

Toward a 2030 Carbon Half and the Future Beyond

Zero Emission Tokyo

Committed to 1.5°C



Zero Emission Tokyo Strategy
Beyond Carbon Half

Digest Version



- Since the historic Paris Agreement was signed 10 years ago, the climate crisis has worsened, and industrial structures and international dynamics have been **changing at an accelerating pace**.
- **Global efforts are underway** to turn these changes into opportunities, strengthen urban resilience and competitiveness, and guide the **transition to a sustainable future**.
- **This is a pivotal moment** to safeguard the lives and livelihoods of Tokyo's residents and to secure a path for its development.

Alarm bells of the climate crisis ringing louder than ever

- ✓ In 2024, the **global average temperature reached the highest ever recorded**.
For the first time in a single year, the global temperature rise **exceeded 1.5°C**.
UN Secretary-General drew attention to a critical situation, saying, "**The era of global boiling has arrived.**"

Climate change has already caused these effects:



A possible future under the accelerating climate crisis - Four seasons turning into two?!



- Average temperature might possibly rise by **4°C** or more by 2100.
- Whether we can continue with the everyday life taken for granted depends on ourselves.

To limit temperature, rise to 1.5°C and combat the climate crisis, we must accelerate efforts to:

Almost halve global CO₂ emissions by 2030 and Make them **net zero** by 2050.

Industrial structure undergoing a major transformation focusing on decarbonization

Progress in digital transformation, expansion in electricity demand



Autonomous driving

Global market for **generative AI to reach \$1.3 trillion by 2032** (\$67 billion in 2023)

More companies placing importance on decarbonization



Companies aiming to power their entire operations with renewable electricity

Significant increase in global renewable energy investment



Expanded share of renewable energy as a power source in global power generation (Approx. 40% by 2027)



Companies aiming to reduce supply chain emissions

The world promoting decarbonization strategies toward a sustainable future

Europe



The EU is developing a new industrial strategy by introducing low-carbon technologies

Has formulated the Green Transformation 2040 Vision

24 states/territories declared they will continue their efforts to achieve the Paris Agreement goals

Japan



Paris

Aims to minimize energy consumption throughout all existing buildings by 2050

London

Has launched a Climate Finance Fund to raise billions of pounds to address climate change

Australia



Berlin

Is promoting 80 circular economy initiatives

New York City

Is planning to create 400,000 jobs by 2040 focusing on green jobs

California

Aims for a complete shift to clean energy by 2045

Has made Green Hydrogen a feature of its national strategy

New South Wales

Is establishing an industrial foundation for a thriving Green Hydrogen sector

- To achieve Zero Emissions by 2050, the **Zero Emission Tokyo Strategy Beyond Carbon Half** has been formulated, with an eye to a **2030 Carbon Half and the future beyond**.
- TMG has set a new target of **reducing greenhouse gas emissions by at least 60% by 2035** compared to 2000 levels and established **31 individual targets** to achieve the reduction target. TMG aims to realize a **decarbonized city** that serves as a model for the world by **strategically making every effort**.

2050 vision and 2035 targets

2050 vision

Realizing a decarbonized society that greatly contributes to achieving net zero worldwide

2035 targets

Setting a target of **reducing greenhouse gas emissions by at least 60%** and establishing **31 individual targets**

10 policies and 8 priority projects

- | | |
|---|--|
| ① Making renewable energy a major energy source | ⑥ Measures for fluorocarbons |
| ② Expanding zero emission buildings | ⑦ Promoting climate change adaptation measures |
| ③ Promoting zero emission mobility | ⑧ TMG's initiatives for its own sustainability |
| ④ Expanding the use of hydrogen energy | ⑨ Collaborating with all entities |
| ⑤ Shift to a circular economy | ⑩ Building the foundation for realizing a zero emission Tokyo (finance etc.) |

Focusing on eight priority projects

Introducing **seven topics** as well

TMG is committed to transforming all of food, clothing, and shelter into sustainable and prosperous ones, enhancing the city's resilience

Three principles and five approaches to create a sustainable future

The Three Principles for Zero Emissions

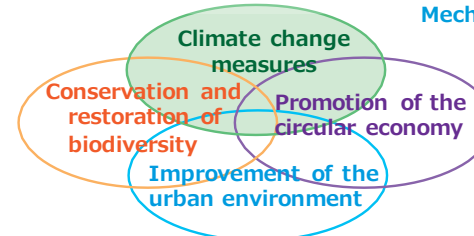
- 1 With increased synergy, decarbonization will contribute to solving various social issues simultaneously
- 2 Tokyo is committed to taking the lead in decarbonization efforts and contributing to the reduction of CO₂ emissions both at home and abroad
- 3 All entities will come together and take action to achieve decarbonization

The Five Approaches to Enhance the Effectiveness of Initiatives

- 1 Developing approaches across initiatives
- 2 Guiding society with mechanisms and support measures toward decarbonization
- 3 Fully using existing technologies and quickly implementing new technologies using digital transformation
- 4 Promoting behavioral change through strategic mechanisms
- 5 Developing human resources and industries for a decarbonized society

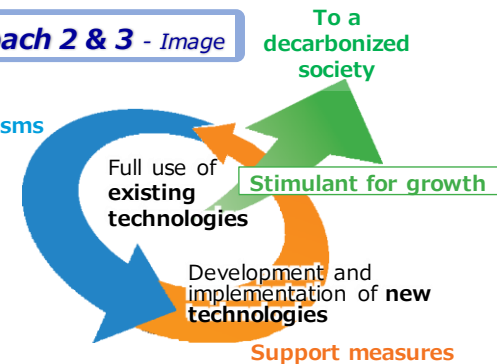
Principle 1 - Image

Sustainability through interconnections between fields



Approach 2 & 3 - Image

Mechanisms

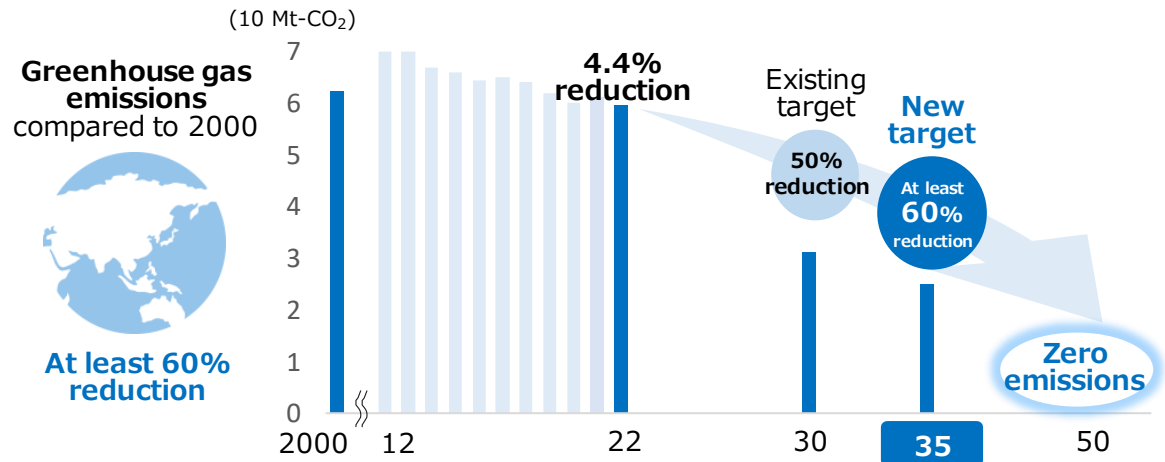


Zero emissions will make Tokyo even better

Setting a new interim target for 2035, paving the way beyond Carbon Half

- **Reduce** greenhouse gas emissions by **at least 60%** by 2035 compared to 2000
- Accelerate emission reductions as a major consumer of energy and resources, aiming to meet a level* expected by the international community

* Level aligned with the 1.5°C target required by IPCC (UN Intergovernmental Panel on Climate Change)



Setting 31 individual targets and promoting effective initiatives in all fields to achieve the 2035 greenhouse gas emissions reduction target

Making Renewable Energy a Major Energy Source & Expanding Zero Emission Buildings

Energy consumption compared to 2000 At least 50% reduction	Percentage of power generated by renewable energy 60% or more	Installation of solar power generation equipment 3.5 GW	Installation of next-generation solar cells Approx. 1 GW	Installation of offshore wind turbines 1 GW or more
Installation of residential storage batteries 3.5 GWh	Installation of grid storage batteries (in TEPCO's service area) 400 MW	Number of high efficiency water heaters installed 4.54 million	Households with thermal insulation retrofits 3.85 million	SMEs with energy efficient equipment 10,000

Promoting Zero Emission Mobility

Market share of non-gasoline vehicles in new car sales  Maintain 100% for passenger cars 100% for motorcycles	Number of EV buses introduced  1,300	Number of EV trucks introduced  70,000	Public fast chargers  2,000	Chargers at apartment buildings  120,000
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Expanding the Use of Hydrogen Energy

Establishing a Green Hydrogen supply system  Establishing a supply system at home & abroad	Number of fuel cell commercial vehicles introduced  Approx. 10,000	Number of hydrogen stations for commercial vehicles  Approx. 100	Municipal solid waste recycling rate  Approx. 40% (guideline)	Incineration of plastic waste compared to FY 2017  50% reduction
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Collaborating with All Entities & Building the Foundation for Realizing a Zero Emission Tokyo

Promoting international collaboration  Further promoting collaboration with overseas cities to address global environmental issues	Encouraging sustainable practices within companies  Decarbonization management accelerates CO₂ reduction in the commercial sector, increases circulation of green products in the market, and drives sustainable choices among consumers	The share of sustainable investment balance held by Japanese institutional investors etc. (global percentage)  15% or more	Food waste compared to FY 2000  65% reduction	Fluorocarbon emissions compared to 2014  70% reduction
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Promoting Climate Change Adaptation Measures

Number of cooling shelters installed  3,000	Construction of heat blocking pavements etc. on Tokyo metropolitan roads  Approx. 270 km	Concentration of particulate matter (PM2.5)  Continuing annual average of 10 µg/m³ or less over all monitoring stations	Concentration of photochemical oxidants  0.07 ppm or less at all monitoring stations	TMG's Initiatives for Its Own Sustainability Total capacity of solar power generation installed at TMG facilities  74 MW (2030) + Approx. 10 MW of next-generation solar cells etc.
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Expanding the Use of Next-Generation Solar Cells

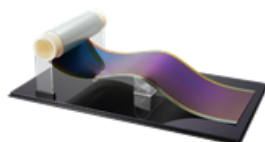
- **Formulate a roadmap** to establish construction methods and build mass production systems, strategically promote the **deployment of new technologies**

x New technologies

x TMG facilities

Creating a power-generating future city driven by Japan's cutting-edge technologies

Roadmap for expanding the use of next-generation solar cells



Installation targets in Tokyo

Approx. 1 GW for 2035
Approx. 2 GW for 2040

Image provided by Sekisui Chemical Co., Ltd.

Installation of garden lights

Introducing Floating Offshore Wind Turbines

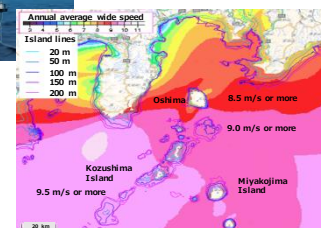
- Aim to introduce a **GW-class farm** of floating offshore wind turbines in the **waters around the Izu Islands**, promoting initiatives in **harmony with local communities** and ecosystems



x Community symbiosis

x Disaster preparedness

Revitalizing and strengthening local industries



The Izu Islands waters in good wind conditions of over 7 m/s



Coexistence with fishing industry through the formation of fish reefs

Doubling Thermal Insulation of Existing Houses

- By 2035, expand **thermal insulation retrofits** to **3.85 million existing houses—twice today's number**—through an approach that unites thermal insulation with **health, disaster preparedness, and security**

x Health

x Disaster preparedness (earthquake resistance)

x Security

Communicating health benefits as well as energy efficiency

Promotion in collaboration with bureaus' advisors

Both energy efficiency and security through insulated security windows



Building a ZEV Charging Infrastructure That Allows Charging at Any Time in a Nearby Location

- Focus on developing a **convenient charging infrastructure** through TMG's **mandatory installation programs, support measures, independent initiatives, and public-private partnerships**

x All entities

x TMG facilities

Support tailored to the needs at the **consideration, introduction, and operation** stages



Charging service providers

Condominium-related industry organizations

Energy suppliers

Installing **120,000 chargers** at apartment buildings by 2035

Car dealers

Collaborative council to promote the expanded use of chargers at condominiums

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Working with Other Prefectures to Expand the Green Hydrogen Network

- Establish a Green Hydrogen supply system at home and abroad by **revitalizing transactions, evaluating and utilizing environmental value, and working with other prefectures**

x Coexistence and co-prosperity

Promoting effective use in collaboration with other prefectures

Tokyo Big Sight



Produced in
Yamanashi

Used in Tokyo



Lighting at Telecom
Center Building

Hydrogen station in Tokyo



Produced in
Fukushima



Used in Tokyo

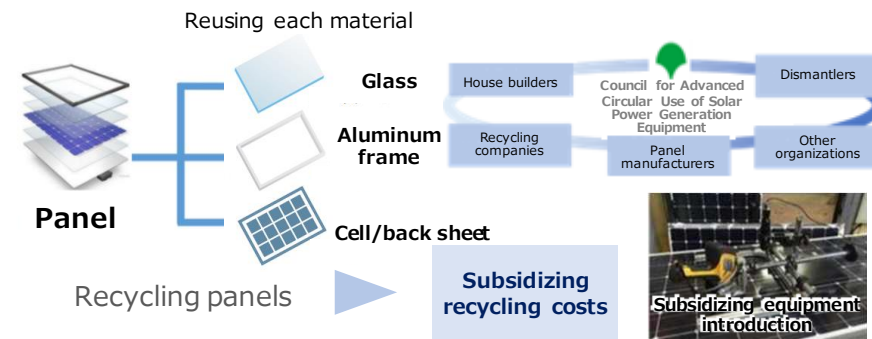
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Promoting Sustainable Resource Management by Recycling Solar Panels

- Accelerate the **advanced circular use** of solar panels in preparation for their **mass disposal in the future**

RE x sustainable resource management

Strengthening the recycling infrastructure in collaboration with the Council



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Preparing for a Hotter Future - Aiming to Be a City Resilient to the Heat

- Disseminate **heat stroke prevention information** tailored to different age groups or industries
- Strengthen **adaptability through multifaceted initiatives**, such as installing cooling shelters, protecting workers from the heat, and synergy with greenery

x All entities

x Greenery

Promoting heat stroke prevention to protect the lives of Tokyo residents



Disseminating information through portal sites



Installing cooling shelters in collaboration with municipalities



Supporting on-site measures by dispatching advisors



Cooling the city with greenery and water features

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Developing the Next Generation of Leaders to Drive a Decarbonized Future

- Foster a future workforce **capable of practicing sustainable actions**
- Expand the pool of **industrial professionals** to drive the realization of a decarbonized society

x Education

x Industrial professionals

Supporting decarbonization actions by Tokyo residents and businesses

- Comprehensive environmental education programs
 - ✓ Teachers' workshops
 - ✓ Classes on demand, participatory programs
- Environmental learning at waste treatment sites



Environmental education workshop



Landfill site

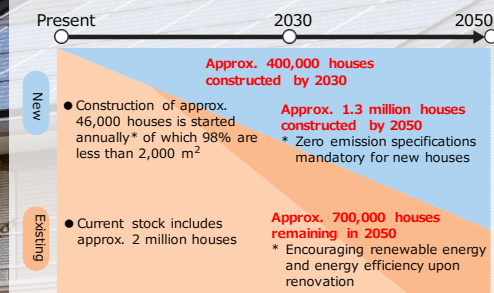
- Technical support for zero emission house constructors
- Certification of outstanding industrial waste treatment businesses
- Improving the technical competence of fluorocarbon filling and recovery operators



In April 2025, Japan's first program for solar power generation, thermal insulation performance, and energy efficiency performance will be launched covering new detached houses and other buildings.

By 2050, it is expected that approximately half of the building stock (approx. 70% for houses) will be replaced by new buildings. Approximately 70% of Tokyo's CO₂ emissions come from buildings. Recognizing that measures for new buildings that will shape the city of 2050 are extremely important for realizing a Zero Emission Tokyo, TMG has established a new program, the Environmental Building Reporting Program.

Trends in housing in Tokyo toward 2050



* Calculated based on the average number of construction starts over the past 10 years
Source: "Basic Policy on Ordinance Revision to Halve Carbon Emissions (Carbon Half)" in September 2022

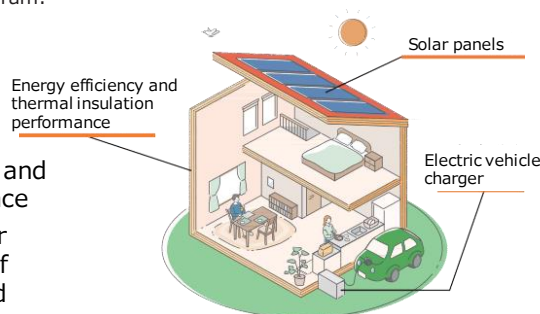
Entities responsible for installing solar power generation equipment

- Major house builders and other businesses* that supply a total floor area of 20,000 m² or more annually in Tokyo
- New buildings with a total floor area of less than 2,000 m² subject to the program

* Businesses that have made application and been approved by the governor will also be able to participate in the program.

Obligations

- ① Installation of solar power generation equipment
- ② Ensuring thermal insulation and energy efficiency performance
- ③ A mechanism to mandate or encourage the installation of electric vehicle chargers and other equipment



A home with high environmental performance enhances quality of life by creating positive synergy effects

Reductions in electricity bills

If a 4-kW solar power system is installed at a new detached house,

Approx. 92,400 yen can be saved per year.

Estimate based on a household of two or more people living in a ward as of August 2024

Healthy living

A comfortable room temperature maintained through thermal insulation leads to a healthy living.

- Reducing heat shock
- Alleviating allergies
- Preventing condensation and mold



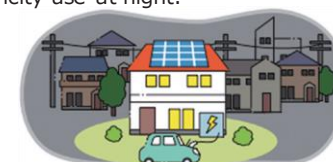
Contribution to CO₂ emission reductions

The amount of CO₂ reduced by a 4-kW solar power system for a year is equivalent to the removal effected by approximately 200 cedar trees.



Preparation for power outages

Electricity is available during power outages. A storage battery allows electricity use at night.



Comprehensive support measures by TMG

① Subsidies for the installation of solar power generation equipment

100,000 yen/kW for new houses in principle
If 4-kW equipment is installed at a new detached house:

¥1.17M for installation

¥400,000 from TMG
¥770,000 paid by householder

Estimate based on a household of two or more people living in a ward as of August 2024

Just over 8 times the electricity bill reduction of approx. **¥92,400/year**

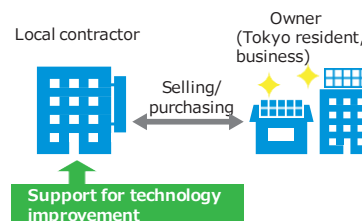


② Setup costs eliminated with leasing etc.

Subsidize installation services without setup costs to promote installations

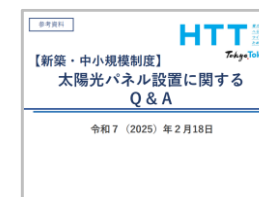
③ Supporting the development of manufacturers' systems

Support local contractors and other entities in improving technology to increase the number of suppliers of houses with high environmental performance



④ Help desk

TMG answers your inquiries about support and installation.



Scan the QR code for more information:

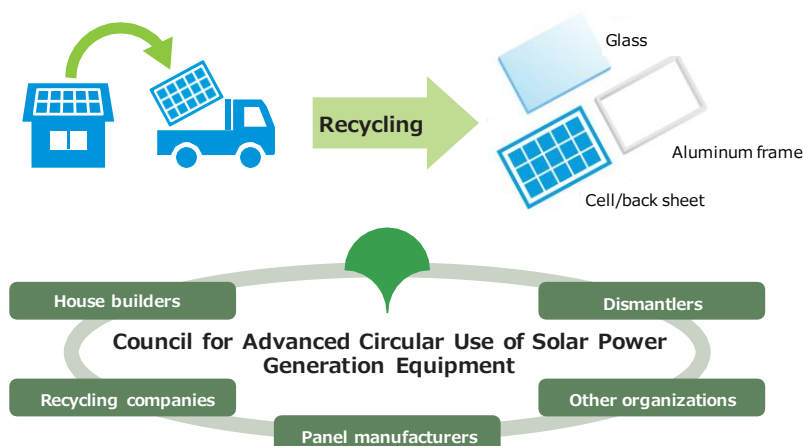


Progress in the development of houses with high environmental performance

- With the program in place, housing suppliers are striving to increase the supply of buildings with high environmental performance that are standardly equipped with solar power generation equipment.
- There is an expansion in product development according to the nature of custom-made, built-for-sale, and rental housing as well as in installation services without setup costs, resulting in different forms of installation.

Promoting the sustainable resource management of solar power generation equipment in anticipation of disposal in the future

- Strengthen the foundation for recycling residential solar panels in preparation for mass disposal in the future
- Recycle the solar panels at facilities in and around Tokyo in cooperation with business and industry organizations



Tokyo Sekisui Heim Co., Ltd.
Enlarging the roof to increase PV capacity

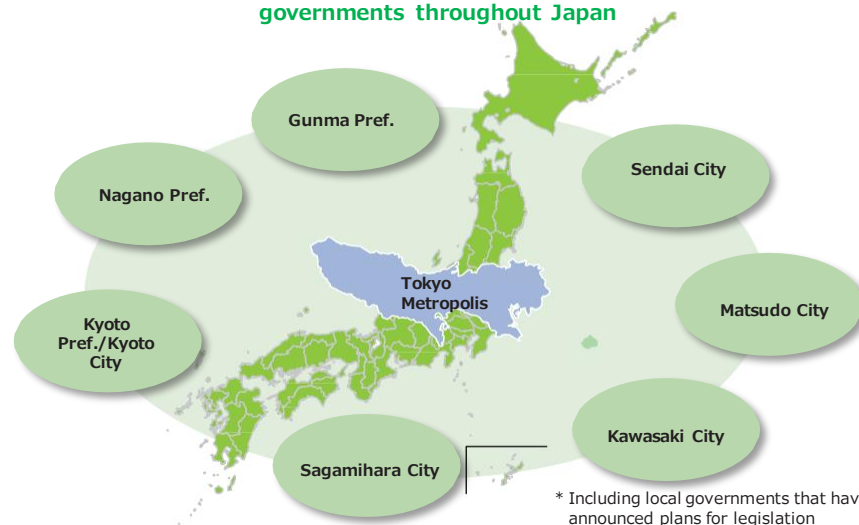


Panasonic Homes Co., Ltd.
Promoting ZEH for rental housing



Tact Home Co., Ltd.
No setup costs for built-for-sale detached houses

Initiatives for the mandatory installation of solar panels underway in local governments throughout Japan



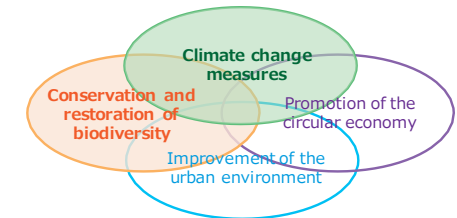
Topic

How Do We Confront Climate Change and the Biodiversity Crisis to Protect the Future?

Climate change and biodiversity are closely related. What are their interactions?

- With more than 46,000 species of living things at risk of extinction*, climate change is expected to further worsen biodiversity loss. Biodiversity supports both climate change mitigation and adaptation by enabling CO₂ absorption through plant photosynthesis and helping to prevent soil erosion and preserve water resources.
- As initiatives for climate change and biodiversity affect each other, it is extremely important to promote actions that contribute to solving both issues, taking into account their synergies and trade-offs.

* IUCN Red List in 2024



Addressing biodiversity and climate change simultaneously through efforts for realizing nature positivity*

* Nature positivity refers to halting biodiversity loss and putting it on a path to recovery.

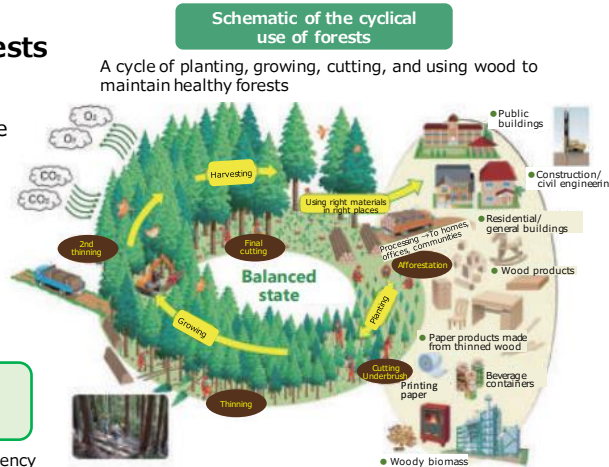
Cyclical use and regeneration of forests

TMG's main initiatives:

- Promoting the cyclical use of forests
- Encouraging the use of locally-sourced Tama-area timber in public and private facilities
- Advancing reforestation efforts in the Tama area

Forest sinks contribute to CO₂ reduction

Source: Website of the Forestry Agency

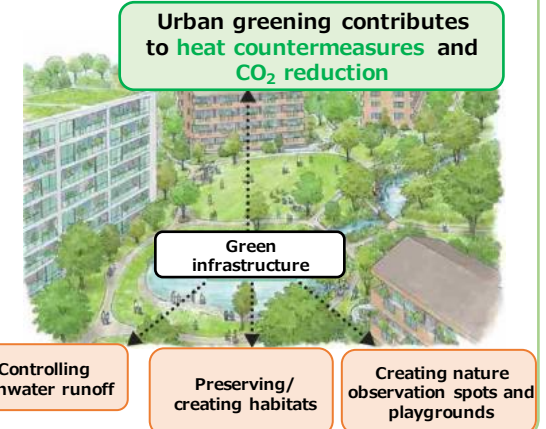


Green infrastructure in urban areas

TMG's main initiatives:

- Construction of rainwater storage/drainage facilities and rain gardens, and dissemination of information on initiatives
- Promoting three-dimensional greening on rooftops and exteriors

Source: "Green Infrastructure Practice Guide," the Ministry of Land, Infrastructure, Transport and Tourism



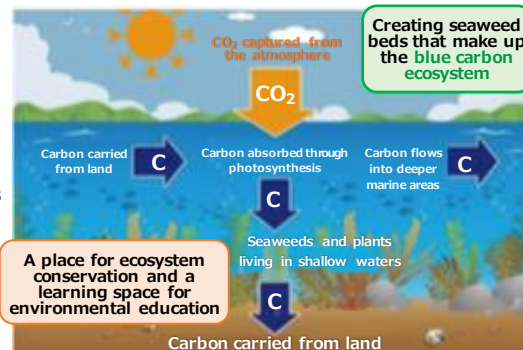
Establishing ecologically symbiotic waterfronts

TMG's main initiatives:

- Creating a healthy marine environment by promoting blue carbon* ecosystems and using seaweed beds as a learning place for environmental education

* CO₂ captured in marine ecosystems through photosynthesis and sequestered in seabed sediments or the deep ocean

Source: Activity Policy for Creating Seaweed Beds in the Port of Tokyo



Tokyo Green Biz, a green project looking 100 years into the future

- Realizing a sustainable city in harmony with nature

Direction of policies toward 2035:

- Handing down existing greenery, including agricultural lands and woodlands, to the future for the conservation and restoration of biodiversity
- Promoting the maintenance of parks and three-dimensional greening and utilizing the diverse functions of greenery to address social issues



Topic

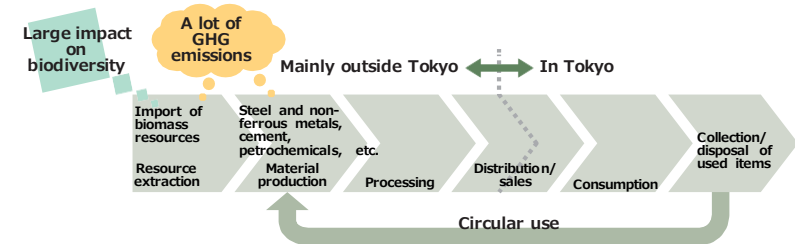
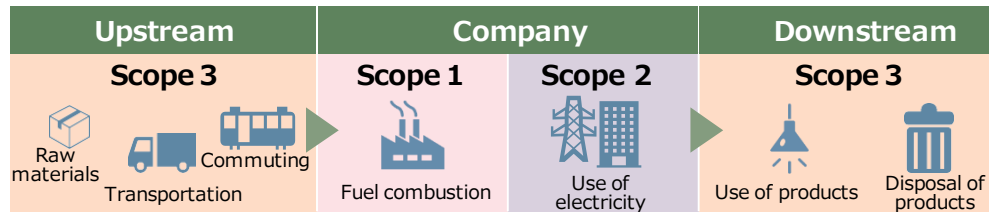
Decarbonizing the Whole of the Supply Chain - Scope 3

What is Scope 3? The need for Tokyo to work on Scope 3

- Scope 3 refers to the greenhouse gas (GHG) emissions generated by external entities related to a company's business activities. For example, before a product reaches a consumer, it passes through numerous processes, each potentially contributing to GHG emissions. Additional emissions often occur during and after disposal. To reduce greenhouse gas emissions, efforts across the whole of the supply chain* are essential.
- Tokyo, as a city with a high concentration of corporate headquarters, consumes a significant amount of resources and natural capital through its urban activities, both from within the city and beyond. To fulfill its responsibility as a major global city, Tokyo must advance its sustainability efforts with a clear focus on Scope 3 emissions.

* Supply chain emissions include those from a series of processes: Raw material procurement, manufacturing, distribution, consumption, and disposal.

Greenhouse gases in the supply chain classified into three categories



Growing momentum toward decarbonization across the entire supply chain

- In 2023, an international standard for the disclosure of sustainability-related financial information*¹ was released. In March 2025, a Japanese version of the disclosure standard*² covering Scope 3 was announced, and its application to large companies*³ from 2027 is under consideration. Efforts to calculate and reduce greenhouse gas emissions throughout the supply chain including small and medium-sized businesses are being strengthened at home and abroad.
- A calculation tool for whole life carbon*⁴ (WLC) of buildings has been published, and the national government has started considering a program to check the life-cycle CO₂ emissions of buildings. In addition, a movement to select lower-carbon materials has begun, with startups providing system tools for Scope 3 calculations.

*¹ An international standard for companies to disclose non-financial information including ESG, formulated by the International Sustainability Standards Board (ISSB).

*² Presented by the Sustainability Standards Board of Japan (SSBJ).

*³ Disclosure should cover Scope 3 in principle.

*⁴ CO₂ emissions from the construction to demolition of buildings.

TMG is promoting its initiatives with Scope 3 in mind

Procurement by TMG including goods and construction

- Gradually introduce the perspective of Scope 3 when procuring goods and services, such as printers and materials for public works, such as low-carbon asphalt
- Promote sustainable procurement that takes into consideration environmental, human rights, labor, and economic factors by establishing the Tokyo Metropolitan Government Socially Responsible Procurement Guidelines. These guidelines require contractors and businesses within the supply chain involved in TMG's projects to adhere to responsible practices

CO₂ reduction during construction

- Promote measures for emissions in the construction supply chain by incorporating a mechanism for monitoring and reducing CO₂ emissions during construction and evaluating the use of low-carbon materials into the Tokyo Green Building Program for new buildings

Subsidies for companies working on Scope 3

- Subsidize small and medium-sized businesses working to depict and reduce CO₂ emissions, including those categorized under Scope 3
- Provide financial support to businesses that use air cargo transportation with SAF to help offset the additional costs associated with reducing Scope 3 emissions

- Ensuring a Zero Emission Tokyo together with children and younger generations living in 2050
- Welcoming the opinions of a diverse range of entities, including Tokyo residents, businesses, and experts, to follow up and upgrade our initiatives

Promoting initiatives together with future generations

- With 25 years remaining until 2050, children and younger generations—who will shape the future—are key to promoting decarbonization actions.
- ✓ TMG has been committed to communication with children by developing engaging content that encourages them to think about environmental issues and take action as well as hosting events that give them opportunities to directly share their opinions with us.

Environment Ambassador at Home Project



- Elementary school children act as environmental leaders at home, engaging in eco-friendly activities.
- An “Environment Ambassador at Home Summit” is also held as a forum for dialog between children and the governor.

Discussion with the Governor 2024 Theme: Realizing a Zero Emission Tokyo



TMG holds meetings to directly exchange opinions with young people on important issues at TMG.

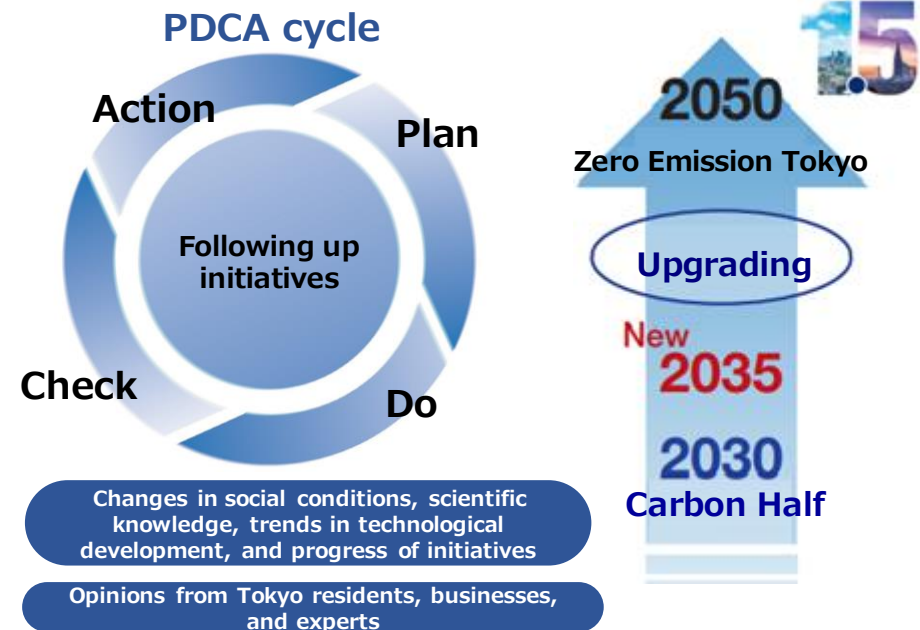
Discussion at the Tokyo Metropolitan Environmental Council



Youth-led environmental groups shared diverse proposals from the perspectives of cross-sectoral collaboration, lifestyle changes, and collaboration with the media

Upgrading initiatives through the PDCA cycle

- In order to continue to develop effective initiatives with a sense of urgency, we need to follow up our initiatives in light of changes in social conditions, trends in latest technologies, and other factors.



Tokyo Metropolitan
Environmental Council



Tokyo Renewable Energy
Implementation Expert
Board



Tokyo Energy Issues
Advisory Board



Zero Emission Tokyo Strategy Beyond Carbon Half

Learn
more!



Get full version from here

Individual plans published simultaneously



Roadmap for
expanding the use of
next-generation solar
cells in March 2025



Zero Emission
TMG Action Plan
in March 2025

