistency and alignment of efforts, thus contributing to the creation of a sustainable and continuous trajectory.
5. Actively encourage and facilitate the engagement of relevant agencies under the BMA, spanning the public, private, and governmental sector

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# 3

## Alignment with the Bangkok Master Plan on Climate Change 2021-2030

Sector	GHG inventory in 2018 (base year)	GHG inventory (BAU Scenario) in 2030	GHG reduction/absorption target under Bangkok Master Plan's mitigation measure in 2030	Reduction/absorption rate against BAU
Transportation	12.63	14.24	4.00	28%
Energy	25.73	33.88	5.55	16%
Waste and Wastewater	5.37	5.81	0.60	10%
<b>Total (Emissions)</b>	<b>43.73</b>	<b>53.93</b>	<b>10.15</b>	<b>19%</b>
AFOLU/ Green Urban Planning	NE*	NE	0.01**	NE



### Remark:

NE = Not Estimated

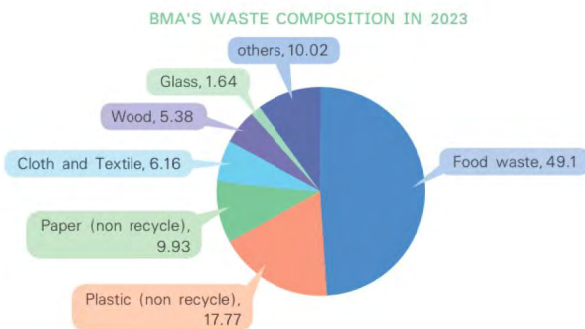
\* = GHG emission calculation is according to the Agriculture, Forestry and Other Land Use (AFOLU) sector, which is not estimated.

\*\* = Calculated from the potential of GHG absorption of green urban planning measure which equals to 0.008 MtCO<sub>2</sub>e approximately.

# 4

## Current Landscape of Waste and Waste-Water in Bangkok

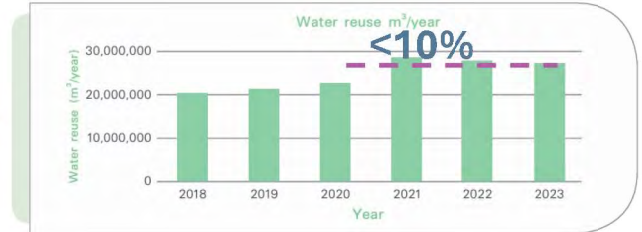
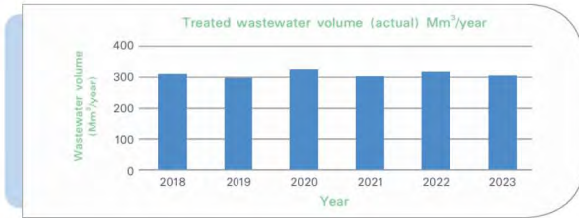
### Waste



# 4

## Current Landscape of Waste and Waste-Water in Bangkok

### Wastewater



# 5

## Key Strategies of the Bangkok Waste and Waste-Water Action Plan 2025-2030

### Strategy I

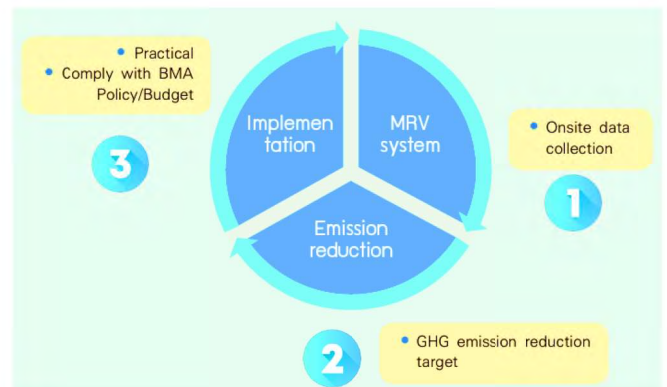
Data collection and MRV system

### Strategy II

Emission reduction target

### Strategy III

Practical and compliance with BMA's policies and Budget





## Key Measures of the Bangkok Waste and Waste-Water Action Plan 2025–2030

### Solid waste management

Measure (and the alignment with BMA master plan)	Responsible unit	Duration
<p>1. Waste Reduction, Segregation at Source measurement and Reduce the amount of waste sent to final disposal(WM1):</p> <p>1.1 Waste reduction measures include minimizing the use of resources and materials.</p> <p>1.2 Campaign to promote, raise awareness, and encourage the public to change their behavior to separate waste and reusable items for proper utilization and disposal.</p> <ul style="list-style-type: none"> <li>- Projects to develop the staff capacity.</li> <li>- District offices to campaign and promote activities.</li> <li>- The Environment Department to campaign and promote waste reduction and separation</li> </ul>	<p><b>Main Agencies:</b> Office of Environment/ District Offices</p> <p><b>Supporting Agencies:</b> All agencies under the Bangkok Metropolitan Administration</p>	2025-2030

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## Key Measures of the Bangkok Waste and Waste-Water Action Plan 2025–2030

### Solid waste management

Measure (and the alignment with BMA master plan)	Responsible unit	Duration
<ul style="list-style-type: none"> <li>- Seminars and study visits on comprehensive waste segregation without mixing. The “No Mixing” project.</li> <li>- Collaboration projects between government and private sectors to install electronic waste collection points across Bangkok.</li> <li>- Collaborative projects between Bangkok Metropolitan Administration and the private sector to manage and reduce food waste.</li> <li>- Collaborative projects between Bangkok Metropolitan Administration and government agencies (e.g., Office of Natural Resources and Environmental Policy and Planning - ONEP) to reduce food waste, including:</li> <li>- Green Office Project Bangkok Carbon Footprint Project</li> </ul>	<p><b>Main Agencies:</b> Office of Environment/ District Offices</p> <p><b>Supporting Agencies:</b> All agencies under the Bangkok Metropolitan Administration</p>	2025-2030

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## Key Measures of the Bangkok Waste and Waste-Water Action Plan 2025–2030

### Solid waste management

Measure (and the alignment with BMA master plan)	Responsible unit	Duration
<p>Measures to Reuse Waste as Resources at the Source:</p> <p>2.1 Utilization of Organic Waste</p> <p>2.1.1 Promote household separation of organic waste for utilization by producing compost at the source.</p> <p>2.1.2 Encourage medium- and large-scale waste generators, such as department stores and hotels, to separate organic waste for utilization by producing compost at the source or by providing it to farmers for use as animal feed.</p> <p>2.2 Utilization of Recyclable Waste (an indirect measure for reducing greenhouse gas emissions, not included in the calculation)</p>	<p><b>Main Agencies:</b> Office of Environment/ District Offices</p> <p><b>Supporting Agencies:</b> All agencies under the Bangkok Metropolitan Administration</p>	2025-2030

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## Key Measures of the Bangkok Waste and Waste-Water Action Plan 2025–2030

### Solid waste management

Measure (and the alignment with BMA master plan)	Responsible unit	Duration
<p>2.2 Utilization of Recyclable Waste</p> <p>2.2.1 Promote waste separation at the source among households</p> <p>2.2.2 Develop a recyclable waste collection system for further utilization</p> <p>Examples include district offices designating specific days for recyclable waste collection, encouraging the private sector to operate vehicles for purchasing recyclable waste, and installing recyclable waste collection points in Bangkok Metropolitan Administration agencies, as well as in other public and private sector offices, related activities Include:</p>	<p><b>Main Agencies:</b> Office of Environment/ District Offices</p> <p><b>Supporting Agencies:</b> All agencies under the Bangkok Metropolitan Administration</p>	2025-2030

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## Key Measures of the Bangkok Waste and Waste-Water Action Plan 2025–2030

### Solid waste management

Measure (and the alignment with BMA master plan)	Responsible unit	Duration
<ul style="list-style-type: none"><li>- “Magic Hands” campaign x “No Mixing” project</li><li>- “Separate, Exchange, Return” project (No Mixing)</li><li>- Bangkok “Magic Hands” project for Responsible unit Budget Duration waste separation - “Pee Mai Kuat” (Brother Broom)</li><li>- Recycling separation activities such as recycling markets, “Sap Thawee Recycling” (Waste Bank), and recycling donation ceremonies</li><li>- Old calendar collection campaigns</li><li>- Wacoal Bra Day - collecting old bras</li></ul>	<b>Main Agencies:</b> Office of Environment/ District Offices  <b>Supporting Agencies:</b> All agencies under the Bangkok Metropolitan Administration	2025-2030

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## Key Measures of the Bangkok Waste and Waste-Water Action Plan 2025–2030

### Solid waste management

Measure (and the alignment with BMA master plan)	Responsible unit	Duration
<p>3. Measures to Improve the Efficiency of the Waste Collection System by Designing an Effective Waste Collection System</p> <p>3.1 Develop an organic waste collection system for utilization by having district offices provide dedicated vehicles to collect organic waste from households, as well as medium- and large-scale establishments, and deliver it to the Bangkok Metropolitan Administration’s organic composting facilities.</p>	<b>Main Agencies:</b> Office of Environment/ District Offices  <b>Supporting Agencies:</b> All agencies under the Bangkok Metropolitan Administration	2025-2030

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## Key Measures of the Bangkok Waste and Waste-Water Action Plan 2025–2030

### Solid waste management

Measure (and the alignment with BMA master plan)	Responsible unit	Duration
<p>3.2 Optimize waste collection routes to match vehicle load capacity, with a plan to collect waste at least twice per week on average. Incorporate waste collection routes into maps (Google Maps) and use GPS to monitor operations along designated routes (GHG emissions from this activity are not included in the calculations).</p> <p>3.3 Improve the waste collection system by using low-emission collection and transport vehicles. (GHG emissions from this activity are not included in the calculations.)</p>	<p><b>Main Agencies:</b> Office of Environment/ District Offices</p> <p><b>Supporting Agencies:</b> All agencies under the Bangkok Metropolitan Administration</p>	2025-2030

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## Key Measures of the Bangkok Waste and Waste-Water Action Plan 2025–2030

### Solid waste management

Measure (and the alignment with BMA master plan)	Responsible unit	Duration
<p>4. Measures for Waste Management Using Environmentally Friendly Technologies</p> <p>4.1 Waste Management through Incineration (WM2)</p> <ul style="list-style-type: none"> <li>- Nong Khaem Waste Disposal Center: 1,000 tons/day</li> <li>- On Nut Waste Disposal Center: 1,000 tons/day</li> </ul> <p>4.2 Waste Management Using Mechanical-Biological Technology (WM3)</p> <ul style="list-style-type: none"> <li>- Mechanical-Biological Treatment (MBT) Plant at On Nut Waste Disposal Center: 300 tons/day</li> </ul> <p>4.3 Measures for Converting Organic Waste into Compost (WM4)</p> <ul style="list-style-type: none"> <li>- Installation project for food waste processing machinery at On Nut Waste Disposal Center: 30 tons/day</li> <li>- Installation project for food waste processing machinery at Nong Khaem Waste Disposal Center: 30 tons/day</li> </ul>	Department of Environment	2025-2030

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## Key Measures of the Bangkok Waste and Waste-Water Action Plan 2025–2030

### Solid waste management

Measure (and the alignment with BMA master plan)	Responsible unit	Duration
<p>5. Legal and Economic Measures</p> <p>5.1 Develop and enforce laws that encourage the public to reduce and segregate waste at the source.</p> <p>5.2 Implement legal measures in conjunction with economic measures through the Bangkok Metropolitan Regulation on Service Fees for Wastewater and Solid Waste Management under the Public Health Law, B.E. 2568 (2025).</p> <p>5.3 Provide awards or organize competitions for waste sources that effectively manage waste at the source, following the principles of Zero Waste.</p>	<p>Department of Environment/ District Offices Budget Duration</p>	<p>2025-2030</p>

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## Key Measures of the Bangkok Waste and Waste-Water Action Plan 2025–2030

### Wastewater management

Measure (and the alignment with BMA master plan)	Responsible unit	Duration
<p>1. Construction of Wastewater Treatment Systems (WM5)</p> <p>1.1 Centralized Wastewater Treatment Systems Includes the Thonburi Wastewater Treatment System, Khlong Toei Wastewater Treatment System, Bueng Nong Bon Wastewater Treatment System, and Min Buri Wastewater Treatment System Phase 2.</p> <p>1.2 Onsite Wastewater Treatment Systems</p> <p>1.3 Cluster Wastewater Treatment Systems</p> <p><i>(Every 1 cubic meter of treated wastewater helps reduce greenhouse gas emissions by 82.125 kg CO<sub>2</sub>)</i></p>	<p>DDS</p>	<p>2025-2030</p>

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## Key Measures of the Bangkok Waste and Waste-Water Action Plan 2025–2030

### Wastewater management

Measure (and the alignment with BMA master plan)	Responsible unit	Duration
2. Measures to Improve Wastewater Collection System and Expand Service Areas (WM6) 2.1 Development of laws and regulations. 2.2 Construction of additional wastewater collection systems.	DDS/District	2025-2030
3. Measures for Resource Recovery 3.1 Utilization of Sewage Sludge (WM7) <i>(Every 1 kilogram of sludge reused reduces greenhouse gas emissions by 25 kg CO<sub>2</sub>.)</i> 3.2 Reuse of Treated Wastewater (WM8) <i>(Every 1 cubic meter of treated wastewater reused reduces greenhouse gas emissions by 0.5081 kg CO<sub>2</sub>.)</i>	DDS	2025-2030

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## Key Measures of the Bangkok Waste and Waste-Water Action Plan 2025–2030

### Wastewater management

Measure (and the alignment with BMA master plan)	Responsible unit	Duration
4. Measures for Collecting Wastewater Fees	DDS	

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# 7

## Monitoring and Evaluation



- Sustainable Environment and Climate Change Division, under the Sustainable Environment Management Section, Environment Department – serving as the main coordinating agency.



- Task Forces (TFs) for driving the implementation of projects under the Bangkok Climate Change Master Plan 2021–2030 in specific sectors, such as sustainable transport, energy efficiency improvement, waste 3)



- Steering Committee for the Bangkok Climate Change Master Plan 2021–2030 – providing strategic oversight and guidance to ensure effective implementation of the master plan. and wastewater management, green urban planning, and climate change adaptation strategies

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# 8

## Financial Options

- Green Bonds or Sustainability-Linked Bonds for environmentally friendly projects



- Public-Private Partnerships (PPP)



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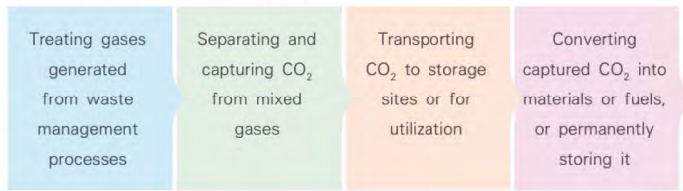
# 9

## Future Considerations

### 9.1 Waste Management

1) Waste-to-Energy (WtE) technologies that use waste as fuel.

2) Carbon Capture, Utilization, and Storage (CCUS) technologies in waste management processes, including:



3) Energy recovery from waste incineration, where heat from waste combustion is used to produce steam, which then drives turbines to generate electricity.

# 9

## Future Considerations

### 9.2 Wastewater Management

1) Nine existing water quality control plants currently in operation

2) Four treatment projects currently under construction

3) Sixteen planned future projects

## Take home message: Key Strategies

### Strategy I

Data collection and MRV system

### Strategy II

Emission reduction target

### Strategy III

Practical and compliance with BMA's policies and Budget

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# Lessons Learned from Climate Change Policy Measures applied in other cities





cases of GHG Reporting and Reduction Planning  
and Refrigerant Management

Makoto Kato  
Board Member,  
Overseas Environmental Cooperation Center, Japan (OECC)

# Outline

1. Energy & GHG Reporting in Japan
2. Case of the Tokyo Metropolitan Government
  - 2.1 Buildings as the major GHG emissions source
  - 2.2 Tokyo's success in reducing GHG emission despite building stock growth
  - 2.3 Policy measures implemented
  - 2.4 Strengthening Programs by Ordinance
  - 2.5 Feedback and advice function
  - 2.6 Incentives for consideration
3. Some additional suggestion on Refrigerant Management
4. Conclusion

## 1. Energy & GHG Reporting in Japan

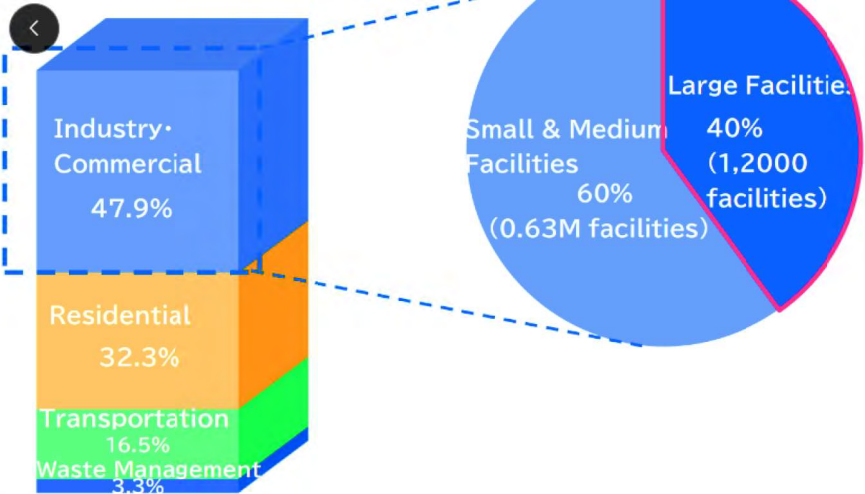
<p><b>Mandatory GHG Accounting, Reporting, and Disclosure Program (SHK)</b></p> <ul style="list-style-type: none"> <li>• Since 2006 under the Act on Global Warming Countermeasures</li> <li>• Target threshold: GHG emission entity <math>\geq 3,000</math> tCO<sub>2</sub>e/Those under the reporting entity under Energy Conservation Act (EC Act)</li> <li>• Target GHG under UNFCCC/Paris Agreement: CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, HFCs, PFC, SF<sub>6</sub>, NF<sub>3</sub></li> </ul>	 <p>(Similar to the forthcoming Act on Climate Change in Thailand)</p>
<p><b>Mandatory Energy Reporting Program</b></p> <ul style="list-style-type: none"> <li>• Since 1993 under the Energy Conservation Act (EC Act)</li> <li>• Target threshold: Energy consumption entity <math>\geq 1,500</math> kl COE/y or more</li> <li>• Target: Energy (=CO<sub>2</sub>)</li> </ul>	 <p>(Similar to the Energy Conservation Law in Thailand)</p>
<p><b>Mandatory GHG Accounting Reporting Program &amp; Reduction Planning (Tokyo, Kanagawa Pref., Saitama Pref. etc)</b></p> <ul style="list-style-type: none"> <li>• Based on Ordinance of local governments</li> <li>• Target threshold: the same is the National Programs</li> <li>• <b>Mandatory Reduction Planning in some case (Tokyo) and Feedback/Advisory Activities</b></li> </ul>	 <p>TOKYO METROPOLITAN GOVERNMENT</p> <p>神奈川県</p>
<p><b>Disclosure under CDP, SBTi, TCFD, IFRS/ISSB, Japan Exchange (Tokyo Stock Exchange)</b></p> <ul style="list-style-type: none"> <li>• Introduced as guidance setting standards → integrated into various “club rules”. In some cases, it is becoming a mandatory (e.g. ISSB domesticated by SBBJ for mandatory disclosure from 2027)</li> <li>• Not only scope 1 and 2, but also scope 3 for supply chain management</li> </ul>	 <p>CDP</p> <p>IFRS International Financial Reporting Standards</p> <p>SCIENCE BASED TARGETS</p>

# 2. Case of the Tokyo Metropolitan Government

## 2.1 Tokyo's Major source of GHG emission is energy consumption in buildings.

Tokyo's GHG emission in 2021

53.5 million tCO2

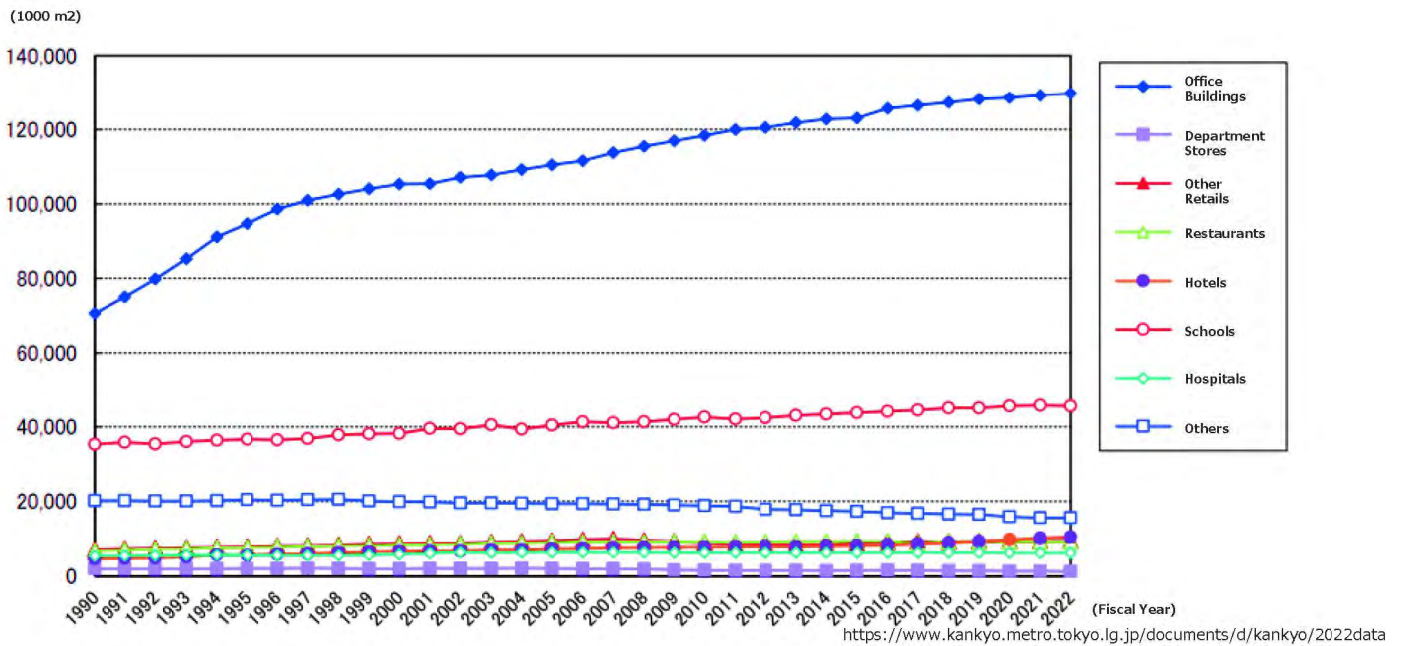


### TMG's Policy Measures

- For Large Facilities**
  - Mandatory GHG reporting system
  - Emission Trading System (Cap & Trade System)
- For Small & Medium Facilities**
  - GHG reporting System
  - Energy Audit for Buildings

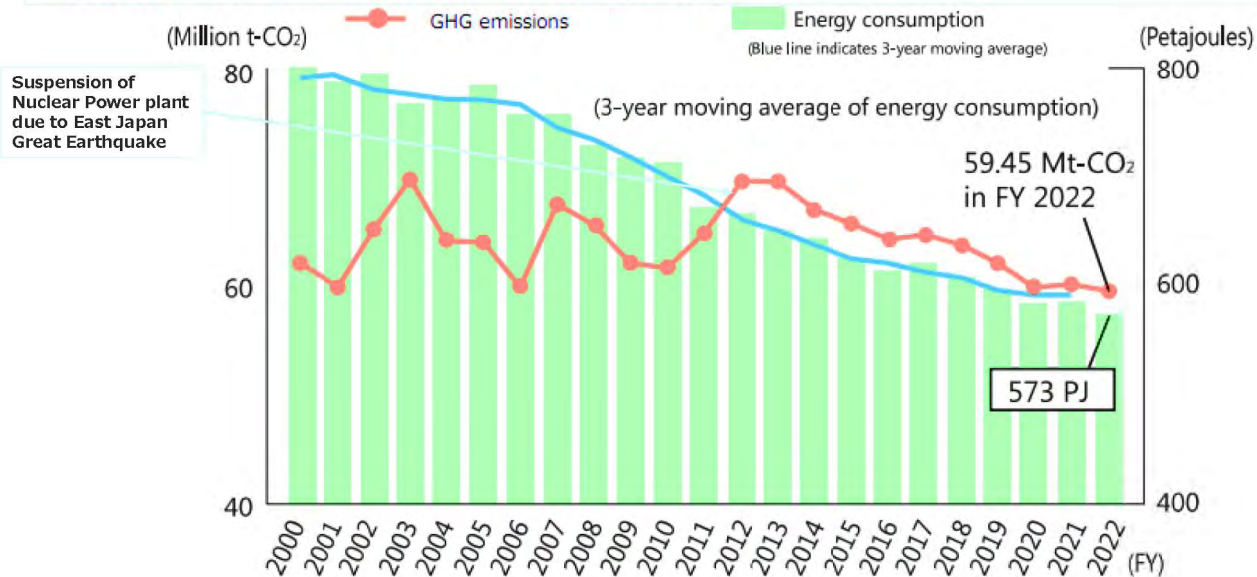
## 2.2 Tokyo's success in reducing GHG emission despite building stock growth

**Building stock (floor area) is constantly growing in the office building sector in Tokyo.**



## 2.2 Tokyo's success in reducing GHG emission despite building stock growth

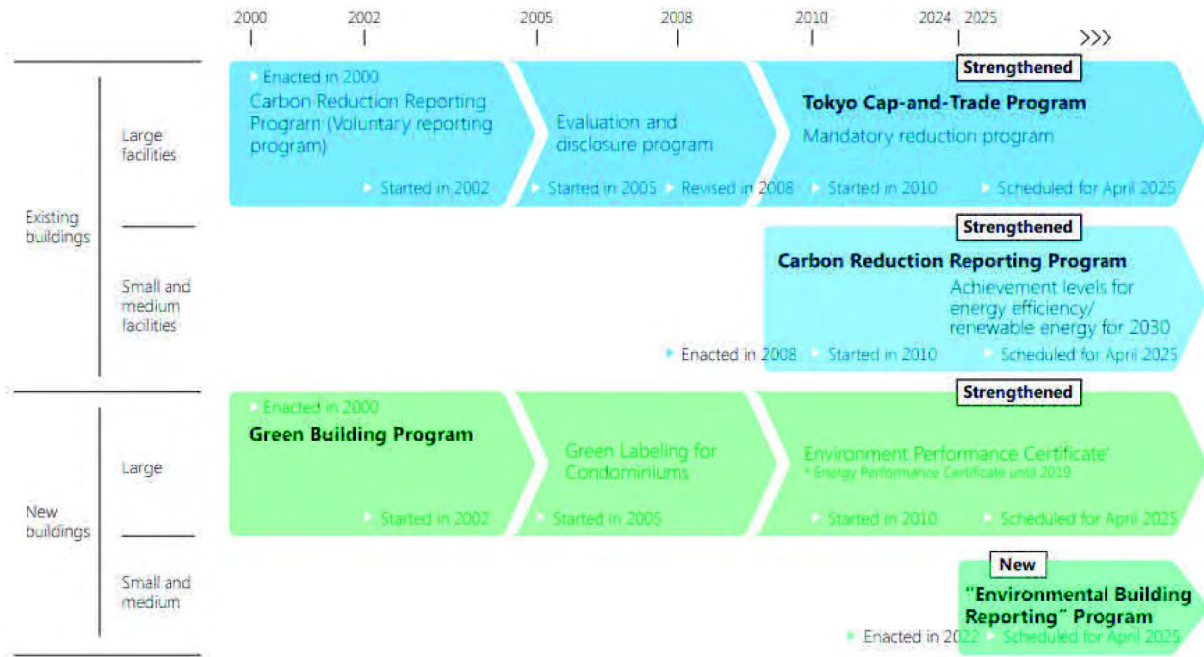
**Despite the growth in building stock, Tokyo successfully reduced both energy consumption and GHG emissions in total.**



Changes in GHG emissions and energy consumption

[https://www.kankyo.metro.tokyo.lg.jp/documents/d/kankyo/-creating2024\\_e2](https://www.kankyo.metro.tokyo.lg.jp/documents/d/kankyo/-creating2024_e2)

## 2.3 Policy measures taken to facilitate GHG reduction in the building sector



[https://www.kankyo.metro.tokyo.lg.jp/documents/d/kankyo/-creating2024\\_e2](https://www.kankyo.metro.tokyo.lg.jp/documents/d/kankyo/-creating2024_e2)

## 2.4 Strengthening Programs Based on Ordinances



[https://www.kankyo.metro.tokyo.lg.jp/documents/d/kankyo/-creating2024\\_e2](https://www.kankyo.metro.tokyo.lg.jp/documents/d/kankyo/-creating2024_e2)

## 2.5 Facilitating GHG emissions reduction by feedback and advises

- TMG not only imposes reporting requirements but provides feedback to each facility based on the statistics of the reporting result.
- The feedback gives a good visual indication of the situation in comparison with other facilities, whether your facility is emitting more or less CO2.

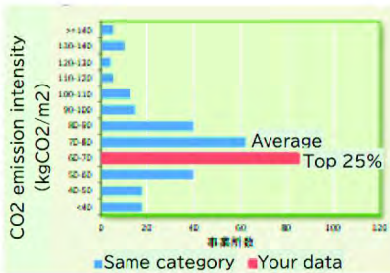
### Feedback Sheet for each facility

#### Result of CO2 emissions of your facility (historical)

項目	計測単位	2019年 年度	2020 年度	2021 年度	2022 年度	2023 年度	2024 年度	2020-2022 年度の累計
基準排出量 (t)	トン	6,750	6,750	6,750	6,750	-	-	20,250
削減義務率 (%)	%	-	27.00	27.00	27.00	-	-	27.00
排出量 (t)	トン	-	4,928	4,928	4,928	-	-	14,784
削減率 (%)	%	-	26.35	26.35	26.35	-	-	26.35
削減率 (t)	トン	-	1,822	1,822	1,822	-	-	5,466
削減率 (%)	%	-	27.00	27.00	27.00	-	-	27.00

#### CO2 emissions/energy intensity of your facility

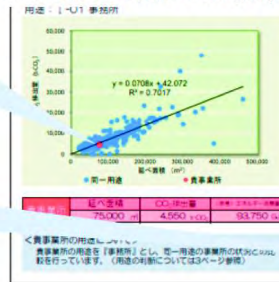
項目	単位	2019年 年度	2020 年度	2021 年度	2022 年度	2023 年度	2024 年度	削減率 (%)
CO2排出係数 (kgCO2/m <sup>2</sup> )	kgCO <sub>2</sub> /m <sup>2</sup>	64.0	60.0	61.3	60.7	-	72.6	60.6
エネルギー消費係数 (MJ/m <sup>2</sup> )	MJ/m <sup>2</sup>	1,260	1,200	1,220	1,250	-	1,578	1,284
削減率 (%)	%	-	-	-	-	-	-	-



Indicates the efficiency (CO2 emission intensity) of your facility compared to facilities in same category.

Reduction potential by using low-carbon electricity.

#### Position in same category



#### Reduction potential

項目	単位	2022年度実績 (推計)
基準排出量	t-CO <sub>2</sub>	6,750
削減義務	t-CO <sub>2</sub>	9,000
削減率 (%)	%	0.150
削減率 (t-CO <sub>2</sub> )	t-CO <sub>2</sub>	▲3,051
削減率 (%)	%	▲45.2

★低炭素の電力の利用により、貴事業所は基準年度比で **45.2%** 削減可能です。

## 2.6 Incentives for consideration

- In case of Bangkok, Floor Area Ratio (FAR) bonus is in practice for green space. Potential application for Energy Efficiency and Renewable Energy may be a good option to promote GHG emissions reduction.
- Also, in some countries, national and local government provided preferential tax treatment for EE and RE buildings.

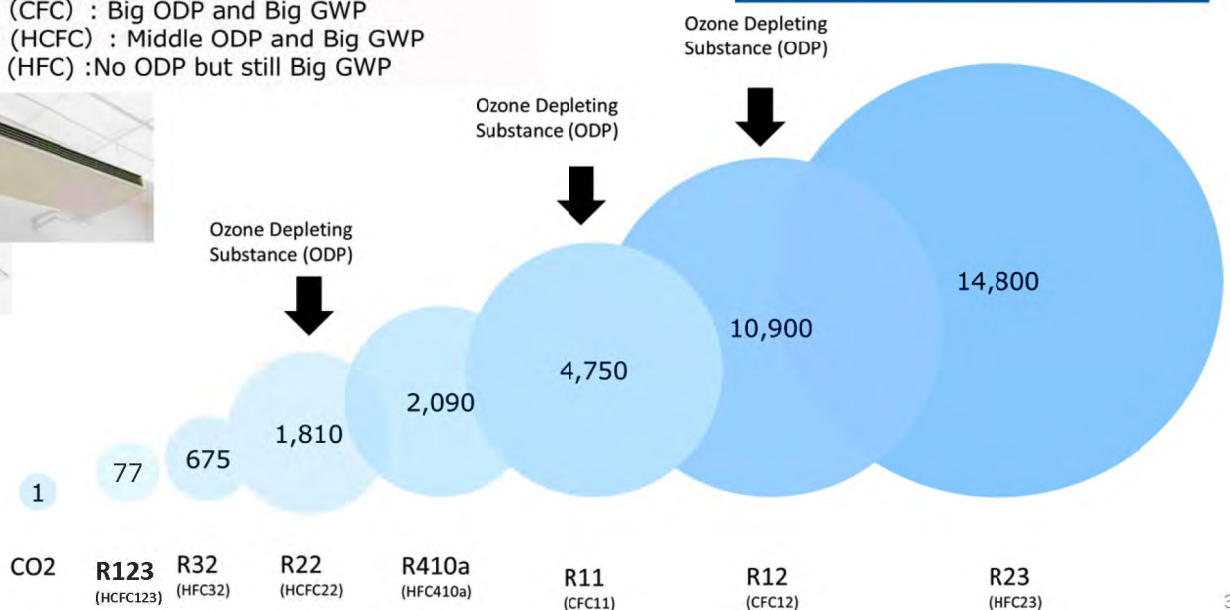
### 3. Some additional suggestion on refrigerant for cooling (Life Cycle Refrigerant Management )

## Refrigerants in Air Conditioners (F-gas) are powerful Greenhouse Gases

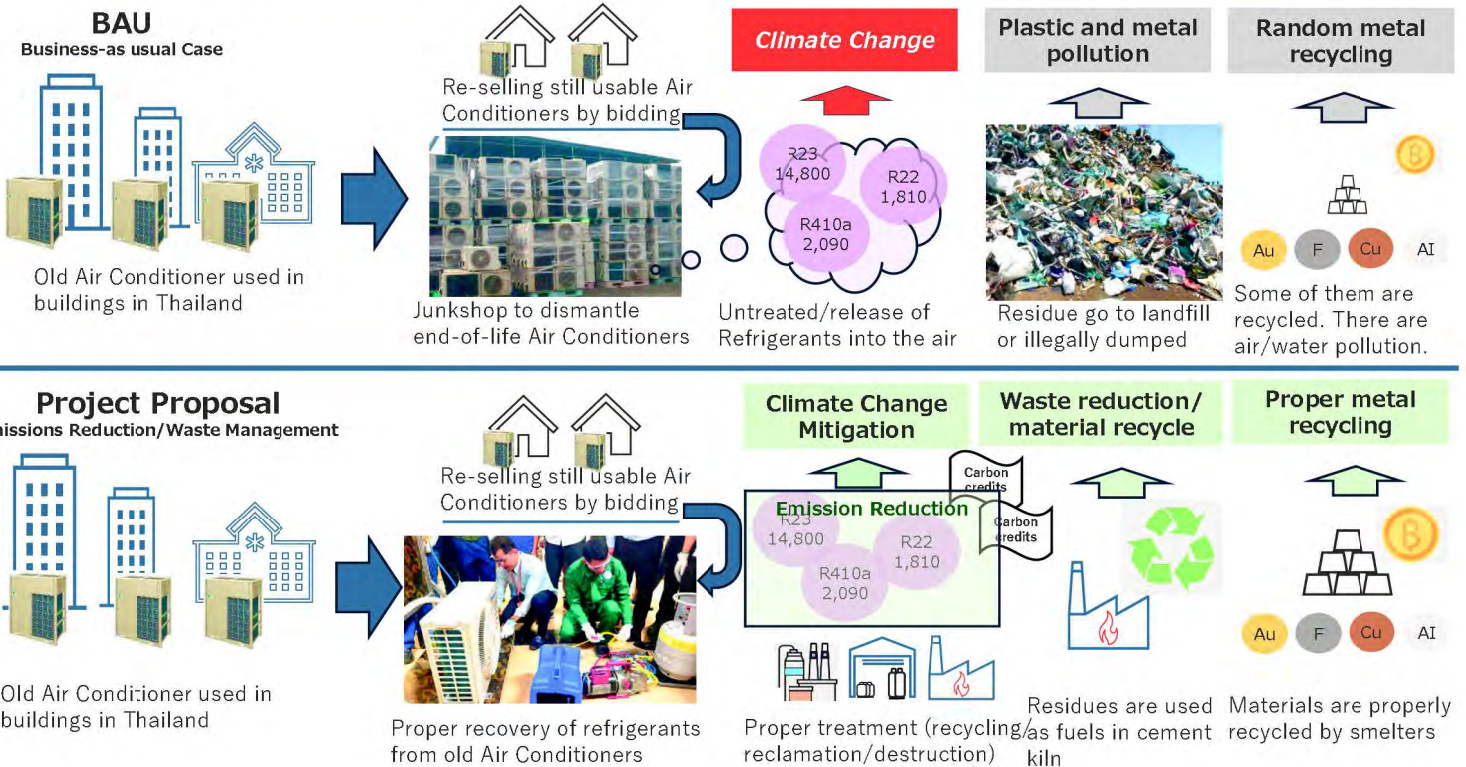
Refrigerant management is a pre-requisite for NET ZERO EMISSION

F-gas Refrigerant

- 1<sup>st</sup> Generation (CFC) : Big ODP and Big GWP
- 2<sup>nd</sup> Generation (HCFC) : Middle ODP and Big GWP
- 3<sup>rd</sup> Generation (HFC) :No ODP but still Big GWP



## Refrigerant and E-waste Management under the Air Conditioners Project



## 4. Conclusion

- GHG and energy reporting are implemented by local government, in line with national government program.
- Tokyo successfully reduced total GHG emissions while building stocks are increasing.
- Facilitation by local government actions are effective to lead to Net Zero Emission.
- Life cycle refrigerant management is suggested as an additional measure.