

**Halving Carbon by 2030 and
Preparing for the Future Beyond**

Zero Emission Tokyo

The 1.5°C Challenge



**Zero Emission Tokyo Strategy
Beyond Carbon Half**

Overview



Climate change and energy trends

- In the decade since the historic Paris Agreement, the climate crisis has deepened, and changes in the industrial structure, global situation, and other circumstances have **accelerated**.
- The world is striving to transform change into opportunity, enhance the resilience and competitiveness of cities, and **pave the way to a sustainable future**.
- We are **now at the pivotal moment** of protecting the lives and livelihoods of Tokyo's residents and ensuring a growth trajectory.

Climate alarm bells are ringing louder than ever

- ✓ 2024 was the **world's warmest year on record**
First calendar year to **exceed 1.5°C** above pre-industrial levels
The UN Secretary-General warned that **"the era of global boiling has arrived"**

Climate change is already having these kinds of impacts

About 2.3 times more frequent instances of heavy rain than 50 years ago



About 3.1 times more days with highs of at least 35°C than 80 years ago



An increase in various risks, including large-scale droughts



Climate change acceleration may change our four seasons!?

No snow



No sakura



No beaches



- If nothing is changed, average temperatures in 2100 could reach at least **4°C** above pre-industrial levels
- Whether the daily life that we take for granted can be sustained is up to none other than us

➤ To keep to the 1.5°C threshold and combat climate change

Need to **halve** global carbon emissions by 2030, and step up initiatives for **net zero emissions** by 2050

Industrial structure is making a major shift centering on decarbonization

Progression of DX and expansion of electricity demand



Autonomous driving

2032 Generative AI
Global market becomes **USD 1.3T**
(2023: USD 67B)

Big boost in the world's renewable energy investment



World power generation by source
Renewable energy increases share
(to about 40% in 2027)

More companies focusing on decarbonization



Companies targeting 100% use of renewable electricity for business operations



Companies targeting reduction of emissions throughout their supply chains

The world is advancing decarbonization strategies for a sustainable future

EURO



EU implementing a new industry strategy including decarbonization technologies

Formulated the GX2040 Vision

24 states and territories declared a continuation of efforts to achieve the Paris Agreement goals

JPN



Paris

Will upgrade all existing buildings by 2050 to meet ultra-low energy consumption standards

London

Launched the Climate Finance Facility for climate change measures on a scale of several billion dollars.

Berlin

Is promoting 80 circular economy measures, etc.

AUS



Made green hydrogen a national strategy

USA



NYC

Will create 400,000 jobs by 2040 through the promotion of green jobs

California

Transition completely to green energy by 2045

NSW

Is promoting the establishment of a green hydrogen industrial foundation

Formulation of Zero Emission Tokyo Strategy: Beyond Carbon Half

- In order to achieve zero emissions by 2050, **Zero Emission Tokyo Strategy: Beyond Carbon Half** was formulated to **halve carbon emissions by 2030 and prepare for the future beyond**
- The new goal of **reducing GHG emissions by at least 60% from 2000 levels by 2035** was raised, and **31 independent targets** were set to achieve this goal. All initiatives will **be implemented strategically** for the realization of a **carbon neutral city** that will be a model for the world.

2050 Vision and 2035 Goal

2050 Vision

Become a carbon-neutral society and greatly contribute to the global achievement of net zero

2035 Goal

The goal of reducing greenhouse gas emissions by **at least 60%** was raised and **31 independent targets** were set

10 policies and 8 priority projects

- (1) Make renewables the primary sources of energy
- (2) Expand zero emission buildings
- (3) Promote zero emission mobility
- (4) Expand the use of hydrogen energy
- (5) Transition to a circular economy
- (6) Measures for fluorocarbons
- (7) Promote climate change adaptation measures
- (8) Lead actions from Tokyo
- (9) Collaborate with all players
- (10) Build the foundation to support realization of Zero Emission Tokyo (finances, etc.)

Focused promotion of 8 priority projects

Also introducing **7 topics**

3 concepts and 5 approaches to create a sustainable future

Concepts for zero emissions

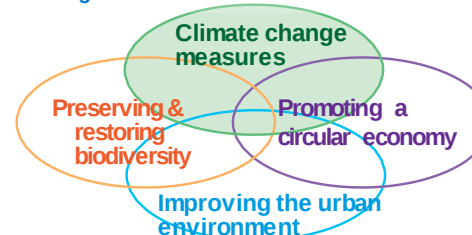
- 1 Enhancing synergy for decarbonization and helping resolve social issues
- 2 Driving decarbonization and CO₂ reduction within and outside Japan
- 3 Uniting all players to realize carbon neutrality

Approaches to increase efficacy

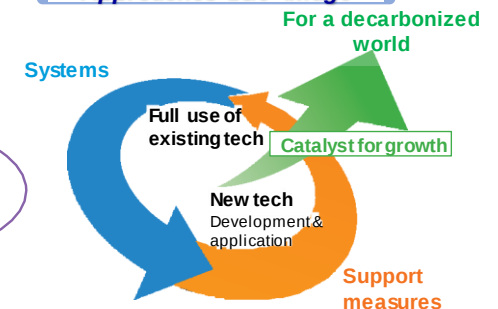
- 1 Take a cross-sectoral approach for implementing measures
- 2 Guide society through decarbonization systems and support
- 3 Fully use existing tech. Work for the early adoption of new tech that also uses DX
- 4 Encourage behavioral change through strategic mechanisms
- 5 Cultivate talent and promote industry for a decarbonized world

Concept 1 Image

Sustainability through interrelations among various fields



Approaches 2&3 Image



➤ Make all essential needs sustainable and abundant, and enhance urban resilience / Make Tokyo even better through zero emissions /

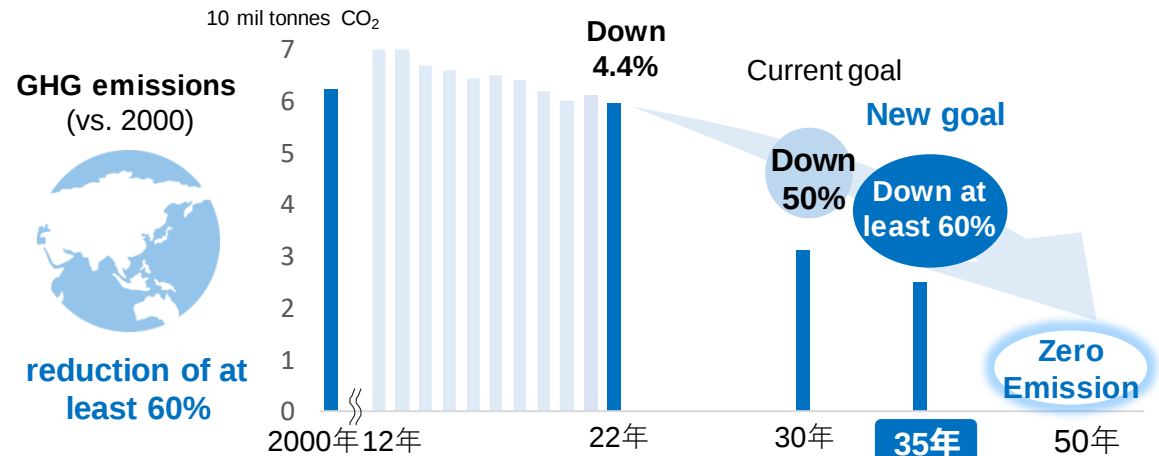
31 targets to reduce GHG emissions by 2035

New goal set for 2035 to guide the way beyond carbon half

● A new goal was set to **reduce greenhouse gas emissions by at least 60%** from 2000 levels by 2035

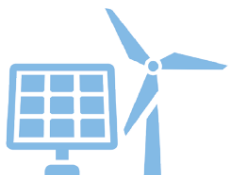
● While also taking into consideration the standard set for the international community*, Tokyo will ambitiously engage in greater reduction as a major consumer of energy and resources.

*Standard consistent with the 1.5 °C target raised by the IPCC (Intergovernmental Panel on Climate Change)



To achieve the GHG emissions reduction goal by 2035, 31 independent targets have been raised, and effective initiatives are being promoted in all fields

Make renewables the primary sources of energy and spread zero emission buildings

Energy consumption (vs. 2000)	Use of renewable electricity	Installed PV system capacity	Installed next generation solar cell capacity	Installed offshore wind power capacity
				
at least 50% reduction	at least 60%	3.5 million kW	approx. 1GW	at least 1GW
Installed home battery storage capacity	Grid-scale battery storage capacity (TEPCO area)	Installation of high-efficiency water heaters	Thermal insulation renovation	Installation of energy-saving equipment by SMEs
				
3.5 million kWh	400,000 kW	4.54 million units	3.85 million dwellings	10,000 companies

Promote zero emission mobility

Percentage of new non-gasoline vehicle sales



Automobiles: maintain 100%
Motorcycles: 100%

Introduction of EV buses



1,300

Introduction of EV trucks



70,000

Public rapid chargers



2,000

Chargers at multi-dwelling units



120,000

Expand the use of hydrogen energy

Build a green hydrogen supply system



Including overseas supply chains

Introduction of fuel-cell commercial mobility



about 10,000

Hydrogen stations for commercial vehicles



about 100

Transition to a circular economy

General waste recycling



about 40% (benchmark)

Waste plastic combustion (vs. 2017)



50% reduction

Food loss (vs. 2000)



65% reduction

Fluorocarbon emissions (vs. 2014)



70% reduction

Collaborate with all players • Build the foundation to support realization of Zero Emission Tokyo

Promote international collaboration



Boost collaboration with overseas cities, etc., for solutions to global environmental issues

Encourage behavioral change in companies



Carbon management advancements accelerate reductions in businesses' carbon emissions; green products change consumer behavior

Japan's institutional investors, etc., share of global sustainable investments



at least 15%

Promote climate change adaptation measures

Installation of cooling shelters



3,000 facilities

Systematic placement of cool pavement, etc. (Tokyo metropolitan roads)



approx. 270km

Particulate matter (PM2.5) concentration



Maintain annual average of $10\mu\text{g}/\text{m}^3$ or lower at monitoring stations

Photooxidants concentration



0.07ppm or lower at all stations

Lead actions from Tokyo

Cumulative installation of PV systems at Tokyo metropolitan facilities



74,000kW (2030)
+ Next generation solar cells, etc. about 10,000kW

Widespread use of next-generation solar cells

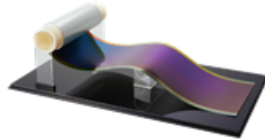
- Strategically advance the **application of this new tech** through **a new roadmap** for establishing installation methods and creating a mass production system

New tech

TMG-owned facilities

Realize a “power-generating future city” with this Japan-born technology

次世代型ソーラーセルの普及拡大に向けたロードマップ



Images courtesy of Sekisui Chemical Co., Ltd.

Garden lights with solar cells (illustration)

Target capacity
(in Tokyo)

2035: **approx. 1 GW**

2040: **approx. 2 GW**

Floating offshore wind farms

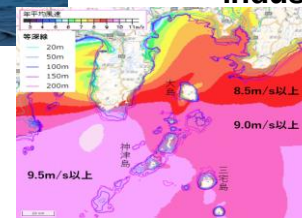
- Introduce **gigawatt-class floating wind farms** off the **Izu Islands**, while promoting **coexistence with local communities** and ecosystems



Community coexistence

Disaster preparedness

Promote the dynamism of local industries and resilience



Ocean areas around the Islands have ideal wind conditions (speeds over 7 m/s)



Artificial reefs benefit fisheries

Double thermal retrofitting in existing residences

- Expand thermal retrofitting to **3.85 million** existing housing units by 2035, by **linking insulation to health, disaster resilience, and crime prevention**

Health

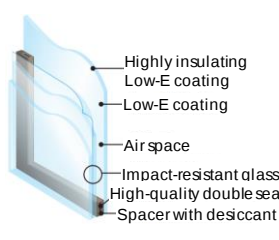
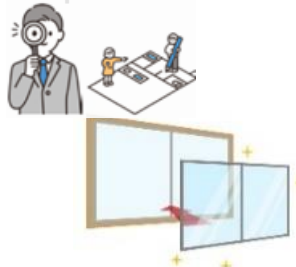
Promote health benefits and reduced energy costs

Seismic resistance

Work with advisors across bureaus for implementation

Crime prevention

Achieve energy efficiency and prevent crime with secure, insulated windows



Build infrastructure in convenient locations for charging ZEVs at any time

- Develop a **convenient charging environment for ZEVs** by leveraging **PPPs**, through **mandating charging infrastructure installation**, implementing support measures, and spearheading action

All players

TMG-owned facilities

Offer tailored support, from studies to installation and operation



Charging service providers

Install 120,000 chargers at multi-dwelling units by 2035

Apt.-related industry groups

Auto dealers

Energy suppliers

Council for the Promotion of Charging Infrastructure Installation at Apartment Buildings

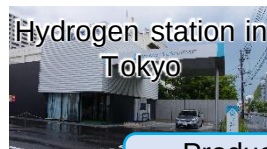
Nationwide efforts to expand the circle of green hydrogen use

- Build a **green hydrogen supply system**, including overseas, by **promoting hydrogen trading, assessing and using environmental values, collaborating with other prefectures, etc.**

Coexistence Promote usage with other prefectures



Produced in
Yamanashi Pref.



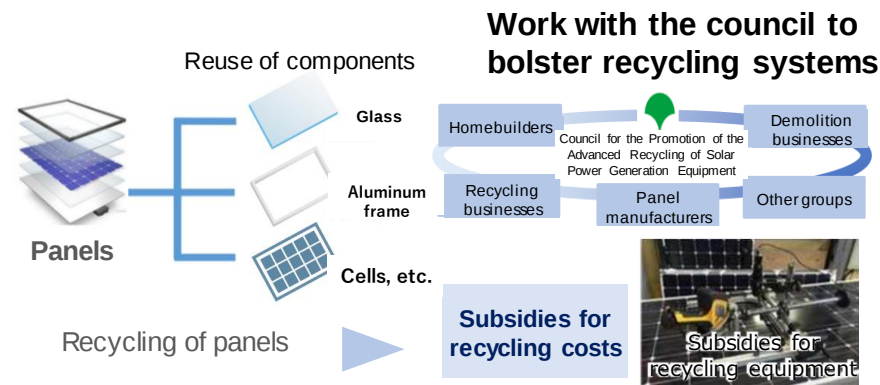
Produced in
Fukushima Pref.



Resource circulation through solar panel recycling

- Accelerate **advanced recycling** to meet the **future increase in solar panel waste**

Energy efficiency × Resource circulation



Climate adaptation measures to prepare our city for a hotter future

- Offer **info about heat stroke prevention** for different age groups and industries
- Strengthen Tokyo's **adaptability through various policies**, such as installing cooling shelters, protecting workers from heat, and promoting synergy with greenery

All players

Greenery

Promote anti-heat stroke measures to protect lives



Share info via a web Portal, etc.



Work with Tokyo's municipalities to build cooling shelters



Support on-site measures by sending advisors, etc.



Cool the city with greenery and water

Cultivate future talent who will lead a carbon-neutral world

- Cultivate future talent who **can practice sustainable behavior**
- Enhance efforts to develop **industry talent** who will drive a carbon-neutral world

Education

Industry talent

- Various environmental education programs
- ✓ Training seminars for teachers
- ✓ On-site lectures, field programs
- Environmental learning at waste treatment sites, etc.



Environmental education seminar



Landfill site

Support the decarbonization initiatives of citizens and businesses

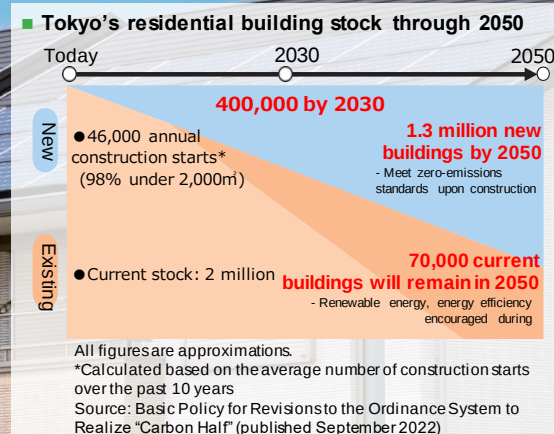
- Technical support for builders of zero-emission houses
- Certify outstanding industrial waste treatment businesses
- Improve technologies of fluorocarbon filling and recovery businesses, etc.



In April 2025, the TMG became the first local government in Japan to launch a system for solar power generation, insulation, and energy efficiency for newly built homes and buildings.

Around half of Tokyo's current building stock (for residential buildings, around 70%) is expected to be replaced with new buildings by 2050.

Buildings account for about 70% of CO₂ emissions in Tokyo. Since measures targeting new buildings, which will shape Tokyo in 2050, are crucial for a Zero Emission Tokyo, the TMG will establish the **Building Environmental Reporting Program**.



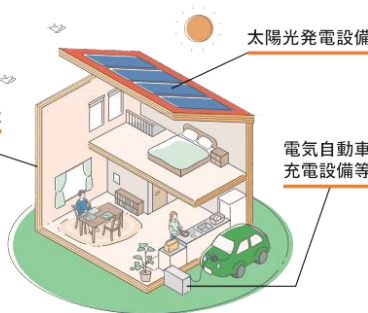
The PV system installation mandate applies to:

- Major homebuilders who supply at least 20,000m² of floor space in Tokyo per year, etc.*
- New buildings with less than 2,000m² of floor space

*Businesses that apply and are approved by the governor of Tokyo can also participate in this system.

The system establishes a framework for mandating and guiding:

1. The installation of PV systems
2. The securing of insulation and energy efficiency
3. The installation of charging equipment for electric vehicles, etc.



The synergy generated by homes with high environmental performance contributes to better living

Reducing electricity fees

Installing a 4kW PV system in a new home

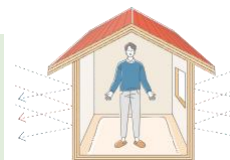
saves around 92,400 yen annually

For a multi-person household in Tokyo's special ward area (August 2024 estimate)

Promoting healthy living

Maintaining a pleasant indoor temperature via insulation leads to healthy living.

- Reduces heat shock
- Reduces allergies, etc.
- Limits condensation to prevent mold



Contributing to CO₂ emissions reductions

The annual use of a 4kW PV system reduces CO₂ emissions equivalent to the carbon absorption capacity of around 200 cedar trees.



Preparing for blackouts

Electricity can be used even during blackouts. Batteries allow use of power even at night.



Extensive support measures offered by the TMG

① Subsidies for PV system installation

If installing a 4kW system in a new home:

Installation cost: 1.17million yen	
TMG subsidy: 400,000 yen	Out-of-pocket cost: 770,000 yen

Electricity savings of
around 92,400 yen/yr.
Cost covered in about
8 yrs.



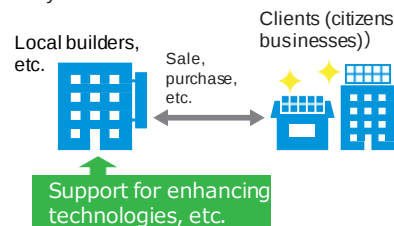
*For a multi-person household in Tokyo's special ward area (August 2024 estimate)

② Zero initial costs through leasing, etc.

Support for using services with zero initial costs to promote various kinds of installation

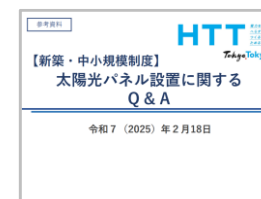
③ Support for homebuilders in improving systems

Support for enhancing the technologies of local construction companies, etc., to increase the number of businesses supplying highly eco-friendly homes



④ Comprehensive help desk for inquiries

Handling consultations related to support measures and installation



Scan the QR code
for more details
*Japan

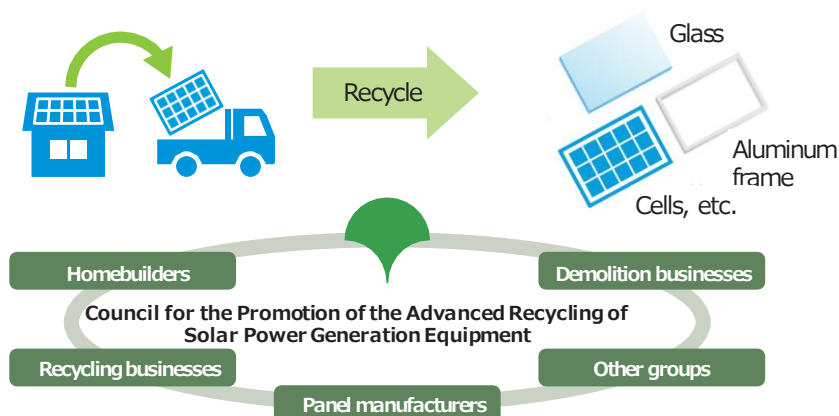


Advancements in the development of highly eco-friendly houses, etc.

- The launch of this system will facilitate the steady development of homebuilders' initiatives to expand their supply of highly eco-friendly houses that come standard with PV systems.
- The expansion of product development tailored to custom, spec, and rental houses, as well as of installation services with zero initial costs, is giving rise to various systems for installation.

Resource circulation for PV equipment to prepare for the future disposal of solar panels

- Strengthening systems for recycling in preparation for the future full-scale disposal of residential solar panels
- Working with business groups, etc. to conduct recycling operations at facilities in and around Tokyo



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



Panasonic Homes Co., Ltd.
Promoting net-zero-energy rental housing



Tact Home Co., Ltd.
Zero initial costs for detached spec homes

Efforts to mandate solar power generation are spreading to local governments across Japan



*Includes local governments that have announced that they are looking into mandating solar power generation

How do we approach the climate change and biodiversity crises to protect our future?

Climate change and biodiversity loss are closely interlinked.

Actions must be taken to tackle these threats together.

- Over 46,000 species are now threatened with extinction*. One of the drivers of biodiversity loss is climate change. Through carbon absorption during photosynthesis, restoration of water sources that help prevent sediment disasters, and other functions, biodiversity also contributes to climate change mitigation and adaptation.
 - Since measures for both threats impact each other, synergies and trade-offs must be considered to advance measures and actions that contribute to solving both challenges.
- * IUCN Red List 2024

* IUCN Red List 2024

Promote the simultaneous resolution of biodiversity loss and climate change through measures to realize a nature positive* future



*Nature positive: To halt biodiversity loss and put it on the path to recovery

Forest cycle and restoration

<Tokyo's main policies>

- Promote the forest cycle
- Expand the use of Tama timber at public and private facilities
- Restore Tama's forests

Absorption by forests removes CO₂

Source: Forestry Agency website

Image of the forest cycle

To preserve healthy forests, establish a “harvest, use, plant, grow” cycle and utilize timber.



Green infrastructure in urban areas

<Tokyo's main policies>

- Develop rainwater storage and infiltration facilities, rain gardens, etc. and disseminate information on measures
- Promote vertical greening systems, green roofs, etc.

Source: Based on the "Guide to the implementation of green infrastructure," Ministry of Land, Infrastructure, Transport and Tourism.

Contribute to heat and carbon reduction measures through urban greening



Stormwater runoff reduction

Habitat
conservation
& creation

Places for nature watching & leisure

Development of waterfronts in harmony with nature

<Tokyo's main policies>

- Create seaweed beds for a rich marine environment, blue carbon* initiatives, and environmental learning opportunities

*Carbon captured by marine ecosystems through photosynthesis and stored in seabed sediments and in deep ocean water.

Source: Policy for seaweed bed creation in Tokyo Bay

Seaweed beds for blue carbon ecosystems



Conserve ecosystems and provide environmental learning opportunities

Tokyo Green Biz:

A greenery project that looks 100 years into the future

Realizing a sustainable city that exists in harmony with nature

Direction of policies in the lead-up to 2035

- Pass down existing greenery, including agricultural land and woodlands, and preserve and restore biodiversity
- Promote park development, vertical greening systems, green roofs, etc., and apply the diverse functions of greenery to resolve social issues

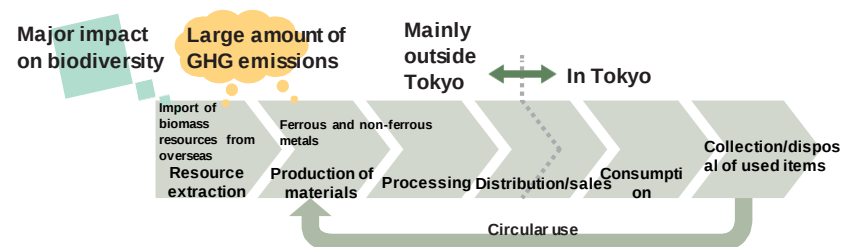
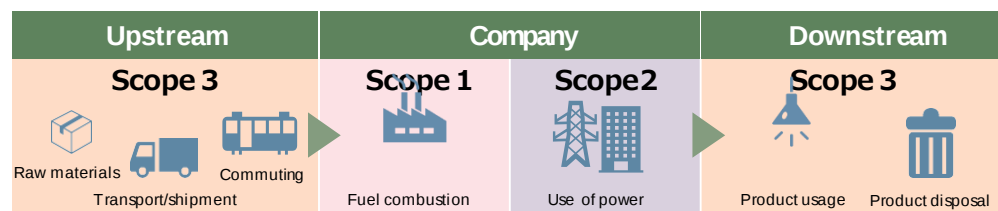


Addressing Scope 3 emissions for supply chain decarbonization

What are Scope 3 emissions? The importance of Tokyo addressing Scope 3 emissions

- Scope 3 emissions are GHG emissions related to a company's business activities not generated by the company itself. For example, over the course of a product's lifetime, including disposal, various processes occur resulting in the release of large amounts of GHGs. To reduce emissions, it is essential to implement measures across the entire supply chain*. ※Emissions that go beyond an individual company, encompassing the entire product supply chain from raw material procurement to product disposal.
- Home to a high concentration of company headquarters, Tokyo consumes large amounts of resources and natural capital for urban activities. It is vital for Tokyo to fulfill its responsibility as a city through measures that also incorporate the perspective of Scope 3 emissions.

Three categories of supply chain GHG emissions



Growing trend for decarbonization with a view to the entire supply chain

- In 2023, the first global sustainability disclosure standards were released by the ISSB※1. In March 2025, the Japanese version of these standards, which also includes Scope 3 emissions※2, was released. The application of these standards to major companies starting in 2027 is under consideration※3. Efforts to calculate and reduce greenhouse gas emissions throughout entire supply chains, including by SMEs, are being strengthened in Japan and abroad.
- With the release of a whole life-cycle carbon※4 (WLC) assessment tool for buildings, the national government is now studying systems for buildings. A shift toward the selection of lower-carbon materials is also underway, including the provision of system tools for estimating Scope 3 emissions by startup companies.

※ 1 International standards utilized by companies for non-financial disclosure, including ESG reporting, created by the International Sustainability Standards Board (ISSB).

※ 2 Standards proposed by the Sustainable Standards Board of Japan (SSBJ) ※ 3 Disclosure includes Scope 3, as a general rule. ※ 4 CO₂ emissions of buildings from construction to demolition.

~Tokyo is promoting measures with a view to Scope 3 emissions~

Procurement by the TMG (goods, construction, etc.)

- When procuring goods and services (printers, etc.) and materials for public works (low-carbon asphalt, etc.), Tokyo is steadily incorporating the perspective of Scope 3 emissions.
- By formulating the TMG Guidelines for Socially Responsible Procurement and requiring businesses awarded TMG contracts and businesses on the supply chain to follow them, sustainable procurement considering environmental, human rights, labor, and economic issues is realized.

Reducing CO₂ emissions at the time of construction

- By introducing a system for evaluating points such as assessment of the amount of CO₂ emissions and reduction of such emissions at the time of construction and the use of low-carbon materials, into the Building Environmental Plan system for new buildings, the TMG is promoting measures to reduce emissions in the construction supply chain.

Support for companies that address Scope 3 emissions

- Support for SMEs working to make CO₂ emissions transparent and SMEs engaged in efforts to reduce CO₂ emissions, including Scope 3 emissions
- To reduce Scope 3 emissions, the TMG is supporting the additional transport costs associated with the use of Sustainable Aviation Fuel (SAF) to businesses that utilize air cargo transport services that use SAF.

Toward realization of a Zero Emission Tokyo and the future beyond

- We will continue involving children and the younger generations, who will be key players in the 2050s, in efforts to ensure realization of a Zero Emission Tokyo.
- Gathering opinions from various sources, including Tokyo residents, businesses, and experts, the TMG will follow up to update policies in an agile manner.

Promoting policies with the younger generations who will shape our future

■ With only 25 years to go to 2050, children and younger generations are the key to advancing decarbonization actions

- ✓ The TMG is working to enhance communications, including producing fun content that encourages children to think about the environment and provides them with steps to take, and holding events that allow the TMG to directly hear from the public.

“Director in charge of environmental measures for our home” program



- A program that challenges elementary schoolers to become environmental leaders at home and take actions for the environment
- Hold a summit of “directors in charge of environmental measures at home” at which the children engage in discussions with the governor

Discussion with the governor event (FY2024 theme: Realizing a Zero Emission Tokyo)



An event at which the governor listens to the opinions of young people and talks with them about important challenges faced by the TMG

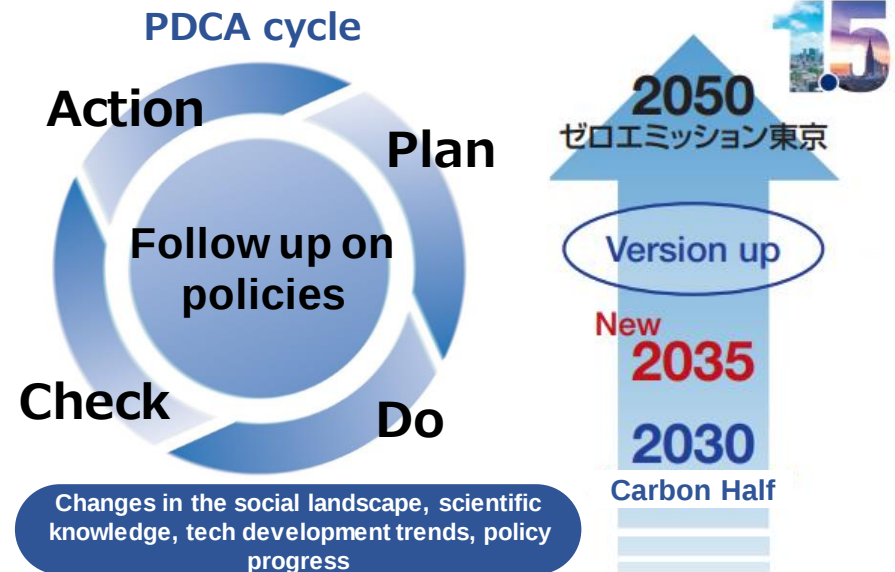
Participation in discussions with the Tokyo Metropolitan Environmental Council



Through discussions with environmental groups led by younger generations, a variety of suggestions were received from perspectives such as cross-sector collaboration, behavior modification, and collaboration with media outlets.

Leveraging the PDCA cycle to update policies

- To continue rolling out highly effective policies with a sense of speed, it is necessary to follow up on policies based on factors such as changes in the social landscape and the latest technological trends.



Tokyo Metropolitan Environmental Council



Tokyo Metropolitan Renewable Energy Implementation Expert Board



Tokyo Metropolitan Energy Issues Advisory Board



Zero Emission Tokyo Strategy Beyond Carbon Half

